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# SMITHSONIAN

## MISCELLANEOUS COLLECTIONS

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"EVERY MAN IS A VALUABLE MEMBER OF SOCIETY WHO, BY HIS OBSERVATIONS, RESEARCHES, AND EXPERIMENTS, PROCURES KNOWLEDGE FOR MEN"—SMITHSON

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### ADVERTISEMENT

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The Smithsonian Miscellaneous Collections series contains all the publications of the Institution except the Annual Report, and occasional publications of a special nature. As the name of the series implies, its scope is not limited, and the volumes thus far issued relate to nearly every branch of science. Papers in the fields of biology, geology, anthropology, and astrophysics have predominated.

A. WETMORE,

*Secretary of the Smithsonian Institution.*



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SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 1

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Johnson Fund

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STATION RECORDS OF THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION

(WITH ONE PLATE)

BY

PAUL BARTSCH

U. S. National Museum; Director of the Expedition



(PUBLICATION 3224)

CITY OF WASHINGTON  
PUBLISHED BY THE SMITHSONIAN INSTITUTION  
DECEMBER 1, 1933







Mr. Eldridge R. Johnson's Yacht *Caroline*.

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### STATION RECORDS OF THE FIRST JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION

By PAUL BARTSCH

*U. S. National Museum; Director of the Expedition*

(WITH ONE PLATE)

The Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep was sponsored by Mr. Eldridge R. Johnson, of Philadelphia, who placed his beautiful yacht *Caroline* at the disposal of the Smithsonian Institution and equipped her with the instruments necessary for the work. We were provided with the best of sonic sounding apparatus, thanks to the assistance of the United States Navy, and with an equally efficient winch, water bottles, and thermometers for hydrographic studies, enabling us to work at any depth. A dredging winch suitable for reaching profound depths could not be had within the time available for equipping; we therefore had installed a temporary winch carrying 6,563 feet of  $\frac{3}{8}$ -inch Special 6 x 19 Monitor strand wire rope. This is mentioned merely in explanation of why work in greater depths was not done. In the next cruise this handicap will be obviated.

The first bearing cited with each station marks the position of the ship at the beginning of the haul, and the second bearing indicates the position at the close of the haul. The bearings were taken by Capt. Andrew H. Peterson and his associated officers: Victor Johnson, chief officer; Hjalmar Iversen, second officer; Gunnar Bergersen, third officer. The radio beacon bearings were obtained under the captain's direction by Thomas W. Braidwood, senior radio operator, and Louis G. Fullerton, junior radio operator.

The sonic sounding operations were conducted by T. Townsend Brown, of the Naval Research Laboratory, Washington, D. C., assisted by E. R. Fenimore Johnson, Anthony Wilding, and the Misses Ena and Florence Douglass. The soundings as here cited are unreduced, using as the basis for notation a 400 fathoms per second interval. These soundings will, therefore, when eventually corrected, record a considerably greater depth than here indicated.

We are deeply indebted to the Hydrographic Office of the United States Navy for the preparation of the accompanying chart.

**STATION 1.** Lat.  $18^{\circ}33'45''$  N. Long.  $66^{\circ}15'00''$  W. January 30, 1933

From the above position, which is about 5 miles off Punta Boca Juana with Morro Castle Light bearing  $126^{\circ}$ , about 9 miles from the light, we lowered a 35-foot  $\frac{1}{2}$ -inch mesh otter trawl into 400 fathoms at 11:30 a.m. Going north, we passed over soundings of 380 and 360 fathoms, then dropped off to 600 fathoms, when the net was hauled in and landed at 2:45 p.m.

The catch consisted of 64 fish, a small lot of mollusks, a few brittle-stars, two solitary corals, and a few other things.

**STATION 2.** Lat.  $18^{\circ}31'20''$  N. Long.  $66^{\circ}16'20''$  W. January 30, 1933

From the above position, which is about 2 miles off Punta Boca Juana and 9 miles from Morro Castle Light, which had a bearing of  $110^{\circ}$ , we dropped a 9-foot beam trawl in 200 fathoms at 4:10 p.m. We moved in a northwesterly direction for about a mile, changing gradually to a depth of 240 fathoms, and landed the trawl at 4:55 p.m. The depth ranged from 200 to 240 fathoms.

This was almost a water haul, owing to the fact that the trawl was lowered while the ship was practically at a standstill, causing the heavy frame to sink more rapidly than the net even with its tail weight, with the result that when the frame came to anchor on the bottom, the tail weight with the net overlapped the opening of the dredge and closed it. However, the haul yielded a lot of glass sponges, a pennarian, and a few brittlestars attached to the webbing.

**STATION 3.** Lat.  $18^{\circ}31'30''$  N. Long.  $66^{\circ}21'30''$  W. January 31, 1933  
Lat.  $18^{\circ}31'20''$  N. Long.  $66^{\circ}22'30''$  W.

Punta Cerro Gordo bore  $156^{\circ}$  and Garza Island  $212^{\circ}$ . We lowered a 9-foot beam trawl, which struck bottom at 10:30 a.m. in 200 fathoms, and hauled to the second position given above in 260 fathoms, landing the net at 11 a.m.

This was purely a water haul, yielding nothing.

**STATION 4.** Lat.  $18^{\circ}31'45''$  N. Long.  $66^{\circ}24'00''$  W. January 31, 1933  
Lat.  $18^{\circ}31'45''$  N. Long.  $66^{\circ}26'30''$  W.

Punta Puerto Nueva bore  $180^{\circ}$  and Garza Island  $151^{\circ}$ . We again dropped the 9-foot beam trawl at 11:45 a.m. in 260 fathoms and began hauling in at 1:30 p.m. from 160 fathoms at the second position noted above. At the time Punta Chivato bore  $182^{\circ}$  and Punta Tortuguera  $220^{\circ}$ .

In this haul rough bottom was encountered; the shackle parted and all the gear was lost. At the end of the wire cable a bit of mud adhered, which held a valve of a scallop (*Amusium*). The depth ranged from 160 to 260 fathoms.

**STATION 5.** Lat.  $18^{\circ}37'00''$  N. Long.  $66^{\circ}24'30''$  W. January 31, 1933

The above is the stopping place of the dredging operations during this haul. The bearing at the start was not recorded.

For this haul a modified young-fish trawl, operated by the hydrographic winch, was used. A rectangular  $\frac{3}{4}$ -inch pipe frame, 3 by 6 feet in size, was substituted for the otterboards. The net was let down at 3 p.m. in 600 fathoms with 3,000 meters of wire out. We held course  $115^{\circ}$  by gyrocompass until 4 p.m., when the cable was started in, the net reaching the deck at 4:35.

This haul yielded 396 small deep-sea fish, three species of pteropod and one of heteropod mollusks, a host of small crustaceans, some sagitta, a few medusae, and some fish eggs.

**STATION 6.** Lat.  $18^{\circ}30'45''$  N. Long.  $66^{\circ}04'30''$  W. February 1, 1933  
Lat.  $18^{\circ}30'50''$  N. Long.  $66^{\circ}01'15''$  W.

A modified young-fish trawl was put overboard at 9:55 a.m. Morro Castle Light bore  $231^{\circ}$  and the west end of Cabras Island  $240^{\circ}$ . When the hauling in began at 10:50, Morro Castle Light bore  $248^{\circ}$  and the dome of San Juan Capitol  $242^{\circ}$ .

The haul was made in about 100 fathoms and resulted in the capture of a small number of fish; some small pelagic mollusks, including a small octopus, heteropods, and pteropods; and a small lot of crustaceans and salpae.

**STATION 7.** Lat.  $18^{\circ}30'45''$  N. Long.  $66^{\circ}00'50''$  W. February 1, 1933  
Lat.  $18^{\circ}31'00''$  N. Long.  $65^{\circ}55'15''$  W.

We lowered an otter trawl with new large boards at 11:35 a.m. Punta Cangrejos bore  $161^{\circ}$  and Punta Vacia Talega  $120^{\circ}$ . At the close of the haul Punta Vacia Talega bore  $159^{\circ}$  and Punta Cangrejos  $235^{\circ}$ . The depths of this haul ranged from 160 to 340 fathoms.

During the middle of the haul there was a vicious jerk, indicating that the gear snagged. When we landed the net, it was found that one of the otterboards was lost and the trawl completely wrecked. A single umbellula caught in the wreckage rewarded us for our efforts.

**STATION 8.** Lat.  $18^{\circ}31'30''$  N. Long.  $65^{\circ}55'30''$  W. February 1, 1933  
Lat.  $18^{\circ}33'15''$  N. Long.  $65^{\circ}56'45''$  W.

When we lowered the modified fish trawl at 1:35 p.m., Punta Vacia Talega bore  $165^{\circ}$  and Punta Morro  $255^{\circ}$ . When the trawl was taken in, Punta Vacia Talega bore  $165^{\circ}$ , Punta Morro  $246^{\circ}$ . The haul was made in about 300 fathoms. The trawl evidently struck heavy mud bottom and filled with enough of the mud to completely rip out the webbing.

**STATION 9.** Lat.  $18^{\circ}31'30''$  N. Long.  $65^{\circ}55'30''$  W. February 1, 1933  
 Lat.  $18^{\circ}30'20''$  N. Long.  $65^{\circ}57'00''$  W.

At the start Punta Vacía Talega bore  $168^{\circ}$ , Punta Morro  $255^{\circ}$ . At the close of the haul Morro Castle Light bore  $254^{\circ}$  and Punta Maldonado  $205^{\circ}$ . A 9-foot beam trawl was lowered at 3:25 p.m. and hauled in at 4:00 p.m., the depth ranging from 240 to 280 fathoms.

Although no snagging was noticed on the accumulator, the net, when brought aboard, was completely ripped apart. The fragments of webbing contained a few brittlestars, some worm tubes, a beautiful hydroid, and a few mollusks.

**STATION 10.** Lat.  $18^{\circ}29'20''$  N. Long.  $66^{\circ}05'30''$  W. February 2, 1933  
 Lat.  $18^{\circ}30'24''$  N. Long.  $66^{\circ}04'15''$  W.

At the start, at 9:55 a.m., Morro Castle Light bore  $242^{\circ}$  and the west point of Cabras Island  $255^{\circ}$ . When we hauled in at 10:35 a.m. Morro Castle Light bore  $259^{\circ}$ , Cabras Island  $264^{\circ}$ . The depth varied from 120 to 160 fathoms. For this haul we used a 9-foot tangle in about 100 fathoms of water, the tangle consisting of 16 loops, 6 feet long, of 2-inch frayed hawser.

The catch was eminently successful, yielding many mollusks, brittlestars, a sea urchin, sand dollars, a crinoid arm, holothurians, many crustaceans, hydroids, corallines, sponges, and many algae.

**STATION 11.** Lat.  $18^{\circ}32'15''$  N. Long.  $66^{\circ}04'10''$  W. February 2, 1933  
 Lat.  $18^{\circ}32'50''$  N. Long.  $66^{\circ}01'00''$  W.

At the start Morro Castle Light bore  $220^{\circ}$  and Cabras Island  $228^{\circ}$ . At the close of the haul Morro Castle Light bore  $234^{\circ}$  and Punta Cangrejos  $167^{\circ}$ . A modified young-fish trawl was put overboard at 11:15 a.m. in 200 fathoms of water and was hauled in at 12:10 p.m.

This haul yielded many small fish, two small cephalopods, a few pelagic mollusks, and many crustaceans.

**STATION 12.** Lat.  $18^{\circ}31'00''$  N. Long.  $66^{\circ}00'15''$  W. February 2, 1933  
 Lat.  $18^{\circ}30'30''$  N. Long.  $66^{\circ}01'45''$  W.

At the start, 12:30 p.m., Morro Castle Light bore  $249^{\circ}$  and Punta Maldonado  $158^{\circ}$ . When the trawl was taken in at 1:30 p.m. Morro Castle Light bore  $245^{\circ}$  and Salinas Island  $256^{\circ}$ . A 9-foot beam trawl was used in 200-300 fathoms.

This haul yielded many mollusks, crustaceans, some holothurians, brittlestars, a glass sponge, three small corals, and a lot of blue mud.

**STATION 13.** Lat.  $18^{\circ}31'05''$  N. Long.  $66^{\circ}02'15''$  W. February 2, 1933  
Lat.  $18^{\circ}30'30''$  N. Long.  $66^{\circ}04'05''$  W.

A 9-foot beam trawl was lowered at 1:30 p.m. and surfaced at 2:36 p.m., the depth ranging from 200 to 300 fathoms; the bottom was blue mud.

The catch consisted of some fish, many mollusks, echinoderms, and hydroids, as well as mud.

**STATION 14.** Lat.  $18^{\circ}31'00''$  N. Long.  $66^{\circ}04'10''$  W. February 2, 1933  
Lat.  $18^{\circ}30'30''$  N. Long.  $66^{\circ}03'15''$  W.

A 6-foot beam trawl was lowered at 2:55 p.m. and raised at 3:45. The haul was made in 240 to 340 fathoms.

It yielded some fish; many mollusks; echinoderms, among them a large rose-red holothurian; worms; and crustaceans.

**STATION 15.** Lat.  $18^{\circ}31'45''$  N. Long.  $66^{\circ}03'00''$  W. February 2, 1933  
Lat.  $18^{\circ}30'30''$  N. Long.  $66^{\circ}03'15''$  W.

At the start, 3:55 p.m., Morro Castle Light bore  $231^{\circ}$  and Punta Salinas  $249^{\circ}$ . At the close at 5.10 p.m., Morro Castle Light bore  $229^{\circ}$  and Punta Salinas  $257^{\circ}$ . An otter trawl was used in about 300 fathoms and did not touch bottom—at least, not for any length of time.

It yielded a small number of deep-sea fish and crustaceans.

**STATION 16.** Lat.  $18^{\circ}29'40''$  N. Long.  $66^{\circ}08'30''$  W. February 3, 1933  
Lat.  $18^{\circ}31'00''$  N. Long.  $66^{\circ}10'15''$  W.

At the start, at 9:07 a.m., the west point of Cabras Island bore  $176^{\circ}$ , Morro Castle Light  $139^{\circ}$ . When the haul was surfaced at 9:50, the west point of Salinas Island bore  $222^{\circ}$  and Morro Castle Light  $121^{\circ}$ . The tangles were used in this haul at a depth ranging from 38 to 95 fathoms.

The catch consisted of sponges; hydroids; corals; echinoderms, including comatulid crinoids; and many mollusks.

**STATION 17.** Lat.  $18^{\circ}30'00''$  N. Long.  $66^{\circ}10'30''$  W. February 3, 1933  
Lat.  $18^{\circ}30'00''$  N. Long.  $66^{\circ}12'20''$  W.

When the 6-foot trawl was lowered at 10:00 a.m., the east point of Salinas Island bore  $188^{\circ}$  and Morro Castle Light  $117^{\circ}$ . When the trawl was taken up at 10:40, Morro Castle Light bore  $109^{\circ}$  and the west point of Salinas Island  $145^{\circ}$ . The haul was made in a depth ranging from 46 to 90 fathoms.

The catch produced a lot of hydroids, brittlestars, crinoids, and worms.

**STATION 18.** Lat.  $18^{\circ}30'15''$  N. Long.  $66^{\circ}12'45''$  W. February 3, 1933  
 Lat.  $18^{\circ}30'30''$  N. Long.  $66^{\circ}14'50''$  W.

When the 6-foot beam trawl was lowered at 11:00 a.m., Morro Castle Light bore  $109^{\circ}$ , west point of Salinas Island  $138^{\circ}$ . When the trawl was surfaced at 11:40, the west point of Salinas Island bore  $119^{\circ}$ , Punta Cerro Gordo  $258^{\circ}$ . The depth ranged from 39 to 80 fathoms.

The result was a water haul.

**STATION 19.** Lat.  $18^{\circ}31'10''$  N. Long.  $66^{\circ}15'45''$  W. February 3, 1933  
 Lat.  $18^{\circ}32'30''$  N. Long.  $66^{\circ}19'35''$  W.

An otter trawl was lowered at 11:54 a.m., the west point of Salinas Island bearing  $120^{\circ}$ , Punta Cerro Gordo  $256^{\circ}$ . When the trawl was taken up at 1 p.m., Punta Cerro Gordo bore  $193^{\circ}$ , and the west point of Salinas Island  $115^{\circ}$ . The depth of the haul ranged from 200 to 420 fathoms.

The catch yielded a few deep-sea fish, a young mackerel, and a couple of small puffers; also a few salpae and a larval crustacean.

**STATION 20.** Lat.  $18^{\circ}40'30''$  N. Long.  $66^{\circ}19'00''$  W. February 3, 1933  
 Lat.  $18^{\circ}38'30''$  N. Long.  $66^{\circ}25'45''$  W.

A modified young-fish trawl was put overboard at 3:05 p.m., Morro Castle Light bearing  $138^{\circ}$ , Punta Cerro Gordo  $187^{\circ}$ . When the trawl was surfaced at 5:40, the depth recorded for the bottom was 960 to 1,000 fathoms.

Owing to a kink in the wire, caused by the winch jumping a sheave in the winch room, we lost about 100 fathoms with the net.

While the last haul was in progress, a pair of *Carachodon* sharks played about the stern of the ship. A bait put overboard was soon snapped up, and Dr. Price and Mr. Weber were able to perform a postmortem which yielded a lot of copepods and a tapeworm from the stomach and one tapeworm from the intestines.

**STATION 21.** Lat.  $18^{\circ}30'20''$  N. Long.  $66^{\circ}10'30''$  W. February 4, 1933  
 Lat.  $18^{\circ}31'15''$  N. Long.  $66^{\circ}12'20''$  W.

When a 6-foot beam trawl was let down at 9:05 a.m. Morro Castle Light bore  $125^{\circ}$ , west point of Salinas Island  $208^{\circ}$ . When the trawl was brought in at 9:52, Morro Castle Light was bearing  $121^{\circ}$  and the west point of Salinas Island  $160^{\circ}$ . The haul was made in a depth ranging from 140 to 200 fathoms.

It yielded a small lot of mollusks, a few brittlestars, some worms and worm tubes, and a single hydroid.

**STATION 22.** Lat.  $18^{\circ}30'30''$  N. Long.  $66^{\circ}12'45''$  W. February 4, 1933  
 Lat.  $18^{\circ}32'15''$  N. Long.  $66^{\circ}16'10''$  W.

When the 6-foot beam trawl was let down at 10:07 a.m., the west point of Salinas Island bore  $154^{\circ}$  and Punta Cerro Gordo  $252^{\circ}$ . When the trawl was brought up at 11:00, the west point of Salinas Island bore  $129^{\circ}$  and Punta Cerro Gordo  $234^{\circ}$ . The haul was made in 200 to 260 fathoms.

It yielded some ascidians and salpae, mollusks, crustaceans, brittle-stars, and a lot of worm tubes.

**STATION 23.** Lat.  $18^{\circ}32'15''$  N. Long.  $66^{\circ}17'45''$  W. February 4, 1933  
 Lat.  $18^{\circ}32'00''$  N. Long.  $66^{\circ}21'15''$  W.

An otter trawl was let down at 11:40 a.m. and landed at 11:57. The bearing was: Punta Cerro Gordo  $165^{\circ}$ , the west point of Salinas Island  $108^{\circ}$ . The haul was made in 260 to 360 fathoms.

This haul was by far the richest made up to this time, yielding about half a bushel of specimens. There were many good-sized deep-sea fish, a large number of mollusks of many kinds, many crustaceans, including at least 15 species of shrimp, and many other things.

**STATION 24.** Lat.  $18^{\circ}32'30''$  N. Long.  $66^{\circ}21'00''$  W. February 4, 1933  
 Lat.  $18^{\circ}31'45''$  N. Long.  $66^{\circ}19'15''$  W.

When the otter trawl was put overboard at 2:15 p.m. Punta Cerro Gordo bore  $167^{\circ}$ , the east point of Salinas Island  $108^{\circ}$ . When it was brought in at 4:00, the east point of Salinas Island bore  $112^{\circ}$  and Punta Cerro Gordo  $206^{\circ}$ . The haul was made in 260 to 350 fathoms.

The net came up in tatters and yielded very little except a small lump of mud, a pennarian, and a few crustaceans and mollusks.

**STATION 25.** Lat.  $18^{\circ}32'15''$  N. Long.  $66^{\circ}22'10''$  W. February 7, 1933  
 Lat.  $18^{\circ}32'05''$  N. Long.  $66^{\circ}22'10''$  W.

A 3-foot dredge was put overboard at 9:45 a.m., when Salinas Island bore  $109^{\circ}$ , Punta Cerro Gordo  $157^{\circ}$ . When the dredge was surfaced at 10:35, Salinas Island gave a bearing of  $108^{\circ}$  and Punta Cerro Gordo  $149^{\circ}$ . This haul was made in 240 to 300 fathoms.

It yielded a bagful of soft, oozy mud, which contained a few ascidians, a splendid lot of many kinds of mollusks, a few crustaceans, a few corals, and many foraminifera.

**STATION 26.** Lat.  $18^{\circ}30'20''$  N. Long.  $66^{\circ}22'05''$  W. February 7, 1933  
 Lat.  $18^{\circ}30'30''$  N. Long.  $66^{\circ}23'05''$  W.

When the 3-foot dredge was let down at 11:10 a.m., Salinas Island bore  $100^{\circ}$ , Punta Cerro Gordo  $125^{\circ}$ . When it was brought up at 11:45, Punta Cerro Gordo gave a bearing of  $117^{\circ}$  and Garza Island  $161^{\circ}$ . The haul was made in 33 to 40 fathoms of water.

It yielded about a ton of rough bottom, blocks of coral rocks, and a large number of sponges, hydrozoa, and other associated faunas.

**STATION 27.** Lat.  $18^{\circ}39'50''$  N. Long.  $66^{\circ}21'30''$  W. February 7, 1933  
 Lat.  $18^{\circ}39'30''$  N. Long.  $66^{\circ}26'00''$  W.

When the 4-foot circular intermediate net was lowered at 12:50 p.m., Punta Cerro Gordo bore  $172^{\circ}$  and Morro Castle Light  $130^{\circ}$ . The haul was made in about 1,100 fathoms and was completed at 4:12.

In pulling up the net, the wire was found to be hopelessly tangled near the net and in trying to unravel it, the line snapped, with the loss of net, swivel, and a considerable quantity of line.

**STATION 28.** Lat.  $18^{\circ}31'40''$  N. Long.  $66^{\circ}12'00''$  W. February 8, 1933  
 Lat.  $18^{\circ}32'00''$  N. Long.  $66^{\circ}14'45''$  W.

When the 3-foot dredge was put over at 10:30 a.m., Morro Castle Light bore  $128^{\circ}$  and Salinas Island  $169^{\circ}$ . When it was hauled in, Morro Castle Light bore  $118^{\circ}$  and Salinas Island  $137^{\circ}$ . The dredging was done in 240 to 300 fathoms.

When the dredge came aboard the canvas sheath protecting the webbing had burst, and the bag was washed clean. It had evidently filled up with mud and bulged out, tearing the canvas, and in hauling it in, everything had been washed from the rather large meshes except a small octopus.

**STATION 29.** Lat.  $18^{\circ}40'30''$  N. Long.  $66^{\circ}20'00''$  W. February 8, 1933  
 Lat.  $18^{\circ}40'30''$  N. Long.  $66^{\circ}21'15''$  W.

The 4-foot intermediate net was lowered at 1:32 p.m. in about 1,100 fathoms of water, the hydrographic winch being used for the purpose. This was evidently a task somewhat too heavy for the winch, for it heated up materially and the flanges were forced decidedly askew. It will be necessary to have this winch repaired before it can be used again.

This haul yielded a number of small fish and some peculiar crustaceans.

**STATION 30.** Lat.  $18^{\circ}40'30''$  N. Long.  $66^{\circ}30'00''$  W. February 8, 1933  
Lat.  $18^{\circ}40'30''$  N. Long.  $66^{\circ}36'15''$  W.

A 4-foot intermediate net was let down at 4:42 p.m. in 1,200 fathoms by means of the heavier cable, which was let out to the full length. It was hauled in at 6:45.

The catch consisted of a number of small fish, some mollusks, and a host of small crustaceans.

**STATION 31.** Lat.  $18^{\circ}27'20''$  N. Long.  $67^{\circ}12'50''$  W. February 9, 1933  
Lat.  $18^{\circ}25'50''$  N. Long.  $67^{\circ}14'55''$  W.

When the 3-foot dredge was lowered at 8:52 a.m., Borinquen Light bore  $58^{\circ}$  and Jiguero Light  $209^{\circ}$ . When it was raised at 9:40, Borinquen Light bore  $54^{\circ}$  and Jiguero Light  $198^{\circ}$ . The depth was 280 to 300 fathoms.

This was a water haul, as the bag had become tangled in the frame.

**STATION 32.** Lat.  $18^{\circ}25'50''$  N. Long.  $67^{\circ}14'55''$  W. February 9, 1933  
Lat.  $18^{\circ}23'50''$  N. Long.  $67^{\circ}17'35''$  W.

When the 3-foot dredge was put overboard at 9:42 a.m., Borinquen Light bore  $54^{\circ}$  and Jiguero Light  $198^{\circ}$ . When the dredge was landed, Borinquen Light bore  $53^{\circ}$  and Jiguero Light  $148^{\circ}$ . The haul was in 200 to 280 fathoms.

The dredge came up washed clean, but in the bottom of the webbing were a number of glass sponges, some worm tubes, a few deep-sea fish, and an excellent lot of mollusks.

**STATION 33.** Lat.  $18^{\circ}24'15''$  N. Long.  $67^{\circ}17'50''$  W. February 9, 1933  
Lat.  $18^{\circ}26'40''$  N. Long.  $67^{\circ}14'00''$  W.

When the otter trawl was lowered at 11:10 a.m., Borinquen Light bore  $56^{\circ}$  and Jiguero Light  $148^{\circ}$ . When it was surfaced at 12:58 p.m., Borinquen Light bore  $56^{\circ}$  and Jiguero Light  $205^{\circ}$ . The haul was made in 180 to 360 fathoms.

It yielded a few heteropods and three deep sea fish.

**STATION 34.** Lat.  $18^{\circ}26'15''$  N. Long.  $67^{\circ}12'50''$  W. February 9, 1933  
Lat.  $18^{\circ}24'00''$  N. Long.  $67^{\circ}16'30''$  W.

When the 5-foot beam trawl was lowered at 11:45 a.m., Borinquen Light bore  $45^{\circ}$  and Jiguero Light  $217^{\circ}$ . When it was surfaced at 3:05 p.m., Jiguero Light bore  $174^{\circ}$  and Borinquen Light  $49^{\circ}$ . This haul was made in 180 fathoms.

It yielded a slender eel about 15 inches long with vicious teeth, and a dozen translucent shrimp with red spots.

**STATION 35.** Lat.  $18^{\circ}23'40''$  N. Long.  $67^{\circ}16'45''$  W. February 9, 1933  
 Lat.  $18^{\circ}24'45''$  N. Long.  $67^{\circ}14'15''$  W.

When the 6-foot beam trawl was lowered at 3:11 p.m., Borinquen Light bore  $50^{\circ}$  and Jiguero Light  $168^{\circ}$ . When it was surfaced at 4:55, Borinquen Light bore  $43^{\circ}$  and Jiguero Light  $215^{\circ}$ . This haul was made in 180 to 80 fathoms.

This was a splendid haul, yielding a number of deep-sea fish; many mollusks; crustaceans; echinoderms, including starfish, echinoids, brittlestars and crinoids; annelids; hydroids; and some glass sponges.

**STATION 36.** Lat.  $18^{\circ}21'50''$  N. Long.  $67^{\circ}30'15''$  W. February 10, 1933  
 Lat.  $18^{\circ}14'20''$  N. Long.  $67^{\circ}38'25''$  W.

When the otter trawl was lowered at 8:36 a.m., the west point of Desecheo Island bore  $25^{\circ}$  and Punta Cadena  $104^{\circ}$ . When it was surfaced, the west point of Desecheo Island bore  $45^{\circ}$  and the north cape of Mona Island  $240^{\circ}$ . The haul was made in 220 to 440 fathoms.

It yielded only a few ascidians, some hydroids and corallines, a crinoid arm, and a worm, the major portion of the bag having been torn out.

**STATION 37.** Lat.  $18^{\circ}13'50''$  N. Long.  $67^{\circ}39'20''$  W. February 10, 1933  
 Lat.  $18^{\circ}11'55''$  N. Long.  $67^{\circ}42'50''$  W.

When the 6-foot beam trawl was put overboard at 11:15 a.m., the west point of Desecheo Island bore  $46^{\circ}$  and the north cape of Mona Island  $241^{\circ}$ . When it was surfaced at 12:15 p.m., the west point of Desecheo Island bore  $48^{\circ}$  and the north cape of Mona Island  $242^{\circ}$ . The haul was made in 160 to 200 fathoms.

It resulted in the net being torn in two in the middle, but in spite of this we obtained a number of sponges, a bunch of corallines, some corals, a lot of hydroids, a lemon-yellow crinoid, a few gastropods, and a small shipworm taken from a bit of submerged wood which was riddled with burrows.

**STATION 38.** Lat.  $18^{\circ}11'55''$  N. Long.  $67^{\circ}42'50''$  W. February 10, 1933  
 Lat.  $18^{\circ}10'00''$  N. Long.  $67^{\circ}46'00''$  W.

The 3-foot dredge was put overboard at 12:23 p.m., the west point of Desecheo Island bearing  $48^{\circ}$  and the north cape of Mona Island  $242^{\circ}$ . When it was surfaced at 1:50, Mona Light bore  $224^{\circ}$  and the north cape of Mona Island  $245^{\circ}$ . This haul was made in 240-260 fathoms.

It yielded a lot of interesting things, including about two dozen brachiopods, almost a gallon of brittlestars, a stalked crinoid and some comatulid crinoids, hydroids, crustaceans, sponges, and mollusks.

**STATION 39.** Lat.  $18^{\circ}10'00''$  N. Long.  $67^{\circ}46'00''$  W. February 10, 1933  
Lat.  $18^{\circ}10'10''$  N. Long.  $67^{\circ}50'30''$  W.

When the 4-foot dredge was put overboard at 2:20 p.m., Mona Light bore  $224^{\circ}$  and the north cape of Mona Island  $345^{\circ}$ . When it was surfaced at 3:45, Mona Light bore  $183^{\circ}$  and the west point of Mona Island  $238^{\circ}$ . The haul was made in water varying from 220 to 240 fathoms in depth.

This was almost a water haul, resulting only in two small deep-sea fish, two small shrimp, and a small ascidian.

**STATION 40.** Lat.  $18^{\circ}09'30''$  N. Long.  $67^{\circ}51'30''$  W. February 10, 1933  
Lat.  $18^{\circ}09'20''$  N. Long.  $67^{\circ}54'40''$  W.

When the 3-foot dredge was let down at 3:57 p.m., the east point of Mona Island bore  $170^{\circ}$  and the west point  $237^{\circ}$ . When it was surfaced, the east point of Monito Island bore  $275^{\circ}$  and the west point of Mona Island  $205^{\circ}$ . The haul was made in water varying from 50 to 120 fathoms.

This was a water haul.

**STATION 41.** Mona Island. February 11, 1933

We made a landing at the west end of Mona Island early in the morning and gathered 1,500 cerions, a lot of annularids, urocoptids, helicinas and subulinas, etc., among the rocky bluffs bordering the sand flat. There was little time for this work, on account of the rising tide and unfavorable sea conditions for landing, and most of the little things were picked out later from the muck and rubbish, of which we took a pailful aboard for examination.

In an attempt to do some dredging in shallow water off the west end of Mona Island, a 3-foot dredge was promptly snagged on a lump of coral and lost.

**STATION 42.** Lat.  $18^{\circ}01'55''$  N. Long.  $67^{\circ}55'05''$  W. February 11, 1933  
Lat.  $18^{\circ}01'50''$  N. Long.  $67^{\circ}51'20''$  W.

When a 4-foot dredge was put overboard at 11:10 a.m., Punta Caigo ó no Caigo, Mona Island, bore  $72^{\circ}$  and the west point of the island  $326^{\circ}$ . When it was raised at 1:50 p.m., Mona Light bore  $7^{\circ}$  and Punta Caigo ó no Caigo  $300^{\circ}$ . The depth was 240 to 360 fathoms.

The rough bottom caused us to snag this dredge and lose it.

**STATION 43.** Lat.  $18^{\circ}02'00''$  N. Long.  $67^{\circ}51'15''$  W. February 11, 1933  
Lat.  $18^{\circ}03'45''$  N. Long.  $67^{\circ}48'10''$  W.

When the tangle was put overboard at 1:00 p.m., Mona Light bore  $8^{\circ}$  and Punta Caigo ó no Caigo  $297^{\circ}$ . The depth varied from 240 to 300 fathoms.

The haul yielded two species of stalked crinoids; a lot of comatulid crinoids; a mass of echinoids; brittlestars, including a few astrophytons; corallines; hydroids; sponges; and a few mollusks.

**STATION 44.** Lat.  $18^{\circ}11'00''$  N. Long.  $67^{\circ}32'45''$  W. February 11, 1933  
Lat.  $18^{\circ}11'20''$  N. Long.  $67^{\circ}31'05''$  W.

When the 6-foot beam trawl was lowered at 4:00 p.m., the west point of Desecheo Island bore  $40^{\circ}$  and the north cape of Mona Island  $258^{\circ}$ . When the haul was completed, the east point of Monito Island bore  $275^{\circ}$  and the west point of Mona Island  $205^{\circ}$ . The depth was 120 fathoms.

The trawl was lost when almost surfaced.

February 12, 1933

We devoted the greater part of the day to sounding out a 5-mile square in Mona Channel in the hope that the information thus gained of the bottom topography might aid us in our dredging operations. The inset on our chart shows the location and details of this effort.

**STATION 45.** Lat.  $18^{\circ}13'10''$  N. Long.  $67^{\circ}25'30''$  W. February 13, 1933  
Lat.  $18^{\circ}14'30''$  N. Long.  $67^{\circ}25'30''$  W.

When the tangle was lowered at 11:00 a.m., Jiguero Light bore  $44^{\circ}$  and the east end of Desecheo Island  $345^{\circ}$ . At the completion of the haul at 11:48, Jiguero Light bore  $50^{\circ}$  and the east end of Desecheo Island  $342^{\circ}$ . This haul was made in 20 to 40 fathoms.

It yielded a lot of shallow-water forms, covering almost the entire marine flora and fauna of the region.

**STATION 46.** Lat.  $18^{\circ}14'40''$  N. Long.  $67^{\circ}25'20''$  W. February 13, 1933  
Lat.  $18^{\circ}17'20''$  N. Long.  $67^{\circ}25'00''$  W.

The tangle was put over at 12:40 p.m., when Jiguero Light bore  $62^{\circ}$  and the east end of Desecheo Island  $330^{\circ}$ . At the completion of the haul at 1:40, Jiguero Light bore  $60^{\circ}$  and the east end of Desecheo Island  $331^{\circ}$ . This haul was made in 30 to 289 fathoms.

This haul cost the loss of our tangle.

**STATION 47.** Lat.  $18^{\circ}17'20''$  N. Long.  $67^{\circ}25'00''$  W. February 13, 1933  
 Lat.  $18^{\circ}17'05''$  N. Long.  $67^{\circ}24'45''$  W.

Another tangle was put over at 2:00 p.m., when Jiguero Light bore  $60^{\circ}$  and the east end of Desecheo Island  $331^{\circ}$ . When brought up at 3:00, Jiguero Light bore  $60^{\circ}$  and the east end of Desecheo Island  $330^{\circ}$ .

This haul, made in 280 to 340 fathoms, yielded a lot of annulid worms, brilliantly colored orange brittlestars, echinoids, corals, hydroids, and sponges.

**STATION 48.** Lat.  $18^{\circ}19'40''$  N. Long.  $67^{\circ}20'30''$  W. February 13, 1933  
 Lat.  $18^{\circ}19'50''$  N. Long.  $67^{\circ}21'45''$  W.

The tangle was again lowered at 3:57 p.m., when Jiguero Light bore  $62^{\circ}$  and the east end of Desecheo Island  $294^{\circ}$ . At the close of the haul at 4:59, Jiguero Light bore  $65^{\circ}$  and the east end of Desecheo Island  $301^{\circ}$ . The haul was made in 400 fathoms.

The tangle was fouled in the cable, resulting in a water haul.

**STATION 49.** Lat.  $18^{\circ}16'12''$  N. Long.  $67^{\circ}31'20''$  W. February 14, 1933  
 Lat.  $18^{\circ}14'18''$  N. Long.  $67^{\circ}35'30''$  W.

The tangle was let down at 3:17 p.m., when the western point of Desecheo Island bore  $15^{\circ}$  and the east point  $22.5^{\circ}$ . At the close of the haul at 4:11, the west point of Desecheo Island bore  $32^{\circ}$  and the east point  $37^{\circ}$ . The depth was 180 fathoms.

The results of the haul were glass sponges, bryozoa, brittlestars, and crinoids.

**STATION 50.** Lat.  $18^{\circ}15'35''$  N. Long.  $67^{\circ}31'35''$  W. February 14, 1933  
 Lat.  $18^{\circ}18'00''$  N. Long.  $67^{\circ}33'30''$  W.

The tangle was lowered at 4:51 p.m., and raised at 5:37, the depth varying from 300 to 320 fathoms.

This was a water haul.

February 15, 1933

We entered Samaná Bay in the afternoon and came to anchor off Santa Barbara de Samaná. About 5 p.m. we visited, with the launch, the Levantado Keys. Here we gathered a few land shells and many beach-loving marine mollusks, crustaceans, and other things. During the evening we fished with the submarine light and gathered some *Beroe* and ctenophores, also some small fish.

**STATION 51.** Lat.  $10^{\circ}10'50''$  N. Long.  $69^{\circ}20'15''$  W. February 16, 1933  
 Lat.  $19^{\circ}10'35''$  N. Long.  $69^{\circ}20'45''$  W.

Samaná Bay, Dominican Republic

At the start at 10:55 a.m., Punta Gordo bore  $59^{\circ}$  and Cape Corozos  $278^{\circ}$ . At the finish at 11:05, Punta Gordo bore  $60^{\circ}$  and Cape Corozos  $285^{\circ}$ . A 6-foot beam trawl was used in 6 to 14 fathoms.

Although this was a short haul, owing to the rough bottom, we carried away the tail of our net, but the haul yielded many hydroids, a bunch of gorgonians, and many mollusks.

**STATION 52.** Lat.  $19^{\circ}10'25''$  N. Long.  $69^{\circ}20'55''$  W. February 16, 1933  
 Lat.  $19^{\circ}10'05''$  N. Long.  $69^{\circ}21'25''$  W.

Samaná Bay, Dominican Republic

A 6-foot beam trawl was lowered at 11:27 a.m., when Cape Alcatraz bore  $93^{\circ}$  and Cape Corozos  $288^{\circ}$ . When the net was surfaced at 11:42, Cape Alcatraz bore  $89^{\circ}$  and Cape Corozos  $292^{\circ}$ . The haul was made in 14 to 22 fathoms.

The net again came up torn but nevertheless contained the following material: A huge filmy hydrozoan of a rose-red color, some slender gorgonians and lesser individuals, masses of sponges, bryozoa, foraminifera, several fragments of stalked crinoids, a huge slab of a thin coral, probably an *Agaricia* that I have not seen before, many small brachiopods, crustaceans and mollusks.

**STATION 53.** Lat.  $19^{\circ}10'05''$  N. Long.  $69^{\circ}21'25''$  W. February 16, 1933  
 Lat.  $19^{\circ}09'50''$  N. Long.  $69^{\circ}21'40''$  W.

Samaná Bay, Dominican Republic

When the 6-foot beam trawl was put overboard at 11:49 p.m., Cape Alcatraz bore  $89^{\circ}$  and Cape Corozos  $292^{\circ}$ . When it was surfaced at 1:00 p.m., Cape Alcatraz bore  $86^{\circ}$  and Cape Corozos  $307^{\circ}$ . The haul was made in 20 fathoms.

The dredge came up in tatters, with little material in it. A few mollusks and solitary corals constituted the catch.

**STATION 54.** Lat.  $19^{\circ}10'05''$  N. Long.  $69^{\circ}26'10''$  W. February 16, 1933  
 Lat.  $19^{\circ}10'10''$  N. Long.  $69^{\circ}26'45''$  W.

Samaná Bay, Dominican Republic

When the 3-foot dredge was put overboard at 12:41 p.m., Buoy No. 8 bore  $82^{\circ}$  and Cape Corozos  $61^{\circ}$ . When it was surfaced at

12:57, Buoy No. 8 bore 85° and Cape Corozos 66°. The haul was made in 17 fathoms.

It yielded mud bottom, crustaceans, and many mollusks.

**STATION 55.** Lat. 19°10'12" N. Long. 69°27'03" W. February 16, 1933  
Lat. 19°10'15" N. Long. 69°27'10" W.

Samaná Bay, Dominican Republic

When the 3-foot dredge was put overboard at 1:05 p.m., Buoy No. 8 bore 86° and Cape Corozos 68°. When it was surfaced at 1:16, Buoy No. 8 bore 87° and Cape Corozos 70°. The haul was made in 17 fathoms.

It yielded some small fish and many mollusks, including some shipworms.

**STATION 56.** Lat. 19°10'15" N. Long. 69°27'20" W. February 16, 1933  
Lat. 19°10'15" N. Long. 69°28'05" W.

Samaná Bay, Dominican Republic

When the 3-foot dredge was put overboard at 1:28 p.m., Buoy No. 8 bore 90° and Cape Corozos 72°. When it was brought up at 1:43, Buoy No. 8 bore 89° and Cape Corozos 74°. The haul was made in 17 fathoms.

It contained a large number of forms, including many mollusks.

**STATION 57.** Lat. 19°10'20" N. Long. 69°28'35" W. February 16, 1933  
Lat. 19°10'20" N. Long. 69°29'00" W.

Samaná Bay, Dominican Republic

The 3-foot dredge was lowered at 1:55 p.m., when Buoy No. 8 bore 91° and Cape Corozos 77°. When it was surfaced at 2:09, Cape Corozos bore 78° and Cape Lorenzo 169°. The haul was made in 18 fathoms on mud bottom.

It yielded, in addition to mud, small fish, small crustaceans, and miscellaneous things, including a number of mollusks.

**STATION 58.** Lat. 19°10'20" N. Long. 69°29'15" W. February 16, 1933  
Lat. 19°10'25" N. Long. 69°30'05" W.

Samaná Bay, Dominican Republic

When the 3-foot dredge was put overboard at 2:18 p.m., Cape Corozos bore 79° and Cape Lorenzo 166°. When it was taken in at 2:34, Punta Mangle bore 72° and Cape Lorenzo 58°. The haul was made in 18 fathoms on mud bottom.

It yielded a few small fish, small shrimp, and miscellaneous small forms, including mollusks.

**STATION 59.** Lat.  $19^{\circ}10'25''$  N. Long.  $69^{\circ}30'05''$  W. February 16, 1933  
 Lat.  $19^{\circ}10'35''$  N. Long.  $69^{\circ}30'40''$  W.

Samaná Bay, Dominican Republic

When the dredge was put overboard at 2:42 p.m., Cape Lorenzo bore  $158^{\circ}$  and Punta Mangle  $72^{\circ}$ . When it was surfaced at 2:58, Punta Mangle bore  $7^{\circ}$  and the east end of the dock  $299^{\circ}$ . The haul was made in 18 to 19 fathoms on mud bottom.

It yielded some small fish and a miscellaneous lot of bottom material.

At our anchorage near this station, shortly after dark, a tiger shark 10 feet in length took the hook and was dispatched with a rifle; later in the evening it was attacked by another shark, apparently of the same species, but of considerably greater size. The observer stated that it attempted to bite the abdomen of the dead shark and later one of the fins. When shot, it disappeared. An autopsy of the tiger shark by Dr. Price and Mr. Weber yielded parasites.

Part of the evening at this anchorage was devoted to fishing with a submarine light and at the gang plank, which yielded a number of small fish, some larval and others adult. We likewise caught some *Beroe*, which we were unable to preserve.

February 17, 1933

Samaná Bay, Dominican Republic

After breakfast a trip was made to the north shore opposite our anchorage, where several birds were shot. These were later examined by Dr. Price for parasites.

Along the shore we gathered some land shells, beach-loving marine mollusks, and other organisms. In the afternoon we took a launch and a skiff and crossed over to the other side of the Bay, where we examined the mangrove fringe and later a bit of the higher upland region, collecting a number of land shells and other forms. During the night we again plied our submarine light, with the result that we obtained many small fish and a few squids.

**STATION 60.** Lat.  $19^{\circ}12'55''$  N. Long.  $69^{\circ}08'35''$  W. February 18, 1933  
 Lat.  $19^{\circ}16'45''$  N. Long.  $69^{\circ}04'45''$  W.

When the net was lowered at 8:45 a.m., Cape Balandra Light bore  $252^{\circ}$  and Cape Samaná  $259^{\circ}$ . When it was surfaced at 10:54, Cape Samaná bore  $395^{\circ}$  and Cape Cabron bore  $307^{\circ}$ . An intermediate net was used at 500 fathoms.

The haul yielded deep-sea fish, some small crustaceans, and pelagic mollusks.

**STATION 61.** Lat.  $19^{\circ}24'45''$  N. Long.  $69^{\circ}09'00''$  W. February 18, 1933

An intermediate net was lowered at 11:05 a.m. in 800 fathoms. No bearings were given at this time. It was surfaced at 1:14 p.m., when Cape Cabron, Dominican Republic, bore  $225^{\circ}$  and Punta Pescadores  $255^{\circ}$ . The net struck bottom at 12:15 p.m. and was lost.

**STATION 62.** Lat.  $19^{\circ}25'45''$  N. Long.  $69^{\circ}09'00''$  W. February 18, 1933  
Lat.  $19^{\circ}27'45''$  N. Long.  $69^{\circ}14'45''$  W.

About 1,045 fathoms of cable were paid out, which indicated a depth of approximately 350 fathoms. Cape Cabron, Dominican Republic, bore  $220^{\circ}$  and Cape Samaná Light  $176^{\circ}$ . When the gear was surfaced at 4:03 p.m., Cape Cabron bore  $159^{\circ}$  and Cape Samaná Light  $147^{\circ}$ .

This haul resulted in the capture of 406 fish, of which 379 belonged to one species. We also caught a lot of crustaceans, some worms, salpae, and heteropods and pteropods. Dr. Price extracted some parasites from the larger fish.

We again came to anchor for the night off Santa Barbara de Samaná in Samaná Bay. The submarine light was again put overboard and enabled us to collect a splendid lot of small fishes; Dr. Price was busy until 2 o'clock in the morning examining them for parasites.

February 19, 1933

The day was devoted to making a line of soundings through the long axis of the Puerto Rican Deep. These soundings and their location are published on the attached chart.

**STATION 63.** Lat.  $19^{\circ}54'00''$  N. Long.  $65^{\circ}27'00''$  W. February 20, 1933

An otter trawl, in the tail end of which we had laced an intermediate net containing some sargassum, or gulfweed, to preserve the finer things and keep them from crushing, was put overboard at 3:45 a.m. in about 80 fathoms of water.

This haul yielded a lot of sargassum, some deep-sea fish, the prize being an *Idiacanthus*, and some small crustaceans.

February 22, 1933

We crossed San Juan Bay, Puerto Rico, to the little village of Pueblo Viejo and proceeded toward the hills, stopping at the first hill on the east side of the road, the honeycombed limestone paradones of which yielded many land mollusks, some lizards, and crustaceans.

**STATION 64.** Lat.  $18^{\circ}28'55''$  N. Long.  $65^{\circ}45'55''$  W. February 23, 1933  
 Lat.  $18^{\circ}31'00''$  N. Long.  $65^{\circ}46'42''$  W.

When we lowered the tangle at 12:22 p.m., Cape San Juan Light bore  $125^{\circ}$  and the buoy off Punta Picua  $174^{\circ}$ . When it was surfaced at 12:35, Cape San Juan Light bore  $131^{\circ}$  and the buoy  $167^{\circ}$ . The haul was made in 160-360 fathoms. The tangle failed to capture anything.

**STATION 65.** Lat.  $18^{\circ}28'48''$  N. Long.  $65^{\circ}45'54''$  W. February 23, 1933  
 Lat.  $18^{\circ}30'24''$  N. Long.  $65^{\circ}46'18''$  W.

When the tangle was put overboard at 12:57 p.m., Cape San Juan Light bore  $125^{\circ}$  and the buoy off Punta Picua bore  $174^{\circ}$ . When it was surfaced at 1:58, the Cape San Juan Light bore  $130^{\circ}$  and the buoy  $171^{\circ}$ . The depth ranged from 180 to 300 fathoms.

The haul resulted in the capture of some sponges, hydroids, brittle-stars, sea urchins, crustaceans, and a few mollusks.

**STATION 66.** Lat.  $18^{\circ}28'48''$  N. Long.  $65^{\circ}45'54''$  W. February 23, 1933  
 Lat.  $18^{\circ}29'30''$  N. Long.  $65^{\circ}45'48''$  W.

When the 4-foot dredge was put overboard at 2:20 p.m., Cape San Juan Light bore  $125^{\circ}$  and the buoy off Punta Picua  $174^{\circ}$ . When it was surfaced at 2:55, Cape San Juan Light bore  $128^{\circ}$  and the buoy  $178^{\circ}$ . The haul was made in 180 to 280 fathoms.

The dredge was lost.

**STATION 67.** Lat.  $18^{\circ}30'12''$  N. Long.  $65^{\circ}45'48''$  W. February 23, 1933  
 Lat.  $18^{\circ}32'18''$  N. Long.  $65^{\circ}46'12''$  W.

When the 4-foot dredge was lowered at 3:03 p.m., Cape San Juan Light bore  $131^{\circ}$  and the buoy off Punta Picua  $179^{\circ}$ . When it was surfaced at 4:16, Cape San Juan Light bore  $137^{\circ}$  and the buoy  $175^{\circ}$ .

This haul, made in 180 to 280 fathoms, yielded a bagful of mud containing a host of mollusks, worms, and crustaceans.

We tested the thermometer by placing it in the cold mud; it registered  $23^{\circ}$  C.

February 23, 1933

We came to anchor off Playa de Fajardo, Puerto Rico, and after dark we tried our new circular net and 8-foot ring with bobbinet net, illuminating the area over this net with the cargo light provided with powerful lamps. In spite of the fact that this is one of the poorest places on the coast of Puerto Rico for life, on account of the volcanic ash bottom, we obtained rather good results, catching a number of fish, among them a cutlass fish about 30 inches long,

which carried a fish in its mouth when surfaced. This was a most voracious fish, snapping at everything with which it came in contact. In addition to the fish, we obtained a mass of small material. Examining the fish for parasites kept Dr. Price busy until 1 o'clock in the morning.

February 24, 1933

At daylight, Fenimore Johnson, Dr. Darby, Dr. Price, Mr. Weber and myself visited Palominos Island, which we found composed of ancient rock, a very poor environment for shell collecting. We obtained a number of beach-inhabiting marine species and returned to the ship at 8:30 a.m.

**STATION 68.** Lat.  $18^{\circ}23'00''$  N. Long.  $65^{\circ}36'25''$  W. February 24, 1933  
Lat.  $18^{\circ}23'35''$  N. Long.  $65^{\circ}37'10''$  W.

When the tangle was lowered at 8:42 a.m., Cape San Juan Light bore  $263^{\circ}$  and Las Cucarachas Light  $346^{\circ}$ . When it was surfaced at 9:00, Cape San Juan Light bore  $176^{\circ}$  and Las Cucarachas Light  $43^{\circ}$ . The haul was made in 10 fathoms.

It yielded some sponges, hydroids, bryozoans, and a few mollusks.

**STATION 69.** Lat.  $18^{\circ}23'55''$  N. Long.  $65^{\circ}37'00''$  W. February 24, 1933  
Lat.  $18^{\circ}24'30''$  N. Long.  $65^{\circ}38'30''$  W.

When the tangle was again put overboard at 9:07 a.m., Cape San Juan Light bore  $159^{\circ}$  and Las Cucarachas Light  $76^{\circ}$ . When it was surfaced at 9:24, Cape San Juan Light bore  $137^{\circ}$  and Las Cucarachas Light  $104^{\circ}$ . The haul was made in 9 fathoms.

It yielded some sponges, hydroids, corals, bryozoans, annulid worms, and a few mollusks.

**STATION 70.** Lat.  $18^{\circ}29'25''$  N. Long.  $65^{\circ}45'55''$  W. February 24, 1933  
Lat.  $18^{\circ}38'08''$  N. Long.  $65^{\circ}50'30''$  W.

When the otter trawl was put overboard at 10:11 a.m., Cape San Juan Light bore  $127^{\circ}$  and the buoy off Punta Picua  $175^{\circ}$ . When it was surfaced at 12:21, Cape San Juan Light bore  $139^{\circ}$  and Morro Castle Light  $240^{\circ}$ . In this haul we paid out 1,000 fathoms of cable, the haul, therefore, being made in about 350 fathoms.

The haul yielded a few deep-sea fish and shrimp.

**STATION 71.** Lat.  $18^{\circ}38'08''$  N. Long.  $65^{\circ}50'30''$  W. February 24, 1933

Here we attached a bulldog snapper to the hydrographic line and lowered this in 600 fathoms of water. When brought up, the snapper had not closed, but the sample attached to it indicated a mud bottom.

**STATION 72.** Lat.  $18^{\circ}38'08''$  N. Long.  $65^{\circ}50'30''$  W. February 24, 1933

The snapper was again put overboard and yielded similar results.

**STATION 73.** Lat.  $18^{\circ}36'50''$  N. Long.  $65^{\circ}51'00''$  W. February 24, 1933

The coring machine with a pasteboard tube in it was next put overboard, with the result that a short core of thick, pasty clay was obtained.

**STATION 74.** Lat.  $18^{\circ}36'55''$  N. Long.  $65^{\circ}51'40''$  W. February 24, 1933  
Lat.  $18^{\circ}36'10''$  N. Long.  $65^{\circ}48'30''$  W.

The otter trawl was put overboard at 3:15 p.m., when Cape San Juan Light bore  $135^{\circ}$  and Morro Castle Light  $241^{\circ}$ . When it was surfaced at 6:00 Cape San Juan Light bore  $141^{\circ}$  and Morro Castle Light  $246^{\circ}$ . From 4:20 to 4:48 we changed course gradually from  $360^{\circ}$  to  $141^{\circ}$ , making a semicircle. This haul was made in about 360 fathoms, 1,000 fathoms of cable being paid out. In the otter trawl we had placed an intermediate bobbinet net.

The haul yielded a number of deep-sea fish, some very brilliantly colored crustaceans, two octopuses, and a small number of mollusks.

While we were making the last haul, a shark 40 inches long, having a basal caudal notch like that of a tiger shark, was caught; parts of it were preserved.

We came to anchor opposite Icaos Cay for the night and after dark made a small collection of fish, crustaceans, and worms, with the use of the cargo light and submarine light and the big circular net, as well as dip nets.

February 25, 1933

During the night an  $11\frac{3}{4}$ -foot shark weighing 660 pounds was caught; we found it on the hook next morning. We also caught a remora, which was swimming about the shark. Both of these were examined by Dr. Price for parasites. The shark proved to be a female bearing 39 young of considerable length.

At about 7:30 a.m., Mr. Douglass, Florence Douglass, Dr. Price, Mr. Weber and the writer went to Lobos Island and made a collection of shore species of mollusks, crustaceans, and other forms. No land shells were found.

**STATION 75.** Lat.  $18^{\circ}24'40''$  N. Long.  $65^{\circ}33'40''$  W. February 25, 1933  
Lat.  $18^{\circ}27'35''$  N. Long.  $65^{\circ}33'35''$  W.

When we lowered the tangle at 10:23 a.m., Cape San Juan Light bore  $242^{\circ}$ , Las Cucarachas Light  $257.5^{\circ}$ . When it was surfaced at

11:10, Cape San Juan Light bore  $216^{\circ}$  and the east end of Palominos Island  $183^{\circ}$ . The haul was made in 26 fathoms.

It yielded a number of sponges, hydroids, corallines, bryozoans, echinoderms, and mollusks.

**STATION 76.** Lat.  $18^{\circ}27'35''$  N. Long.  $65^{\circ}33'35''$  W. February 25, 1933  
Lat.  $18^{\circ}30'55''$  N. Long.  $65^{\circ}33'05''$  W.

When the 3-foot dredge was put overboard at 11:16 a.m., the position was latitude  $18^{\circ}27'35''$  N., longitude  $65^{\circ}33'35''$  W.; when it was surfaced at 11:59 Cape San Juan Light bore  $206^{\circ}$  and the east end of Las Cucarachas  $184^{\circ}$ . The haul was made in 30 to 200 fathoms.

This was a water haul.

**STATION 77.** Lat.  $18^{\circ}25'30''$  N. Long.  $65^{\circ}33'36''$  W. February 25, 1933  
Lat.  $18^{\circ}27'30''$  N. Long.  $65^{\circ}32'36''$  W.

When the otter trawl was put overboard at 12:55 p.m., Cape San Juan Light bore  $233^{\circ}$  and the east end of Palominos Island  $185^{\circ}$ . When it was surfaced at 1:27, Cape San Juan Light bore  $224^{\circ}$  and the east end of Palominos Island  $191^{\circ}$ . The haul was made in about 45 fathoms.

It yielded only one batfish.

**STATION 78.** Lat.  $18^{\circ}27'30''$  N. Long.  $65^{\circ}32'36''$  W. February 25, 1933  
Lat.  $18^{\circ}29'42''$  N. Long.  $65^{\circ}31'15''$  W.

When the otter trawl was again lowered at 1:37 p.m., Cape San Juan Light bore  $223^{\circ}$  and the east end of Palominos Island  $191^{\circ}$ . When it was surfaced at 2:30, Cape San Juan Light bore  $220^{\circ}$  and the east end of Palominos Island  $197^{\circ}$ .

This was an intermediate haul with 175 fathoms of cable out in about 60 fathoms of water. The bottom over the territory traversed ranged from 100 to 300 fathoms in depth.

This haul yielded a gorgonian (showing that we must have struck bottom) covered with a mass of brilliantly colored comatulid crinoids, a slender spider crab, and a few mollusks.

**STATION 79.** Lat.  $18^{\circ}30'30''$  N. Long.  $65^{\circ}31'00''$  W. February 25, 1933  
Lat.  $18^{\circ}30'05''$  N. Long.  $65^{\circ}25'10''$  W.

When the otter trawl was lowered at 2:43 p.m., Cape San Juan Light bore  $218.5^{\circ}$  and the east end of Palominos Island  $197^{\circ}$ . When it was surfaced at 5:02, Cape San Juan Light bore  $238^{\circ}$  and Fungy

Bowl Rock 162°. Nine hundred fathoms of cable was paid out, the haul being made, therefore, in at least 300 fathoms. The area traversed ranged from 100 to 300 fathoms in depth, the result being that the tail end of the otter trawl was torn out. From the remaining webbing we obtained a mass of sticky mud containing a pecten and an isopod. We had undoubtedly overloaded the dredge with the bottom mud and thus ripped out the end.

February 25, 1933

We came to anchor in Luispena Channel off Culebra Island and after dark put the 8-foot net overboard and used the cargo lights. With it and the deep nets we caught a mass of small fish and a squid. We also made a tow with the 4-foot bobbinet net, using the port launch, and caught a mass of minute forms.

February 26, 1933

Shortly after 6 o'clock, Fenimore Johnson, Dr. Darby, Mr. Douglass and his two daughters, Dr. Price, Mr. Weber, and the writer paid a visit to Flamingo Lake in the interior of Culebra Island, which we were told was swarming with ducks. This slightly brackish lake has been formed by the piling up of shore debris at the entrance to a gully on its sea side to form a hurricane rampart. It is probably a quarter of a mile across in its largest diameter, is shallow, and contains an abundance of vegetation, largely *Chara*. The lake was literally swarming with ducks. There must have been several thousand, most of them being lesser scaup. The rest were bahama ducks, and among these was a sprinkling of coots, great blue herons, little blue herons in various phases of coloration, and green herons. There was also a huge flock of lesser yellowlegs, a smaller number of turnstones, some spotted sandpipers, and the usual number of native species of land birds, as well as man o' war hawks, brown pelicans, etc. From the shores of this lake we gathered some algae, fiddler crabs, and a few minute mollusks.

**STATION 80.** Lat. 18° 19' 05" N. Long. 65° 19' 20" W. February 26, 1933  
Lat. 18° 19' 10" N. Long. 65° 19' 40" W.

When the dredge was lowered at 10:15 a.m., Punta Tamarindo, Culebra Island, bore 336°, Stream Point 306°. When it was surfaced at 10:30, Punta Tamarindo bore 270° and Stream Point 336°. This haul was made in 9 to 10 fathoms, in the narrow channel.

It yielded a quantity of corallines and bryozoans.

**STATION 81.** Lat.  $18^{\circ}29'45''$  N. Long.  $65^{\circ}25'50''$  W. February 26, 1933  
Lat.  $18^{\circ}35'30''$  N. Long.  $65^{\circ}23'54''$  W.

When the otter trawl was lowered at 12:07 p.m., Cape San Juan Light bore  $238^{\circ}$  and Fungy Bowl Rock  $155.5^{\circ}$ . When it was surfaced at 1:53, Cape San Juan Light bore  $226^{\circ}$  and Fungy Bowl Rock  $174^{\circ}$ . This haul was made in depths varying from 200 to 400 fathoms.

It yielded a host of deep-sea fish and many other forms, including brittlestars, holothurians, crustaceans, and mollusks.

**STATION 82.** Lat.  $18^{\circ}31'15''$  N. Long.  $65^{\circ}28'10''$  W. February 26, 1933  
Lat.  $18^{\circ}32'45''$  N. Long.  $65^{\circ}23'45''$  W.

When the otter trawl was again put overboard at 3:09 p.m., Cape San Juan Light bore  $226^{\circ}$  and Fungy Bowl Rock  $148^{\circ}$ . When it was surfaced at 4:25, Cape San Juan Light bore  $232^{\circ}$  and Fungy Bowl Rock  $172^{\circ}$ . The haul was made at depths varying from 200 to 300 fathoms.

It yielded a file fish and miscellaneous other forms.

**STATION 83.** Lat.  $18^{\circ}32'54''$  N. Long.  $65^{\circ}23'42''$  W. February 26, 1933  
Lat.  $18^{\circ}32'15''$  N. Long.  $65^{\circ}18'45''$  W.

The otter trawl was put overboard at 4:52 p.m., when Cape San Juan Light bore  $235^{\circ}$  and Fungy Bowl Rock  $176^{\circ}$ . When it was surfaced at 6:24, Fungy Bowl Rock bore  $197^{\circ}$  and Culebrita Light  $160^{\circ}$ . This haul was in depths varying from 250 to 320 fathoms.

It yielded a number of deep-sea fish.

**STATION 84.** Lat.  $18^{\circ}32'30''$  N. Long.  $65^{\circ}18'30''$  W. February 26, 1933  
Lat.  $18^{\circ}39'00''$  N. Long.  $65^{\circ}17'00''$  W.

When we dropped the otter trawl at 6:46 p.m., Fungy Bowl Rock bore  $197^{\circ}$  and Culebrita Light  $161^{\circ}$ . The trawl was surfaced at 9:45. We had 1,000 fathoms of cable out, which meant that the depth was probably 300 to 350 fathoms.

This was a remarkable haul, yielding a lot of deep-sea fish, among them two very beautiful lantern fish. There were also a lot of mollusks, as well as comatulid crinoids and many other forms. The capture of the crinoids and mollusks indicated that bottom was reached, but it must have been touched very lightly, for no damage to the gear was noted.

**STATION 85.** Lat.  $18^{\circ}39'30''$  N. Long.  $65^{\circ}16'55''$  W. February 26, 1933  
 Lat.  $18^{\circ}44'00''$  N. Long.  $65^{\circ}16'15''$  W.

The otter trawl was again lowered, with 1,000 fathoms of cable out. The haul, therefore, was made probably in 400 fathoms.

It resulted in a catch of a number of deep-sea fish, some that had not been taken before; a small lot of cephalopods, pteropods, and heteropods; and many small crustaceans.

**STATION 86.** Lat.  $19^{\circ}30'30''$  N. Long.  $65^{\circ}14'00''$  W. February 27, 1933

As it was a calm day, we put overboard at 1 o'clock in the morning a pressure chamber, made by Fenimore Johnson, to depths of 500, 1,500, and 3,000 fathoms. From these three depths the chamber was returned intact. As the echo sounding machine failed to give us an answer, we believed that we were in still deeper water and so lowered the pressure chamber to 4,500 fathoms. A kink developed in the wire, which in passing through the sheave on hauling up caused the wire to break, and we lost the chamber.

While this work was being done, the ship was adrift. Two sharks were caught, which appear to be *Carcharodon*; they were post-mortemed by Dr. Price for parasites. One of the sharks was accompanied by two pilotfish, which we caught by leading the shark into the circular net, the fish following.

Lat.  $19^{\circ}30'30''$  N. Long.  $65^{\circ}14'00''$  W. February 27, 1933  
 Lat.  $19^{\circ}18'30''$  N. Long.  $65^{\circ}16'00''$  W.

We next made a haul with the otter trawl, which we lowered at 3:40 p.m. and surfaced at 6:34. At this haul we used 950 fathoms of cable, which meant a depth of about 350 fathoms for our haul.

It yielded a lot of deep-sea fish, crustaceans, and a few mollusks.

**STATION 87.** Lat.  $19^{\circ}18'30''$  N. Long.  $65^{\circ}16'00''$  W. February 27, 1933  
 Lat.  $19^{\circ}13'00''$  N. Long.  $65^{\circ}16'00''$  W.

The otter trawl was again put overboard at 6:58 p.m., and surfaced at 9:17.

This haul resulted in a similar catch of fish, shrimp, and squid, although not so many were taken as in the previous haul.

**STATION 88.** Lat.  $19^{\circ}13'00''$  N. Long.  $65^{\circ}16'00''$  W. February 27, 1933

At this station we bent on the hydrographic line 120 hooks with luminous bait and real bait, spacing them at 15 meters, and lowered the line to 2,500 fathoms. We drifted all night to give the hooks a

chance to make a catch, but found no fish on the line next morning. It is probable that the treating of the hydrographic stranded wires with a mixture of linseed and kerosene oils proved a deterrent to the fish.

**STATION 89.** Lat.  $19^{\circ}13'00''$  N. Long.  $65^{\circ}16'00''$  W. February 28, 1933

The day being calm and the sea almost as smooth as glass, we decided to try out our Nansen water bottles and reversible thermometers. Six sets of Nansen bottles, each provided with two thermometers, were lowered in series, to 500, 1,000, 2,000, 3,000, 4,000 and 4,500 meters, and yielded splendid results as to water and temperature readings, which will be reported on separately.

While this work was going on, the launch picked up a tubful of sargassum, which upon being washed with fresh water and shaken, yielded a number of fish, crustaceans, and mollusks.

**STATION 90.** Lat.  $19^{\circ}13'00''$  N. Long.  $65^{\circ}16'00''$  W. February 28, 1933

A small circular dredge, with a bucketlike rim and handle frame an inch in width and a foot in diameter, with a double net  $2\frac{1}{2}$  feet long, one bobbinet and the other  $\frac{1}{2}$ -inch webbing, was lowered to 3,000 fathoms. The ship was then moved slightly ahead while another 1,000 fathoms of cable was paid out. On hauling in, it was found that the net had indeed struck bottom, but the wire cable, unfortunately, had been too profusely supplied and had kinked, so that a large amount of it had to be abandoned on account of the kinking. The net itself contained a bit of sticky mud and a single fragment of an *Oliva*.

While these operations were going on, another tiger shark was captured, a moderate-sized specimen, and later still another, probably a *Carcharodon*. Both of these were examined by Dr. Price and Mr. Weber for parasites, and parts of the animals were preserved.

**STATION 91.** Lat.  $18^{\circ}37'30''$  N. Long.  $65^{\circ}05'00''$  W. March 1, 1933  
Lat.  $18^{\circ}42'00''$  N. Long.  $65^{\circ}10'00''$  W.

We lowered the 6-foot beam trawl at 2:58 p.m. on bottom registering between 320 and 400 fathoms. The trawl was surfaced at 4:43, and the haul proved to be merely a water haul.

We came to anchor at Brewers Bay, St. Thomas, and after dark Mr. Weber and Miss Florence Douglass used the submarine light at the gangway and obtained a splendid lot of fish, four small squids, some shrimp, and other crustaceans. We also used the cargo light

and the 8-foot circular net, but the strong current prevented its successful operation. The single haul, however, yielded a small number of minute crustaceans.

**STATION 92.** Lat.  $18^{\circ}39'00''$  N. Long.  $65^{\circ}05'30''$  W. March 2, 1933  
 Lat.  $18^{\circ}38'00''$  N. Long.  $65^{\circ}09'30''$  W.

A 6-foot beam trawl was let down at 8:35 a.m., when Culebrita Light bore  $202^{\circ}$ , the northwest point of St. Thomas  $170^{\circ}$ . When it was hauled in at 10:00, Culebrita Light bore  $193^{\circ}$  and the northwest point of St. Thomas  $158^{\circ}$ . The depth varied from 310 to 350 fathoms.

Upon hauling in, it was found that all of the gear had been torn free from the shackle and lost.

**STATION 93.** Lat.  $18^{\circ}38'00''$  N. Long.  $65^{\circ}09'30''$  W. March 2, 1933  
 Lat.  $18^{\circ}37'45''$  N. Long.  $65^{\circ}05'00''$  W.

When the 3-foot dredge was lowered at 10:10 a.m., Culebrita Light bore  $193^{\circ}$  and the northwest point of St. Thomas  $158^{\circ}$ . When it was surfaced at 11:44, Culebrita Light bore  $196^{\circ}$  and the northwest point of St. Thomas  $164^{\circ}$ . The depth varied from 350 to 400 fathoms.

The haul yielded a bagful of cementlike mud which contained many specimens including mollusks, echinoderms, worms, and foraminifera.

**STATION 94.** Lat.  $18^{\circ}37'45''$  N. Long.  $65^{\circ}05'00''$  W. March 2, 1933  
 Lat.  $18^{\circ}39'00''$  N. Long.  $65^{\circ}03'30''$  W.

When another 3-foot dredge was put overboard at 11:51 a.m., Culebrita Light bore  $196^{\circ}$  and the northwest point of St. Thomas  $164^{\circ}$ . When it was surfaced at 2:10 p.m., Culebrita Light bore  $206^{\circ}$  and the northwest point of St. Thomas  $177^{\circ}$ , the depth varying from 300 to 470 fathoms.

The dredge became unshackled on one side, and the protecting canvas sleeve was almost ripped off and badly torn, but the webbing held several chunks of rock which are made up almost exclusively of pteropod shells. The writer has not known pteropod shells to form coquina before, and he believes that the largest specimen will prove to be excellent for museum exhibition. In addition to this we obtained also some brittlestars and some splendid mollusks and brachiopods.

**STATION 95.** Lat.  $18^{\circ}39'00''$  N. Long.  $65^{\circ}03'30''$  W. March 2, 1933  
Lat.  $18^{\circ}39'00''$  N. Long.  $65^{\circ}01'30''$  W.

When the 3-foot dredge was put overboard at 2:25 p.m., Culebrita Light bore  $196^{\circ}$  and the northwest point of St. Thomas  $164^{\circ}$ . When it was hauled in at 3:43, Culebrita Light bore  $209^{\circ}$  and the northwest point of St. Thomas  $282^{\circ}$ . The haul was made in 300 to 350 fathoms. The entire gear, including the swivel, was lost in this attempt.

**STATION 96.** Lat.  $18^{\circ}36'00''$  N. Long.  $65^{\circ}05'30''$  W. March 3, 1933  
Lat.  $18^{\circ}37'15''$  N. Long.  $65^{\circ}03'00''$  W.

When the otter trawl was lowered at 8:35 a.m., the northwest point of St. Thomas bore  $170^{\circ}$  and the west point of Savana Island  $180^{\circ}$ . When it was surfaced at 10:20, the northwest point of St. Thomas bore  $180^{\circ}$  and Savana Island  $188^{\circ}$ .

This haul, made in 270 to 330 fathoms, was one of the finest of the cruise, yielding several large deep-sea fish, as well as smaller species; some splendid mollusks, among them a lot of *Xenophora longleyi*; worms; sea urchins; brittlestars; and large rose-red holothurians.

**STATION 97.** Lat.  $18^{\circ}37'30''$  N. Long.  $65^{\circ}02'15''$  W. March 3, 1933  
Lat.  $18^{\circ}38'15''$  N. Long.  $65^{\circ}00'30''$  W.

When the otter trawl was again lowered at 10:52 a.m., the northwest point of St. Thomas bore  $182^{\circ}$  and Savana Island  $189^{\circ}$ . When it was surfaced at 12:19 p.m., the northwest point of St. Thomas bore  $187^{\circ}$  and the west point of Jost Van Dyke Island  $131^{\circ}$ . The depth ranged from 310 to 400 fathoms.

This haul yielded some very interesting deep-sea fish.

**STATION 98.** Lat.  $18^{\circ}33'30''$  N. Long.  $65^{\circ}00'00''$  W. March 3, 1933  
Lat.  $18^{\circ}39'30''$  N. Long.  $64^{\circ}56'00''$  W.

When the otter trawl was put overboard at 12:50 p.m., the northwest point of St. Thomas bore  $188^{\circ}$  and the west point of Jost Van Dyke Island bore  $133^{\circ}$ . When it was surfaced at 2:43, the northwest point of St. Thomas bore  $199^{\circ}$  and the west point of Jost Van Dyke Island  $146^{\circ}$ . The depth ranged from 290 to 340 fathoms.

The net, unfortunately, did not touch bottom, as the haul included pelagic animals only, embracing a lot of small deep-sea fish, a few pteropods and heteropods, and some shrimp.

**STATION 99.** Lat.  $18^{\circ}39'30''$  N. Long.  $64^{\circ}56'00''$  W. March 3, 1933  
 Lat.  $18^{\circ}40'00''$  N. Long.  $64^{\circ}51'00''$  W.

When the otter trawl was again put overboard at 3:22 p.m., the northwest point of St. Thomas bore  $199^{\circ}$  and the west point of Jost Van Dyke Island  $146^{\circ}$ . When it was surfaced at 4:51, the west point of Jost Van Dyke Island bore  $163^{\circ}$  and Tobago  $173^{\circ}$ . The depth varied from 180 to 200 fathoms.

The net touched bottom, as evidenced by the eight sea urchins, brittlestars, crinoids, and crustaceans that were captured. We also gathered a number of deep-sea fish and a few mollusks.

**STATION 100.** Lat.  $18^{\circ}38'45''$  N. Long.  $64^{\circ}52'45''$  W. March 4, 1933  
 Lat.  $18^{\circ}40'15''$  N. Long.  $64^{\circ}50'15''$  W.

When the otter trawl was let down at 8:41 a.m., the west end of Tobago Island bore  $167^{\circ}$  and the west end of Jost Van Dyke Island  $154^{\circ}$ . When it was surfaced at 10:45, the center of Tobago Island bore  $176^{\circ}$  and the west end of Jost Van Dyke Island  $167^{\circ}$ . The depth ranged from 100 to 300 fathoms.

The haul yielded about half a bushel of material, including two species of splendid glass sponges, a large number of deep-sea fish, many sea urchins, brittlestars, crinoids, crustaceans, anemones, corals, and mollusks.

**STATION 101.** Lat.  $18^{\circ}40'30''$  N. Long.  $64^{\circ}50'00''$  W. March 4, 1933  
 Lat.  $18^{\circ}45'40''$  N. Long.  $64^{\circ}48'00''$  W.

When the otter trawl was placed overboard at 11:29 a.m., the center of Tobago Island bore  $178^{\circ}$ , and the west end of Jost Van Dyke Island bore  $169^{\circ}$ . When it was hauled up at 1:00 p.m., the center of Tobago Island bore  $185^{\circ}$  and the west end of Jost Van Dyke Island  $177^{\circ}$ . The haul was made in 190 to 300 fathoms.

This haul yielded a number of deep-sea fish, some fine hydroids, echinoderms, sponges, many crustaceans, and a few mollusks.

**STATION 102.** Lat.  $18^{\circ}50'30''$  N. Long.  $64^{\circ}43'00''$  W. March 4, 1933  
 Lat.  $18^{\circ}51'00''$  N. Long.  $64^{\circ}33'00''$  W.

When the otter trawl was lowered at 2:25 p.m., the center of Tobago Island bore  $193^{\circ}$  and the western end of Jost Van Dyke Island  $197^{\circ}$ . The haul was made in depths ranging from 90 to 500 fathoms.

This was by far the most important station. The dredge came up with a mass of material, among which were two dozen exquisite

*Neocrinus* and several specimens of another stalked crinoid, *Endoxocrinus parrae*. There were also a lot of comatulids and some beautiful specimens of *Astrophyton* attached to hydroids. We likewise obtained a host of deep-sea fish, mollusks, brachiopods, crustaceans, sponges, hydroids, anemones, worm tubes, etc. Dr. Price obtained a number of parasites from larger fish.

**STATION 103.** Lat. 18°51'00" N. Long. 64°33'00" W. March 4, 1933  
Lat. 18°49'00" N. Long. 64°30'00" W.

An otter trawl was lowered at 4:42 p.m. and surfaced at 6:10, the water varying from 150 to 400 fathoms in depth.

During this haul, the accumulator indicated that we had snagged, and upon surfacing the line, it was found that only the bridle of the otter trawl was present, the boards and the net having been torn away. On the rope, however, there was a piece of a hydroid containing an *Astrophyton*.

Beginning in the evening and continuing until the next morning, T. T. Brown and Fenimore Johnson, assisted by Anthony Wilding and Ena and Florence Douglass, took soundings. These extended over two lines parallel to the one previously made, one 20 miles to the north and another 20 miles to the south. Soundings on these lines were also spaced at 5-mile intervals. The former middle line was also extended east to coincide with these two parallel lines. The three, therefore, are 235 miles in length. There was also a line of soundings run north from the last dredging station to the parallel sounding lines, on which stations were made at 5-mile intervals. All these, together with their depths, are plotted on the accompanying chart. A detailed report of these soundings with bearings will be published in a separate paper.

**STATION 104.** Lat. 18°30'40" N. Long. 66°13'20" W. March 8, 1933  
Lat. 18°30'10" N. Long. 66°13'50" W.

When we lowered the Chesapeake Bay oyster dredge at 8:53 a.m., Morro Castle Light bore 111° and the western end of Salinas Island 136°. When it was surfaced at 9:41, the western end of Salinas Island bore 121° and the eastern end 116°. The depth ranged from 80 to 120 fathoms.

We had lined the chain-linked oyster trawl with ½-inch webbing, and the haul brought up a bagful of bottom, containing a host of mollusks, crustaceans, crinoids, sponges, and other forms.

**STATION 105.** Lat.  $18^{\circ}30'50''$  N. Long.  $66^{\circ}13'20''$  W. March 8, 1933  
Lat.  $18^{\circ}31'30''$  N. Long.  $66^{\circ}14'55''$  W.

When the oyster dredge was again lowered at 10:09 a.m., Morro Castle Light bore  $113^{\circ}$  and the west end of Salinas Island  $138^{\circ}$ . When it was surfaced at 10:51, Morro Castle Light bore  $113^{\circ}$  and the west end of Salinas Island  $129^{\circ}$ . The haul was made in 150 fathoms.

By the time the dredge reached the surface, most of the material had been washed out of the bag, but an interesting lot of fish, mollusks, crustaceans, echinoderms, worms, and hydroids were present.

**STATION 106.** Lat.  $18^{\circ}31'20''$  N. Long.  $66^{\circ}16'30''$  W. March 8, 1933  
Lat.  $18^{\circ}31'30''$  N. Long.  $66^{\circ}18'20''$  W.

When the otter trawl was again lowered at 11:12 a.m., Morro Castle Light bore  $109^{\circ}$  and the west end of Salinas Island  $119^{\circ}$ . When it was surfaced at 12:03 p.m., Morro Castle Light bore  $106^{\circ}$  and the west end of Salinas Island  $113^{\circ}$ . The depth of this haul ranged from 150 to 195 fathoms.

The material was again largely washed out of the dredge, but there remained a lot of mollusks, brittlestars, anemones, and other forms.

**STATION 107.** Lat.  $18^{\circ}32'15''$  N. Long.  $66^{\circ}17'45''$  W. March 8, 1933  
Lat.  $18^{\circ}32'30''$  N. Long.  $66^{\circ}22'45''$  W.

When the otter trawl was put over at 12:57 p.m., Morro Castle Light bore  $112^{\circ}$  and the west end of Salinas Island  $120^{\circ}$ . When it was surfaced at 2:34, Punta Cerro Gordo bore  $145^{\circ}$  and Garza Island  $182^{\circ}$ . The haul was made in 250 to 260 fathoms.

A tremendous pull on the accumulator indicated that the apparatus had snagged, and upon hauling in, we found we had lost all the gear.

On the way north we made a series of soundings across the great deep, which are indicated on our chart.

**STATION 108.** Lat.  $19^{\circ}32'00''$  N. Long.  $67^{\circ}53'00''$  W. March 9, 1933

At this station on the north side of the deep, a depth of 2,940 fathoms was sounded. We put a series of Nansen water bottles over, but the heavy swell caused us to drift too rapidly to effect a straight line. We therefore lowered only four bottles with thermometers to depths of 500, 1,000, 1,900 and 2,400 meters. Water samples and thermometer readings were obtained at this station, an account of which will be given later.

**STATION 109.** Lat.  $20^{\circ}05'00''$  N. Long.  $68^{\circ}10'00''$  W.      March 9, 1933

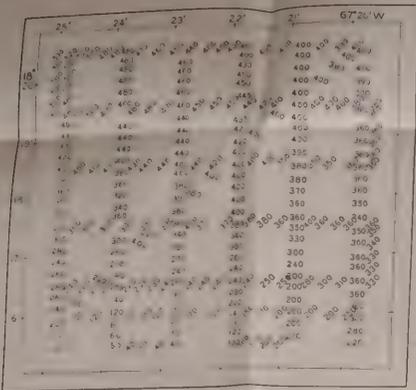
The small Johnson bucket dredge was lowered at the end of the cable to 3,000 fathoms. The drift of the ship, caused by the wind, again prevented us from reaching bottom. The sounding given was 2,900 fathoms. The few forms caught in the Johnson bucket dredge were pelagic organisms and were probably captured on the upward pull.



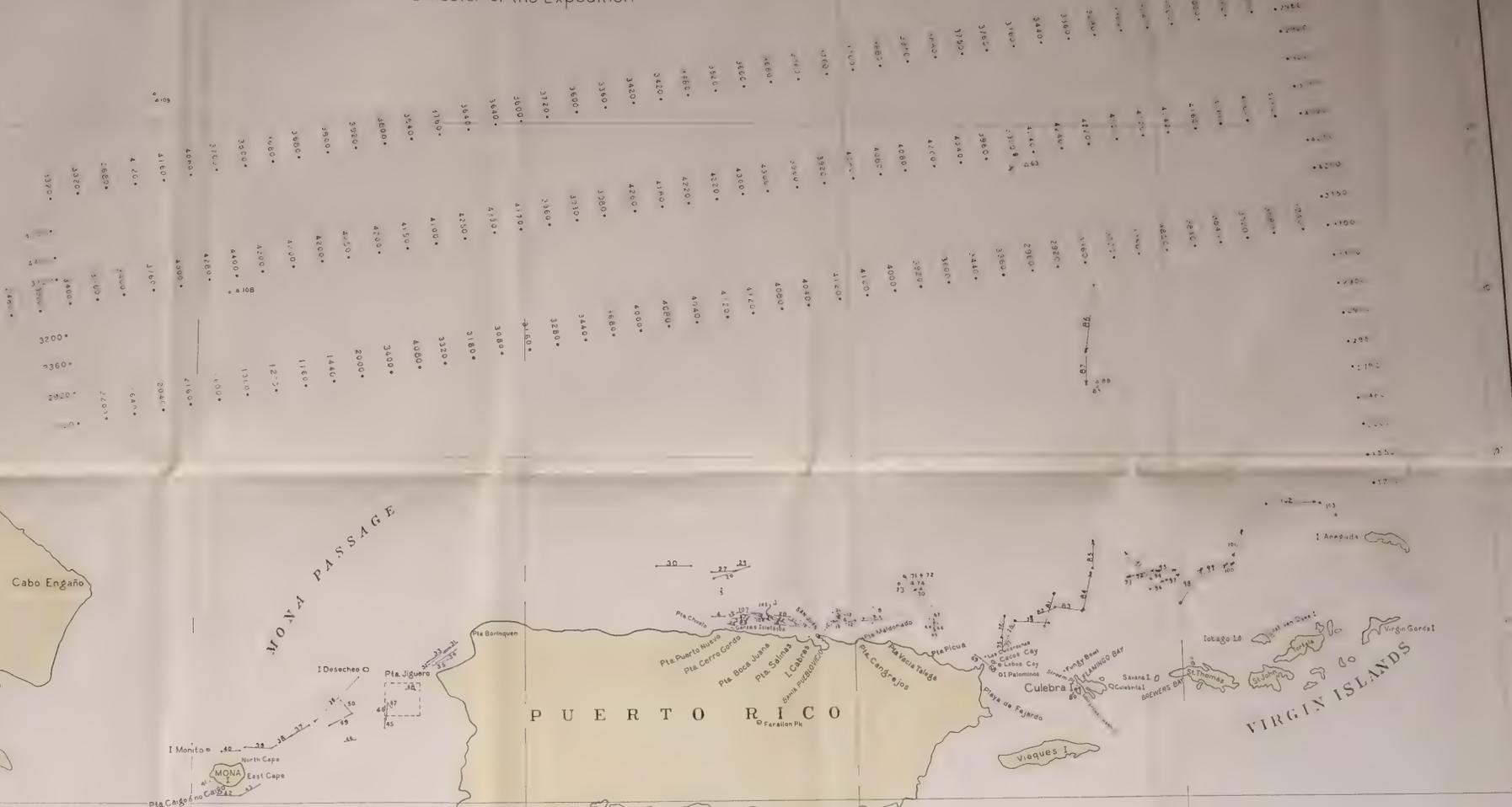




CHART SHOWING  
**DREDGING & SOUNDING STATIONS**  
 OF THE FIRST  
**JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION**  
 1933  
 PAUL BARTSCH  
 Director of the Expedition



MONA PASSAGE  
 Depth detail of Dredging Ground



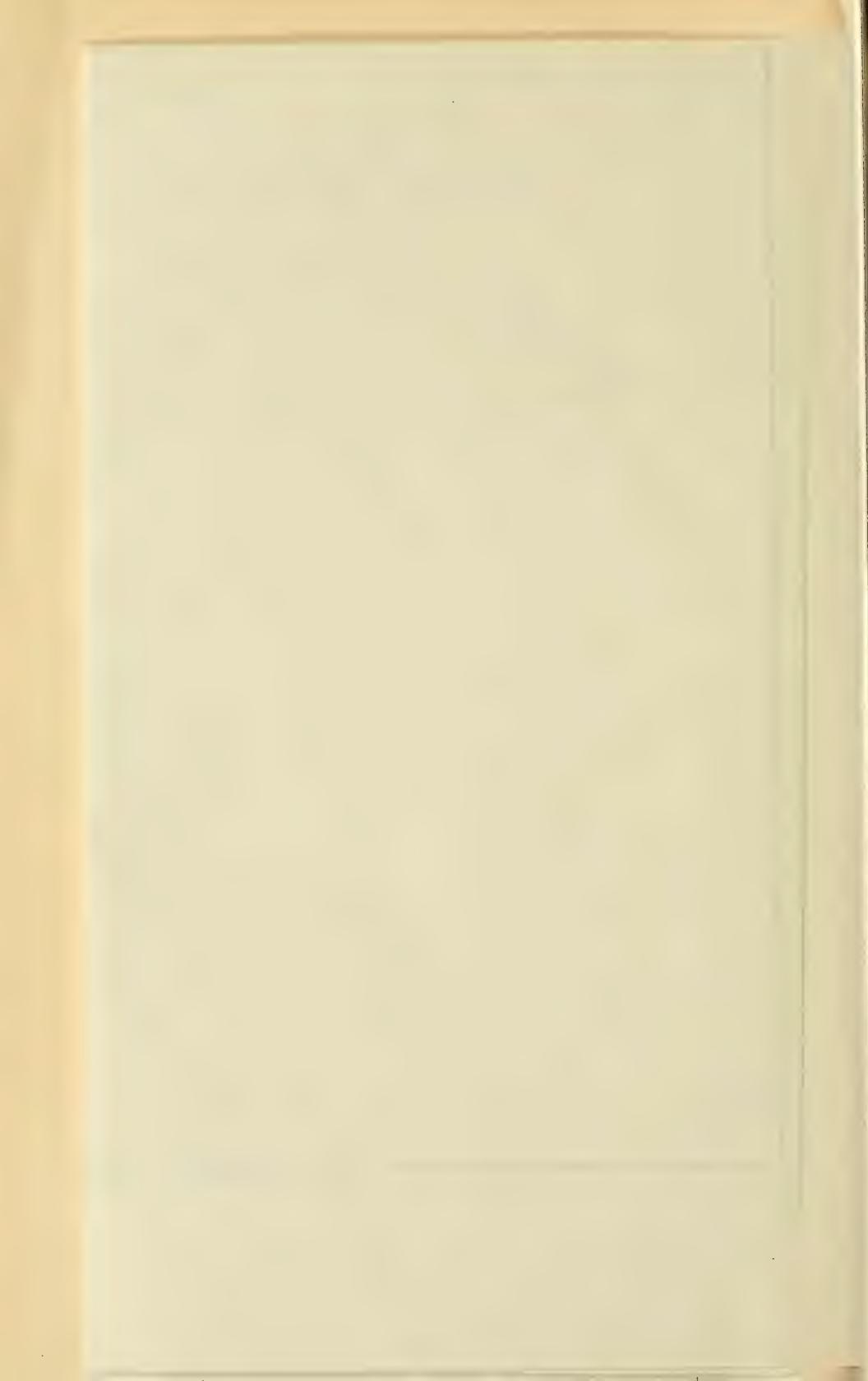
HISPANIOLA

PUERTO RICO

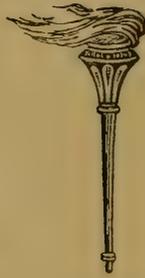
VIRGIN ISLANDS

The soundings in these records are unreduced,  
 using a 400 fathoms per second standard

Scale: 1° Longitude equals 4 1/2 inches







SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 2

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## Johnson Fund

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## NEW MOLLUSKS OF THE FAMILY TURRITIDÆ

(WITH EIGHT PLATES)

BY

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Curator, Division of Mollusks and Cenozoic Invertebrates,  
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### NEW MOLLUSKS OF THE FAMILY TURRITIDAE

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U.S. National Museum*

(WITH EIGHT PLATES)

The first Johnson-Smithsonian Deep-Sea Expedition devoted its attention to the great deep of the Atlantic—the Puerto Rican Deep, a region faunally decidedly unexplored. The reason why this has been so becomes quite evident to the investigator making the attempt, for during our entire work there, which extended from January 30 to March 9, 1933, we encountered but 2 days of calm sea. The fact that we were able to work at all times was due to the large size of the *Caroline*, which has a length over all of 279 feet 10 inches, a beam of 38 feet, depth of hull 27 feet, draft  $17\frac{1}{2}$  feet, and also to the fact that she carries a 50-ton Sperry gyro-stabilizer, which keeps the yacht almost on an even keel at all times.

Most of the 109 stations covered during our cruise yielded mollusks, many of them members of the family Turritidae.

Almost all of the stations were on very rough bottom, and this was particularly true of those in the Mona Island Passage. Probably the most interesting haul was at station 92, which is near the place where the *Challenger* made her famous haul at her station 24, March 25, 1873. This was one of the four richest hauls made by the *Challenger* on her whole cruise. Our stations 36, 91, 93, 94, and 95 surround this *Challenger* station.

We have always felt the lack of types or topotypes of the numerous mollusks described by Watson from this station, and our hauls supplied these.

The National Museum is exceedingly rich in West Indian mollusks, having the large collections obtained by government investigators and many specimens acquired through private donations. It is therefore possible with this splendid material to subject our catch to a critical review.

The family Turritidae has for some time been a troublesome group whose genera have been variously interpreted by different authors.

Most of the difficulties have been due to the fact that authors have been loath to increase the number of genera in the family, which has already 326 generic names to its credit. Also, most authors have lacked the necessary genotypes to fix definitely the characters of each genus.

Realizing the confusion that has existed and still exists in the nomenclature of this family, I have been acquiring genotypes of it for the National Museum for some time and can now say that the Museum has specimens of almost all of them, or, where specimens are not available, photographs of them. It is this collection of genotypes that brings to light the woeful inadequacy of names, and in reviewing even as limited a fauna as that here in part discussed, it becomes necessary to add many new names.

In the examination of the turritids I find that the nuclear characters here as elsewhere yield useful elements in the definition of groups, but these are points which may be discussed in detail in the final paper, which will give an account of all the mollusks obtained in the Puerto Rican Deep, not merely the new forms here made known.

#### ELDRIDGEA, n. gen.

*Type species.*—*Eldridgea johnsoni*, new species.

Shell moderately large, ovate (early nuclear whorls unknown). The first of the remaining nuclear whorls apparently smooth. The early post-nuclear whorls strongly axially ribbed. Those succeeding marked by expanded foliations that take the place of ribs. These broadly expanded elements are best understood by examining the figures (pl. 1, figs. 1-3); they suggest the ornamentations of certain Boreotrophons. The outside of the expanded wings, the base, and the columella are marked by more or less equal and equally spaced spiral lirations. The inside of the foliations is smooth. Aperture large. Posterior sinus immediately below the summit; stromboid notch very shallow; inner lip appressed to the columella; parietal wall covered with a thin callus, which forms a nodule at the posterior angle.

This genus suggests *Clavus* Montfort = *Clavicantha* Swainson and *Tylotia* Melville, in which the ribs are spinose or slightly lamellosely expanded, but the present genus carries this to an extreme point.

#### ELDRIDGEA JOHNSONI, n. sp.

Plate 1, figs. 1-3

Shell moderately large, ovate, horn-colored, with the inside of the alations and the broad basal band white; interior of aperture porcellaneous with a pinkish tinge. A part of the first turn of the nuclear

whorl is lost; the remaining nuclear turn appears to be smooth. The early postnuclear whorls are marked by protractively slanting, axial ribs, of which 9 occur upon the first three turns and 10 upon the fourth. On the first three whorls these axial ribs are quite regular, being strongest on the middle of the turns and tapering toward the summit and the periphery. The spaces that separate them here are about as wide as the broad ribs. On the fourth postnuclear whorl they begin to be more oblique and tend toward the formation of a lamina at the tip. This becomes accentuated on the fifth turn, and on the succeeding turns it becomes increasingly more pronounced, gradually forming the broad winglike expansion that characterizes this species. There are 10 ribs on the fifth and sixth, 8 upon the seventh to ninth, and 12 upon the last turn. These alations are marked by incremental lines, and their outside, as well as the base and columella, are crossed by slender, wavy, spiral threads. The insides of the alations are smooth, barring incremental lines. Aperture moderately large and expanded, decidedly channeled anteriorly and at the posterior angle. Outer lip thin, protracted between the posterior channel and slender stromboid notch anteriorly. Inner lip reflected over the somewhat twisted columella as a heavy callus, which extends over the parietal wall and forms a slight lump near the posterior angle.

*Type*.—The unique type, U.S.N.M. no. 430852, was dredged at station 12, off the north coast of Puerto Rico, in 200 to 300 fathoms between latitude  $18^{\circ}31' N.$ , longitude  $66^{\circ}00'15'' W.$  and latitude  $18^{\circ}30'30'' N.$ , longitude  $66^{\circ}01'45'' W.$  It has 11.5 whorls remaining and measures: Length, 31 mm; greater diameter, including alations, 19.7 mm.

#### FENIMOREA, n. gen.

*Type species*.—*Fenimorea janetae*, new species.

Shell large; nuclear whorls well rounded, smooth. Postnuclear whorls with strong, broad axial ribs that are retractively bent and reduced in the depressed groove below the summit and extend anteriorly to the fasciole on the base. The finer sculpture on the ribs and intercostal spaces consists of decidedly wavy incised spiral lines and fine incremental lines, which vary in strength. The combination of these two elements gives to the surface a peculiar effect, resembling the scales on some butterfly wings; this sculpture extends to the basal fasciole. The fasciole itself and the area immediately posterior to it, as well as the rest of the columella, are marked by spiral threads. The aperture is moderately long and broad and strongly channeled an-

teriorly. The basal sinus is deep and reflected at the edge with a strong parietal callus; the stromboid notch is shallow.

This genus suggests *Elaeocyma* Dall, type *E. empyrosia* Dall, but differs from it in having the nuclear whorls rounded instead of carinated and the ribs stronger, and above all in the detailed fine sculpture described above.

The genus is represented by 11 species in our collection, of which only two have been named, namely *Fenimorea moseri*, Dall = *Pleurotoma (Drillia) moseri* Dall from the West Coast of Florida and *Drillia fucata*, Reeve from the Bahamas. The unnamed species come from:

East Coast of Florida (3)  
 West Coast of Florida (1)  
 Puerto Rico (2, 1 here described)  
 St. Thomas (1)  
 Barbados (2)

**FENIMOREA JANETAE, n. sp.**

Plate 1, figs. 4-7

The shell is rather large, with the posterior groove and an area about as wide as this groove, anterior to the groove, on the axial ribs, white. This is followed by a broad zone of chestnut-brown occupying about half the whorls between the summit and suture; this zone terminates a little below the periphery. Anterior to this is a fainter thread of brown and a little paler brown area in the groove just posterior to the fasciole. In addition to this, there are, in the lighter bands in the intercostal spaces, indications of pale brown markings. The broad brown band becomes enfeebled on the last portion of the last whorl. The interior of the aperture is bluish white with the dark band shining partly through this, and the callus on the columellar area is porcelaneous. The nuclear whorls are 1.5, small, well rounded and smooth; the postnuclear whorls are appressed at the summit with a depressed groove occupying the posterior third between the summit and suture, evenly rounded from the anterior termination of this to the periphery, and marked by strong, broad, rounded, axial ribs, which have their strongest development anterior to the sinus at the summit and become attenuated posteriorly in crossing the base, where they extend to the basal fasciole. Of these ribs, 10 are present on the first four whorls, 12 on the fifth to seventh, 14 on the eighth and ninth, and 16 on the tenth. The spaces separating the axial ribs are about as wide as the ribs. In addition to this sculpture the whorls are marked by slender spiral threads in the depressed area near the summit, of

which 11 are present on the last whorl. Anterior to the depressed area the threads are replaced by pitted impressed lines, which also cover the base. Between the threads and lines, under high magnification, still finer, closely spaced, microscopic spiral striations are present, and the ribs and the intercostal spaces also bear fine incremental lines with microscopic axial incised lines between them. The heavier incremental lines terminating anteriorly in the spiral line of pits divide the space between the spiral lines into scalelike elements suggesting the scales of some butterfly wings, each scale being bordered by a deeper axial depression and marked by microscopic axial striations, as well as the microscopic spiral lines, the axial striations being a little stronger. The columella has a moderately strong basal fasciole, which is bordered posteriorly by three feeble spiral threads and crossed by two more, whereas anterior to the basal fasciole the columella bears about six feebly impressed spiral threads. The aperture is moderately large, rather broad, slightly channeled anteriorly with the posterior channel deeply incised and its wall reflected as a strong callus over the parietal wall. The stromboid notch at the anterior end of the outer lip is rather short and shallow; the space between the stromboid notch and the basal channel is clawlike. The parietal wall is covered by a moderately thick callus. There is a stronger varix about a quarter of a turn behind the aperture on the last whorl.

*Type*.—U.S.N.M. no 430249, obtained at station 26 in 33 to 40 fathoms on rough coral rock bottom between latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. and latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W. It has 12 whorls and measures: Length, 37.8 mm; greater diameter, 14.3 mm.

#### DOUGLASSIA, n. gen.

*Type species*.—*Dougllassia enae*, new species.

Shell of medium size. Nuclear whorls well rounded, smooth; post-nuclear whorls with a broad concave area immediately below the summit, across which the axial ribs do not extend; the rest convex. Base rather short. Columella short with a feeble fasciole. Aperture rather large, deeply channeled anteriorly and posteriorly, the posterior channel being immediately below the summit; stromboid notch conspicuously reflected; columellar wall reflected as a heavy callus; parietal wall with a heavy callus that forms a knob at the posterior angle. The sculpture consists of strong axial ribs that extend from the anterior limit of the concave area, where they are strongest over the base, growing feebler anteriorly. Fine incremental lines are also present on the

ribs and in the intercostal spaces. The body of the whorls is marked by fine spiral lirations, while the columella has strong spiral cords.

The present genus suggests *Symatosyrinx* Dall, the type of which is *Pleurotoma lunata* Lea, which comes from the Yorktown Miocene at Petersburg, Va. It differs from it in having the nuclear whorls well rounded instead of carinated, the columella strongly lirate, the basal fasciole less pronounced, and in being smaller in every way.

**DOUGLASSIA ENAE**, n. sp.

Plate 2, figs. 1-3

Shell elongate-conic, wax-yellow with a broad pale-brown band at the periphery. Nuclear whorls 2.5, smooth, forming a pointed apex. The beginning of the postnuclear whorls has the axial riblets characteristic of the later postnuclear whorls, but here they are a little more slender and a little more closely approximated. The postnuclear whorls are marked by strong axial ribs that almost form cusps at the anterior termination of the posterior sinal region; they extend only very feebly across the sinal area, which occupies the posterior two fifths of the turns. On the last whorl these ribs are decidedly enfeebled on the base and evanesce at the junction with the columella. Of the axial ribs, 10 occur upon the first six whorls, 12 upon the seventh and the last turn. These ribs are about one third as wide as the spaces that separate them, the latter being broad and concave. In addition to the axial ribs the whorls are marked by rather strong incremental lines that have a decidedly sigmoid curve, being retractorily slanting at the posterior sinal region and protractorily anterior to this. The spiral sculpture consists of numerous, closely spaced, microscopic obsolete spiral lines. Base moderately well rounded. Columella short and stubby, marked by 12 rather strong sinuous spiral threads and finer spiral lines corresponding to those on the spire and base. Aperture moderately large and rather broad, decidedly channeled posteriorly and anteriorly with a feeble stromboid notch. The outer lip is protracted between the posterior angle and the stromboid notch into a clawlike element, while the inner lip is reflected over the columella as a heavy callus, which extends over the parietal wall and projects into the aperture at the posterior sinus as a decided knob. There is a heavy varix about one sixth of a turn behind the edge of the outer lip.

*Type*.—U.S.N.M. no. 430289, dredged at station 26 in 33 to 40 fathoms between latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. and latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W. It has 6.5 whorls

remaining and measures: Length, 16.6 mm; diameter, 6.9 mm. The nucleus was described from one of two specimens, U.S.N.M. no. 430038, obtained at the same station. This specimen has 9 whorls and measures: Length, 11.4 mm; diameter, 4.7 mm. Another lot, U.S.N.M. no. 429205, contains seven specimens from station 104 taken in 80 to 120 fathoms between latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. and latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W.

In the collection of the United States National Museum is also an undescribed species belonging here, which was labeled *Drillia thea* Dall, variety, from the west coast of Florida.

#### FUSISYRINX, n. gen.

*Type species.*—*Fusisyrinx fenimorei*, new species.

Shell rather fusus-like in appearance with the aperture almost equal to the rest of the shell and a strong, deeply cut sinus at the summit of the whorls. The columella is slender and but slightly twisted. The nuclear whorls ? . Postnuclear whorls with a few strong knoblike ribs, which extend from the anterior limit of the sutural sinus to the periphery. In addition to this there are strong lines of growth which pass over the ribs and intercostal spaces. The spiral sculpture consists of fine spiral threads in the sinus at the summit, succeeded anteriorly to the sinus by stronger spiral threads, between which finer spiral threads are present. This sculpture is also present on the slender columella, where the finer spiral threads are less numerous. Aperture very long, the anterior channel very slender and long, the posterior broad and deeply incised. The outer lip is slender at the edge, and the inner lip appears as a smooth callus and as if the shelly substance carrying the outer sculpture had been here resorbed. This also holds good on the parietal wall of the aperture.

#### FUSISYRINX FENIMOREI, n. sp.

Plate 2, figs. 4, 5

Shell very large, of fusus-like shape, milk-white, covered with a very thin translucent periostracum. Nuclear whorls decollated. Postnuclear whorls strongly rounded, marked by almost knoblike axial ribs, which extend from the anterior limit of the posterior sinus to the periphery. These ribs are almost as wide as the spaces that separate them. In addition to this the whorls are marked by sigmoid axial lines of growth. Of these ribs, 10 occur upon all but the penultimate and the last whorl, each of which has 12. The spiral sculp-

ture consists of fine threads, which in the sinus portion near the summit of the early turns are about as strong as the spiral threads anterior to this, but on the later whorls these spiral threads become less strongly developed, while those anterior to it increase in strength. The anterior portion of the whorls on the later turns are marked by rather coarse, definitely spaced threads, between which finer spiral threads are present, varying in number from one to four. This fine sculpture, combined with the lines of growth, gives a reticulated pattern to the spiral grooves between the spiral cords. Base short, well rounded, marked like the anterior portion of the spire. Columella very long, slender, marked by numerous slender, more or less equally spaced spiral threads, which become somewhat enfeebled near the tip. Between these stronger threads an occasional slender spiral thread is present. Aperture tear-shaped with a very long anterior channel. The posterior channel broad and deep, immediately below the summit. The inner lip smooth, appearing as if excavated below the surface of the sculptural portion of the shell.

*Type*.—U.S.N.M. no. 425356, collected at station 35 in 180 to 80 fathoms between latitude  $18^{\circ}23'40''$  N., longitude  $67^{\circ}16'45''$  W. and latitude  $18^{\circ}24'45''$  N., longitude  $67^{\circ}14'15''$  W. It has eight and one quarter whorls remaining and measures: Length, 71.1 mm; diameter, 20.4 mm.

A younger specimen, a topotype, U.S.N.M. no. 430653, has nine whorls remaining and measures: Length, 56 mm; diameter, 16.7 mm.

I have seen nothing in our turritid collection that compares with this group.

#### POLYSTIRA Woodring

The genus *Polystira* was created by W. P. Woodring in 1928<sup>1</sup> for certain large West Indian turritids. He named the largest of the recent species, generally known as *Pleurotoma albida* Perry, as type. Unfortunately, the mollusk so designated is not *Pleurotoma albida* Perry, which Perry states<sup>2</sup> "is frequently found at New Zealand and Lord Howe's Island." Perry's figure 4, plate 32, of this species does not agree with the West Indian material. It clearly resembles certain shells from North Australia in the collection of the National Museum. The name is, therefore, not applicable to the West Indian shell, which will have to carry the next available designation.

<sup>1</sup> Miocene mollusks from Bowden, Jamaica, pt. 2, p. 145, 1928.

<sup>2</sup> Conchology or the natural history of shells, London, 1811.

Lamarck in 1816, in his "Tableau Encyclopedique et Methodique", figured on plate 439, as figure 2, the West Indian shell without naming it. Wood, in 1818, in his "Index Testaceologicus", on page 125, names this species *Murex virgo*, referring to Lamarck's figure cited above. This appears to be the oldest available name for the type species.

The type of *Polystira* Woodring must therefore be *Murex virgo* Wood = *Polystira albida* Woodring, not Perry.

**POLYSTIRA FLORENCAE, n. sp.**

Plate 3, figs. 4-7

Shell rather large, fusiform, pale brown, excepting the large median keel between summit and suture and a broad area that extends over a little more than half of the posterior part of the columella, which are white. The tops of the other spiral keels are also a trifle paler than the spaces between them. The first 1.5 nuclear whorls are large, well rounded, and smooth. These are followed by about one half of a turn that is crossed by about 10 slightly retractorily curved, axial ribs, which are about one fourth as wide as the spaces that separate them. The postnuclear whorls are marked by very strong spiral keels, of which the most conspicuous one is the second one below the summit, which bears the deeply narrow posterior sinus. The first keel occupies the space almost midway between the summit and this keel. Anterior to the strong keel, there are on each whorl two additional keels, one, the stronger, occupying the periphery of the whorls, another a little nearer to the strong second keel than the peripheral and slightly weaker than the peripheral. A slender spiral thread is present midway between the summit and the first, and between the second and third; and two are present between the third and fourth. The spaces between the keels are decidedly concave, and they are crossed by slender, axial riblets, which are retractorily curved posterior to the strong keel and protractorily curved anterior to it. In addition to this the whorls are marked by microscopic lines of growth and spiral striations. The base is short and marked by four keels, which grow consecutively weaker anteriorly. In the middle of the broad spaces between these keels is a slender spiral thread. A continuation of the axial sculpture of the spire is present here. The columella is rather long, slender, and marked by oblique spiral cords, which grow consecutively weaker anteriorly, becoming obsolete toward the anterior tip. This also holds good for the continuation of the axial sculpture, which likewise becomes enfeebled and obsolete.

Aperture narrow and long, the outer lip deeply incised to form the narrow sinus of the second keel and scalloped by the rest of the keels and cords. Inner lip thin, reflected over and appressed to the columella. The parietal wall is covered by a moderately thick callus.

*Type*.—U.S.N.M. no. 429760, collected at station 26, on rough bottom off the north coast of Puerto Rico, in 33 to 40 fathoms between latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. and latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W. It has 12 whorls and measures: Length, 33.2 mm; greater diameter, 9.0 mm.

U.S.N.M. no. 430329 contains nine young specimens from the same station.

U.S.N.M. no. 429747 contains five young specimens dredged at station 10 in 120 to 160 fathoms between latitude  $18^{\circ}29'20''$  N., longitude  $66^{\circ}05'30''$  W. and latitude  $18^{\circ}30'24''$  N., longitude  $66^{\circ}04'15''$  W.

U.S.N.M. no. 430053 contains six specimens from station 104, on rough bottom off the north coast of Puerto Rico, in 80 to 120 fathoms between latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. and latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W.

**POLYSTIRA MACRA, n. sp.**

Plate 3, figs. 8, 9, 13, 14

Shell slender, fusiform, pale cream-colored with the columella white. Nuclear whorls almost 2, the first 1.5 rather large, well rounded, smooth, the last half marked by eight slender, not strongly expressed, sinuous, rather distantly spaced, axial riblets. The postnuclear whorls are marked by strong spiral keels, of which the second carrying the sinus, is the strongest. The first is a little nearer to the summit than to the second. The other two keels ornament the anterior half of the whorls, the fourth one being at the periphery and the third midway between this and the strong keel. The spaces between these keels vary in width, that between the first and second being considerably narrower than that between the second and third, which equals the space between the third and fourth. All the spaces between the keels are deeply concave. There is a slender crenulated thread at the summit and another slender thread between the first and second spiral keel, a little nearer the second than the first. A feeble spiral thread is present about one fourth of the distance between the second and third keel anterior to the second keel, and a second thread doubly as strong as the last mentioned is a little nearer the third keel than the second. Another spiral thread occupies the space midway between the second and third. The axial sculpture consists of rather strong,

slender, closely spaced, axial riblets, which are retractively slanting posterior to the strong keel and protractive anterior to it. The base is moderately short, well rounded, and marked by four strong spiral cords, which are almost equally spaced, and by the continuations of the axial riblets. A slender thread occurs between the third and fourth. The columella is long and slender and marked by rather regularly spaced spiral threads, which extend to the very tip and which grow gradually weaker from the base anteriorly. The axial sculpture on the base is almost as strong as on the spire, while on the columella it becomes decidedly weakened and evanescent toward the tip. Aperture narrow, slender, with a deep narrow sinus on the outer lip corresponding to the second keel. The rest of the outer lip is rendered more or less sinuous by the external sculpture. The inner lip is appressed to the columella as a callus, and this callus extends over the parietal wall.

*Type*.—U.S.N.M. no. 430395, collected at station 101, off the north coast of Puerto Rico, in 190 to 300 fathoms between latitude  $18^{\circ}40'30''$  N., longitude  $64^{\circ}50'$  W. and latitude  $18^{\circ}45'40''$  N., longitude  $64^{\circ}48'$  W. It has 13.5 whorls and measures: Length, 32 mm; greater diameter, 6.7 mm.

U.S.N.M. no. 430526 contains 21 specimens from station 23 dredged in 260 to 360 fathoms between latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}17'45''$  W. and latitude  $18^{\circ}32'$  N., longitude  $66^{\circ}21'15''$  W.

U.S.N.M. no. 429582 contains three specimens dredged from station 32 in 200 to 280 fathoms between latitude  $18^{\circ}25'50''$  N., longitude  $67^{\circ}14'55''$  W. and latitude  $18^{\circ}23'50''$  N., longitude  $67^{\circ}17'35''$  W.

U.S.N.M. no. 429565 contains three specimens from station 25 obtained in 240 to 300 fathoms between latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}22'10''$  W. and latitude  $18^{\circ}32'05''$  N., longitude  $66^{\circ}22'10''$  W.

U.S.N.M. no. 430584 contains two specimens from station 12 in 200 to 300 fathoms between latitude  $18^{\circ}31'$  N., longitude  $66^{\circ}00'15''$  W. and latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}01'45''$  W.

All the specimens obtained came from off the north coast of Puerto Rico.

#### LEUCOSYRIX JANETAE, n. sp.

Plate 3, figs. 3, 11, 12

Shell elongate, fusiform, yellowish white except the early nuclear whorls, which are pale brown. Nuclear whorls 1.7, the first smooth and well rounded, the second one with a faint submedian angulation. Postnuclear whorls well rounded, bearing a series of nodulelike ribs,

which are almost median on the whorls and evanesce at the sutural sulcus and on the anterior portion of the whorls. These nodules are cusped on the early turns and become broad and well rounded on the later whorls. Of these nodules, 12 occur upon the first four post-nuclear turns, 14 upon the fifth to eighth, 16 upon the ninth, 20 upon the tenth to twelfth, and 25 on the last whorl. In addition to these axial nodules the whorls are marked by closely spaced, slender, sigmoid lines of growth, which have a retractive curve in the sinus at the summit and are protractive anteriorly. The spiral sculpture on the early postnuclear whorls is almost absent, at best merely indicated, but beginning with the fourth whorl and from there on it increases steadily in strength, eventually forming in the sinus at the summit a series of low, flattened cords of which 18 are present between the summit and the anterior termination of the sinus, those near the summit being more broadly and more strongly developed than those on the anterior portion. Anterior to the sinus the whorls are marked by rather wavy subequal and subequally spaced, somewhat flattened spiral threads of which 20 are present on the last whorl. Suture slightly constricted. Periphery well rounded. Base short, well rounded, marked like the spire with 10 spiral cords, which equal those on the spire in strength and spacing. Columella rather long, moderately slender, and marked with the same type of sculpture that characterizes the base. Aperture pyriform, strongly channeled anteriorly, and provided with a broad sinus at the posterior angle, the portion anterior to the sinus being drawn forward as a clawlike element but maintaining the same curvature as the main body whorl. Outer lip thin. Inner lip covered with a thick callus, which extends on to the parietal wall.

*Type*.—U.S.N.M. no. 429834, collected at station 96 in 270 to 330 fathoms between latitude  $18^{\circ}36'$  N., longitude  $65^{\circ}05'30''$  W. and latitude  $18^{\circ}37'15''$  N., longitude  $65^{\circ}03'$  W. It has lost one nuclear turn. The 15 whorls remaining measure: Length, 30.8 mm; diameter, 11.9 mm.

U.S.N.M. no. 429818 contains two topotypes obtained from station 96.

U.S.N.M. no. 430475 contains three specimens from station 84 in 300 to 350 fathoms between latitude  $18^{\circ}32'30''$  N., longitude  $65^{\circ}18'30''$  W. and latitude  $18^{\circ}39'$  N., longitude  $65^{\circ}17'$  W., one of which served for the description of the nucleus.

U.S.N.M. no. 430519 contains three additional specimens from station 23 in 260 to 360 fathoms between latitude  $18^{\circ}32'15''$  N.,

longitude  $66^{\circ}17'45''$  W. and latitude  $18^{\circ}32'$  N., longitude  $66^{\circ}21'15''$  W.

This species comes nearest to *Leucosyrinx verrilli*, from which it differs markedly by its more slender form and more numerous nodulose ribs.

**FUSITURRICULA ENAE, n. sp.**

Plate 3, figs. 1, 2, 10

Shell of medium size, fusiform, pale horn-colored, with the intercostal spaces pale chestnut-brown, and with a pale chestnut-brown median basal band, and the tip of the columella of the same color. Nuclear whorls 1.5, smooth, well rounded. A few closely spaced wrinkles mark the transition of the nuclear turns to the postnuclear whorls. Postnuclear whorls moderately high. The first bears a strong median nodulose cord. On the second this cord tends to split and from there on develops into two nodulose cords, the nodules representing the axial ribs. The nodules on the first postnuclear whorl are cusplike, whereas those of the succeeding turns become increasingly more rounded and elongated, their long axes corresponding with the spiral sculpture. Of these nodules, 10 occur upon the first and second turn, 12 upon the third and fourth, 14 upon the fifth and sixth, and 16 upon the seventh and last turns. Anterior to the two nodulose spiral cords the whorls are marked by four almost equal and equally spaced spiral cords. Periphery and base well rounded. The latter is marked by five equal and equally spaced spiral threads. The entire base and the anterior portion of the whorls are in addition crossed by rather coarse lines of growth, which are particularly emphasized between the spiral cords. Columella long and attenuate, marked by 19 rather distantly spaced, somewhat flattened, low, spiral cords. Aperture very elongate, decidedly channeled anteriorly and with a very deeply cut sinus immediately below the summit. Outer lip thin. Inner lip slightly excavated, appearing as a white callus.

*Type*.—U.S.N.M. no. 430619, has 10 whorls and measures: Length, 23.5 mm; diameter, 7 mm. It was dredged at station 24 in 260 to 350 fathoms between latitude  $18^{\circ}32'30''$  N., longitude  $66^{\circ}21'$  W. and latitude  $18^{\circ}31'45''$  N., longitude  $66^{\circ}19'15''$  W.

U.S.N.M. no. 429666 contains two specimens from station 25 in 240 to 300 fathoms between latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}22'10''$  W. and latitude  $18^{\circ}32'05''$  N., longitude  $66^{\circ}22'10''$  W.

U.S.N.M. no. 429823 contains one specimen from station 96 in 270 to 330 fathoms between latitude  $18^{\circ}36'$  N., longitude  $65^{\circ}05'30''$  W. and latitude  $18^{\circ}37'15''$  N., longitude  $65^{\circ}03'$  W.

U.S.N.M. no. 430494 contains two specimens from station 101 in 190 to 300 fathoms between latitude  $18^{\circ}40'30''$  N., longitude  $64^{\circ}50'$  W. and latitude  $18^{\circ}45'40''$  N., longitude  $64^{\circ}48'$  W.

U.S.N.M. no. 430931 contains two specimens dredged at station 23 in 260 to 360 fathoms between latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}17'45''$  W. and latitude  $18^{\circ}32'$  N., longitude  $66^{\circ}21'15''$  W.

**GLYPHOSTOMA (GLYPHOSTOMA) EPICASTA, n. sp.**

Plate 4, figs. 4, 7, 9

Shell rather large, elongate-conic, milk-white. Nuclear whorls almost 3, the first one well rounded, the other two with a strong submedian keel. Postnuclear whorls rather low, well rounded, marked by axial ribs that evanesce in the sulcus below the summit, and on the last whorls evanesce as they pass over the base. Of these ribs, 10 occur upon the first four, 12 upon the fifth and sixth, 14 upon the seventh and eighth, 18 upon the ninth, and 20 upon the last turn. In addition to the axial ribs the entire surface of the shell is well marked by lines of growth, which on the sulcus below the summit are strengthened to form a series of wrinkles more numerous than the axial ribs. The spiral sculpture consists of well-developed cords, which are slightly flattened and which are about one third as wide as the spaces that separate them. The intersection of the axial ribs and spiral cords is rendered nodulose, the long axes of the nodules coinciding with the spiral sculpture. Of these spiral cords, one is present on the first turn, two on the second to sixth, three on the seventh, and seven on the remaining. Beginning with the eighth whorl, finer spiral threads are apparent in the sulcus below the suture, and these increase in number with the turns. On the last turn there are six. Suture moderately constricted. Periphery well rounded. Base rather long, well rounded, marked like the posterior portion of the last whorl, five spiral threads being present. Columella rather long, marked by lines of growth and 11 spiral threads, which become consecutively a little less strong from the posterior anteriorly. The entire surface of the shell is rather coarsely granulatedly sculptured. Aperture rather long, decidedly channeled posteriorly and anteriorly. Outer lip reinforced by a strong varix a little beyond the edge, the portion of the lip between the varix and edge being reflected over the aperture as a clawlike element. The inner edge of the thickened varix within the aperture bears seven strong denticles. The inner lip is also denticulated. Here the denticles are less strong and more numerous. About 15 are present in the type. Columella well covered by a moderately thick callus, which is strength-

ened into a decided denticle opposite the posterior termination of the internal callus of the outer lip, thus almost constricting the posterior channel into a tube, the outer portion of the parietal callus from the denticle to the posterior angle of the aperture being decidedly thickened.

*Type*.—U.S.N.M. no 430507, dredged at station 23 in 260 to 360 fathoms between latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}17'45''$  W. and latitude  $18^{\circ}32'$  N., longitude  $66^{\circ}21'15''$  W. It has almost 13 whorls and measures: Length, 31 mm; diameter, 10 mm.

U.S.N.M. no. 429580 contains two specimens from station 32 dredged in 200 to 280 fathoms between latitude  $18^{\circ}25'50''$  N., longitude  $67^{\circ}14'55''$  W. and latitude  $18^{\circ}23'50''$  N., longitude  $67^{\circ}17'35''$  W.

U.S.N.M. no. 429668 contains two specimens from station 25 dredged in 240 to 300 fathoms between latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}22'10''$  W. and latitude  $18^{\circ}32'05''$  N., longitude  $66^{\circ}22'10''$  W.

U.S.N.M. no. 430536 contains one specimen from station 1 in 360 to 600 fathoms at latitude  $18^{\circ}33'45''$  N., longitude  $66^{\circ}15'$  W.

This species is the largest of the West Indian *Glyphostomas*.

**GLYPHOSTOMA (GLYPHOSTOMA) ELSAE, n. sp.**

Plate 4, figs. 1, 3, 6

Shell broadly conic, yellowish white, with the tip horn-colored and the spiral cords of the postnuclear whorls pale chestnut-brown, fading as they cross the ribs. On the base the spiral cords are interrupted by the much more numerous ribs, which gives them a catenated effect. The tip of the base is brown for about one fifth of its length, but an area of equal width posterior to this lacks the brown interrupted bands. The interior of the aperture is bluish white. Nuclear whorls three, the first well rounded, the other two marked by a strong acute spiral keel a little anterior to the middle of the whorls. Postnuclear whorls well rounded, marked by exceedingly strong, broad, almost humplike axial ribs, which become very attenuated in the posterior sinial region and evanesce at the suture. Of these ribs, 10 occur upon all but the last whorl, which has 12. The intercostal spaces are a little wider than the ribs. At the summit of the whorls in the posterior sinial region the shell is marked by rather strong, closely spaced, curved riblets, which give to this part a crenulated aspect. On the base additional riblets are intercalated so that one, two, or even three slender axial ribs may appear between the heavy knobs described above. These are of very regular strength and spacing and are rendered nodulose by the spiral threads. The yellowish white nodules furnish a decided contrast to the dark areas that separate

them. The spiral sculpture of the postnuclear whorls consists of three exceedingly feeble threads in the sinal region at the summit on the first two turns. On the third turn an additional thread is added and on the remaining turns, two more. The posterior of these threads render the later whorls finely nodulose. Anterior to the sinal groove three spiral threads are present on the first and second of the postnuclear whorls, and five on the remaining whorls except the last, which has six. Here too an additional slender spiral thread is present between the first and second and the second and third of the strong threads. The suture is given a somewhat false aspect by the appressing of the summit of the whorls against the preceding turn. Periphery well rounded. Base moderately long, marked by the slender axial riblets described above, which become evanescent a little anterior to the middle, and 21 spiral threads, which are of almost equal strength and spacing, the last three near the tip of the columella, however, being less strong and a little more closely spaced. The entire surface of the shell is covered with fine granules. Aperture moderately large and rather broad, strongly channeled anteriorly and posteriorly. Outer lip reinforced by a strong varix, from which the edge of the lip projects as a clawlike element that is bent inward. The callus on the inside of the lip marking the varix is finely denticulated. Fine denticles also mark the somewhat sinuous columellar margin of the aperture.

*Type*.—U.S.N.M. no. 430290, collected at station 26 in 33 to 40 fathoms between latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. and latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W. It has 9.5 whorls and measures: Length, 14.3 mm; diameter, 6.5 mm.

This species is related to *Glyphostoma gabbi*, from which it differs markedly in its color pattern and detailed sculpture.

#### GLYPHOSTOMA (GLYPHOSTOMA) HERMINEA, n. sp.

Plate 4, figs. 2, 5, 8

Shell elongate-conic, rather broad, yellowish white. Nucleus decolored. Early postnuclear whorls somewhat worn, those remaining marked by broad, stout, slightly retractorily slanting axial ribs, which are about as wide as the spaces that separate them and which evanesce at the sulcus immediately below the summit and likewise gradually evanesce on the base. Of these ribs, 10 occur upon the first to third and 12 on the remaining turns. On the sinus below the summit the axial sculpture consists of numerous rather closely spaced curved riblets, which render this part slightly crenulated. The spiral sculpture consists of rather strongly developed, somewhat flattened cords, which in

passing over the axial ribs render these nodulose, the long axes of the nodules coinciding with the spiral sculpture. Of these spiral cords, two occur on the third and fourth, four on the fifth, five on the sixth, and six on the last whorl between the summit and the periphery. In addition to this there are fine spiral threads on the channel, at the summit of which three occur on the fifth, four on the sixth, and five on the last whorl. On this there are also some finer spiral threads between some of the spiral cords. Suture well constricted. Periphery well rounded. Base moderately long, marked by the continuation of axial ribs and six spiral cords. Columella moderately long, marked in the posterior half by the feeble continuation of the axial ribs and 11 spiral threads, which grow consecutively weaker from the posterior anteriorly. In addition to this the entire surface of the shell is marked by fine lines of growth and densely placed granulations. Aperture moderately long, decidedly channeled both anteriorly and posteriorly. Outer lip reinforced by a strong callus a little behind the edge, the edge being produced into a clawlike element. The inside of the callus within the aperture bears seven strong denticles. Inner lip also denticulated, the denticles not so strongly developed as on the outer lip. The anterior portion of the inner lip is abraded so that the actual count of the denticles cannot be made. Parietal wall covered by a callus that is developed into a strong denticle opposite the posterior termination of the callus of the outer lip, which renders the posterior sinus almost tubular.

*Type*.—The unique type, U.S.N.M. no. 430354, was collected at station 102 in 90 to 500 fathoms between latitude  $18^{\circ}50'30''$  N., longitude  $64^{\circ}43'$  W. and latitude  $18^{\circ}51'$  N., longitude  $64^{\circ}33'$  W. It has eight whorls remaining and measures: Length, 16 mm; diameter, 6.5 mm.

**GLYPHOSTOMA (GLYPHOSTOMOPS), n. subgen.**

*Type species*.—*Glyphostoma (Glyphostomops) hendersoni*, new species.

Shell similar to *Glyphostoma* but lacking the denticulations on the columella and within the aperture on the varicial callus.

**GLYPHOSTOMA (GLYPHOSTOMOPS) HENDERSONI, n. sp.**

Plate 5, figs. 2, 5, 8

Shell moderately large, elongate-conic, milk-white. Nuclear whorls 2.5, the last one with a moderately strong angulation one third of the distance between the summit and the periphery, posterior to the

periphery. Postnuclear whorls moderately well rounded, marked by somewhat sinuous, retractively slanting axial ribs, of which 12 occur upon the first, second, and third, 14 upon the fourth, 16 upon the fifth, 18 upon the sixth, and 20 upon the last whorl. These ribs become somewhat attenuated on the shoulder near the summit, where they are somewhat bent to correspond to the posterior channel. In addition to this the whorls are marked by rather strong spiral cords, of which one occurs upon the first, two upon the second and third, three upon the fourth, and four upon the remaining turns excepting the last, which has five. These cords are of about equal strength, and the first of them is about one fourth the distance between the summit and suture anterior to the summit. The intersection of the axial ribs and spiral cords form elongate nodules having their long axes parallel to the spiral cords. In addition to this the entire surface of the axial ribs and intercostal spaces are marked by lines of growth. Suture moderately constricted. Periphery well rounded. Base moderately long, marked like the spire, bearing four nodulose cords. Columella rather long, moderately stout, marked by 17 spiral cords and threads, which grow progressively weaker anteriorly, the last six being very feebly indicated. Aperture rather large, outer lip with a very strong varix a little behind its edge, from which a clawlike element projects into the aperture, bearing the external sculpture on its outer surface. This structure, together with a rather strong denticle on the parietal wall, gives to the posterior channel an almost tubular effect. Inner lip covered with a thick callus, which is reflected over the columella and the parietal wall.

*Type*.—U.S.N.M. no. 411799, collected by Mr. Henderson's yacht *Eolis* at station 153,  $3\frac{1}{2}$  miles southeast of Fowey Light. It has 9.5 whorls and measures: Length, 12.4 mm; diameter, 4.5 mm.

There are 65 additional lots in the collection of the National Museum from various stations along the Florida coast.

#### GLYPHOSTOMA (GLYPHOSTOMOPS) OENOA, n. sp.

Plate 5, figs. 1, 3, 4

Shell small, slender, shiny, pale yellow. Nuclear whorls a little more than three, the first well rounded, the second with a very feeble angulation, and the third with a submedian carina. Postnuclear whorls marked by 10 irregularly developed, protractively slanting axial ribs, which evanesce in the sinus at the summit and at the periphery. These irregular callus-like ribs are about one third as wide as the spaces that separate them. In addition to this axial sculpture the whorls are

marked by fine lines of growth. The spiral sculpture consists of a raised, slightly submedian cord on the first turn, which at its junction with the axial ribs renders this sharply nodulose. This keel has a tendency to bifurcation, which becomes complete on the next turn, where two nodules are present, and on the last turn an additional nodule appears on the periphery. In addition to these spiral cords the entire surface of spire and base is marked by closely spaced microscopic spiral striations. Suture moderately constricted. Periphery well rounded. Base moderately long, marked by a feeble spiral thread below the periphery and another near the columella. The columella is slender and marked by eight poorly expressed spiral threads. The aperture in the only specimen at hand is fractured. I am therefore unable to give a description of the features covering this part of the shell. The inner lip is decidedly sigmoid.

*Type*.—U.S.N.M. no. 429437, collected at station 37 in 160 to 200 fathoms between latitude  $18^{\circ}13'50''$  N., longitude  $67^{\circ}39'20''$  W. and latitude  $18^{\circ}11'55''$  N., longitude  $67^{\circ}42'50''$  W. It has eight whorls remaining and measures: Length, 9.1 mm; diameter, 3 mm.

Its characters are nearest to those of an undescribed species from the south side of Cuba. It is also distantly related to *Glyphostoma* (*Glyphostomops*) *hendersoni*.

#### COMPSODRILLIA PETERSONI, n. sp.

Plate 5, figs. 6, 7, 9

Shell very elongate-conic, bluish white. Nuclear whorls 2.5, the first two well rounded, smooth, the last half crossed by a number of distantly spaced axial riblets. Postnuclear whorls well rounded, the first with two nodulose spiral threads, the second with three, of which the median is the strongest. These remain throughout the length of the shell. In addition to this the appressed summit of the shell appears as a spiral cord. The posterior sinus is narrow and located immediately below the spiral cord at the summit. In addition to the strong spiral cords finer spiral threads are present both in the sinular sulcus near the summit and on and between the ribs anterior to this. In addition to the spiral sculpture the whorls are marked by axial ribs which have their beginning in the nodulose spiral threads on the first postnuclear whorl. These axial ribs are slightly protractively slanting. They extend but very slightly posteriorly to the posterior sulcus, and evanesce anteriorly on the base of the last whorl. They are more than twice the width of the spaces that separate them. Of these, 10 occur upon the first to seventh, 12 upon the eighth to tenth, and 14

upon the last whorl. These ribs and the spaces that separate them are marked by lines of growth, which also extend across the posterior sulcus and over the base and columella and give to the general surface a finely reticulated clothlike sculpture. Suture slightly impressed. Base well rounded, marked by four strong nodulose spiral cords like the spire and the intervening spiral threads. Columella rather long, twisted, with an obscure indication of an umbilicus at its tip, marked by seven strong, broad, rounded, very nodulose spiral cords, and six slender threads on the anterior tip. Between and on the strong cords on the columella finer threads are present. Aperture rather long, strongly channeled anteriorly and posteriorly, the posterior channel almost forming a tube, since the outer lip and the parietal callus bend forward, partly closing it. The outer lip bears a strong varix one fifth of a turn behind its edge, and beyond this is drawn into a clawlike element, which bends in very slightly toward the aperture. The inner lip is strongly developed and projects considerably beyond the columella and extends as a rather thickened callus over the parietal wall, forming a decided knob at the termination of the posterior angle of the aperture.

*Type*.—U.S.N.M. no. 429821, dredged at station 96 in 270 to 330 fathoms between latitude  $18^{\circ}36'$  N., longitude  $65^{\circ}05'30''$  W. and latitude  $18^{\circ}37'15''$  N., longitude  $65^{\circ}03'$  W. It has lost the nucleus and first postnuclear turn. The 12 whorls measure: Length, 27.6 mm; diameter, 6.7 mm.

U.S.N.M. no. 430514 contains three specimens dredged at station 23 in 260 to 360 fathoms between latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}17'45''$  W. and latitude  $18^{\circ}32'$  N., longitude  $66^{\circ}21'15''$  W. From one of these the nucleus and first postnuclear whorl were described.

This species is most nearly related to *Compsodrillia tristicha*, Dall (= *Drillia tristicha*, Dall), which came from between the Mississippi Delta and Cedar Keys from a depth of 196 fathoms, but is easily distinguished from it by its much more slender form and detail of sculpture.

#### COMPSODRILLIA DISTICHA, n. sp.

Plate 6, figs. 6-8

Shell elongate-conic, covered with a very pale, ashy, dehiscent periostracum, which in the type is absent on the base and columella and gives the shell a decidedly bicolored effect, the shell itself appearing white. Nuclear whorls 2.5, well rounded, smooth, the last half crossed by a small number of axial riblets. First postnuclear whorl with two nodulose spiral cords. On the next turn these split into two and three

tuberculated cords, the third one almost falling into the suture, being appressed to the cord at the summit of the succeeding turns. These remain inconspicuous on the succeeding turns, while the other two occupying the middle portion of the shell become decidedly pronounced. The cord at the summit forms an abrupt sloping shoulder, and the space between this and the first strong spiral cord constitutes the sulcus marking the posterior channel of the shell. In addition to these spiral cords the cords themselves and the spaces that separate them are marked by strong spiral threads. This is also true of the sulcus at the summit, the base, and partly so of the columella. The axial sculpture consists of very heavy, broad, low, rounded ribs which are about twice as wide as the spaces that separate them. These ribs are rendered nodulose by the two strong spiral cords. They are also marked, as well as the intercostal spaces, by slender lines of growth that extend over the entire surface of the shell. Of these ribs, 12 are present on all the whorls. Suture slightly constricted. Periphery well rounded. Base short, marked by three strong spiral cords. Columella moderately long, slightly curved and marked by nine strong spiral cords, between and on which slender spiral threads are present. Aperture moderately long, channeled posteriorly and anteriorly. Unfortunately, the outer lip is fractured in the unique type so that it is impossible accurately to describe this, and the shell is not sufficiently mature to have differentiated the heavy varix behind the aperture characteristic of the group. The inner lip constitutes the heavy callus that extends upon the parietal wall.

*Type*.—The type, U.S.N.M. no. 429401, has 11.7 whorls and measures: Length, 26.6 mm; diameter, 7.4 mm. It was dredged at station 67 in 180 to 280 fathoms between latitude  $18^{\circ}30'12''$  N., longitude  $65^{\circ}45'48''$  W. and latitude  $18^{\circ}32'18''$  N., longitude  $65^{\circ}46'12''$  W.

This species is easily differentiated from *Compsodrillia tristicha* by the fact that only two of the strong spiral keels are apparent on the whorls.

#### COMPSODRILLIA NANA, n. sp.

Plate 6, figs. 1-3

Shell small, elongate-conic, yellowish white. The first one-half nuclear turn well rounded, smooth, the last half marked by a few rather distantly spaced, slightly protractively slanting axial riblets. Post-nuclear whorls well rounded, the first marked by three slender spiral cords, of which the anterior two increase more rapidly in size than the first one, which remains rather feeble. The summit of the whorls is

marked by a smooth spiral cord representing the portion appressed to the preceding turn. On the later whorls the sinal sulcus at the summit is crossed by two slender spiral threads anterior to the cord at the summit which divides the space between this cord and the first strong nodulose cord into nearly equal portions. There is also a slender spiral cord between the first and second strong nodulose cords on the antepenultimate turn and two on the last whorl. There are two slender spiral cords between the second nodulose cord and the nodulose cord at the periphery which shows weakly in the suture of the whorls. The axial sculpture consists of strong, broad, rounded, protractively slanting ribs, which are about twice as wide as the spaces that separate them. The junction of these ribs with the stronger spiral cords produces nodules. Suture well impressed. Periphery marked by a nodulose spiral cord, the major portion of which, however, falls immediately below the periphery. Base short, well rounded, marked by two nodulose spiral cords. Columella rather short and stumpy, marked by nine subequal, closely spaced, feebly nodulose spiral cords. Aperture rather short, decidedly channeled anteriorly and posteriorly, the posterior channel falling in the posterior angle of the aperture. There is a strong varix a little behind the edge of the outer lip, and the outer lip between the channel at the summit and its base is protracted into a clawlike element, which, however, does not infringe upon the aperture. The inner lip is reflected as a distinct wall upon the columella and forms a heavy callus on the parietal wall.

*Type*.—U.S.N.M. no. 430562, collected at station 13 in 200 to 300 fathoms between latitude  $18^{\circ}31'05''$  N., longitude  $66^{\circ}02'15''$  W. and latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}04'05''$  W. It has 7.5 whorls and measures: Length, 8.7 mm; diameter, 3.1 mm.

#### DARBYA, n. gen.

*Type species*.—*Darbya lira*, new species.

Shell elongate-conic. Nuclear whorls well rounded, smooth. The early postnuclear whorls with a single median row of cusps, the later ones with heavy knoblike axial ribs anterior to the sulcus at the summit, which are crossed by strongly developed, low, well-rounded, weakly nodulose, spiral cords anterior to the sulcus. The entire surface is marked by fine lines of growth, which are retractorily slanting in the sulcus and protractively slanting on the rest of the turn. Suture strongly appressed. Base well rounded. Columella short, thickened to form a broad fold opposite the varix of the outer lip; this fold is separated from the parietal wall by a deep concave channel. The

outside of the columella is marked by a few strong spiral cords. Aperture very strongly channeled posteriorly and anteriorly. The posterior channel falls immediately below the summit and is deeply incised. A strong varix is present about half a turn behind the edge of the outer lip which is protracted to form a clawlike element anterior to the sinus. The inner lip appears as a heavy callus, which is reflected over the columella and extends up on the parietal wall.

**DARBYA LIRA, n. sp.**

Plate 6, figs. 4, 5; plate 7, figs. 6, 8

Shell elongate-conic, pale yellow, with a faint brown band encircling the whorls a little anterior to the sinal sulcus at the summit. Nuclear whorls 1.5, smooth, well rounded. Postnuclear whorls well rounded, marked on the first three turns by a submedian row of distantly spaced cusps. On the succeeding whorls these cusps become elongated into ribs that extend from the sinal sulcus at the summit anteriorly to the suture, becoming weaker toward the suture. Of these ribs, 10 occur upon the first whorl, 12 upon the second and third, and 14 upon the remaining whorls except the last, which has 16. The spaces that separate these ribs are a little less wide than the ribs. In addition to this there are numerous fine lines of growth, which slope retractorily in the sulcus at the summit and protractorily anteriorly. The sulcus at the summit is without spiral sculpture, whereas in the region anterior to it both ribs and intercostal spaces are crossed by rather strong, low, rounded, spiral cords, of which four occur upon the fifth to seventh, five upon the eighth, seven upon the ninth, and eight upon the last whorl between the summit and suture. These spiral cords are more or less equal. Suture rendered conspicuous by the slightly sloping shoulder of the summit of the whorls. Periphery well rounded. Base short, marked by the feeble continuation of the axial ribs and by seven spiral cords which are of unequal strength. Columella short and stubby with a strong, broad fold opposite the varix on the outer lip which is separated from the parietal wall by a concave groove; marked by seven rather broad spiral cords, which are separated by narrow channels. Aperture short, decidedly channeled anteriorly and posteriorly, the posterior channel being deeply notched and at the summit of the shell. There is a broad varix half a whorl behind the aperture, the outer lip being protracted between the sinus and the basal portion. The inner lip is appressed to the columella as a heavy callus which extends over the parietal wall.

*Type*.—U.S.N.M. no. 430930, collected at station 23 in 260 to 360 fathoms between latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}17'45''$  W. and latitude  $18^{\circ}32'$  N., longitude  $66^{\circ}21'15''$  W. It has 12 whorls and measures: Length, 22.6 mm; diameter, 6.2 mm.

U.S.N.M. no. 430505 contains three specimens from the same station.

U.S.N.M. no. 430534 contains one specimen from station 1 in 400 fathoms, latitude  $18^{\circ}33'45''$  N., longitude  $66^{\circ}15'$  W.

U.S.N.M. no. 430660 contains one specimen from station 35 in 180 to 80 fathoms between latitude  $18^{\circ}23'40''$  N., longitude  $67^{\circ}16'45''$  W. and latitude  $18^{\circ}24'45''$  N., longitude  $67^{\circ}14'15''$  W.

#### LEPTODRILLIA SPLENDIDA, n. sp.

Plate 7, figs. 2, 5, 7

Shell small, elongate-conic, shiny. Nuclear whorls 1.5, well rounded, smooth. Postnuclear whorls moderately well rounded with strongly developed axial ribs, which begin weakly at the summit of the whorls and become strongest at about the anterior termination of the posterior third, again gradually weakening on the base and evanescent on the columella. These ribs on the early whorls are cusped at their highest elevation. On the later whorls the cusps become less pronounced. Ten occur upon all but the last whorl, which has twelve. There is a very strong varix a little distance behind the outer lip. The lines of growth are exceedingly fine, and the spiral sculpture is absent on all but the columella, thus giving to the entire surface of the shell a decidedly glassy appearance. On the anterior two thirds of the columella nine slender spiral threads are present. Aperture rather broad, decidedly channeled anteriorly and posteriorly. The posterior channel is at the summit of the whorl and is deeply incised. The outer lip from the channel to the slender notch anteriorly is protracted into a clawlike element. Inner lip appressed to the columella as a heavy callosity that extends over the parietal wall and forms a decided knob over the posterior angle.

*Type*.—U.S.N.M. no. 429368, dredged at station 56, Samaná Bay, in 17 fathoms between latitude  $19^{\circ}10'15''$  N., longitude  $69^{\circ}27'20''$  W. and latitude  $19^{\circ}10'15''$  N., longitude  $69^{\circ}28'05''$  W. It has a little more than eight whorls and measures: Length, 9.5 mm; diameter, 3.1 mm.

U.S.N.M. no. 429752 contains four specimens from station 10, in 120 to 160 fathoms between latitude  $18^{\circ}29'20''$  N., longitude  $66^{\circ}05'30''$  W., and latitude  $18^{\circ}30'24''$  N., longitude  $66^{\circ}04'15''$  W.

This species differs from *Leptodrillia loria* in being in every way larger and in having much larger nuclear whorls.

## LEPTODRILLIA LORIA, n. sp.

Plate 7, figs. 1, 3, 4

Shell small, elongate-conic, vitreous, semitranslucent. Nuclear whorls 1.5, well rounded, smooth. Postnuclear whorls moderately well rounded, marked by rather strong, almost vertical axial ribs, which become weak toward the summit and which attain their largest development on the posterior third of the whorls. On the first post-nuclear whorl these ribs are cusped; on the later ones they become less elevated. On the last whorl they extend but feebly across the base and evanesce on the columella. These ribs are about two thirds as wide as the spaces that separate them. Eight are present on the first, and 10 on all but the last whorl, which has 12. In addition to the axial ribs the whorls are marked by fine incremental lines on the spire as well as the base. Suture well impressed. Periphery well rounded. Base moderately long, well rounded. Spiral sculpture is absent on the spire and base and present on the short, stout columella, which is crossed by nine spiral threads. Aperture rather large, strongly channeled anteriorly and posteriorly. The posterior sinus is deeply notched and immediately below the summit. There is a slender stromboid notch a little posterior to the anterior termination of the outer lip. The space between this and the posterior sinus is protracted into a clawlike element. The inner lip is appressed to the columella as a callus which extends up over the parietal wall, where it develops into a conspicuous nodule near the posterior angle.

*Type*.—U.S.N.M. no. 430701 dredged at station 106 in 150 to 195 fathoms between latitude  $18^{\circ}31'20''$  N., longitude  $66^{\circ}16'30''$  W., and latitude  $18^{\circ}31'30''$  N., longitude  $66^{\circ}18'20''$  W. It has 7.5 whorls and measures: Length, 6.8 mm; diameter, 2.5 mm.

The present species differs from *Leptodrillia splendida* in being in every way smaller and in having a much smaller nucleus.

## SYNTOMODRILLIA Woodring

*Type species*.—*Syntomodrillia woodringi*, new species = *S. lissotropis* Woodring 1928, not *Drillia lissotropis*, Dall 1889.

In 1928 Dr. Woodring described the genus *Syntomodrillia*,<sup>3</sup> citing *Drillia lissotropis* Dall as type. Dall in 1881<sup>4</sup> described *Drillia lissotropis* as follows:

Shell small, slender, somewhat bluntly tipped, with six whorls, shining with the lustre of paraffine; nucleus rather large, bullate, smooth, translucent, shin-

<sup>3</sup> Miocene mollusks from Bowden, Jamaica, pt. 2, pp. 160-161, 1928.

<sup>4</sup> Bull. Mus. Comp. Zool., pp. 58-59, 1881.

ing; remaining whorls with transverse, stout, shouldered ribs (on the last whorl eleven) becoming obsolete anteriorly, and succeeded by a few (four or five) revolving riblets at the anterior extreme of the canal; suture appressed; lines of growth not evident; whorls rather inflated in appearance; notch very slight; aperture small and unusually short; pillar very short, straight, and pointed. Lon. of shell 4.5; of last whorl 2.25; of aperture, 1.25. Lat. of last whorl, 1.75 mm. Defl. about 27°.

Station 20, 220 fms.

This very likely grows to larger size, and is notable for its peculiar translucent waxy lustre.

In 1889 in the same publication, he figures it on plate 11, figure 34, and on pages 91, 92 he states:

*Pleurotoma (Mangilia) lissotropis* Dall, Bull. M. C. Z., IX, p. 58, August, 1881.  
? *Pleurotoma (Mangilia) hypsela* Watson, Journ. Linn. Soc., XV, p. 433, Oct., 1881. Chall. Gastr., p. 341, pl. xxi. fig. 4, 1885.

Habitat. Station 20, 220 fms., Gulf of Mexico; off Havana, in 127 fms.; Station 273, near Barbados, in 103 fms.; Stations 282 and 290, off Barbados, in 154 and 73 fms., coral; Station 134, near Santa Cruz, in 248 fms., coarse sand. Range of temperatures, 54°.5 to 71° F.

Mr. Watson's specimen is not sufficiently perfect to decide with certainty, but it looks very much like the present species. The examination of better material since the first description was made shows this species to have the regular *Drillia* aperture and nucleus, and it is therefore referred to that genus. The curvature and number of the ribs vary slightly, and the spaces between are indifferently perfectly smooth, or finely spirally striate, especially toward the anterior end of the shell. . . . These shells are so very small and polished that it is extremely difficult for an artist in pure line-work to represent them adequately. Only lithography with its delicate mutations of shade can do it properly. For this reason our figures of this species are less satisfactory than most of these which represent rougher and larger shells.

Critically examining the material in the collection of the United States National Museum, I find that Dr. Dall in his last report embraced three species under this name, one belonging to the genus *Leptadrillia* Woodring, another to *Syntomodrillia* Woodring, and a third to an unnamed genus. Woodring, in selecting a specimen for his genotype, unfortunately chose the specimen having the "spiral sculpture consisting of fine threads on pillar and of microscopic threads between ribs of later whorls," (Woodring), which applies not to *Drillia lissotropis* Dall as defined in 1881, but to *Drillia lissotropis* Dall in part, as emended by him in 1889. It is the *Drillia lissotropis* Woodring 1928, an undescribed species, which I now call *Syntomodrillia woodringi*.

**SYNTOMODRILLIA WOODRINGI, n. sp.**

Plate 8, figs. 5, 7, 9

1889. *Drillia lissotropis* Dall, Bull. Mus. Comp. Zool. pp. 91-92, in part. Not *Drillia lissotropis* Dall, 1881, *ibid.*, pp. 58-59.  
 1928. *Drillia lissotropis*, Woodring, Miocene mollusks from Bowden, Jamaica, pt. 2, pp. 160-161.

Shell small, fusiform, yellowish white, shining. Nuclear whorls 2.5, smooth, well rounded; the early postnuclear whorls marked by almost nodulose axial ribs, which are largest posterior to the periphery and give to these whorls a somewhat crenulated aspect. These ribs gradually grow longer on the succeeding turns, and on the last turn they extend over the base to the columella. They are strongest on the middle of the shell and become less strong anteriorly. There are 10 on the first and second postnuclear whorls, 12 on the third to sixth, and 16 upon the last. On the last whorl there is a decided hump a little behind the aperture. The spaces separating the axial ribs are about as wide as the ribs, or a little wider. They are crossed on the spire by slender, spiral threads, which are confined to the anterior two thirds of the turns between the summit and the suture. Of these, six occur upon the fourth, seven upon the fifth and last whorl between the summit and the periphery, and eight between the periphery and the insertion of the columella on the well-rounded base. The columella is of moderate length crossed by nine almost equal spiral threads, which are much stronger than those on the base. Aperture moderately long and rather broad, decidedly channeled at the posterior angle of the aperture and also anteriorly; outer lip thin, decidedly channeled at the posterior angle, and protracted between the channel and its anterior limitation; inner lip reflected over and appressed to the columella as a thick callus that extends up over the parietal wall, where it forms a lump near the posterior angle of the aperture.

*Type*.—U.S.N.M. no. 87477c, dredged by the *Blake* at station 273 in 103 fathoms off Barbados. It has 8.7 whorls and measures: Length, 18.2 mm; diameter, 3.1 mm.

**SYNTOMODRILLIA CAROLINAE, n. sp.**

Plate 8, figs. 1, 4, 8

Shell small, elongate-conic, horn-colored with a pinkish flush. Nuclear whorls a little more than 2, forming a conspicuous slender apex, whose whorls are well rounded and smooth. Postnuclear whorls

rather strongly rounded, marked by strong, slightly sinuous axial ribs, which become slightly enfeebled near the summit of the whorls but extend conspicuously across the posterior sulcus. These ribs are about as wide as the spaces that separate them. Twelve occur upon the first to third, 14 upon the fourth, and 16 upon the last turn, on which they extend across the base to the columellar area, where they become evanescent. In addition to the ribs the entire surface is marked by rather well developed incremental lines. The spiral sculpture is absent on all the whorls but the last. On this, five slender, feeble spiral threads are present anterior to the sutural sinus. Suture well impressed. Base moderately long, well rounded, marked by seven feebly developed spiral cords that grow stronger from the periphery anteriorly. Columella short and stubby, marked by five strong spiral cords. Aperture decidedly channeled anteriorly and posteriorly, the posterior channel deep and slightly thickened at the edge. There is a strong varix about one fourth of a turn behind the aperture. Outer lip protractive from the posterior sinus to the anterior notch, inner lip reflected over the columella as a heavy callus that has almost the aspect of a distinct lip, parietal wall covered by a heavy callus that develops into a strong nodule near the posterior angle.

*Type*.—U.S.N.M. no. 430853, collected from station 10 in 120 to 160 fathoms between latitude  $18^{\circ}29'20''$  N., longitude  $66^{\circ}05'30''$  W. and latitude  $18^{\circ}30'24''$  N., longitude  $66^{\circ}04'15''$  W. It has 7.2 whorls and measures: Length, 6.2 mm; diameter, 2.2 mm.

U.S.N.M. no. 430999 contains two topotypes from the same locality.

This species is closely related to *Syntomodrillia woodringi*, from which it can at once be distinguished by its much stouter and fewer spiral cords on the columella and by its more slender nuclear whorls.

#### SYNTOMODRILLIA TANTULA, n. sp.

Plate 8, figs. 2, 3, 6

Shell small, elongate-conic, pale wax-yellow. Nuclear whorls 1.6, smooth. Postnuclear whorls marked by strong, slightly protractively slanting axial ribs which extend over the posterior sinus, where they become slightly retractively curved but not interrupted. Anteriorly they extend over the rounded periphery and base to the columella. These axial ribs are about as wide as the spaces that separate them. Ten are present on the first three postnuclear whorls, 12 on the fourth, and 14 on the last turn. The spiral sculpture consists of well-incised lines anterior to the posterior sinus, no spiral sculpture being noticed on the latter. Of these lines, 5 are present on the second, 6 on the

third, 10 on the fourth, and 19 on the last whorl and base. On the columella the spaces between these lines form moderately strong threads which increase in size from the insertion of the columella toward its tip. Nine of them are present. Aperture moderately large, decidedly channeled anteriorly and posteriorly; the posterior channel is very deeply incised. The outer lip is protracted anterior to the posterior channel into a clawlike element. There is a very heavy varix a little behind the outer lip on the last turn. The inner lip is reflected over the columella as a heavy callus that extends over the parietal wall and extends as a decided knob opposite the outer lip.

*Type*.—U.S.N.M. no. 430164, dredged at station 16, off the north coast of Puerto Rico in 38 to 95 fathoms between latitude  $18^{\circ}29'40''$  N., longitude  $66^{\circ}08'30''$  W. and latitude  $18^{\circ}31'00''$  N., longitude  $66^{\circ}10'15''$  W. It has 7.6 whorls and measures: Length, 7.1 mm; diameter, 2.8 mm.

Another specimen, U.S.N.M. no. 430854, not quite complete, is from the same station.





2



1



3



4



6



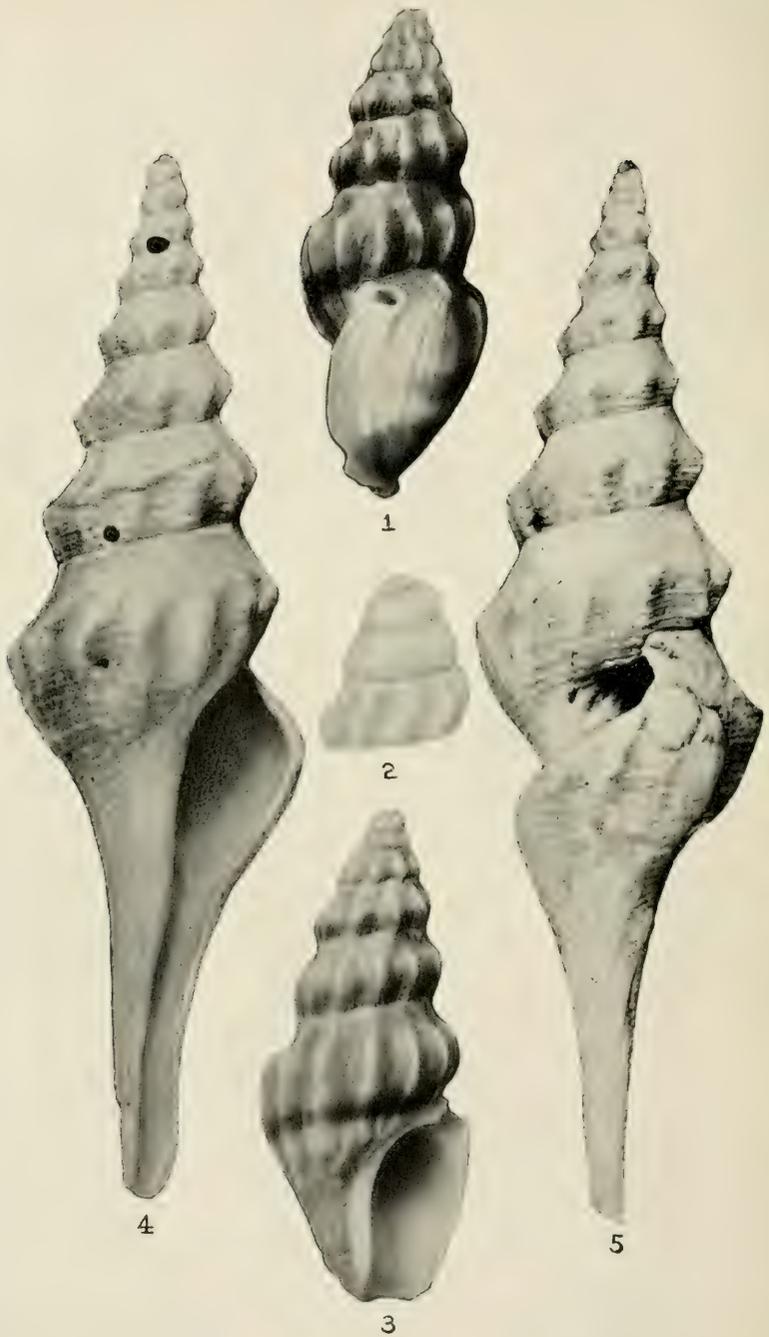
5



7

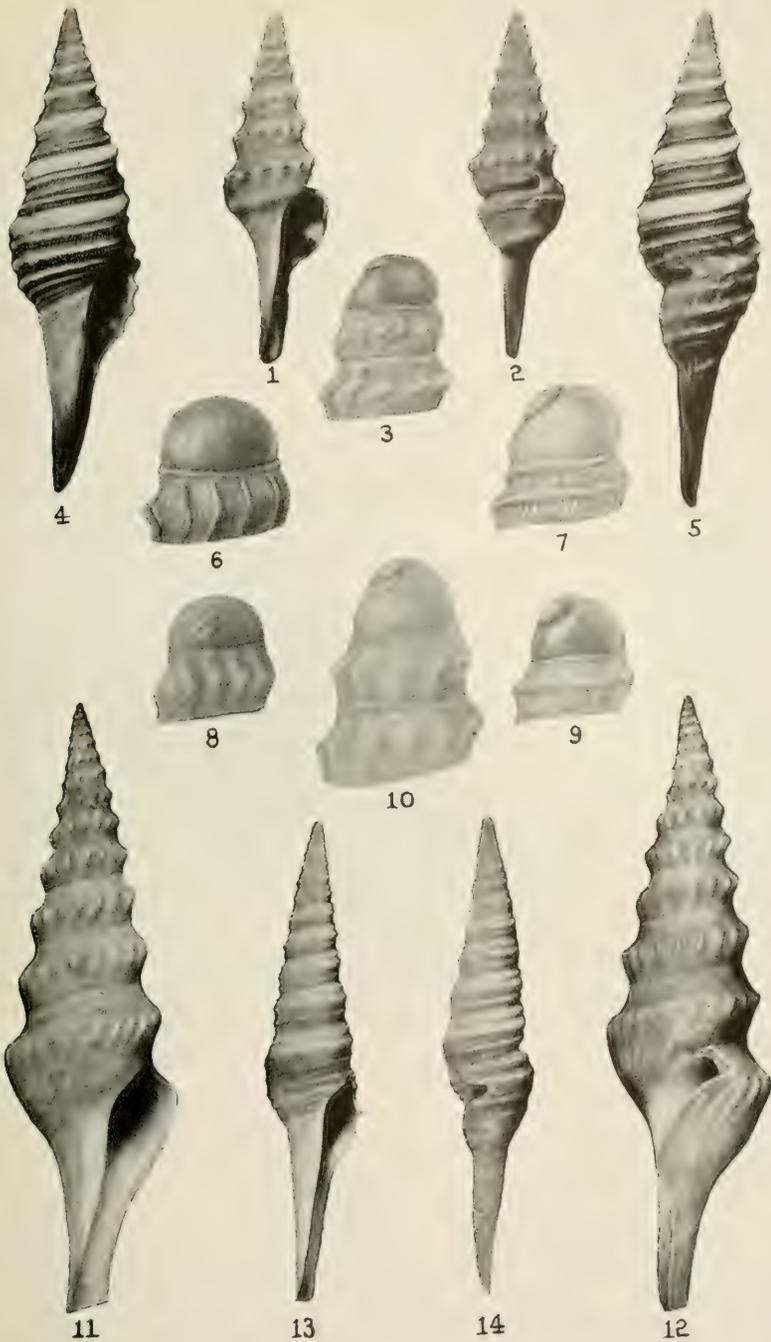
NEW MOLLUSKS OF THE FAMILY TURRITIDAE

1-3, *Eldridgea johnsoni*.  
4-7, *Fenimorea janetac*.



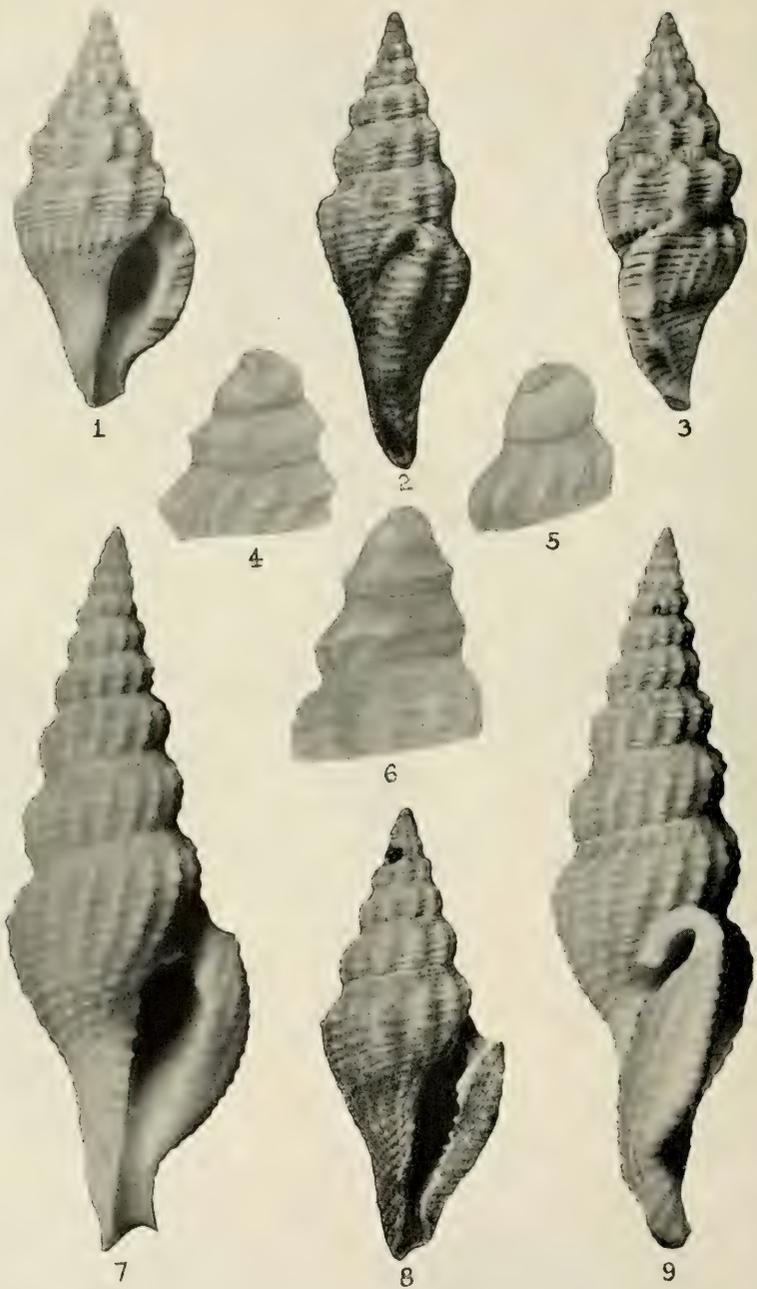
## NEW MOLLUSKS OF THE FAMILY TURRITIDAE

1-3, *Douglassia enae*.  
4, 5, *Fusisyrinx fenimorei*.



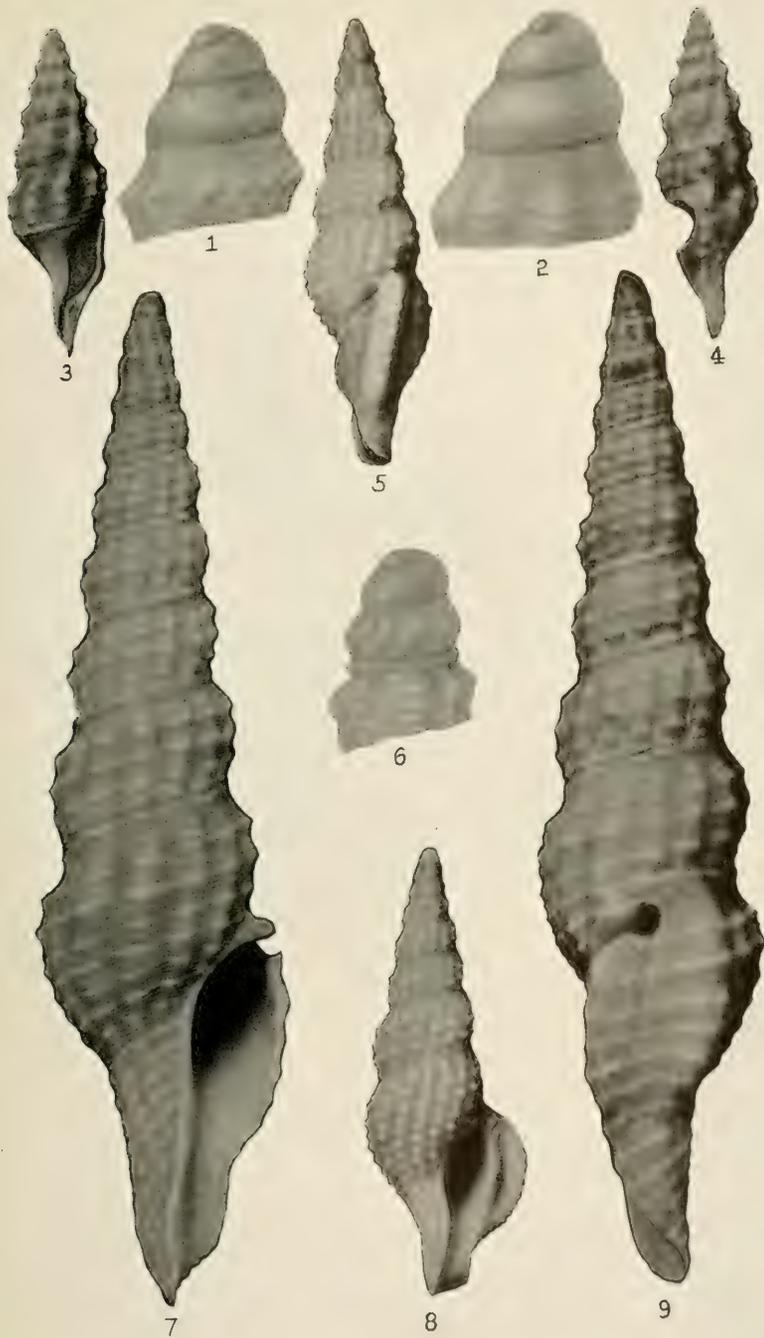
## NEW MOLLUSKS OF THE FAMILY TURRITIDAE

- 1, 2, 10, *Fusiturricula enae*.  
 3, 11, 12, *Leucosyrinx janetac*.  
 4-7, *Polystira florencae*.  
 8, 9, 13, 14, *Polystira macra*.



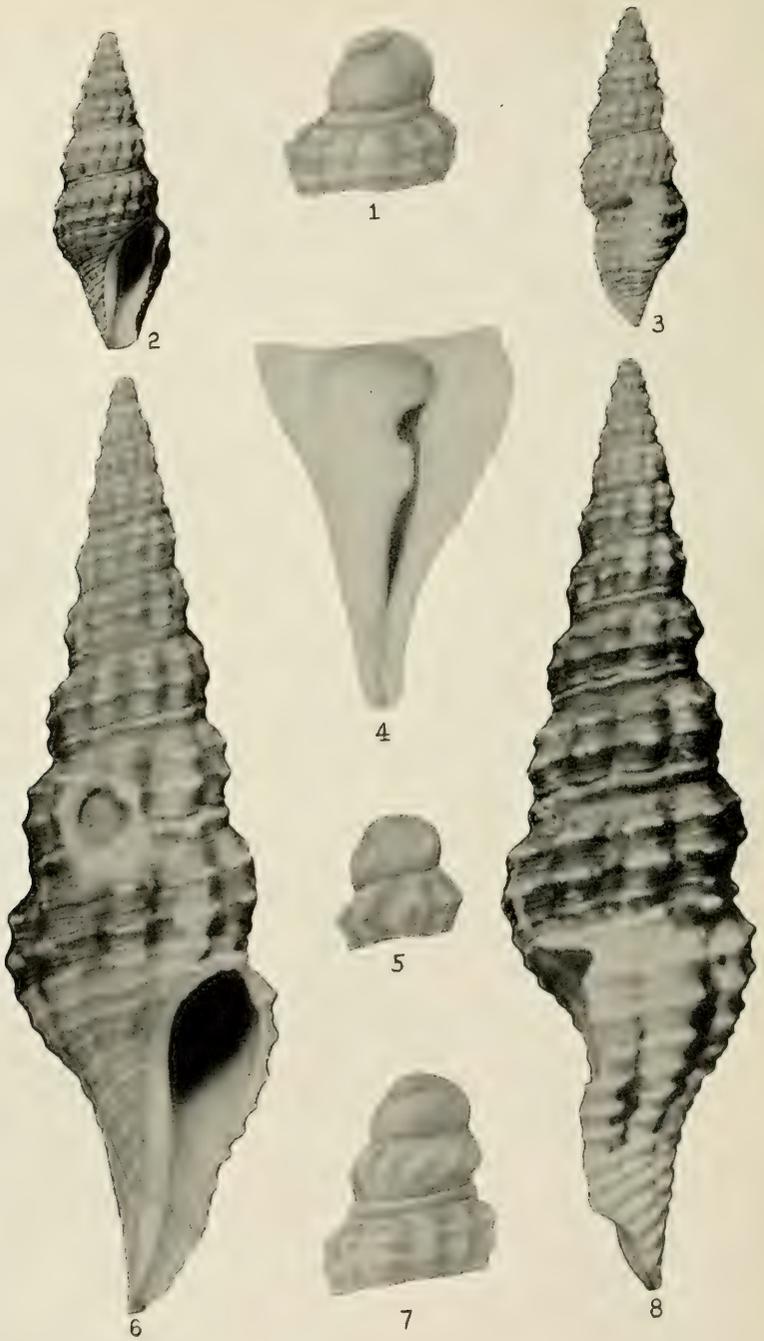
## NEW MOLLUSKS OF THE FAMILY TURRITIDAE

- 1, 3, 6, *Glyphostoma (Glyphostoma) elzac.*  
 2, 5, 8, *Glyphostoma (Glyphostoma) herminca.*  
 4, 7, 9, *Glyphostoma (Glyphostoma) epicasta.*



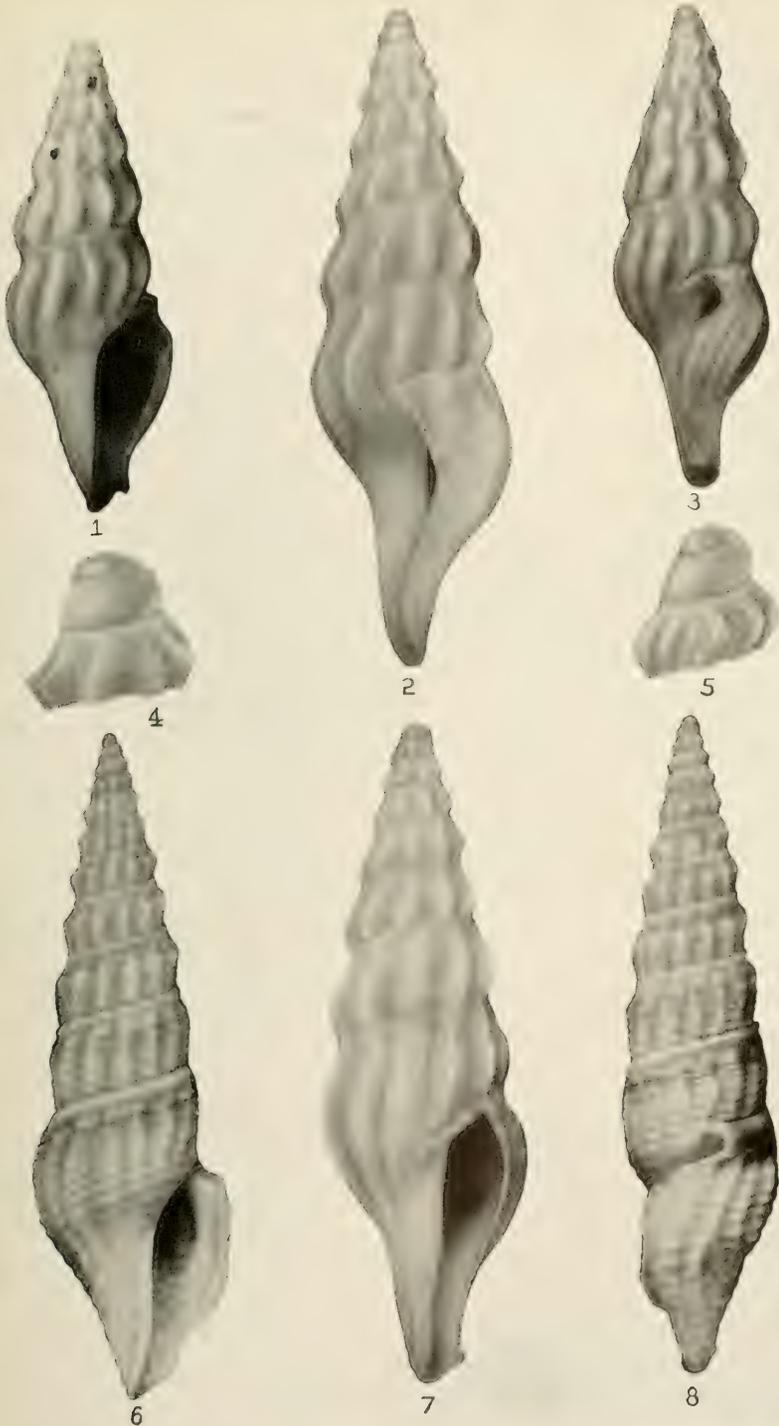
## NEW MOLLUSKS OF THE FAMILY TURRITIDAE

- 1, 3, 4, *Glyphostoma (Glyphostomops) oenoa*.  
 2, 5, 8, *Glyphostoma (Glyphostomops) hendersoni*.  
 6, 7, 9, *Compsodrillia petersoni*.



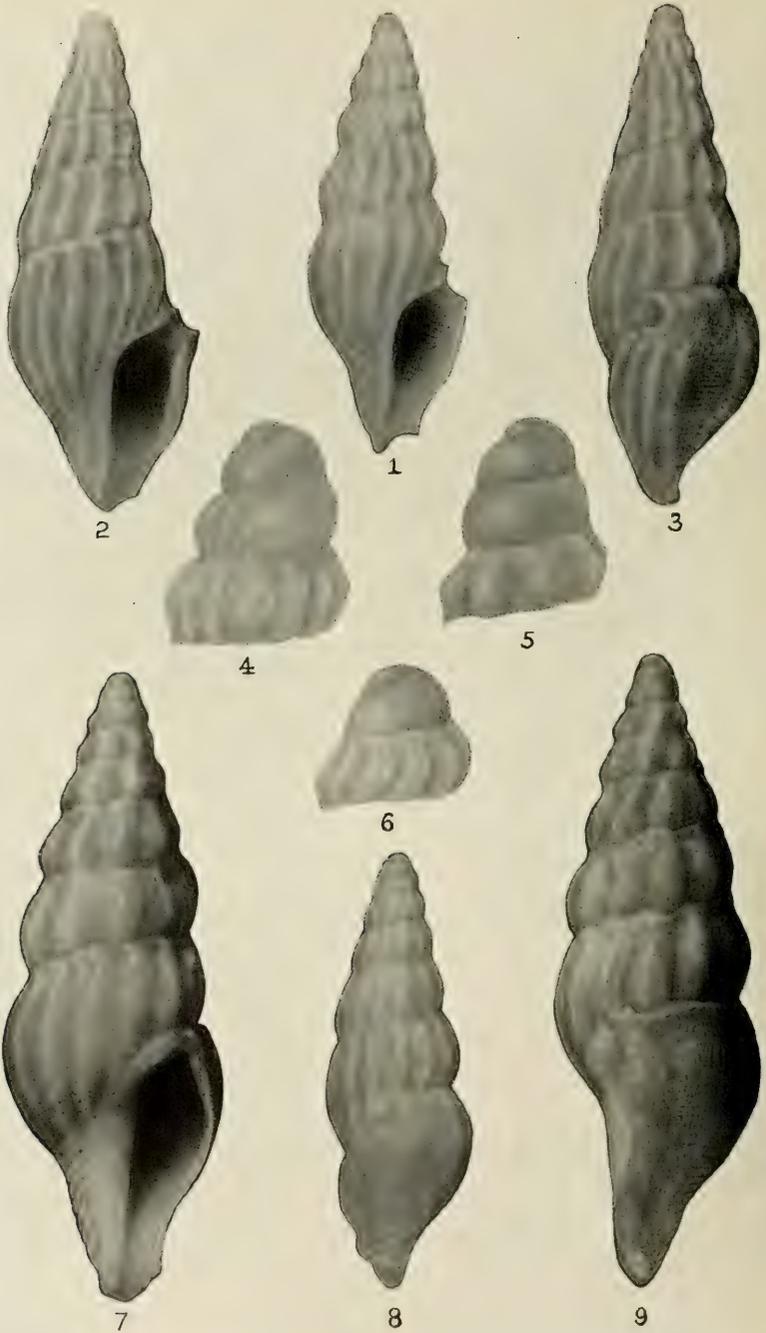
NEW MOLLUSKS OF THE FAMILY TURRITIDAE

- 1-3, *Compsodrillia nana*.
- 4, 5, *Darbya lira*.
- 6-8, *Compsodrillia disticha*.



## NEW MOLLUSKS OF THE FAMILY TURRITIDAE

- 1, 3, 4, *Leptodrillia loria*.  
 2, 5, 7, *Leptodrillia splendida*.  
 6, 8, *Darbya lira*.



NEW MOLLUSKS OF THE FAMILY TURRITIDAE

- 1, 4, 8, *Syntomodrillia carolinac.*
- 2, 3, 6, *Syntomodrillia tantula.*
- 5, 7, 9, *Syntomodrillia woodringi.*





SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 3

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# A NEW CRAB OF THE GENUS CYCLODORIPPE

(WITH ONE PLATE)

BY

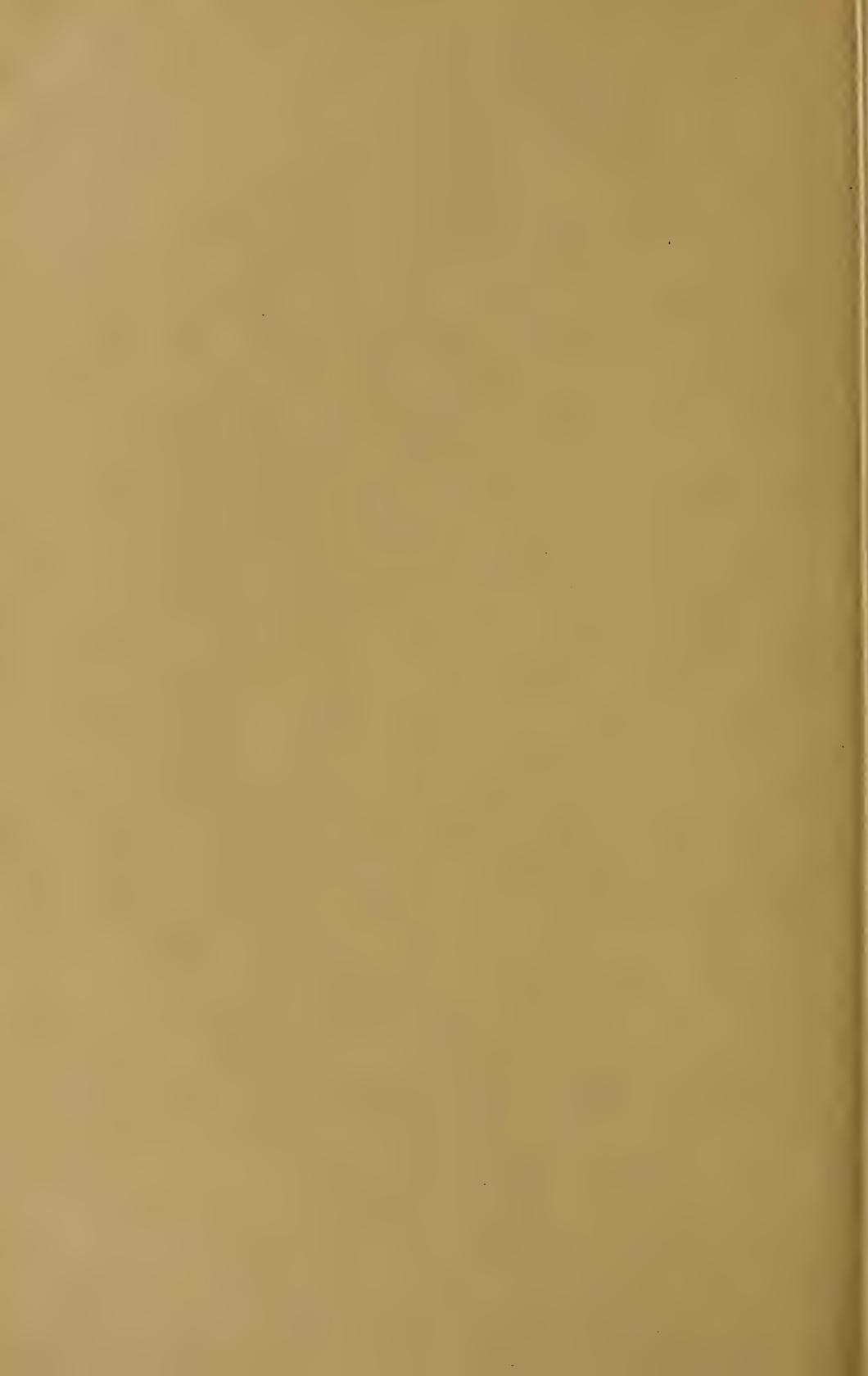
MARY J. RATHBUN

Associate in Zoology, U.S. National Museum



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### A NEW CRAB OF THE GENUS CYCLODORIPPE

BY MARY J. RATHBUN

*Associate in Zoology, U.S. National Museum*

(WITH ONE PLATE)

Two species of *Cyclodorippe* are known from American waters: *C. agassizii* and *C. antennaria*, both described briefly by A. Milne Edwards and later described in detail and figured by Milne Edwards and Bouvier. Of *C. agassizii*, these authors recognized one varietal specimen from off Havana; the first Johnson-Smithsonian Deep-Sea Expedition obtained three similar specimens in Puerto Rican waters. This additional material permits establishing that so-called variety as a distinct species, to which the name *bouvieri* is here given.

Family DORIPPIDAE Dana

Genus CYCLODORIPPE A. Milne Edwards

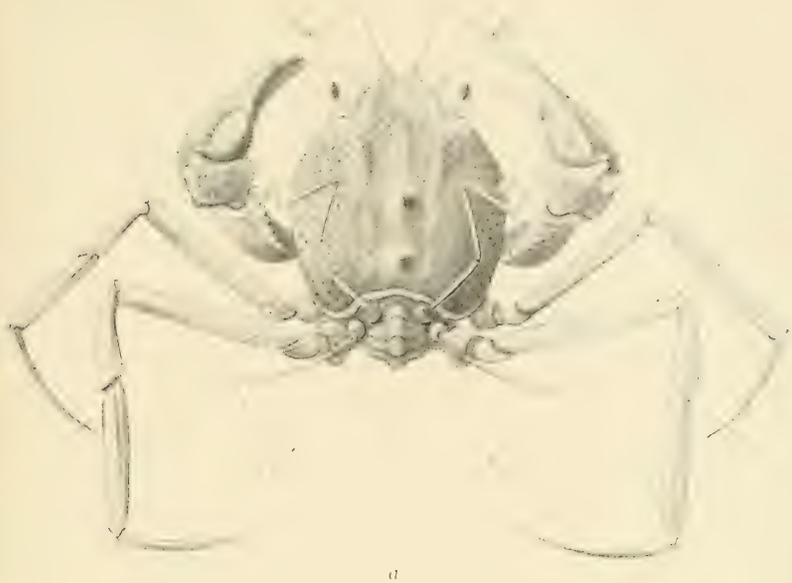
CYCLODORIPPE BOUVIERI, n. sp.

*Cyclodorippe agassizii*, A. Milne Edwards and Bouvier, Mem. Mus. Comp. Zool., vol. 27, p. 94 (part), 1902.

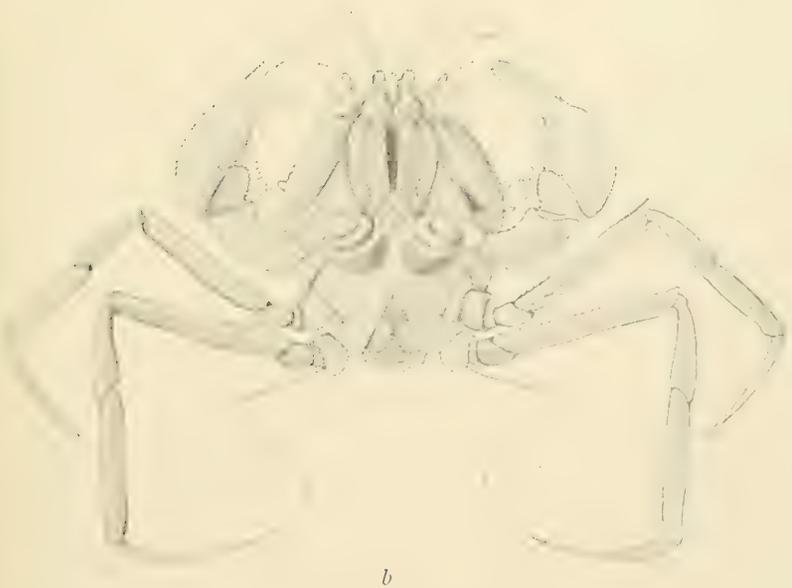
*Description.*—*Cyclodorippe bouvieri* differs from *C. agassizii* as follows: There is no spine on the protogastric regions; the median spines are tubular, not conical, and are higher than in *agassizii*; the granulation is coarser on carapace and cheliped; the margin of the rostrum is arcuate, not angled; orbit narrow in dorsal view, margin rounding, orbital spine smaller than in the allied form. Wrist with a prominent blunt outer tooth or spine near distal end and directed forward.

*Type locality and distribution.*—A male specimen from station 100, northeast of Puerto Rico, latitude  $18^{\circ}40'15''$  N., longitude  $64^{\circ}50'15''$  W., 150 fathoms, March 4, 1933, has been selected as the holotype (U.S.N.M. no. 67827). It has a carapace length of 5.2 mm and a width of 5.6 mm. An ovigerous female was also taken in the same haul. A second male specimen was taken at station 101, latitude  $18^{\circ}45'40''$  N., longitude  $64^{\circ}48'$  W., in 300 fathoms. The specimen that Milne Edwards and Bouvier thought represented but a variety of *C. agassizii* was dredged by the United States Coast Survey steamer *Blake* off Havana, Cuba (station 53) in 242 fathoms.





*a*



*b*

**CYCLOPORIPPE BOUVIERI, MALE HOLOTYPE**  
**LENGTH OF CARAPACE 5.2 MM**

*a*, dorsal view; *b*, ventral view.







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# TWO NEW CRINOIDS

(WITH TWO PLATES)

BY

AUSTIN H. CLARK

Curator, Division of Echinoderms, U.S. National Museum



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**Johnson Fund**  
**TWO NEW CRINOIDS**

BY AUSTIN H. CLARK

*Curator, Division of Echinoderms, U.S. National Museum*

(WITH TWO PLATES)

The collection of crinoids brought back by the Johnson-Smithsonian Deep-Sea Expedition from the cruise of 1933 was a notable one, including 143 specimens representing 19 species, of which 2 are undescribed, one of these representing a genus which heretofore was known only from the Indian and Pacific Oceans. These two new species are herein described.

**PSATHYROMETRA ACUTA**, n. sp.

Plate 1, figs. 1, 2; plate 2, fig. 4

*Locality*.—*Caroline* station 102; northeast of Puerto Rico (lat. 18°51' N., long. 64°32' W.); 90 to 500 fathoms; March 4, 1933. Three specimens (U.S.N.M. nos. E.3121 [type], E.3122, and E.3123).

*Description*.—The centrodorsal (pl. 1, figs. 1, 2) is sharply conical, the sides in profile straight in the proximal two thirds, thence very gradually and slightly turning outward and running to the pointed tip, longer than broad, 2.7 mm wide at the base and 3.5 mm long, measured along the sides interradially. The cirrus sockets are closely crowded all around the centrodorsal, which shows no trace of division into radial areas. There are proximally three columns of cirrus sockets in each radial area; the two outer columns of cirrus sockets consist of usually nine sockets, which diminish gradually in size from the base to the tip. The median column is incomplete, consisting of three or four sockets only and ending slightly beyond the middle of the centrodorsal.

The cirri are lacking.

The ends of the basal rays are indicated by low, broad, and inconspicuous tubercles in the interradiial angles of the calyx.

The radials are visible as curved bands with parallel sides from six to eight times as broad as long just above the centrodorsal. The anterolateral angles of adjacent radials are separated by a slight notch, the sides of which make an angle of about  $90^\circ$  with each other. There are no subradial clefts, but the line of junction between the centrodorsal and the radials is slightly and narrowly incised.

The  $IBr_1$  are about three times as broad as their lateral length, with the lateral edges, as viewed dorsally, approximately straight and parallel and separated from those of their neighbors by a narrow interval. The proximal border is straight, but the distal is deeply incised in the median portion by the backward projection of the axillary, which reaches a point between one third and one half the distance from the distal to the proximal edge. The  $IBr_2$  (axillaries) are longer than broad, and are more or less rhombic in shape. The proximal sides are rather strongly concave, and the distal sides are broadly **S**-shaped, curving inward from the lateral angles and thence gradually outward, becoming almost parallel on the sides of the unusually produced anterior angle, which is broadly truncated.

The first brachials are at least four times as long exteriorly as interiorly. The proximal border is broadly **S**-shaped, following the curve of the adjoining border of the axillary. The distal border runs inward from the outer anterolateral angle approximately at right angles to the longitudinal axis of the arm to a point somewhat beyond the midradial line, then curves outward and runs at a very slight angle to the proximal border to the inner anterolateral angle.

The second brachials are larger than the first, and are irregularly quadrate with their lower angle rather deeply incising the first brachial.

The third brachials (the hypozygals of the first syzygial pair) are low triangular, the inner border being about twice as long as the median length and the outer border being reduced almost or quite to a point.

The arms are not preserved beyond this point.

The width of the animal at the level of the third brachials is about 6.5 mm.

A second specimen from the same locality resembles the first, but is very slightly smaller.

In a third specimen from the same locality (pl. 2, fig. 4) the cirri are 10.0 mm long with 27 segments, of which the first is from twice as broad as long to about as long as broad, the second is about as long as broad or slightly longer than broad, the third is about three times as long as the median width, the fourth is still longer, and the fifth

and sixth are five or six times as long as the median width; those following decrease in length so that the last 12 are only about one third again as long as broad. The elongate earlier segments have expanded ends, the distal end being somewhat produced, especially dorsally, and slightly overlapping the base of the segments following. On the short and more compressed distal segments the production of the distal edge dorsally becomes narrowed and accentuated so that the dorsal profile of the outer portion of the cirri is strongly serrate, whereas the ventral profile is smooth. The opposing spine is triangular, erect, arising from the entire dorsal surface of the penultimate segment, equal to half the width of the segment in height, and much higher than the production of the distal edge of the segments preceding. The terminal claw is small, conical, and scarcely curved.

$P_1$  is 4.4 mm long with 17 segments and is slender and evenly tapering. The first three segments are about as long as broad, and those following slowly increase in length so that the seventh is about twice as long as broad, the tenth is about three times as long as the median width, and the outermost are about four times as long as the median width. From the tenth onward the segments are constricted centrally, and the slightly projecting distal edge is finely spinous dorsally.

$P_2$  is 4.3 mm long with 12 segments, of which the first is about as long as broad, the second is about one third again as long as broad, the third is somewhat more than twice as long as broad, and those following are greatly elongated with slightly produced and very finely spinous distal ends. The pinnule is about as stout basally as  $P_1$  but tapers rather more rapidly, the distal half being very slender, though not flagellate.

$P_3$  resembles  $P_2$  and is about the same length or slightly shorter, with about 10 segments. It is about as stout basally as  $P_2$  but tapers more gradually and evenly, so that it appears stouter in the proximal half. It bears a gonad which extends from the middle of the fourth to the end of the proximal third of the sixth segment.

The next three pinnules are similar to  $P_3$ .

The distal pinnules are 6.0 mm long with 17 segments, which, except for the first two, are much elongated and very slender.

*Remarks.*—No species of the genus *Psathyrometra* has heretofore been known from the Atlantic. It is represented in the Indian and Pacific Oceans by 14 species, which range from the eastern coast of India to the Lesser Sunda, Philippine, and Hawaiian Islands, thence northward to the northern part of the Sea of Japan and the Aleutian

Islands, and southward along the coast of North America to Panama and the Galápagos Islands, in from 184 to 1,617 fathoms of water.

The new species, *P. acuta*, appears to be most closely related to *P. major* and *P. mira*, which are found on the western coast of the Malay Peninsula and southward to the Lesser Sunda Islands in 185 to 434 fathoms of water. These agree with *P. acuta* in having two and a partial third column of cirrus sockets in each radial area on the centrodorsal, but in both of them the radial areas on the centrodorsal are conspicuously delimited by broad grooves or bare lines.

#### DIPLOCRINUS CAROLINAE, n. sp.

Plate 1, fig. 3; plate 2, fig. 5

*Locality*.—*Caroline* station 47; west of Puerto Rico (lat.  $18^{\circ}17'05''$  N., long.  $67^{\circ}24'45''$  W.); 280 to 340 fathoms; February 13, 1933. One specimen (U.S.N.M. no. E.3124 [type]).

*Description*.—The stem as preserved is 47 mm long and, in section, is pentagonal with broadly rounded angles. There are seven complete internodes, six of five and one of six columnals. The columnals alternate thick and thin, the thick ones being twice as high as the thin ones or even higher, and some of the thin ones being incomplete.

The cirri are about 25 mm in length and consist of 26 to 29 segments, of which the first 6 have a single dorsal tubercle and those following have two dorsal tubercles, a proximal and a distal, with often a small tubercle between them. The penultimate segment is entirely smooth dorsally. The terminal claw is short, stout, and strongly curved.

There are exactly 30 arms, which are about 75 mm long from the radials. Each post-radial series bears two IIBr series, and each of these bears externally a IIIBr series, so that the arms on each post-radial series are six, arranged in 2,1,1,2 order. The division series are only slightly rounded dorsally and have broadly and sharply flattened sides so that the basal portion of the crown is very compact.

*Remarks*.—This new species is closely related to *D. maclearanus* (Wyville Thomson), which was dredged by the *Challenger* off Barra Grande, south of Pernambuco, Brazil (lat.  $9^{\circ}05'$  S., long.  $34^{\circ}50'$  W.), in 350 fathoms on September 10, 1873, from which it differs in having a larger number of internodals, in having more segments in the cirri, and in having the cirri provided with prominent dorsal tubercles.

## EXPLANATION OF PLATES

## PLATE 1

- FIG. 1. *Psathyrometra acuta*, n. sp., the type specimen (U.S.N.M. no. E.3121) from Caroline station 102, lateral view.  $\times 3$ .
- FIG. 2. *Psathyrometra acuta*, n. sp., the type specimen (U.S.N.M. no. E.3121) from Caroline station 102, dorsal view.  $\times 3$ .
- FIG. 3. *Diplocrinus carolinac*, n. sp., the type specimen (U.S.N.M. no. E.3124) from Caroline station 47, lateral view. Natural size.

## PLATE 2

- FIG. 4. *Psathyrometra acuta*, n. sp., another specimen (U.S.N.M. no. E.3123) from Caroline station 102, dorsal view.  $\times 3$ .
- FIG. 5. *Diplocrinus carolinac*, n. sp., the type specimen (U.S.N.M. no. E.3124) from Caroline station 47, lateral view. Natural size.





*PSATHYROMETRA ACUTA* AND *DIPLOCRINUS CAROLINAE*

(For explanation, see page 5.)



*PSATHYROMETRA ACUTA* AND *DIPLOCRINUS CAROLINAE*

(For explanation, see page 5.)





SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 5

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

A NEW  
NEMATODE OF THE GENUS *DIPLOTRIAENA*  
FROM A HISPANIOLAN WOODPECKER

BY

EVERETT E. WEHR

Zoological Division, Bureau of Animal Industry,  
U.S. Department of Agriculture



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### A NEW NEMATODE OF THE GENUS DIPLOTRIAENA FROM A HISPANIOLAN WOODPECKER

By EVERETT E. WEHR

*Zoological Division, Bureau of Animal Industry, U.S. Department of  
Agriculture*

The species of nematode described in this paper was collected from the body cavity of a Hispaniolan woodpecker killed near Santa Barbara de Samaná, Dominican Republic, by E. W. Price while a member of the scientific staff of the Johnson-Smithsonian Deep-Sea Expedition to Puerto Rico and adjacent areas.

#### DIPLOTRIAENA SERRATOSPICULA, n. sp.

*Description.*—*Diplotriaena*: Body long, slender, attenuated at extremities, more abruptly so at anterior than at posterior portion. Oral opening more or less oval in shape, not surrounded by lips. Four pairs of large submedian cephalic papillae, one papilla of each pair internal to the other papilla; papillae approximately equal in size. Lateral papillae or amphids appearing as dark areas, one on each lateral side, situated between the two outer submedian papillae. Chitinous tridents (fig. 1, *b*) very conspicuous, one on each lateral side of anterior end of esophagus, their distal ends somewhat enlarged and tips of dorsal and ventral prongs of tridents delaminated. Esophagus differentiated into an anterior short, narrow, and a posterior long, broad portion. Intestine usually visible through body wall as a narrow dark streak extending through most of body length.

*Male* 33 mm long by 390  $\mu$  wide near equator of body. Body very light in color for a short distance behind anterior end and usually so for a slightly greater distance anterior to tip of posterior extremity; remaining portion of body slightly darker in color. Esophagus much lighter in color than intestine; anterior portion of esophagus 220  $\mu$  long and approximately 48  $\mu$  wide; posterior portion 2.55 mm long and about twice as broad as anterior portion. Nerve ring 146  $\mu$  from anterior end of body. Each trident averaging about 109.5  $\mu$  in length. Spicules (fig. 1, *c*) unequal in length and dissimilar in shape; the left spicule the longer, about 1.60 mm long, broadly curved, its diam-

eter gradually decreasing from proximal to distal ends; the short right spicule (fig. 1, *d*) about  $675\ \mu$  long when measured in a straight line from end to end, describing two shallow loops, and with edges serrated except at extreme anterior and posterior ends. Posterior portion of body truncated or broadly rounded, usually with the two spicules extruding for a considerable distance out of the cloacal opening. Tip of tail in specimens somewhat shrunken as illustrated in

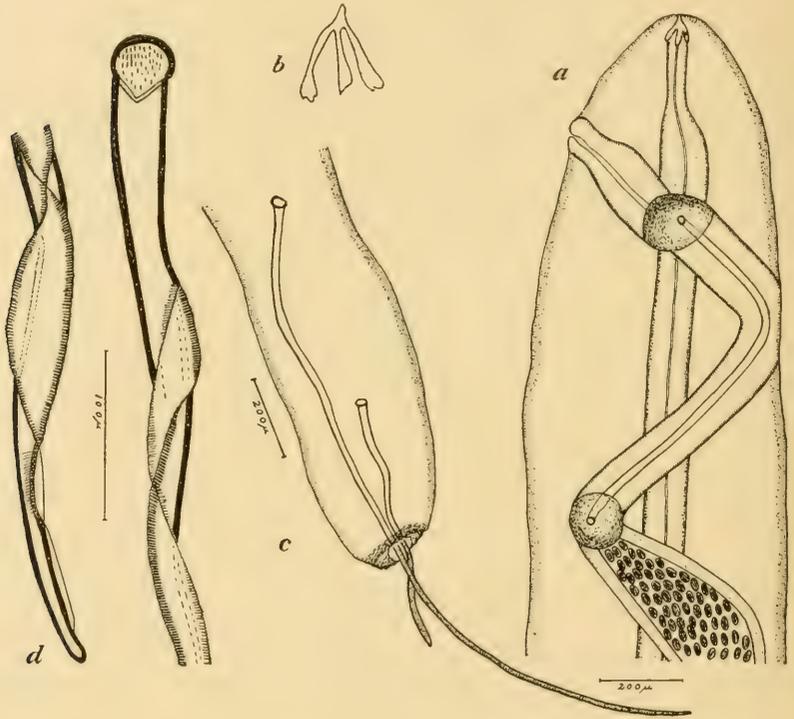


FIG. 1. *Diplotriaeana serratospicula*, n. sp.; *a*, lateral view of female; *b*, trident; *c*, ventral view of posterior extremity of male; *d*, enlarged view of short spicule of male.

figure 1*c*; shrinkage due apparently to the fixing reagent. If any caudal papillae were present it was impossible to recognize them.

*Female* 75 mm long by  $750\ \mu$  wide near equator of body. Body color the same as in male. Anterior part of esophagus about  $224\ \mu$  long and  $48.5\ \mu$  wide, and posterior portion  $4.65\ \text{mm}$  long and about  $104\ \mu$  wide. Nerve ring  $187\ \mu$  from anterior extremity. Trident  $117\ \mu$  long and very similar in appearance to that of male. Vulva (fig. 1, *a*) rather prominent,  $300$  to  $375\ \mu$  from anterior end. True vagina or

ovjector about 1.35 mm long and averaging about  $134 \mu$  in width, describing one knee-shaped bend a short distance from vulvar opening and a second one at the point of its union with uterine vagina. It was impossible to determine the length of the uterine vagina because of the many coils of egg-filled uteri that concealed it. Posterior end of intestine atrophied; anus not discernible. Tail broadly rounded. Eggs in posterior portions of uteri containing embryos; those in anterior portions not embryonated. Embryonated eggs 48 to  $52 \mu$  long by 32 to  $36 \mu$  wide, with a shell about  $8 \mu$  thick.

*Host*.—Hispaniolan woodpecker, *Chrysoperpes striatus*.

*Location*.—Body cavity.

*Locality*.—Santa Barbara de Samaná, Dominican Republic.

*Type specimens* (male and female).—U.S.N.M. Helm. Coll. no. 8705; paratypes no. 8706.

*D. serratospicula* may be distinguished from all other species of the genus *Diplotrriaena*, so far as the present writer is able to determine from the published descriptions and figures of those species, by the short spicule which is serrated for its entire length except for the two extremities, and by the size of the long spicule, which is nearly two and one half times as long as the short spicule. This long spicule is exceeded in length by those of only two other species of the genus, namely, *D. nocti* Hoëppli and Hsü (1929) and *D. obtuso-caudata* (Rudolphi, 1819).

#### LITERATURE CITED

HOEPLI, R. J. C., and Hsü, H. F.

1929. Parasitische Nematoden aus Vögeln und einem Tümmeler. Beiheft (1) Arch. Schiffs-u. Tropen-Hyg., vol. 33, pp. 24-34, pls. 1-5, figs. 1-22, Leipzig.

RUDOLPHI, C. A.

1819. Entozoorum synopsis cui accedunt mantissa duplex et indices locupletissimi. x + 811 pp., 3 pls., Berlin.











SMITHSONIAN MISCELLANEOUS COLLECTIONS

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
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# NEW TREMATODE PARASITES OF BIRDS

(WITH ONE PLATE)

BY

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# NEW TREMATODE PARASITES OF BIRDS

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### NEW TREMATODE PARASITES OF BIRDS

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Agriculture*

(WITH ONE PLATE)

This is the first of several papers dealing with the parasitic worms collected by the writer during the winter of 1933 while a member of the scientific staff of the Johnson-Smithsonian Deep-Sea Expedition. While on this cruise to Puerto Rico and adjacent areas, a few birds were taken and examined for parasites; these included a pelican (*Pelecanus occidentalis occidentalis*), a booby (*Sula leucogastra*), and a duck (*Nyroca affinis*). From these hosts were collected five species of trematodes that appear to be new, the preliminary descriptions of which are given in this paper. A more extended discussion of these forms will appear in a later paper dealing with all of the parasitic worms collected by the expedition.

#### Family HETEROPHYIDAE

#### Subfamily HETEROPHYINAE

#### **GALACTOSOMUM JOHNSONI**,<sup>1</sup> n. sp.

Plate I, figs. 1, 2

*Description.*—Body elongate, 0.97 to 1.03 mm long by 280 to 340  $\mu$  wide. Cuticula covered with spines from anterior end of body as far posteriorly as level of right testis. Oral sucker 60 to 90  $\mu$  in diameter, its aperture slightly subterminal; acetabulum absent. Prepharynx slender, 120 to 280  $\mu$  long; pharynx well developed, 60  $\mu$  long by 40 to 50  $\mu$  wide; esophagus 40 to 60  $\mu$  long; intestinal ceca terminating near posterior end of body. Genital aperture median, slightly preequatorial; genital sinus occupied by a piriform gonotyl, the protrusible portion armed with several rows of minute spines.

<sup>1</sup> Named in honor of Mr. Eldridge R. Johnson, sponsor of the expedition.

Seminal vesicle large, not divided by constrictions, its posterior end lying near anterior margin of left testis. Testes globular, or slightly wider than long, with zones and fields partly coinciding, left testis a little in advance of right, situated in anterior part of posterior third of body; right testis 92 to 120  $\mu$  long by 100 to 120  $\mu$  wide; left testis 100 to 120  $\mu$  in diameter. Ovary transversely oval, 40 to 48  $\mu$  long by 60 to 62  $\mu$  wide, situated to right of median line and about midway between right testis and gonotyl. Seminal receptacle oval, immediately anterior to ovary. Vitellaria not abundant, consisting of scattered follicles between level of ovary and posterior end of body. Uterus long, filling postovarial portion of body. Eggs asymmetrical, 34 to 36  $\mu$  long by 20  $\mu$  wide.

*Host*.—*Sula leucogastra*.

*Location*.—Small intestine.

*Type locality*.—Fajardo Roads, between Palominos Island and Fajardo, Puerto Rico.

*Type specimen*.—U.S.N.M. Helm. Coll. no. 8694; paratypes no. 8695.

#### GALACTOSOMUM DARBYI,<sup>2</sup> n. sp.

Plate 1, figs. 3, 4

*Description*.—Body elongate, 800 to 970  $\mu$  long by 140 to 200  $\mu$  wide, usually showing a slight constriction at or near level of ovary. Cuticula covered with spines except at posterior end of body. Oral sucker 56 to 60  $\mu$  in diameter; acetabulum absent. Prepharynx slender, 160 to 180  $\mu$  long; pharynx well developed, 40 to 44  $\mu$  long by 20 to 40  $\mu$  wide; esophagus 24 to 40  $\mu$  long; intestinal ceca extending to near posterior end of body. Genital aperture preequatorial, median in position or nearly so; genital sinus occupied by a piriform gonotyl. the protrusible portion armed with several rows of fine spines. Seminal vesicle elongate, S-shaped, more or less uniform in width, extending from genital aperture to level of posterior margin of ovary. Testes globular, 60 to 100  $\mu$  in diameter, with zones and fields partly coinciding, left testis slightly in advance of right, and situated about midway between genital aperture and posterior end of body. Ovary globular or transversely oval, 20 to 48  $\mu$  long by 40 to 60  $\mu$  wide, situated anterior to, and in same field as, right testis. Seminal receptacle postovarial, about same size as ovary. Vitellaria largely intercecal, extending from level of posterior margin of ovary to near

<sup>2</sup> Named in honor of Dr. George D. B. Darby, collector of the host from which this species was taken.

posterior end of body. Uterus long, extending posteriorly in a series of short transverse loops to near posterior end of body, where it turns and extends anteriorly in a similar manner, passing between testes and between testes and ovary to its termination in the genital sinus. Eggs oval, 22 to 24  $\mu$  long by 12 to 14  $\mu$  wide.

*Host*.—*Pelecanus occidentalis occidentalis*.

*Location*.—Small intestine.

*Type locality*.—Levantade Keys, Samaná Bay, Dominican Republic.

*Type specimen*.—U.S.N.M. Helm. Coll. no. 8699; paratypes no. 8700.

*Galactosomum johnsoni* differs from *G. darbyi* in the position of the seminal receptacle and in the shape and size of the eggs. In the former species the seminal receptacle is preovarial and the eggs are 34 to 36  $\mu$  long and asymmetrical, whereas in the latter species the seminal receptacle is postovarial and the eggs are 22 to 24  $\mu$  long and symmetrical. The shape of the eggs and the position of the seminal receptacle also serve to distinguish *G. johnsoni* from other species of the genus. *G. darbyi* may be distinguished from the other species of *Galactosomum*, viz, *G. lacteum* (Jägerskiöld), *G. erinaceum* (Poirier), *G. cochleariforme* (Rudolphi), *G. cochlear* (Diesing), *G. semifuscum* (Olsson), *G. spinetum* (Braun), *G. aharonii* (Witenberg), and *G. baylisi* (Nazmi), in the position of the genital aperture, which is near the intestinal bifurcation in *G. darbyi* and much farther posterior in the other species. There are also other differences, but these will not be discussed in this paper.

A comparison of the species of *Galactosomum* described in this paper with *Stictodora sawakinensis*, a species described from *Larus* sp. in Egypt by Looss (1899) and reported from dogs and cats in Palestine, also from *Puffinus kühli* from Suez by Witenberg (1929), shows such close relationships that it appears doubtful whether *Stictodora* should be retained as a valid genus.

## Family MICROPHALLIDAE

### LEVINSENIELLA MINUTA, n. sp.

Plate I, fig. 5

*Description*.—Body triangular, 153 to 180  $\mu$  long by 105 to 112  $\mu$  wide, flattened dorso-ventrally. Oral sucker subterminal, 23 to 25  $\mu$  in diameter; acetabulum 22 to 27  $\mu$  in diameter, situated about one third of body length from posterior end. Prepharynx apparently absent; pharynx moderately developed, 10 to 18  $\mu$  in diameter; esophagus 18 to 36  $\mu$  long; intestinal ceca relatively wide, terminating at

level of center of acetabulum. Genital aperture to left of acetabulum; genital sinus relatively large and containing apparently three papilla-like processes. Seminal vesicle large, semilunar in shape, filling greater part of space between acetabulum and intestinal ceca. Testes globular, about  $28 \mu$  in diameter, with zones coinciding and fields widely separated, situated posterior to acetabulum. Ovary transversely oval, about  $18 \mu$  long by  $22 \mu$  wide, pretesticular and to right of acetabulum. Vitellaria posttesticular, situated dorsal to uterine coils and consisting of two groups of five to six follicles each. Uterus postacetabular and largely posttesticular. Eggs oval,  $21.6 \mu$  long by  $12.6 \mu$  wide.

*Host*.—*Nyroca affinis*.

*Location*.—Small intestine.

*Type locality*.—Flamingo Lake, Culebra Island, West Indies.

*Type specimens*.—U.S.N.M. Helm. Coll. no. 8703; paratypes no. 8704.

This is the smallest species of the genus and perhaps the smallest known trematode. It resembles *Levinseniella claviforme* (Brandes) as described by Nicoll (1909) more than any other member of the genus, but may be distinguished from that species by its almost triangular shape, absence of prepharynx, shorter esophagus, longer intestinal ceca, and fewer eggs.

## Family STRIGEIDAE

### Subfamily CYATHOCOTYLINAE

#### **PROHEMISTOMUM FAJARDENSIS, n. sp.**

Plate 1, fig. 6

*Description*.—Body scoop-shaped, 1.105 to 1.360 mm long, divided into a widened anterior part 1.071 mm long by 0.51 to 0.795 mm wide and a short, dorsally directed, appendixlike posterior part 85 to 175  $\mu$  long by 160 to 204  $\mu$  wide. Oral sucker subterminal 52 to 60  $\mu$  in diameter; acetabulum 64 to 80  $\mu$  in diameter; adhesive organ slightly oval in outline, 320 to 400  $\mu$  long by 300 to 320  $\mu$  wide, with deep central depression. Pharynx 32 to 40  $\mu$  long by 24 to 35  $\mu$  wide; esophagus short; intestinal ceca slender, extending to junction of anterior and posterior parts of body. Genital aperture at posterior end of body, subterminal, directed dorsally; genital sinus spacious. Cirrus pouch slender, about 380  $\mu$  long by 80  $\mu$  wide at base, extending either to right or left around testes and ovary, its base lying in zone of anterior testis, and containing a seminal vesicle, prostate and cirrus. Testes globular or slightly oval, with zones separated and fields partly coinciding; anterior testis 120 to 140  $\mu$  long by 112 to

120  $\mu$  wide; posterior testis about 160  $\mu$  in diameter. Ovary sub-globular, 100 to 140  $\mu$  long by 100 to 120  $\mu$  wide, situated between testes, either to right or left depending largely upon position of cirrus pouch. Vitellaria consisting of large follicles forming an almost complete circle around adhesive organ. Uterus completely covered by adhesive organ and containing 16 to 60 eggs; vaginal sphincter well developed, 80 to 120  $\mu$  in diameter. Eggs oval, 44 to 48  $\mu$  long by 32 to 36  $\mu$  wide.

*Host.*—*Sula leucogastra*.

*Location.*—Small and large intestine.

*Type locality.*—Fajardo Roads, between Palominos Island and Fajardo, Puerto Rico.

*Type specimen.*—U.S.N.M. Helm. Coll. no. 8696; paratypes no. 8697.

#### PROHEMISTOMUM APPENDICULATOIDES, n. sp.

Plate I, fig. 7

*Description.*—Body scoop-shaped, 680 to 970  $\mu$  long, divided into a widened anterior part 510 to 850  $\mu$  long by 240 to 369  $\mu$  wide, and a conical posterior part. Oral sucker subterminal, 40 to 48  $\mu$  in diameter; acetabulum 20 to 28  $\mu$  in diameter; adhesive organ prominent, 160 to 200  $\mu$  long by 100 to 180  $\mu$  wide, with a deep central depression. Pharynx 28 to 32  $\mu$  long by 20 to 32  $\mu$  wide; esophagus 42 to 120  $\mu$  long; intestinal ceca slender, terminating at or near junction of anterior and posterior parts of body. Genital aperture at posterior end of body, subterminal and directed dorsally; genital sinus spacious. Cirrus pouch 280 to 360  $\mu$  long by 50 to 85  $\mu$  wide, extending to right or left around testes and ovary, its base reaching level of anterior margin of anterior testis; it contains a small seminal vesicle, long pars prostatica and cirrus. Testes globular to oval, with zones separated and fields partly coinciding; anterior testis 80 to 100  $\mu$  long by 60 to 80  $\mu$  wide; posterior testis 100 to 120  $\mu$  long by 70 to 80  $\mu$  wide. Ovary globular, about 40  $\mu$  in diameter, situated between testes. Vitellaria well developed, forming an almost complete circle around base of adhesive organ. Uterus short and containing from two to four eggs; vaginal sphincter moderately developed. Eggs oval, 80 to 112  $\mu$  long by 60 to 80  $\mu$  wide.

*Host.*—*Pelecanus occidentalis occidentalis*.

*Location.*—Small intestine.

*Type locality.*—Levantade Keys, Samaná Bay, Dominican Republic.

*Type specimen.*—U.S.N.M. Helm. Coll. no. 8701; paratypes no. 8702.

The first of the species of *Prohemistomum*, *P. fajardensis*, described here may be distinguished from all other species of the genus by the size of the eggs, which are only about half as large as those of the other species. The second species, *P. appendiculatoides*, appears to be closely related to *P. appendiculata*, which was described by Ciurea (1916) from dogs and cats in Rumania; it differs, however, from that species in having a distinct esophagus (almost absent in *P. appendiculata*) and in having an acetabulum only about one half the size of the oral sucker (suckers about equal in size in *P. appendiculata*). *P. fajardensis* also resembles in some respects a species, *P. serpentum*, described from a snake, *Natrix piscator*, by Gogate (1932) at Rangoon, India. Aside from the difference in host relationship, the two species may be distinguished by the fact that *P. fajardensis* is much smaller than *P. serpentum*, and that in the former the adhesive organ does not cover the vitellaria as it does in the latter species.

## REFERENCES CITED

CIUREA, JOAN

1916. *Prohemistomum appendiculatum*, eine neue Holostomiden-Art aus Hunde- und Katzendarm, dessen Infektionsquelle in der Süßwasserfischen zu suchen ist, etc. Zeitschr. Infektionskrankh. parasit. Krankh. u. Hyg. Haustiere, Berlin, vol. 17, pp. 309-328, pls. 15-16.

GOGATE, B. S.

1932. On a new species of trematode (*Prohemistomum serpentum*, n. sp.) from a snake with a note on an immature species of *Heterochinostomum* Odhner from the cat. Parasitology, vol. 24, pp. 318-320, figs. 1, 2.

LOOSS, ARTHUR

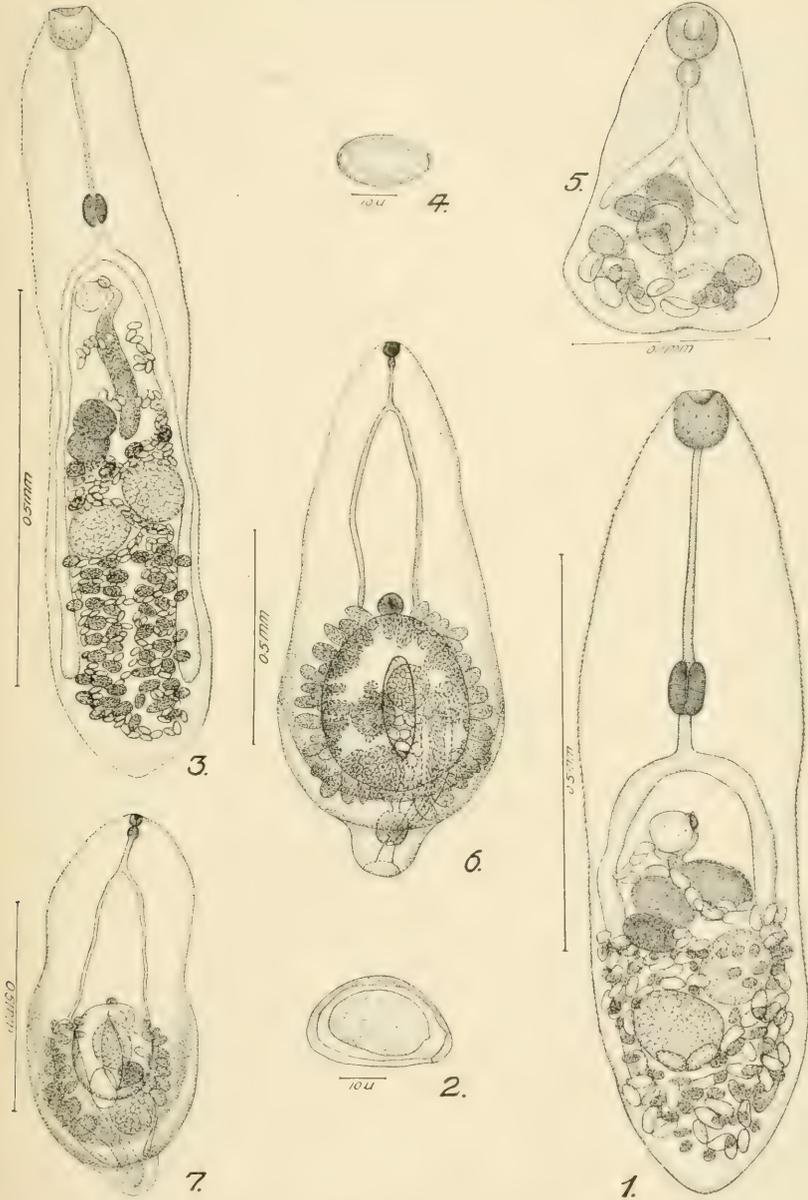
1899. Weitere Beiträge zur Kenntniss der Trematoden-Fauna Aegyptens, zugleich Versuch einer natürlichen Gliederung des Genus *Distomum* Retzius. Zool. Jahrb., Jena, Abt. Syst., vol. 12, pp. 521-784, pls. 24-32, figs. a, b.

NICOLI, WILLIAM

1909. Studies on the structure and classification of the digenetic trematodes. Quart. Journ. Micr. Soc., n. s., vol. 53, pp. 391-487, pls. 9, 10.

WITENBERG, G.

1920. Studies on the trematode-family Heterophyidae. Ann. Trop. Med. and Parasit., vol. 23, pp. 131-239, figs. 1-33.



TREMATODE PARASITES OF BIRDS

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|--|--|
| 1. <i>Galactosomum johnsoni</i> . Complete worm; ventral view. | 5. <i>Levinseniella minuta</i> . Complete worm; ventral view.            |
| 2. <i>Galactosomum johnsoni</i> . Egg.                         | 6. <i>Prohemistomum fajardensis</i> . Complete worm; ventral view.       |
| 3. <i>Galactosomum darbyi</i> . Complete worm; ventral view    | 7. <i>Prohemistomum appendiculatoides</i> . Complete worm; ventral view. |
| 4. <i>Galactosomum darbyi</i> . Egg.                           |  |







SMITHSONIAN MISCELLANEOUS COLLECTIONS  
VOLUME 91, NUMBER 7

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# NEW DIGENETIC TREMATODES FROM MARINE FISHES

(WITH ONE PLATE)

BY

EMMETT W. PRICE

Zoological Division, Bureau of Animal Industry,  
U.S. Department of Agriculture



(PUBLICATION 3234)

CITY OF WASHINGTON  
PUBLISHED BY THE SMITHSONIAN INSTITUTION  
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### NEW DIGENETIC TREMATODES FROM MARINE FISHES

By EMMETT W. PRICE

*Zoological Division, Bureau of Animal Industry, U.S. Department of  
Agriculture*

(WITH ONE PLATE)

This paper contains descriptions of five digenetic trematodes that are regarded as new. These trematodes were collected by the writer from fishes taken during the months of February and March, 1933, in the vicinity of Puerto Rico, by the Johnson-Smithsonian Deep-Sea Expedition. Inasmuch as the descriptions of these flukes are preliminary in nature, no attempt has been made in most instances to differentiate them from all of the species in the genera to which they have been allocated, but only from those to which they are most closely related. A more complete discussion of these forms and their relationships will be given in a later paper.

The writer is indebted to Dr. George S. Myers, assistant curator of fishes, United States National Museum, for the determinations of the fish hosts. The fishes referred to as hosts without a specific name are apparently new and will be described by Dr. Myers in the near future.

#### Family FELLODISTOMIDAE

#### Subfamily FELLODISTOMINAE

#### **STERINGOTREMA OVATA, n. sp.**

Plate I, fig. 1

*Description.*—Body oval, 500  $\mu$  long by 300  $\mu$  wide, flat and transparent. Cuticula very delicate, without spines. Oral sucker sub-terminal, 140  $\mu$  in diameter; acetabulum weakly muscular, 50  $\mu$  long by 68  $\mu$  wide, slightly preequatorial. Prepharynx absent; pharynx 40  $\mu$  long by 36  $\mu$  wide; esophagus apparently absent; intestinal ceca relatively wide, extending to about 120  $\mu$  from posterior end of body. Excretory aperture terminal; excretory vesicle almost V-shaped, its branches extending to near level of pharynx. Genital aperture at

posterior end of pharynx, slightly to right of median line. Cirrus pouch piriform, 120  $\mu$  long by 52  $\mu$  wide at base, containing a short cirrus, pars prostatica and a large, globular seminal vesicle. Testes globular, about 40  $\mu$  in diameter, with zones coinciding and fields separate, intercecal, postequatorial. Ovary about 40  $\mu$  long by 28  $\mu$  wide, to left of, and partly in zone of, acetabulum. Seminal receptacle and Laurer's canal not observed. Mehlis' gland median, immediately postacetabular. Vitellaria extracecal, consisting of few, relatively large follicles situated largely in same zone as acetabulum and ovary. Uterus largely posttesticular, with two antero-laterally directed loops on each side which extend into extracecal fields. Eggs oval, 24  $\mu$  long by 16  $\mu$  wide.

*Host*.—*Opisthonema oglinum* (Le Seur) (J-S 356).

*Location*.—Pyloric ceca.

*Locality*.—Fajardo Roads, near Fajardo, Puerto Rico.

*Type specimen*.—U.S.N.M. Helm. Coll. no. 8712.

This species belongs in the family Fellodistomidae, subfamily Fello-distominae, and has been placed in the genus *Steringotrema* despite a number of differences that may ultimately necessitate the erection of a new genus for its reception. In view of the fact that only a single specimen was available for study, the writer does not feel justified in proposing a new genus for this form at this time. *Steringotrema ovata* may be distinguished from all other species of the genus in having an oral sucker that is distinctly larger than the acetabulum, the oral sucker being much smaller than the acetabulum in all other species.

#### PYCNADENA PIRIFORME, n. sp.

Plate I, fig. 2

*Description*.—Body piriform, 629  $\mu$  long and 420  $\mu$  wide. Cuticula without spines. Oral sucker 140  $\mu$  long by 120  $\mu$  wide; acetabulum 224  $\mu$  long by 268  $\mu$  wide, aperture 100  $\mu$  long by 160  $\mu$  wide. Prepharynx very short; pharynx 80  $\mu$  long by 64  $\mu$  wide; esophagus very short; intestinal ceca relatively wide, extending to level of posterior margins of testes. Genital aperture near left margin of body, at level of anterior end of pharynx. Cirrus pouch slender, 168  $\mu$  long by 48  $\mu$  wide at base. Testes more or less globular, about 80  $\mu$  in diameter, with zones coinciding and fields partially overlapping, near posterior end of body. Ovary globular, about 70  $\mu$  in diameter, median, in same zone and fields as testes. Seminal receptacle small, piriform, to right of vitelline reservoir. Vitellaria largely extracecal,

extending from anterior margin of acetabulum to near ends of intestinal ceca, the follicles more numerous in acetabular zone; vitelline reservoir large, median, anterior to ovary. Uterus simple; no eggs present in available material.

*Host*.—*Monocanthus hispidus* (Linn.) (J-S 443).

*Location*.—Intestine.

*Locality*.—Station 82 (lat.  $18^{\circ}32'48''$  N., long.  $65^{\circ}23'45''$  W.).

*Type specimen*.—U.S.N.M. Helm. Coll. no. 8713.

*Pycnadena piriforme* differs from *P. lata* (Linton) in having the acetabulum more anterior and the genital aperture more anterior and nearer the body margin; the vitellaria are less well developed than in *P. lata*, but as the specimen upon which *P. piriforme* is based is more immature than Linton's specimens, the lesser development of the vitellaria may be only apparent.

The genus *Pycnadena* Linton (syn., *Didymorchis* Linton) has been included with *Fellodistomum* Stafford, *Steringophorus* Odhner, *Rhodotrema* Odhner, *Steringotrema* Odhner, *Bacciger* Nicoll, and *Lintonium* Stunkard and Nigrelli (= *Gastris* Lühe) in the subfamily Fellodistominae by Stunkard and Nigrelli (1930). The writer doubts whether *Pycnadena* should be included in this subfamily, or even in the family Fellodistomidae, since there are several characters in which it differs from all the other genera, these being the pretesticular uterus, presence of a seminal receptacle and more profuse development of the vitellaria. However, at present it is left in the subfamily as a doubtful member until more material is available for study.

## Family ZOOGONIDAE

### Subfamily LECITHOSTAPHYLINAE

#### LECITHOSTAPHYLUS ATHERINAE, n. sp.

Plate 1, fig. 3

*Description*.—Body spearhead-shaped, 1.22 to 1.36 mm long by 425 to 544  $\mu$  in maximum width near equator. Cuticula armed with fine scalelike spines. Oral sucker subterminal, 152 to 160  $\mu$  long by 100 to 133  $\mu$  wide; acetabulum 80 to 100  $\mu$  long by 108 to 120  $\mu$  wide, 425 to 510  $\mu$  from anterior end of body. Prepharynx 20 to 40  $\mu$  long; pharynx 80 to 88  $\mu$  long by 60  $\mu$  wide; esophagus very short or absent; intestinal ceca relatively wide, extending to, or slightly beyond, level of posterior poles of testes. Genital aperture preacetabular, 320 to 400  $\mu$  from anterior end of body, to left of median

line. Cirrus pouch piriform, 120 to 160  $\mu$  long by 60 to 80  $\mu$  wide, containing a short cirrus, a somewhat twisted seminal vesicle and numerous prostate cells. Testes lobulated, 120 to 160  $\mu$  long by 60 to 80  $\mu$  wide, with zones coinciding and fields separate, situated about one third of body length from posterior end. Ovary median, lobulated, 60 to 120  $\mu$  long by 88 to 120  $\mu$  wide, immediately posterior to acetabulum. Seminal receptacle globular, about 60  $\mu$  in diameter, postero-lateral of ovary. Vitellaria largely extracecal, extending from posterior margin of acetabulum to level of anterior poles of testes. Uterus long and convoluted, filling greater part of posttesticular space and entire intercecal field as far forward as ovary. Eggs 32  $\mu$  long by 18  $\mu$  wide.

*Host.*—*Atherina araea* Jordan and Gilbert (J-S 334).

*Location.*—Intestine.

*Locality.*—Samaná Bay, near Santa Barbara de Samaná, Dominican Republic.

*Type specimen.*—U.S.N.M. Helm. Coll. no. 8714; paratypes no. 8715.

*Lecithostaphylus atherinae* differs from *L. retroflexus* (Molin) as described by Odhner (1911) in body shape, position of genital aperture, and the size of the eggs. *L. retroflexa* is elongate oval, the genital aperture is at the level of the pharynx, and the eggs are 41  $\mu$  long by 20  $\mu$  wide, whereas in *L. atherinae* the body possesses shoulderlike projections at the level of the ovary, which gives to it somewhat the shape of a spearhead, the genital aperture is about midway between the acetabulum and pharynx, and the eggs are 32  $\mu$  long by 18  $\mu$  wide. The subfamily Lecithostaphylinae contains, according to Fuhrmann (1928), the genera *Lecithostaphylus* Odhner, *Proctophantastes* Odhner, and *Lepidophyllum* Odhner. Manter (1926) has included in this subfamily the genus *Steganoderma* Stafford. Fuhrmann (1928) included *Steganoderma* in the subfamily Zoogoninae, but his action in this case probably was unintentional, since *Steganoderma* is obviously more closely related to the genera included in the Lecithostaphylinae than to those of the Zoogoninae.

In reviewing the family Zoogonidae, which action was necessary in connection with the identification of *L. atherinae*, the writer has examined the types of the genera proposed by Linton (1910) and finds that *Deretrema fusillus* Linton is congeneric with *Proctophantastes abyssorum* Odhner and, according to priority, the genus *Proctophantastes* must fall as a synonym of *Deretrema*, *P. abyssorum* Odhner becoming *D. abyssorum* (Odhner). Furthermore, this review has shown that the genus *Diplangus* Linton (1910), also belongs

in the subfamily Lecithostaphylinæ. It is possible that *Mesolecitha* Linton (syn., *Mesorchis* Linton) may belong to this subfamily, but more study is necessary before this can be determined with certainty.

Family ALLOCREADIIDÆ

Subfamily ALLOCREADIINÆ

**PLAGIOPORUS FUSIFORMIS**, n. sp.

Plate 1, fig. 4

*Description*.—Body fusiform, 1.27 to 1.7 mm long by 475 to 680  $\mu$  wide at level of acetabulum, slightly flattened dorso-ventrally. Cuticula delicate, unarmed. Oral sucker 120 to 152  $\mu$  in diameter; acetabulum 220 to 340  $\mu$  long by 280 to 576  $\mu$  wide, in equatorial zone. Prepharynx 20 to 40  $\mu$  long; pharynx 40 to 60  $\mu$  long by 40 to 80  $\mu$  wide; esophagus 200 to 240  $\mu$  long; intestinal ceca simple, extending to level of posterior testis. Excretory aperture terminal; excretory vesicle tubular, extending anteriorly as far as level of anterior testis. Genital aperture near left margin of body and about midway between pharynx and intestinal bifurcation. Cirrus pouch slender, about 300  $\mu$  long, its base lying in median line dorsal to acetabulum, and containing a slender unarmed cirrus, prostate cells, and a slender, somewhat convoluted seminal vesicle; a distinct pars prostatica apparently absent. Testes elongated transversely, tandem and in contact, in anterior part of posterior third of body; anterior testis about 80  $\mu$  long by 240  $\mu$  wide; posterior testis 120  $\mu$  long by 240  $\mu$  wide. Ovary trilobed, about 60  $\mu$  long by 180  $\mu$  wide, pretesticular, mostly to right of median line. Seminal receptacle and Laurer's canal present, the latter opening in the mid-dorsal line at level of ovary. Vitellaria extending from level of genital aperture to about half way between posterior testis and posterior end of body. Uterus with relatively few coils, preovarial; metraterm extending from near center of acetabulum to genital aperture. Eggs oval, 70 to 72  $\mu$  long by 36  $\mu$  wide, with thin, yellowish shells.

*Host*.—Eel (*Xenomystax* sp.) (J-S 447 and 448).

*Location*.—Intestine.

*Locality*.—Station 84 (lat. 18°39' N., long. 65°17' W.).

*Type specimen*.—U.S.N.M. Helm. Coll. no. 8716; paratypes no. 8717.

*Plagioporus fusiformis* appears to be more closely related to *P. serotinus* Stafford than to any of the other species so far placed in the genus, but differs from that species in the length of the ceca which

in *P. fusiformis* extend only to the level of the posterior testis, whereas in *P. serotinus* they extend to the posterior end of the body.

In comparing the species of the genus *Plagioporus* Stafford with those included in the genus *Lebouria* Nicoll the writer is convinced that the latter are congeneric with *P. serotinus*, type of *Plagioporus*. Stafford's (1904) description of *P. serotinus* is rather meager, but all of the generic characters are clearly indicated; therefore, the writer transfers the species *Lebouria aducta* Nicoll, *L. accrinae* Pigulevsky, *L. alacris* (Looss), *L. cooperi* Hunter and Bangham, *L. crassigula* Linton, *L. elongata* Goto and Ozaki, *L. idonea* Nicoll, *L. isaitschikowi* Layman, *L. nicolli* Isaitschikov, *L. obducta* Nicoll, *L. tumidulum* (Rudolphi), and *L. varia* Nicoll to the genus *Plagioporus*, the new combinations being, respectively, *P. aducta* (Nicoll), *P. acerinae* (Pigulevsky), *P. alacris* (Looss), *P. cooperi* (Hunter and Bangham), *P. crassigula* (Linton), *P. elongata* (Goto and Ozaki), *P. idonea* (Nicoll), *P. isaitschikowi* (Layman), *P. nicolli* (Isaitschikov), *P. obducta* (Nicoll), *P. tumidulum* (Rudolphi), and *P. varia* (Nicoll).

From the above species, which up to the present time have been included in the genus *Lebouria*, *Plagioporus fusiformis* may be distinguished by the distinctly fusiform shape of the body and by the very large, equatorially placed acetabulum. In the extent of the intestinal ceca posteriorly, this form resembles *P. nicolli* and *P. cooperi* more than the others; *P. fusiformis* may be differentiated from *P. nicolli* in that loops of the uterus pass between the ovary and testes in the latter species, a condition not occurring in *P. fusiformis* or in any of the other species of the genus. *P. fusiformis* differs from *P. cooperi* in having a larger and more equatorially placed acetabulum, in having the genital aperture situated more anteriorly and nearer the body margin, and in having the testes tandem in position instead of being placed diagonally as in *P. cooperi*.

#### PODOCOTYLE LANCEOLATA, n. sp.

Plate 1, fig. 5

*Description*.—Body lanceolate, 1.95 to 2 mm long by 645 to 850  $\mu$  wide, strongly flattened dorso-ventrally and more attenuated anteriorly than posteriorly. Cuticula without spines or ridges. Oral sucker subterminal, 100 to 189  $\mu$  in diameter; acetabulum 220 to 240  $\mu$  long by 240 to 280  $\mu$  wide, about one third body length from anterior end. Prepharynx short; pharynx somewhat globular, 88 to 100  $\mu$  long by 88  $\mu$  wide; esophagus 160 to 200  $\mu$  long; intestinal ceca

simple, extending to near posterior end of body. Genital aperture sinistral, cephalad of intestinal bifurcation, and about midway between margin of body and esophagus. Cirrus pouch about  $400\ \mu$  long by  $100$  to  $120\ \mu$  wide, extending to, or only slightly beyond, posterior margin of acetabulum. Testes lobed, tandem, sometimes touching, postequatorial; anterior testis  $160\ \mu$  long by  $260$  to  $280\ \mu$  wide; posterior testis  $160$  to  $180\ \mu$  long by  $260$  to  $320\ \mu$  wide. Ovary trilobed,  $140\ \mu$  long by  $240$  to  $320\ \mu$  wide, pretesticular, and mostly to right of median line. Vitellaria well developed, extending from slightly in front of anterior margin of acetabulum to near posterior end of body. Uterus in intercecal field between ovary and acetabulum, relatively long and with several loops containing numerous eggs. Eggs oval,  $56\ \mu$  long by  $30\ \mu$  wide.

*Host.*—*Polymixia* sp. (J-S 595).

*Location.*—Intestine.

*Locality.*—Station 100 (lat.  $18^{\circ}40'15''$  N., long.  $64^{\circ}50'15''$  W.).

*Type specimen.*—U.S.N.M. Helm. Coll. no. 8719; paratypes no. 8720.

*Podocotyle lanceolata* differs from all species of the genus except *P. levinseni* Isaitschikov, *P. odhneri* Isaitschikov, *P. sygnathi* Nicoll, and *P. pennelli* Leiper and Atkinson in that the cirrus pouch does not extend posterior to the acetabulum. Of the species mentioned above, *P. lanceolata* resembles *P. odhneri* perhaps more closely than it does any of the other species, but it may be distinguished from that form in having distinctly lobed testes, a relatively larger ovary, and more profusely developed vitellaria. *P. lanceolata* has a smaller ovary and a more laterally placed genital aperture, which serve to distinguish it from *P. levinseni*. It may be differentiated from *P. sygnathi* by the position and character of the testes and the extent of the vitellaria anteriorly, the testes being smooth and well separated, and the vitellaria not extending to the acetabulum in *P. sygnathi*, while the testes are lobed and close together, and the vitellaria extend anterior to the acetabulum in *P. lanceolata*. This species may be distinguished from *P. pennelli* in the position of the genital aperture and in the length of the intestinal ceca, the genital aperture being situated at the level of the pharynx and the intestinal ceca extending only as far as the level of the posterior margin of the posterior testis, while the genital aperture is situated some distance posterior to the pharynx and the intestinal ceca extend to near the posterior end of the body in *P. lanceolata*.

## REFERENCES CITED

FUHRMANN, OTTO

1928. Zweite Klasse des Cladus Platyhelminthes; Trematoden. Handb. Zool. (Krumbach), vol. 2, 3 Lief., Teil 2, Bogen 1-8, pp. 1-128, figs. 1-171, Dec. 6.

LINTON, EDWIN

1910. Helminth fauna of the Dry Tortugas. 2. Trematodes. [In Papers, Tortugas Lab., Dept. Marine Biol., vol. 4] Carnegie Inst. Washington Publ. 133, pp. 11-98, pls. 1-28, figs. 1-241.

MANTER, H. W.

1926. Some North American fish trematodes. Illinois Biol. Monogr., vol. 10, no. 2, pp. 1-138, 1 fig., charts 1, 2, pls. 1-6, figs. 1-88, April.

ODHNER, T.

1911. Zum natürlichen System der digenen Trematoden. 3. (Ein weiterer Fall von sekundärem Anus.) Zool. Anz., vol. 38, no. 4, pp. 97-117, figs. 1-8, August.

STAFFORD, J.

1904. Trematodes from Canadian fishes. Zool. Anz., vol. 27, nos. 16-17, pp. 481-495, May 3.

STUNKARD, H. W., and NIGRELLI, R. F.

1930. On *Distomum vibex* Linton, with special reference to its systematic position. Biol. Bull., vol. 58, no. 3, pp. 336-343, 1 fig., June.









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BY

AARON L. TREADWELL

Professor of Zoology, Vassar College



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NEW POLYCHAETOUS ANNELIDS

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*Professor of Zoology, Vassar College*

(WITH TWO PLATES)

The polychaetous annelids obtained by the First Johnson-Smithsonian Deep-Sea Expedition have been submitted to me for report, and in the collection I have found a number of new species, which are here described and figured.

**MELAENIS** Malmgren

**MELAENIS TROPICUS**, n. sp.

Plate I, figs. 1-6

A single specimen 33 mm long and 9 mm wide in the greatest diameter. Twelve pairs of elytra completely cover the body. The prostomium is about 1 mm in diameter and carries the cirrophores of the three tentacles from which the styles have been broken. The median cirrophore overlaps the lateral ones. The prostomium (fig. 1) is rounded in outline, its transverse diameter being a trifle greater than its antero-posterior. No eyes are visible. The palps are very long and not very stout.

The first parapodia are small and largely concealed by the bases of the palps. The basal portion of each parapodium narrows distally, and on its anterior border are numerous papillae (fig. 2). Terminally, there is a considerable widening, the main axis continuing into a point, from which the acicula protrudes. On the dorso-lateral surfaces are the cirrophores for the tentacular cirri from which the styles are lost. Antero-laterally there are three tufts of setae radiating in fan shape in each tuft. The second parapodium is also small, its notopodium (fig. 3) rather broad at the base and continuing with the same diameter about half way to the apex, where it narrows asymmetrically and rapidly to a sharp point. A large acicula protrudes from the apex. Antero-dorsally, there is a tuft of setae. Small, rounded vesicles are attached to the body wall between the two parts

of the parapodium. The neuropodium is irregularly ringed at the base and narrows at a rather uniform rate to the apex. The bending of the tip and breaking of the acicula is obviously an accident. A slender ventral cirrus extends beyond the end of the setal portion. Beginning with the third, the parapodia are very large, and the large setae of the third parapodium extends as far as the tips of the palps. In a parapodium from the middle of the body, the notopodium is short and thick but narrows abruptly to an acute tip, from which the acicula protrudes. The neuropodium is slender, longer than the notopodium, and almost circular in cross-section, ending in a blunt point. Just proximal to the end are two blunt lobes, and nearer the body is a third. From each of these protrudes a stout seta. The dorsal cirrus is very long and slender, but the ventral one hardly reaches the end of the setal lobe.

The elytra are large, entirely covering the dorsal surface of the body, and most of them, if not all, overlap in the dorsal midline. They are broadly oval in outline, with the elyrophore attachment nearer one end, the long axis of the elytron being at right angles to that of the body. The elytra are thin, with entire margins and no surface markings. They are mostly translucent, this character being most marked near the margins, for whitish deposits occur near the elyrophore attachment and extend for some distance outward.

In a parapodium from near the middle of the body, the most noticeable setae are those of the notopodium, which curve upward and outward. The largest of these are very heavy and terminate in a point, which has barbs on either side of the end of the shaft (fig. 5). These did not appear in all somites, but this was probably due to accidental causes. The remainder of the dorsal tuft is composed of slightly smaller setae than the above, which end in sharp points and are faintly bilimbate toward the ends. On the surface of their shafts are minute points, giving it a shagreen appearance. A tuft of slender, colorless, sharp-pointed setae lies on the antero-posterior face of the notopodium. The neuropodial setae are very few and heavy (fig. 6). Toward the ends they bend slightly and taper to an acute tip, which carries two or three stout teeth on the outer surface. In the neuropodium is a tuft of setae that have sharp lateral teeth along the shaft (fig. 4).

*Type*.—U.S.N.M. no. 20031, collected at station 101 in the Virgin Islands at latitude  $18^{\circ}40'30''$  N., longitude  $64^{\circ}50'$  W.—latitude  $18^{\circ}45'40''$  N., longitude  $64^{\circ}48'$  W., in 300 fathoms.

## EUPHOLOE McIntosh

## EUPHOLOE ACUMINATA, n. sp.

Plate 1, figs. 7, 8

Only incomplete specimens are present. The type measures 28 mm for the first 50 somites and has a width anteriorly of 6 mm. The head width is 5 mm. This width continues for about the first 10 mm of body length, but behind this there is a decided narrowing. The prostomium (fig. 7) is oval in outline, with the tentacle arising in the middle of its anterior border. Dorsally there are two very indistinct eyes (not shown in the figure), and two others, much more distinct, lie near the ventral surface. The cirrophore of the tentacle is globular and about half as long as the prostomium, but is very thin-walled. Toward the end there is a constriction, so that the style is carried on the end of a very small globular portion. The style is slender and four or five times as long as the prostomium.

The first parapodia are elongated cones, truncated near the ends, and each has a very slender dorsal cirrus near its end (fig. 7). The two parapodia are in contact at their bases and on either side press tightly against the tentacle, each long, slender dorsal cirrus reaching to the end of the tentacle. This arrangement of tentacle and parapodia gives a pointed appearance to the anterior end of the animal. In each parapodium is a dense tuft of setae, which overlap from the two sides and surround the ends of tentacle and cirri. The palps are long and slender, extending beyond the tips of the first parapodial setae. The first pair of elytra carried on the first parapodium are borne on transversely oval elytriphores (fig. 7) and completely cover the prostomium. Between the elytriphores the anterior margin of the first somite protrudes over the prostomium. In one specimen this protrusion is a blunt cone; in the other it has two rounded lobes on its margin. The lower lip is prominent, its surface thrown into longitudinal folds.

As stated, the first pair of elytra overlap. I am uncertain about the second, but behind this there is a definite area of the dorsal surface that is uncovered. Even when elytra have been removed, this clearly shows because of a dusting of fine sand grains on portions of the dorsal surface that had been uncovered by elytra. A similar covering of sand grains appears on the elytra, these grains being coarser on anterior somites. Except where overlapped by other elytra, each elytron carries a row of fine cirri around its margin, and on its outer half there are a considerable number of these on the surface. Except at the point of attachment, each elytron is very thin

and soft. I am uncertain whether the denser appearance at the elytraphore is due to a thickening of the tissue or to a greater accumulation of sand grains at that point. As far as about somite 25 the dorsal exposed portion of the body wall seems to be thin and delicate. Behind this point the body narrows, the sand grains are larger, and the elytra cover more of the surface. The last somites present in the fragments are completely covered. Beyond about somite 25 each has on its dorsal surface three transversely arranged bunches of sand grains, successive somites thus showing three longitudinal rows of sand piles. It is possible that these represent three rows of rudimentary gills, but I was unable to discover any trace of gills in them.

The dorsal appearance of the first parapodium has been given above. On the ventral surface there is a short cirrus near the end of the neuropodium. The setae of this parapodium are of varying sizes but are all essentially the same in structure in that they carry two rows of toothed plates, giving the setae a double saw-tooth effect. The second parapodium carries a whorl of very fine setae, which have minute lateral plates forming spines as in the first. In the neuropodium are a few much larger setae, which are smooth throughout the greater part of their length but toward the end acquire lateral plates. Toward their ends, they widen and then narrow again, forming what one would expect to be a narrow lanceolate apex, but this suddenly ends and forms the basis for a slender and much curved terminal joint (fig. 8). The second parapodium has the form of a truncated cone, is very much annulated on its surface, and has a long cirrus at its apex, together with a bunch of smaller cirri. Except for the absence of the long terminal cirrus, the third parapodium is much like the second. The dorsal setae are like those in the notopodium of the second parapodium, whereas ventral ones are compound but without the lateral teeth. These are continued in later somites, but the terminal joint may be very short. In the third parapodia are also very slender colorless compound setae having long and slender terminal joints.

*Type*.—U.S.N.M. no. 20032. Specimens were collected at station 100, at latitude  $18^{\circ}38'45''$  N., longitude  $64^{\circ}52'45''$  W.—latitude  $18^{\circ}40'15''$  N., longitude  $64^{\circ}50'15''$  W., in 15 fathoms (type specimen); and at station 28, latitude  $18^{\circ}31'40''$  N., longitude  $66^{\circ}12'$  W.—latitude  $18^{\circ}32'$  N., longitude  $66^{\circ}14'45''$  W., in 40 fathoms.

**EUPHOLOE CIRRATA**, n. sp.

Plate 1, figs. 9-12; plate 2, figs. 13-16

A number of specimens are in the collection, but none is entire. Anterior portions containing about 60 somites are 50 mm long. The prostomium is 1 mm in diameter, but if the parapodia which extend along the sides of the prostomium are measured, the total head width is 3 mm. The greatest body width is 4 mm.

The prostomium (fig. 9) is oval in outline its width being about twice its length. No eyes are to be seen, but the dorsal surface is irregularly blotched with purplish patches. The tentacle is very short and slender and is inserted a little back from the anterior prostomial border. The palps are long and slender and not noticeably thickened at the bases. There are no lateral tentacles or tentacular cirri.

The first parapodium (fig. 10) on either side extends forward and, together with the buccal membrane and the bases of the palps, forms the outer boundary of a space lateral to the prostomium. It was very difficult to get a satisfactory dissection of this parapodium, and the drawing is not complete. The setal portion is blunt-ended, and there is a single acicula. From the outer dorsal surface arises a tuft of very slender setae, and on the dorsal surface are numerous cirri of various sizes. No attempt has been made to draw them all, as so great a number would confuse the drawing. One as drawn is much larger than the others and may be the dorsal cirrus; but if so, it is broken, for in another specimen (fig. 11) this cirrus is long and slender. There is a slender ventral cirrus. The second parapodium (fig. 12), is very thick and heavy and extends forward so as to overlap the first, the inner face of the second being slightly concave. Each carries dorsally a small, nearly circular elytra. There is no marginal indentation between the neuropodium and notopodium, and each portion carries an acicula. In the neuropodium is a bunch of very heavy setae, most of which have been broken off at about the level of the body surface. The only notopodial setae are a tuft of slender ones arising at the anterior margin of the elythrophere. A tangle of cirri similar to those of the first parapodium arise from this same position. The ventral cirrus is short and heavy. The second parapodium is larger than the first, and this increase in size continues as far as the eighth.

A parapodium from near the middle of the body (fig. 13), is elongated, and the vertical diameter of its setal portion is much less than that of the body. The neuropodium widens slightly toward the end, where there are a large posterior and two smaller anterior lobes.

The notopodium is smaller than the neuropodium and is more uniform in diameter throughout. Its apex is conical, but dorsal to this is a small lobe, and numerous cirri arise from the ends of both parts. In all somites a heavy gill is attached to the body wall above the parapodium. In somites having elytra this is just ventral to the cirrophore (fig. 13). In other somites the dorsal cirrus is a fleshy lobe resembling a cirrophore but lacking a style (fig. 12).

The anterior elytra are very small, but later ones increase in size so that they overlap on the dorsal surface. Behind the twentieth they are lost in the specimens at hand, but apparently the large size is continued to the posterior end of the body. They are located on somites 2, 4, 5, 7, and on alternate somites behind this. All are roughly oval in outline and have smooth margins and a very delicate translucent appearance. A prominent feature is a brown spot near the elytophore.

The setae of the first parapodium are all very slender and long, some having smooth margins, others finely serrate. In the second parapodium the notopodial setae are like those of the first, but neuropodial ones are shorter and heavier and curve to fine points, the terminal part being camerated (fig. 14): In later parapodia there are several kinds of setae, some like those in the second, others long, slender, and sharp-pointed, distinctly bent and carrying two rows of toothed plates (fig. 15). In the neuropodium there is a ventral bundle of compound setae, whose terminal joints are straight, pointed, and camerated (fig. 16).

*Type*.—U.S.N.M. no. 20033, collected at station 14 at latitude  $18^{\circ}31' N.$ , longitude  $66^{\circ}4'10'' W.$ —latitude  $18^{\circ}30'30'' N.$ , longitude  $66^{\circ}3'15'' W.$ , north of Puerto Rico, at 200-240 fathoms. Others were collected at station 23, latitude  $18^{\circ}32'15'' N.$ , longitude  $66^{\circ}17'45'' W.$ —latitude  $18^{\circ}32' N.$ , longitude  $66^{\circ}21'15'' W.$ , north of Puerto Rico, in 260 fathoms.

#### HYALINOECIA Malmgren

#### HYALINOECIA BRANCHIATA, n. sp.

Plate 2, figs. 17-19

This name is provisionally given to a single incomplete specimen 15 mm long and 2 mm wide, and retaining only 20 somites. Because of the lack of nuchal cirri, it belongs in the genus *Hyalinoecia*. The specific name refers to the unusual amount of gill development.

The prostomium (fig. 17) has a width of about twice its length and carries short tentacles that are obscurely, if at all, ringed on the cirrophores and have slender styles. The style of the median

tentacle is lost; those of the inner paired extend to somite 10, whereas those of the outer paired are hardly more than one-fourth as long as these. The frontal tentacles are broadly oval in outline, their bases being in contact. The palps are large and extend down over the mouth.

On its anterior margin somite 1 is wider than the prostomium, and this width reappears on the posterior margin. In the middle, where the parapodia arise, it is very much wider than this, and the parapodia extend almost to the anterior prostomial border. Each parapodium carries a slender dorsal and a much heavier ventral cirrus, the latter having a heavy basal section and a slender terminal one, the two being of about equal length. Apparently there are three subequal terminal parapodial lobes, but owing to imperfect preservation, it is not possible to be certain. Each parapodium carries three stout hooked setae.

Somite 2 is a trifle wider than somite 1 and less than one third as long, its anterior border being a trifle wider than its posterior. The parapodia extend forward but to a much less extent than in somite 1. Somite 3 assumes a form characteristic of the remainder of the body. Its width is about four times its length, and the lateral margins are uniformly rounded except where they extend out into the bases of the parapodia. In somite 3 the dorsal cirrus is prominent, four or more times as long as the setal lobe. The ventral cirrus is also prominent, but stouter than the dorsal. The fourth, fifth, sixth, and seventh parapodia have large dorsal and ventral cirri, the dorsal being longer than the ventral. After the seventh there is a diminution in length of the cirri, and in later somites, although they are longer than the setal lobes, they are very slender. Gills are composed of several filaments, and on the sixteenth parapodium there are six of them, palmately arranged (fig. 18).

Just dorsal to the insertion of the ventral cirrus, each parapodium carries a tuft of heavy setae and two aciculae. The aciculae are bluntly rounded and end just inside the surface. The setae are of two kinds: heavy ones having stout terminal and subterminal teeth covered by a hood (fig. 19), and slender bilimbate ones reaching as far as the end of the dorsal cirrus. The hooks of the first parapodium are very heavy and have a terminal and a much smaller subterminal tooth.

Since only one specimen appeared in the collection, I did not think it wise to mutilate it by removing the jaws for study and I have no information concerning them. In the gill character this species seems

rather distinctive. Verrill's<sup>1</sup> account of *H. artifex* states that gills first appear on about the twenty-eighth somite and are never of more than one filament.

*Type*.—U.S.N.M. no. 20034, collected at station 84, latitude 18°32'30" N., longitude 65°18'30" W.—latitude 18°39' N., longitude 65°17' W., in 300 fathoms, north of Culebra Island.

**ALCIOPA Audouin and Milne Edwards**

**ALCIOPA MUTILATA, n. sp.**

Plate 2, figs. 20, 21

This species name is provisionally suggested for a fragment of an *Alciopa* retaining only a limited portion of the anterior body region. Its total length is 7 mm and width at the eyes 1.5 mm. The eyes are very large and almost in contact dorsally, their lenses pointing downward and outward so as not to be visible from a dorsal view. Ventrally, they are more widely separated (fig. 20). The median tentacle (fig. 20) is very short and inconspicuous and is located well forward between the eyes. All frontal tentacles are thick, the dorsal pair being a trifle smaller than the ventral ones. Between the dorsal frontal and the median tentacles is a pair of fleshy lips. The anterior face of the first somite is in contact with the eyes but does not enclose them in a cup effect, as it does in other species.

The parapodia are conical in outline, and a single acicula protrudes at the apex (fig. 21). Only a very few setae are present, most of them having been broken. Those that remain have sharp-pointed ends, and this undoubtedly holds for all.

*Type*.—U.S.N.M. no. 20035, collected at station 6 in latitude 18°30'45" N., longitude 66°4'30" W.—latitude 18°30'50" N., longitude 66°1'15" W., north of Puerto Rico, in 100 fathoms.

**Family MALDANIDAE**

**MALDANELLA FIMBRIATA, n. sp.**

Plate 2, figs. 22-24

The collection contains one slender specimen 35 mm long and 2 mm wide, composed of 20 setigerous somites. The anterior margin of the cephalic plate (fig. 22), is broadly rounded but is not continued

<sup>1</sup>Verrill, A. E., Notice of recent additions to the marine invertebrata of the northeastern coast of America, with descriptions of new genera and species and critical remarks on others. Pt. 5, Annelida, Echinodermata, Hydroida, Tunicata. Proc. U. S. Nat. Mus., vol. 8, pp. 429-431, 1885.

on to the lateral regions. The posterior margin is prominent and is continued forward on either side nearly to the middle of the plate. Between these two portions is a thin membrane drawn out on the right side into three, and on the left into four, sharp-pointed processes. The surface of the cephalic plate is deeply hollowed just in front of the posterior margin and more shallow elsewhere. The median ridge extends only about half the length of the plate and has a cone-shaped outline. Its dorsal surface is marked by transverse lines.

A prominent collar on the anterior margin of the first setigerous somite overlaps the posterior margin of the buccal somite for its entire circumference. The anal funnel (fig. 23), has a prominent bilobed dorsal and a single ventral lip. On the margin of the dorsal lip are a few slender cirri. The first four setigerous somites are short, the next five longer, and the final ones shorter again.

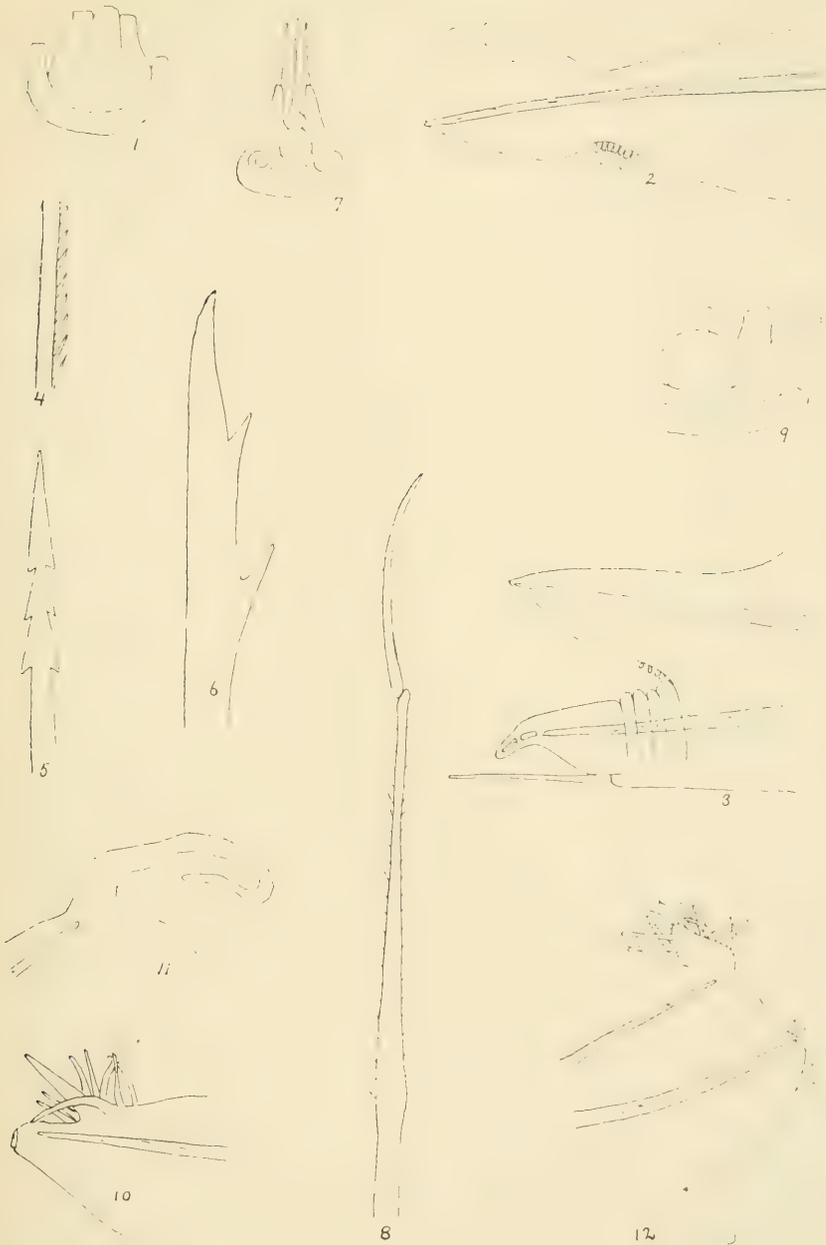
There are two kinds of setae. The first are slender and sharp-pointed, arranged in tufts in which there is great variation as to length. Some are very short, others several times as long. Some at least, and probably all, are narrowly bilimbate. Toward the ends, they narrow rapidly to fine points. The hooks (fig. 24) have very long shafts, enlarged to form a collar at the point where they protrude from the body surface. The distal end is bent to form a "head," which on the lower surface carries a large tooth. Above this is a much smaller tooth and above this several denticulations. A long tuft of subrostral hairs extends beyond the large tooth.

*Type*.—U.S.N.M. no. 20036, collected at station 35, latitude 18° 23'40" N., longitude 67° 16'45" W.—latitude 18° 24'45" N., longitude 67° 14'15" W., in 80-100 fathoms.

#### EXPLANATION OF PLATES 1 AND 2

- FIGS. 1-6. *Melaenis tropicus*, n. sp. Fig. 1, head,  $\times 13$ ; fig. 2, first parapodium,  $\times 52$ ; fig. 3, second parapodium,  $\times 50$ ; fig. 4, seta,  $\times 340$ ; fig. 5, seta,  $\times 90$ ; fig. 6, parapodium,  $\times 90$ .
- FIGS. 7, 8. *Eupholoe acuminata*, n. sp. Fig. 7, head,  $\times 20$ ; fig. 8, seta,  $\times 60$ .
- FIGS. 9-16. *Eupholoe cirrata*, n. sp. Fig. 9, head,  $\times 10$ ; fig. 10, first parapodium,  $\times 40$ ; fig. 11, dorsal portion of first parapodium,  $\times 40$ ; fig. 12, second parapodium,  $\times 40$ ; fig. 13, posterior parapodium,  $\times 20$ ; fig. 14, seta,  $\times 240$ ; fig. 15, seta,  $\times 90$ ; fig. 16, seta,  $\times 240$ .
- FIGS. 17-19. *Hyalinoecia branchiata*, n. sp. Fig. 17, head,  $\times 5$ ; fig. 18, parapodium,  $\times 40$ ; fig. 19, seta,  $\times 240$ .
- FIGS. 20, 21. *Alciopa mutilata*, n. sp. Fig. 20, head,  $\times 13$ ; fig. 21, parapodium,  $\times 30$ .
- FIGS. 22-24. *Maldanella fimbriata*, n. sp. Fig. 22, head,  $\times 20$ ; fig. 23, anal funnel,  $\times 20$ ; fig. 24, seta,  $\times 90$ .

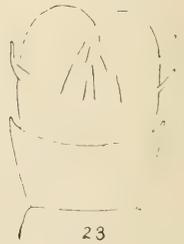
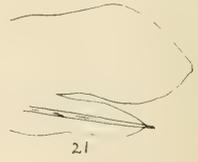
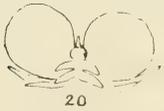
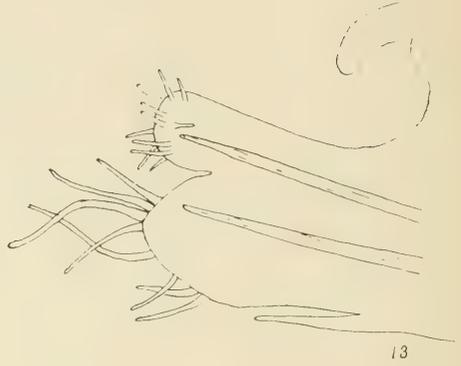
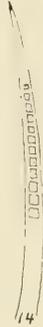
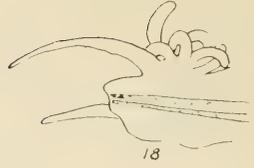




NEW POLYCHAETOUS ANNELIDS

FIGS. 1-12

(For explanation, see p. 9.)



NEW POLYCHAETOUS ANNELIDS

FIGS. 13-24

(For explanation, see p. 9.)





SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 9

## Johnson Fund

REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
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TO THE PUERTO RICAN DEEP

# THREE NEW DEEP-WATER FISHES FROM THE WEST INDIES

(WITH ONE PLATE)

BY

GEORGE S. MYERS

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### THREE NEW DEEP-WATER FISHES FROM THE WEST INDIES

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(WITH ONE PLATE)

Preliminary examination of the fishes obtained by the Johnson-Smithsonian Deep-Sea Expedition in 1933 has disclosed the presence of several new forms, three of which are herewith diagnosed.

#### Family GONOSTOMATIDAE

*Margrethia obtusirostra* was described by Jespersen and Tåning<sup>1</sup> from postlarval and adolescent individuals obtained at a depth of about 150 meters in the eastern Atlantic by the *Margrethe*. No exact localities are given, except for the two figured specimens, in the explanation of the plate, and as for range the authors merely state, "the distribution closely coincides with that shown by *Bonapartia pedaliota*," that is, Cadiz Bay and the Atlantic south of the latitude of the Azores. The description is very short, and the authors probably intended to present a more extended account later, as they did for the Mediterranean species, but this has not appeared. I find no record of the capture of additional specimens. In the collections obtained by the *Caroline* I find a single large *Margrethia* which differs distinctly from *M. obtusirostra* in many ways.

#### MARGRETHIA DISJUNCTA, n. sp.

*Holotype*.—U.S.N.M. no. 93112 (Field no. 498a); 31 mm standard length; *Caroline* station 87, open ocean north of Culebra Island, latitude 19° 18' 30" N., longitude 65° 16' 00" W., to latitude 19° 13' 00" N., longitude 65° 16' 00" W., February 27, 1933, otter trawl, 950 fathoms wire out.

<sup>1</sup> Vidensk. Medd. Dansk. naturh. Foren., vol. 70, p. 222, pl. 17, figs. 11, 12, 1919.

Dorsal 16. Anal 21, the anterior rays more elongate. Pelvic 8. Caudal (counting from above downward) 7+10+9+6. Gill-rakers on first arch long and slender, with minute asperities, 5 on upper limb and 10 on lower. Pseudobranchiae well developed. Scales mostly lost, but there appear to be about 30 scale pockets in the midside series.

Teeth in jaws uniserial, conical, and sharp. On the premaxillary the teeth are rather small, but with some enlarged on the expanded part. Median part of upper jaw toothless, the first tooth on each premaxillary enlarged and directed forward and inward. Teeth of maxillary extremely close set, every fourth to sixth tooth enlarged; all of them strongly directed forward, those of the anterior part pointing almost straight forward. Mandibular teeth larger than those of maxillary, close set, every seventh or eighth tooth enlarged. A single series of small conical teeth on each palatine, the first one enlarged. Two large patches of tiny pterygoid teeth in the roof of the mouth.

Photophores: One preorbital (Orb) photophore directly in front of eye, embedded in the proximal end of the maxillary bone. Three opercular (Op) photophores, one along the preopercle-opercle junction, one beneath the subopercle, and one directly behind the articulation of the mandible. No symphysial (SO) photophore. Branchiostegal (Br) photophores 11. Body (BO) photophores 14, arranged peculiarly. Up to the tenth they are in a straight, compact series, but the tenth, eleventh, and twelfth are displaced upward in an ascending series. The thirteenth is set directly below the twelfth (that is, in a line with the first 9) and the fourteenth follows the thirteenth directly behind. It is this disjunction of the BO series that is the most notable character of the new fish and the one from which the specific name is derived. The pelvic base barely separates the fourteenth BO photophore from the four pelvic (VO) ones. The supra-anal (AO) photophores are 14+3 in number, the first two slightly elevated, but not forming an arch as in *M. obtusirostra*.

Top of head with three bony keels. The lateral ones begin together at the supraoccipital region and run forward and outward till they merge with the orbital rim. The median crest, more rounded in cross-section than the lateral ones, begins above the pupil and runs forward to the ethmoid region. Preopercular margin sharply inclined. Posterior margin of operculum nearly straight, with a slight excision medially. Tooth-bearing edge of each premaxillary with a strong convex expansion posteriorly. The long and uninterrupted curve of the maxillary is rather strongly convex. Lower jaw bones rather deep and very thin.

Body deepest at junction of head and body, the venter rising in an almost straight line to the beginning of the caudal peduncle. The upper profile of the snout is flat or a little concave, and the top of the head is rounded. The dorsum then rounds slightly to the dorsal origin and thence slopes gradually to the caudal peduncle.

The measurements of the holotype, in millimeters, are as follows: Standard length 31, greatest depth 10, head length 9, orbit diameter 3, length lower jaw 9, length dorsal base 7.5, length anal base 10, snout 2, snout tip to dorsal origin 16, snout tip to pelvic origin 15, snout tip to anal origin 18, least depth caudal peduncle 3.5, length caudal peduncle (from anal) 4.5, longest gill-raker (at angle) 2.5, length caudal fin 10. All longitudinal measurements, save those of the lower jaw and fin bases, are made as to the verticals of the points indicated, on an ideal longitudinal axis of the fish.

Entire snout and tip of lower jaw hyaline. Cheeks, opercles, and middle area of sides back to above first third of anal base iridescent bluish silvery. From above eye to end of dorsal base the back is blackish, and there is a dark patch or bar over the origin of the caudal rays. Posterior part of body yellowish. Iris blackish, except for a segment directly under the pupil, which is silvery. Fins all hyaline.

Below is given a table of the chief differences between *M. obtusirostra* and the new species. Those differences which are marked with an asterisk (\*) may disappear when specimens of similar age or size are compared.

<i>M. obtusirostra</i>	<i>M. disjuncta</i>
Top of head and snout continuously convex, the profile of the snout very strongly decurved.*	Top of head rounded, with a median bony crest, the line of the snout, as it slopes down, becoming flat or slightly concave as it approaches upper jaw.*
Tooth-bearing edge of premaxillary only weakly convex posteriorly.*	Tooth-bearing edge of premaxillary posteriorly with a strongly convex expansion bearing canine teeth.*
Lower jaw very shallow.	Lower jaw rather deep.
Depth of cheek (orbit rim to maxillary), directly below center of pupil, scarcely half orbit diameter.	Depth of cheek equal to over .75 orbit diameter.
Greatest body depth (at rear of head) enters standard length about 3.5 times.*	Greatest body depth (at rear of head) enters standard length about 3 times.*
No preorbital photophore.	A preorbital photophore present.
Branchiostegal photophores 12.	Branchiostegal photophores 11.

*M. obtusirostra*

Body photophores (BO) 14 or 15, in a single straight, continuous series.

Ventral photophores (VO) 4, distinctly separated from BO series; small in size\* and slightly separated from each other.

Supra-anal photophores (AO) small and separated from each other by distances much greater than their own widths; \* 13 + 4 in number; the first four forming an upward arc.

Eye with iris wholly dark.

Teeth of maxillary and premaxillary small; directed forward very slightly.

*M. disjuncta*

Body photophores (BO) 14, with a disjunction between the twelfth and thirteenth.

Ventral photophores (VO) 4, scarcely separated from the BO series by pelvic base; large\* and placed tightly together.

Supra-anal photophores (AO) large and separated from each other by distances distinctly less than their own widths; \* 14 + 3 in number; the first two slightly elevated.

Iris dark except for a silvery segment below.

Teeth of maxillary small, interspersed with enlarged teeth; all teeth of upper jaw strongly directed forward, those of the premaxillary expansion and of anterior part of maxillary pointing almost straight forward.

## Family TRIACANTHIDAE

The discovery of a second genus and species of this family in the Western Hemisphere by the Johnson-Smithsonian Deep-Sea Expedition is exceptionally interesting. *Hollardia hollardi* was described by Poey in 1861 from a single specimen cast ashore near Havana. Poey's type, a dried skin in good condition, is still the only example known, and it is here figured (pl. 1, fig. 2) for comparison with the new genus. The two specimens referred to *H. hollardi* by Breder in 1925 are considered below to belong to a distinct species.

In attempting to work out the relationships of the new form, it was found useful to prepare a table of the genera, and since there has been no recent attempt at a revision, my notes are presented in the form of a key followed by brief remarks on the genera. In describing the new genus and preparing the synopsis, I have been fortunate in having at hand examples of all the described recent genera, from the collections of the United States National Museum.

I am unable at present to correlate either of the two fossil triacanthid genera, *Acanthopleurus* Agassiz<sup>2</sup> and *Marosia* de Beaufort<sup>3</sup> with the recent forms. Both seem near *Triacanthus*.

<sup>2</sup> See Woodward, Cat. Foss. Fish. British Mus., part 4, p. 566, 1901.

<sup>3</sup> Jaarb. Mijnw. Ned.-Ind., vol. 54, pt. 1, p. 142, pl. 5, fig. 5, 1926.

**JOHNSONINA**, n. gen.

*Genotype*.—*Johnsonina eriomma*.

Teeth minute, weak, conical, about 40 in a single regular series in each jaw. Snout short, blunt. Body deep, heavy, and compact. Gill openings restricted, reaching down only to opposite middle of pectoral base. Pseudobranchiae restricted to upper half of opercular wall. Mouth terminal. Lips thin. Spinous dorsal origin well forward, the spines 6 in number, the last buried deeply in the flesh. Eyes very large.

Named in honor of Mr. Eldridge R. Johnson, sponsor of the Johnson-Smithsonian Deep-Sea Expedition.

**JOHNSONINA ERIOMMA**, n. sp.

Plate 1, fig. 1

*Holotype*.—U.S.N.M. no. 93113 (Field no. 591), 113 mm standard length; from *Caroline* station 100, due north of Tobago Island, latitude  $18^{\circ}38'45''$  N., longitude  $64^{\circ}52'45''$  W., to latitude  $18^{\circ}40'15''$  N., longitude  $64^{\circ}50'15''$  W., March 4, 1933, otter trawl, 100 to 300 fathoms.

*Paratypes*.—U.S.N.M. no. 93114 (Field no. 592-594); three specimens, 111 to 117 mm standard length; same data as holotype.

*Paratype*.—U.S.N.M. no. 93115 (Field no. 651); one specimen, 106 mm standard length; from *Caroline* station 101, north of Tobago Island, latitude  $18^{\circ}40'30''$  N., longitude  $64^{\circ}50'00''$  W., to latitude  $18^{\circ}45'40''$  N., longitude  $64^{\circ}48'00''$  W., March 4, 1933, otter trawl, 190 to 300 fathoms.

*Paratype*.—U.S.N.M. no. 93116 (Field no. 439); one specimen, 61 mm standard length; from *Caroline* station 81, north-northwest of Culebra Island, latitude  $18^{\circ}29'45''$  N., longitude  $65^{\circ}25'50''$  W., to latitude  $18^{\circ}35'30''$  N., longitude  $65^{\circ}23'54''$  W., February 26, 1933, otter trawl, 200 to 400 fathoms.

Dorsal spines 6, decreasing in length and stoutness to the last, which is buried almost to its tip in the flesh. Length of first spine equals slightly more than half body depth in adult specimens, comparatively longer in half grown. Soft dorsal 15, first and last rays short and slender, base of first ray only a very short distance behind tip of sixth spine. Basal half of anterior dorsal spines with a dermal covering of minute asperities, these being larger on the lateral faces of the spines. Soft dorsal rays with minute asperities for more than half their length. Distal ends of dorsal spines longitudinally grooved. Origin of spinous dorsal slightly anterior to vertical of gill opening, far anterior to middle of standard length.

Anal fin of 13 soft rays, first and last short and slender, all of them with asperities basally similar to those of soft dorsal rays. Anal origin under base of seventh dorsal ray.

Pelvic fins each of 1 strong spine, equal to first dorsal spine in length, and a tiny spine in the axil (hinged like the larger one) with its base rather heavy and its tip soft and tapering. Occasionally this tip is absent. The large spine is covered with minute asperities for nearly half its length. Distally, it is grooved like the dorsal spines. Origin of pelvic spine under base of first dorsal spine. Pelvic girdle rather wide beneath; width of girdle (inclusive of bases of the appressed spines) is one half the length of the spines, whereas the same measurement enters the length of the spines two and one half times in the type of *Hollardia hollardi*.

Pectoral fins rather short and rounded, of 14 rays, the first (upper) one very short and slender. Upper end of pectoral base below mid-depth of body at this point, opposite middle of gill opening. Pectoral rays with asperities on both sides. Longest ray slightly less than orbit diameter.

Caudal fin more or less rounded, of 10 principal branched rays and 1 shorter undivided supporting ray above and below. Length of caudal fin equals half body depth.

Teeth minute, conical, strictly in one series. There are 38 to 44 teeth in each jaw.

Body rather compressed (more so in young), thick-set, widest at the head, deepest at end of spiny dorsal in the adult, and at first dorsal spine in half grown. Depth 2.17 in standard length (adult) to 1.84 (half grown). Head 2.69 (adult) to 1.84 (half grown). Eye enormous, twice in head. Interorbital wide, 1.4 in eye diameter. Snout blunt, 1.75 in eye. Gill opening very restricted, half above and half below level of upper border of pectoral base, lower extremity of the slit not reaching down to level of lower part of pectoral base. Pseudo-branchiae well developed, but restricted to the upper half of the opercular wall. Squamation rough, resembling that of *Hollardia hollardi* but the individual scales much smaller. Lateral line not evident.

Coloration in alcohol yellowish white, with a black spot about one third eye diameter on the upper part of the side under origin of soft dorsal. A color sketch from life shows the body marbled orange-pink above, pale on belly, the large spot dark brown ocellated with a narrow orange ring and a larger white ring. Dorsal spines orange-pink, fins otherwise colorless. Pupil black. Iris white.

(Eriomma, from *ἐρι*, an intensive particle, and *ὄμμα*, eye; in allusion to the enormous eyes and the ocellated spot.)

## KEY TO GENERA OF TRIACANTHIDAE

- 1a. Front pair of teeth in each jaw wide compressed incisors, forming a beak; caudal peduncle long; mouth terminal; spinous dorsal 5; pseudobranchiae present, little developed, confined to upper part of opercular wall. (Subfamily Triacanthinae.) ..... *Triacanthus*.
- 1b. Front pair of teeth in each jaw not enlarged incisors, rather small, conical or compressed, and never forming a beak; caudal peduncle comparatively short.
- 2a. Snout greatly prolonged, tubular, the tiny mouth at the tip, directed upward; dorsal spines 2 or 3. (Subfamily Halimochirurginae.)
- 3a. Teeth present in both jaws, conical; lips not greatly flattened; dorsal spines 2 or 3..... *Halimochirurgus*.
- 3b. Teeth present only in lower jaw, incisors with truncate tips; lips wide, forming a flattened, suckerlike disk; dorsal spines 3.  
*Macrorhamphosodes*.
- 2b. Snout not greatly prolonged; dorsal spines 4 or more. (Subfamily Triacanthodinae.)
- 4a. Teeth truncated incisors; dorsal spines 4, the last imbedded deeply; lips very thick; mouth very strongly directed upward, almost superior; fin spines with strong retrorse hooks; pseudobranchiae confined to upper half of opercular wall..... *Tydemanina*.
- 4b. Teeth conical; dorsal spines 5 or more (except in *Bathyphylax*), the last deeply imbedded; lips moderate or thin; mouth terminal or directed upward, never superior.
- 5a. Branchial openings comparatively wide, extending below lower edge of pectoral base; pseudobranchiae very well developed, extending far below middle of opercular wall; dorsal origin anterior; teeth strong and few, a pair of conical teeth behind main series in each jaw indifferently present or absent; dorsal spines 5 or 6.  
*Triacanthodes*.
- 5b. Branchial openings restricted, not extending downward as far as lower part of pectoral base; pseudobranchiae confined to upper half of opercular wall (not examined in *Hollandia* or *Bathyphylax*); conical teeth behind main series usually absent.
- 6a. Dorsal set posteriorly, distance between snout tip and base of first dorsal spine greater than half standard length; dorsum rising to a point at first dorsal spine, the base of dorsal fins obliquely descending; teeth large, strong and few; dorsal spines 6.  
*Hollandia*.
- 6b. Dorsal set anteriorly, distance between snout tip and base of first dorsal spine considerably less than half standard length; dorsum truncate, the base of the dorsal fins in adults approximately horizontal.
- 7a. Teeth strong and few, about 10 in each jaw; dorsal spines 6, the last almost invisible; conical teeth behind main row occasionally present; eye moderate..... *Paratriacanthodes*.
- 7b. Teeth weak and many, 20 or more in each jaw, strictly in a single series; eye large.

- 8a. Snout very blunt; body deep and heavy; teeth minute, about 40 in each jaw in the adult; dorsal spines 6. . . . .*Johnsonina*.
- 8b. Snout tubular but short, forming a deep angle with forehead before eye; body rather slender; teeth larger, unequal in number, 20 in upper and 28 in lower jaw; dorsal spines 4, with two deeply imbedded free spines between the two dorsal fins. . . . .*Bathyphylax*.

*Triacanthus* (Cuvier) Oken, 1817. Several species studied. The genus was revised by Regan.<sup>4</sup>

*Halimochirurgus* Alcock, 1899. I have examined two of the four species (*H. macraulos* Fowler and *H. triacanthus* Fowler).

*Macrorhamphosodes* Fowler, 1934. Types of *M. platycheilus* Fowler<sup>5</sup> examined.

*Tydemania* Weber, 1913. I have studied eight examples of *T. navigatoris* Weber, the only known species. The fourth dorsal spine, almost completely hidden in the flesh, was evidently overlooked by Weber.

*Triacanthodes* Bleeker, 1858. Examples of both *T. anomalus* (Schlegel) and *T. aethiops* Alcock have been examined. There may be either 5 or 6 spines present in *aethiops*.

*Hollardia* Poey, 1861. The type and only known specimen of *H. hollardi* Poey is a dried skin, now 139 mm standard length, U.S.N.M. no. 15454. The origin of the spinous dorsal is above the middle of the standard length and the distance from the base of the first dorsal spine to the snout tip is equal to half the total length of the specimen. Dorsal spines 6, soft dorsal rays 17, anal 15, caudal 12, pectoral 13 besides one rudimentary ray at upper margin. A single small spine or ray in the axil of each large pelvic spine. Teeth large, strong, conical, 14 in upper and 16 in lower jaw. The other proportions are well shown in the photograph (pl. 1, fig. 2).

In 1925 Breder<sup>6</sup> recorded two specimens from the Caribbean as *H. hollardi*, one of them being figured. No locality or measurements are given. It seems likely, however, that the 484-fathom haul of April 20, from which came specimen 540, is the same one in which the type of *Pseudoxenomystax dubius* was caught, on the same date and at the same depth. If this is true, the *Hollardia* was taken north of Glover Reef, British Honduras. The figured example differs from *H. hollardi*, if we may believe the apparently excellent figure, in the following points: Soft dorsal 12, anal 16. Orbit small, about 4.17 in body depth (versus 3.58 in *hollardi*). Caudal peduncle much more

<sup>4</sup> Proc. Zool. Soc. London, 1903, pp. 180-185.

<sup>5</sup> Proc. Acad. Nat. Sci. Philadelphia, vol. 85, p. 365, 1934.

<sup>6</sup> Bull. Bingham Oceanogr. Coll., vol. 1, no 1, p. 75, fig. 33, 1925.

slender. An interspace present between end of soft dorsal fin base and beginning of caudal peduncle. Dorsal fin inserted farther forward, nearly over pectoral base, rather than far behind it. These differences make me believe that Breder's material represents a distinct species.

*Paratriacanthodes* Fowler, 1934. Fowler<sup>1</sup> mentioned six paratypes of his *P. retrospinis*. Three of these agree with the holotype in their larger size; the upturned mouth, which is partly on a level with the lower border of the eye; a very long pelvic spine, which is equal to or longer than the first dorsal spine; and comparatively coarse squama-

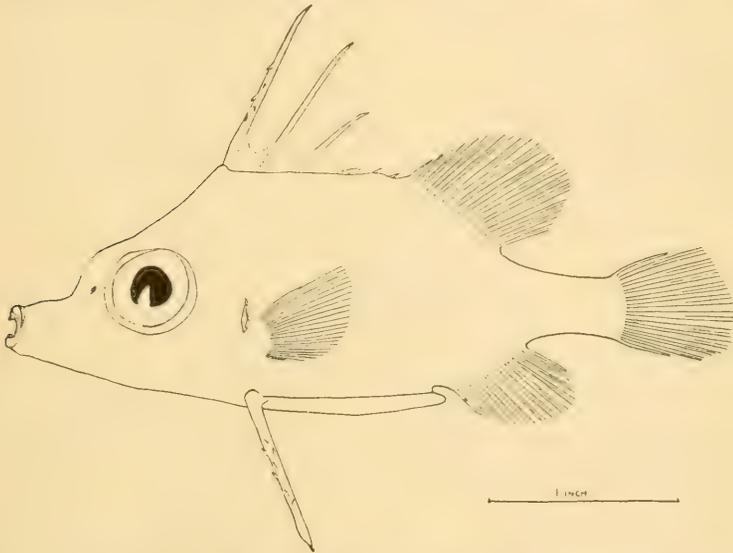


FIG. 1.—*Bathypylax bombifrons*. Holotype, U.S.N.M. no. 93299. Drawing by Martha Bowen. Natural size.

tion. The pelvic and first dorsal spines are armed with strong retrorse hooks, and the body depth enters the standard length about 2.25 to 2.30 times. The other three paratypes represent a smaller species with a strictly terminal mouth, entirely below the level of the eye; pelvic spines somewhat shorter than the first dorsal spine; and much finer squamation. The spines entirely lack strong retrorse hooks and the depth is only 2. The new species, of which the holotype is U.S.N.M. no. 93293 (P. 3149, D. 5519), from off Point Tagolo Light, latitude  $8^{\circ}47'00''$  N., longitude  $123^{\circ}31'15''$  E., 182 fathoms, August 9, 1909, U.S.S. *Albatross*, may be called *Paratriacanthodes herrei*, after Dr. Albert W. Herre of Stanford University. The holotype is 73 mm

<sup>1</sup> Proc. Acad. Nat. Sci. Philadelphia, vol. 85, p. 364, fig. 114, 1934.

standard length. The dorsal spines in both *P. retrospinis* and *P. herrei* are 6 in number, Fowler having overlooked the hidden sixth spine in these specimens.

*Johnsonina* Myers, 1934. See above for description.

*Bathyphylax*, new genus. Genotype *Bathyphylax bombifrons*, new species (text fig. 1). The single specimen, U.S.N.M. no. 93299 (P. 4357, D. 5308), from the China Sea off Hong Kong, latitude  $21^{\circ}54'00''$  N., longitude  $115^{\circ}42'00''$  E., 62 fathoms, November 4, 1908, U.S.S. *Albatross*, was misidentified in the collection as *Tydemania navigatoris*, which it resembles considerably. Standard length 87 mm. Dorsal with 4 spines, 2 small imbedded spines between the 2 fins, and 14 soft rays. Anal 12. Caudal 12. Pectoral 13. No ray in pelvic axil. First dorsal spine 25 mm. Pelvic spine 27 mm. Orbit (horizontal) 14 mm. Depth at dorsal origin 33 mm, equal to head length. First dorsal and pelvic spines with retrorse hooks, as in *Tydemania*. Color pale brownish.

#### Family PERISTEDIIDAE

##### PERISTEDION BARTSCHI, n. sp.

Text fig. 2

*Holotype*.—U.S.N.M. no. 93186 (Field no. 16); from *Caroline* station 1, off Punta Boca Juana, north coast of Puerto Rico, latitude  $18^{\circ}33'45''$  N., longitude  $66^{\circ}15'00''$  W., January 30, 1933, large otter trawl, 360 to 600 fathoms.

Dorsal VII—19. Anal 19. Scutes in the upper of the two lateral series 33. Lower lateral series of scutes not breaking up into two rows anteriorly, behind the appressed pectoral fins.

Head and snout broad. Width of snout (including flanges), at base of rostral processes, equal to snout length and greater than length of processes. Rostral processes long, narrow, of almost equal breadth throughout their length, diverging, their bases far apart, their length 2.25 times in distance from their base to posterior termination of main cephalic flange. Interorbital equal to horizontal diameter of bony orbit. Cephalic flange well developed along its entire length, its margin more or less regular, not strongly emarginate near its end, truncate at its posterior termination. Supplementary ridges below flange well developed, low, not produced outward beyond flange at any point. Greatest width of head (including flanges) much greater than its greatest depth. Anterior pair of ventral thoracic plates short and broad, not extending as far forward as do the bony processes before each pelvic

fin. Barbels slender, with filamentous tips, the outer compound ones at each side of lower jaw long, nearly twice horizontal diameter of orbit.

Measurements of holotype in millimeters: Standard length (hypural to tip of premaxillary) 185.0, greatest body depth 35.0, head length (minus rostral processes, on ideal axis) 92.5, depth head at middle of pupil 33.5, width head (at posterior termination of flanges) 64.0, length orbit 17.0, depth orbit 12.0, least width of snout (at outer margin of base of rostral processes) 30.5, width between bases of rostral processes 20.0, greatest distance between outer margins of distal

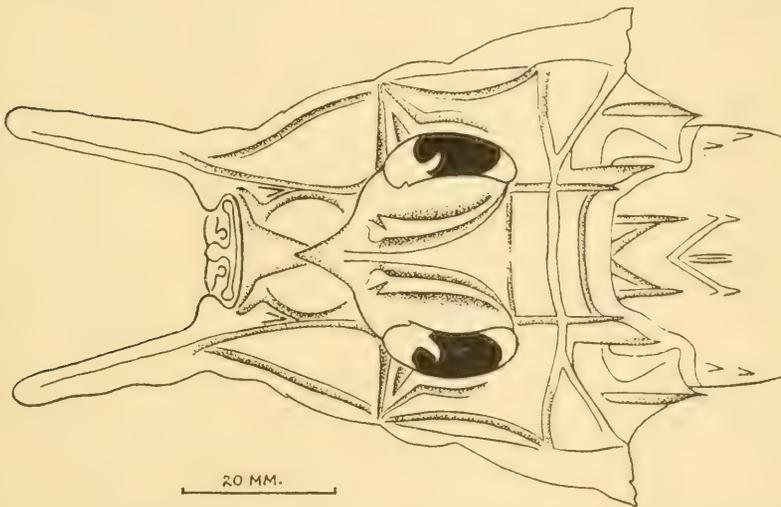


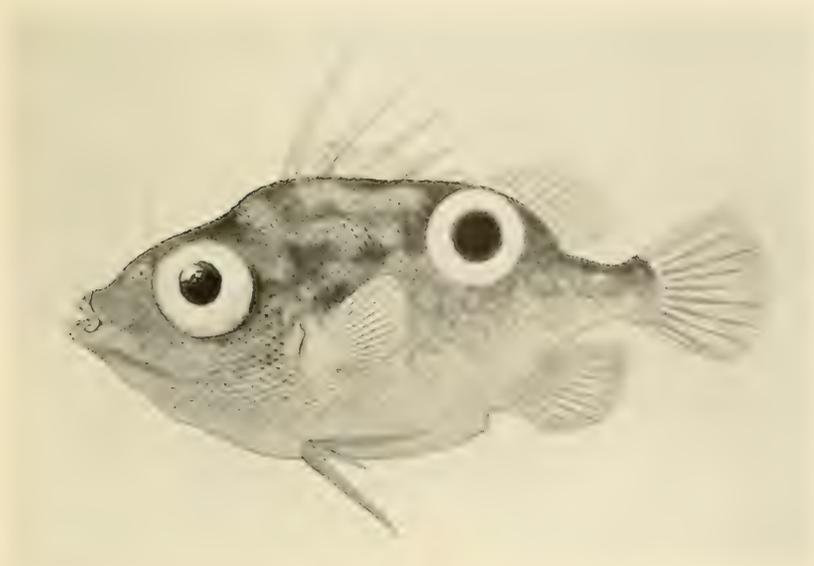
FIG. 2.—*Peristedion bartschi*. Holotype, U.S.N.M. no. 93186. Drawing of upper surface of head, by Mary Wallach. Natural size.

parts of rostral processes 41.0, length rostral process 26.0, width rostral process 4.5, interorbital 18.0, snout length including rostral processes (on ideal axis) 50.5, premaxillary tip to dorsal origin (on ideal axis) 62.5, premaxillary tip to anal origin (on ideal axis) 95.5, premaxillary tip to anus (on ideal axis) 87.0, length base first dorsal 26.0, length base second dorsal 70.0, length base anal fin 62.5, length (greatest) anterior ventral thoracic plate 30.0, width anterior ventral thoracic plate (one, not both) 14.0, length outer (longest) barbel 30.5.

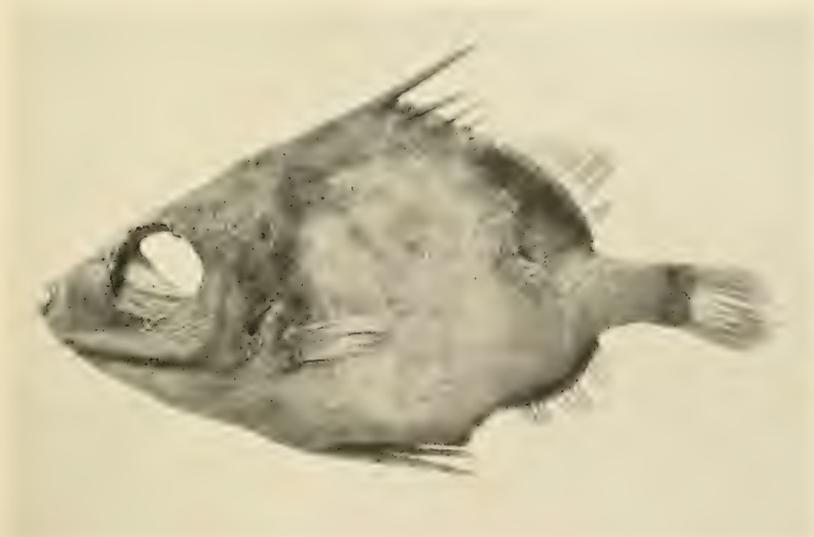
Coloration pale (red in life), mottled and marbled all over upper surface and sides of body and head with dark brown. First dorsal fin with a black border. Pectoral dark with many light spots. Caudal mottled with dark.

Only the type known.

Most closely allied among known species to *P. longispatha* Goode and Bean, but differing widely in the much broader and heavier head and snout, the shorter and broader rostral processes, the wider inter-orbital, the absence of a strong emargination near the posterior termination of the cephalic flange, and the color. Named for Dr. Paul Bartsch, director of the Johnson-Smithsonian Deep-Sea Expedition.



1. *Johnsonina eriomma*. Paratype (Field no. 592), 111 mm standard length, from Caroline station 100. From a painting by E. Cheverlange.



2. *Hollardia hollardi*. Holotype, U.S.N.M. no. 15454.







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## Johnson Fund

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TO THE PUERTO RICAN DEEP

# NEW BRACHIOPODS

(WITH TWO PLATES)

BY

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### NEW BRACHIOPODS

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(WITH TWO PLATES)

One of the most profitable realms for the collection of brachiopods living in the waters of the Atlantic Ocean is the region about the West Indies. From this region 16 species of brachiopods, representing 10 genera, are known. Of this number the Johnson-Smithsonian Deep-Sea Expedition collected six species, representing six genera, some of them the rarest and most interesting brachiopods of the region. The following species have been identified: *Dallina floridana* (Pourtales), *Thecidellina barretti* (Davidson), *Platidia "seminula,"* *Gryphus bartlettii* (Dall), *Argyrotheca barrettiana* (Davidson) and *Terebratulina* species. Two additional species have proved to be new and are here named in honor of the distinguished leaders of the expedition.

#### GRYPHUS BARTSCHI, n. sp.

Plate I, figs. 1-8

*Gryphus cubensis* Dall (in part), Proc. U.S. Nat. Mus., vol. 57, p. 315, 1920; U.S.N.M. nos. 193567, 226290, 64250, 211014, 64264 (part), 274140 (part).  
*Gryphus bartlettii* Dall (in part), idem, p. 314, 1920; U.S.N.M. no. 64258.

Shell moderately large for the genus, longitudinally oval in outline. Hinge narrow. Lateral profile unequally biconvex, the ventral valve having the greater depth. Lateral commissure nearly straight; anterior commissure rectimarginate or faintly uniplicate. Beak slightly incurved, foramen mesothyrid to permesothyrid, labiate. Surface marked by fine concentric lines of growth and faint, distant, elevated radial lines.

Ventral valve rather strongly convex, most convex a little posterior to the middle of the shell; anterior portion flattened; anterior margin gently rounded or subtruncate.

Dorsal valve evenly convex, slightly flattened at the front. Sides gently rounded, narrowed at the posterior to form an obtuse beak which curves under the ventral beak.

Ventral interior: Pedicle collar short; length of muscle field equal to about one third the length of the valve. Pallial sinuses narrowly divergent.

Dorsal interior: Loop narrow, equal in length to about one fourth the length of the valve. Crural processes short, transverse ribbon wide, rather sharply folded medianly.

*Discussion.*—The shell nearest to *Gryphus bartschi* externally is *Liothyrella wva* (Broderip). This species has the lenticular profile of the new species herein described and possesses also the fine radial lines in addition to concentric lines of growth. However, the loop of *L. wva* is sufficiently different from that of *Gryphus* to have warranted the erection of the different generic name.

*Gryphus bartschi* has been misidentified as *G. cubensis* (Pourtales), to which it has only a superficial resemblance. The latter is a larger shell with a very different growth habit. (See pl. 1, fig. 9.) In profile *G. cubensis* has a sinuous lateral profile with the greatest curvature at the middle of the valve. The sides of the ventral valve are conspicuously flexed dorsally. Viewed from the dorsal valve (see pl. 1, fig. 9), it is triangular in outline, being widest near the front. The anterior commissure is rectimarginate. The triangular outline is also seen in the young of the species.

In the same general geographic realm as *G. cubensis* and *G. bartschi* is another species, *G. bartlettii*. This is a large species readily distinguished by the strong fold on the dorsal valve. In shape, color, and ornamentation this species differs notably from the one described here as new.

*Type locality.*—Station 102, at 90 to 500 fathoms, latitude  $18^{\circ}50'30''$  N., longitude  $64^{\circ}43'$  W.—latitude  $18^{\circ}51'$  N., longitude  $64^{\circ}33'$  W. Occurs in association with *Gryphus bartlettii*.

*Holotype.*—U.S.N.M. no. 431002.

#### ARGYROTHECA JOHNSONI, n. sp.

Plate 1, fig. 10; plate 2, figs. 1-12

Shell larger than usual in the genus, semicircular to subelliptical in outline. Hinge straight, cardinal extremities acutely angular to mucronate in the young, but nearly a right angle in adults and old individuals. Lateral profile plano-convex. Anterior commissure broadly sulcate. Ventral interarea strongly inclined ventrally (pro-

cline), forming an angle of about  $90^\circ$  with the lateral commissure. Shell costate; costae broad and rounded with narrower interspaces. The ribs are salmon-colored, and the interspaces are yellow.

Ventral valve subpyramidal, gently convex in lateral profile. Fold low, defined by two central costae which are a little broader and more elevated than their fellows. In the sulcus between these two costae a rib is intercalated near the front of the valve. This rib appears  $2\frac{1}{2}$  to 3 millimeters from the beak when it is present. Lateral slopes flat or gently convex.

Dorsal valve flat or gently convex in lateral profile, but broadly sulcate in anterior profile. Median sulcus shallow, usually occupied by a low, indistinct secondary rib near the front of the valve. Region on each side of the sulcus gently convex, but just anterior to the cardinal extremities a prominent depression sets them off from the body of the shell.

Ventral interior: Teeth wide, pedicle collar high and narrow, supported by the median septum which extends nearly to the middle of the valve. The median septum is high, thin, and broadly triangular in profile, the apex of the triangle being located about one fourth the length of the valve from the beak.

Dorsal interior: The median septum extends nearly to the front margin of the valve and is triangular in profile. Front margin of septum sigmoidal in profile. Apex of septum located at about the middle of the valve. Loop broad, attached to the floor of the valve near the middle. The soft parts of the shell present no new features. The digestive gland is pale yellow in color. The gonads are crescentic in outline and pale yellow in color.

*Type locality*.—Station 52 at 14 to 22 fathoms, latitude  $19^\circ 10' 25''$  N., longitude  $69^\circ 20' 55''$  W.—latitude  $19^\circ 10' 05''$  N., longitude  $69^\circ 21' 25''$  W., attached to worm tubes in association with *Thecidellina barretti* (Davidson). The above description is based on 6 dried specimens and 26 alcoholic specimens, U.S.N.M. no. 431003, a-f.

*Holotype*.—U.S.N.M. no. 431003.

*Discussion*.—There are five known species of *Argyrotheca* living in the Atlantic around the West Indies. Three of these species are very small animals and are readily distinguished from *A. johnsoni*. The other two are rather large for the genus, but this is the only feature in which they resemble *A. johnsoni*. *Argyrotheca barrettiana* (Davidson) differs from *A. johnsoni* in color and ribbing pattern. This species is conspicuously marked by scarlet bands in the spaces between the ribs, but the ribs themselves are pale yellow.

Furthermore, the ribs are sharper and narrower than those of *A. johnsoni*. The feature of an intercalated rib between the two median costae marking the fold is shared by both species, but in addition to the median intercalated rib, there are extra costae inserted between the primary costae along the front margin of *A. barrettiana*.

Internally there are differences between *A. barrettiana* and *A. johnsoni* in the loop and apical region of the ventral valve. The loop of *A. johnsoni* meets the floor of the valve farther forward than in *A. barrettiana*. In the ventral valve of the latter the pedicle collar is less elevated and less strongly developed than in *A. johnsoni*.

There are equally as strong color and ribbing differences between *A. johnsoni* and *A. lutea* Dall as there are between the new species and *A. barrettiana*. The common color of *A. lutea* is a pale yellow, which is in contrast to the salmon color of *A. johnsoni*. The ribbing pattern of *A. lutea* is characterized by a rather prominent median sinus on both valves and frequent intercalation of ribs. There are also differences internally between the two species. The septum of *A. lutea* is serrate along its front margin, but that of *A. johnsoni* forms a somewhat sigmoidal curve in profile.

#### EXPLANATION OF PLATES

##### PLATE I

All views are of the holotype, U.S.N.M. no. 431002.

FIGS. 1-8. *Gryphus bartschi* Cooper, n. sp. Fig. 1, posterior view showing labiate foramen,  $\times 2$ . Fig. 2, lateral view,  $\times 2$ . Fig. 3, anterior view, commissure rectimarginate,  $\times 2$ . Fig. 4, ventral view,  $\times 2$ . Fig. 5, dorsal view,  $\times 2$ . Fig. 6, dorsal view, natural size. Fig. 7, posterior view of ventral valve showing symphytium and foramen,  $\times 4$ . Fig. 8, dorsal interior showing narrow loop with plicated transverse ribbon.

FIG. 9. *Gryphus cubensis* (Pourtales). Dorsal view of a characteristic specimen introduced for comparison with *G. bartschi*,  $\times 2$ . Note the marked triangular outline of *G. cubensis* as compared with the oval outline of *G. bartschi*. U.S.N.M. no. 334762.

FIG. 10. *Argyrotheca johnsoni* Cooper, n. sp. Anterior view of a young specimen attached to a fragment of bryozoan colony. Note the broadly sulcate anterior commissure, median intercalated rib, and great width of the shell,  $\times 4$ . Paratype, U.S.N.M. no. 431003f.

##### PLATE 2

*Argyrotheca johnsoni* Cooper, n. sp.

FIGS. 1, 2. Ventral and dorsal views respectively of the holotype, natural size. U.S.N.M. no. 431003.

- FIGS. 3, 5. Ventral and dorsal views respectively of a young individual showing mucronate cardinal extremities and intercalated median rib,  $\times 4$ . Paratype, U.S.N.M. no. 431003a.
- FIG. 4. Ventral view of a somewhat larger individual than the preceding (431003a). The cardinal extremities are much less angular and the proportion of width to length has decreased,  $\times 4$ . Paratype, U.S.N.M. no. 431003b.
- FIGS. 6, 7. Young specimen in which median intercalated rib has not yet developed,  $\times 4$ . Paratype, U.S.N.M. no. 431003c.
- FIG. 8. Dorsal interior showing the lophophore,  $\times 4$ . Paratype, U.S.N.M. no. 431003d.
- FIGS. 9, 10. Dorsal and ventral views respectively of the holotype,  $\times 4$ . The ventral valve shows the median intercalated rib, but this is not represented on the dorsal valve. Note broad rounded costae.
- FIG. 11. Ventral interior showing pedicle collar and strong median septum,  $\times 6$ . Paratype, U.S.N.M. no. 431003e.
- FIG. 12. Dorsal interior showing loop and its union with the floor of the valve,  $\times 6$ . Paratype, U.S.N.M. no. 431003e.

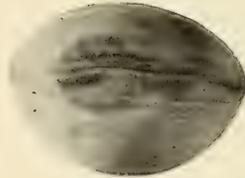




1



2



3



4



5



6



10



7

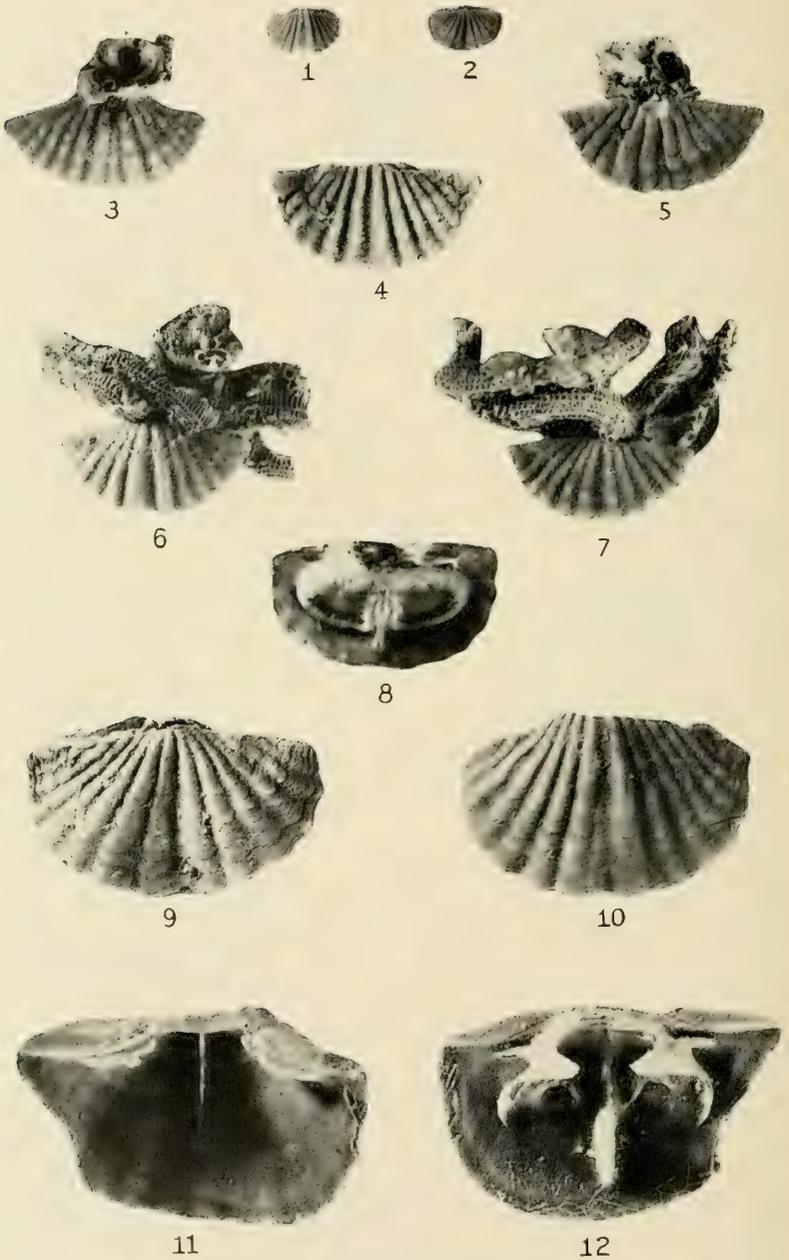


8



9

NEW BRACHIOPODS  
(For explanation, see page 4.)



**NEW BRACHIOFODS**

(For explanation, see pages 4, 5.)





SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 11

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# TWO NEW NEMATODES

(WITH ONE PLATE)

BY

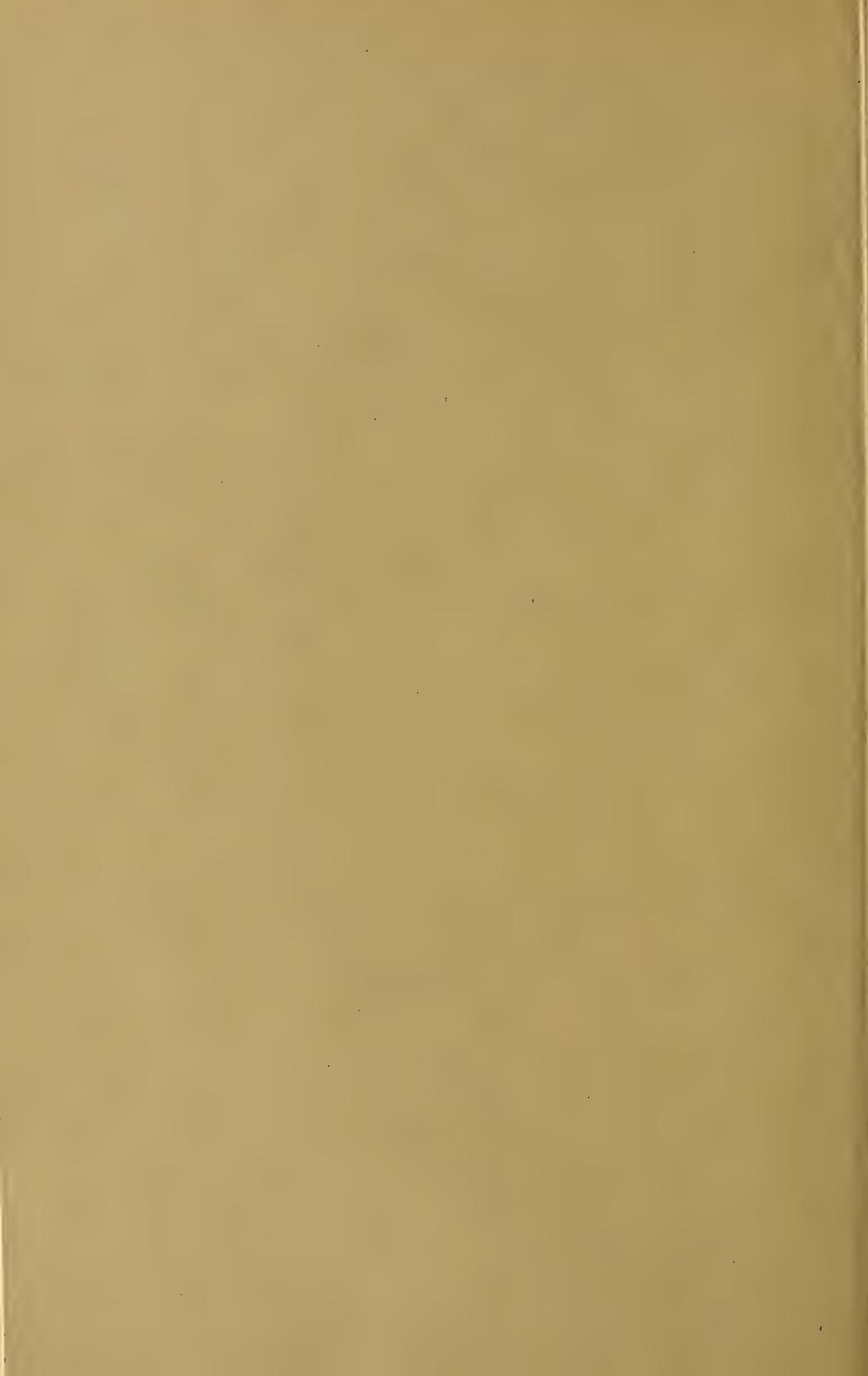
B. G. CHITWOOD

Zoological Division, Bureau of Animal Industry,  
U.S. Department of Agriculture



(PUBLICATION 3243)

DISTRICT OF COLUMBIA, CITY OF WASHINGTON  
PUBLISHED BY THE SMITHSONIAN INSTITUTION  
APRIL 13, 1934



SMITHSONIAN MISCELLANEOUS COLLECTIONS  
VOLUME 91, NUMBER 11

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## Johnson Fund

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CITY OF WASHINGTON  
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BALTIMORE, MD., U. S. A.

## Johnson Fund

### TWO NEW NEMATODES

By B. G. CHITWOOD

Zoological Division, Bureau of Animal Industry, U.S. Department of Agriculture

(WITH ONE PLATE)

In this paper are described two nematodes collected by the First Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep. One of the species, *Parathelandros anolis*, new species, taken from a lizard, *Anolis cristatellus*, is of special interest, since it appears to belong to a group which is composed, as a rule, of parasites of arthropods. The other species, *Ascarophis cestus*, new species, was collected from a deep-sea fish, *Coelorhynchus* sp.

#### Family THELASTOMATIDAE

##### PARATHELANDROS ANOLIS, n. sp.

Plate I, figs. 1-6

*Male* (incomplete specimen) 926  $\mu$  long by 76  $\mu$  wide exclusive of lateral alae, or 137  $\mu$  wide including lateral alae. Alae distally bifurcate, sometimes trifurcate, extending from cervical region to level of anus. Cuticular striae deep. Esophagus 184  $\mu$  long, consisting of a corpus 140  $\mu$  long by 19  $\mu$  wide, an indistinct isthmus, and a bulb 43  $\mu$  long by 43  $\mu$  wide. Excretory pore 270  $\mu$  from anterior extremity. Cloacal opening 220  $\mu$  from posterior extremity (distal portion of tail missing). Tail attenuated, filiform, without spines. Genital papillae consisting of one pair of preanal papillae, two pairs of postanal papillae, and one medioventral double postanal papilla on posterior lip of anus. Spicule absent.

*Female* 2.016 to 2.58 mm long by 180 to 224  $\mu$  wide. Cuticle distinctly annulated in cervical and anal regions. Extremely narrow. Paired sublateral alae present. Oral opening trilobed. Cephalic papillae consisting of eight large labiopapillae (dorsodorsals, laterodorsals, lateroventrals, and ventroventrals), papillae unequal (see pl. I, fig. 1); amphids slightly raised, situated at posterior level of papillae. Stoma inconspicuous. Esophagus 320 to 400  $\mu$  long. Corpus 230 to 245  $\mu$

long by 25 to 30  $\mu$  wide, isthmus 40  $\mu$  long by 20  $\mu$  wide, bulb 80  $\mu$  long by 80 to 90  $\mu$  wide. Nerve ring 170  $\mu$  from anterior extremity. Excretory pore 275 to 320  $\mu$  from anterior extremity. Anus 680 to 760  $\mu$  from posterior extremity; tail filiform, bearing paired spines. Vulva preequatorial, 320 to 360  $\mu$  from anterior extremity, immediately posterior to excretory pore. Vagina 790  $\mu$  long, directed posteriorly, vagina vera 117  $\mu$  long, vagina uterina 673  $\mu$  long; amphidelphic. Eggs 102 to 104  $\mu$  long by 43 to 51  $\mu$  wide.

*Host*.—*Anolis cristatellus*. U.S.N.M. no. 9034f.

*Location*.—Rectum.

*Type locality*.—Pueblo Viejo, Puerto Rico.

*Type specimens*.—U.S.N.M. Helm. Coll. no. 8746; paratypes no. 8747.

*Parathelandros anolis* appears to be closely related to *P. mastigurus* Baylis, 1930, the only other species of the genus. *P. anolis* differs from *P. mastigurus* in the absence of a spicule in the male, the extremely narrow sublateral alae of the female, and the presence of spines on the tail of the female, there being a spicule in the male of *P. mastigurus* which also has wide lateral alae in the female, and no spines on the tail.

The affinities of the genus *Parathelandros*, as evidenced by the study of *P. anolis*, are worthy of comment. The cephalic papillae being eight in number, separate and distinct from one another, place this genus in the Thelastomatidae rather than with the Oxyuridae, since the cephalic papillae in the Oxyuridae consist of only four papillae which represent complete fusions of the eight papillae of thelastomatids. Since this is the chief distinguishing character between the two families, it appears necessary to remove *Parathelandros* from the Oxyuridae.

The alae of *P. anolis* are particularly interesting, since they show in cross-section characters not generally known. The sublateral alae of the female (pl. I, fig. 5) appear to correspond to the lateral alae of the male (pl. I, fig. 3), the latter probably being formed by the extension and fusion of paired sublateral alae.

## Family SPIRURIDAE

### ASCAROPHIS CESTUS, n. sp.

Plate I, figs. 7-10

Cuticle minutely striated except near anterior extremity, becoming wrinkled here and forming a collar (pl. I, fig. 8). Oral opening

surrounded by two indistinctly trilobed pseudolabia. Cephalic papillae consisting of completely fused dorsodorsal-laterodorsal and ventroventral-lateroventral; remaining papillae rudimentary.

*Male* 5.5 mm long by 85  $\mu$  wide. Stoma 60  $\mu$  long. Esophagus 890  $\mu$  long, consisting of a narrow anterior muscular part 200  $\mu$  long by 18  $\mu$  wide and a wide posterior glandular part 690  $\mu$  long by 40  $\mu$  wide. Nerve ring 140  $\mu$  from anterior extremity. Cloacal opening 155  $\mu$  from posterior extremity. Genital papillae consisting of four pairs of preanal and five pairs of postanal papillae. Left spicule 260  $\mu$  long, setiform, apparently alate. Right spicule 65  $\mu$  long, thick, hooklike. Caudal alae vesicular.

*Female* 11 to 12.3 mm long by 100 to 120  $\mu$  wide. Stoma 55 to 58  $\mu$  long. Esophagus 1.1 to 1.12 mm long, consisting of an anterior part 215 to 270  $\mu$  long by 19  $\mu$  wide and a posterior part 850 to 885  $\mu$  long by 47 to 60  $\mu$  wide. Nerve ring 157 to 180  $\mu$  from anterior extremity; excretory pore 190 to 220  $\mu$  from anterior extremity. Anus 119 to 150  $\mu$  from posterior extremity; tail slightly attenuated, distally blunt. Vulva preequatorial, 4.8 mm from anterior extremity in specimen 12.3 mm long. Vagina directed anteriorly, 125  $\mu$  long; uteri divergent. Eggs 38  $\mu$  long by 32  $\mu$  wide.

*Host*.—*Coelorrhynchus* sp. (J-S 650).

*Location*.—Intestine.

*Locality*.—Station 101 (lat. 18°40'30" N., long. 64°50' W.).

*Type specimens*.—U.S.N.M. Helm. Coll. no. 8153; paratypes no. 8754.

At the present time there seems to be no satisfactory means of separating the genera *Ascarophis* and *Spinitectus*. The presence of spines, which has generally been regarded as characteristic of the genus *Spinitectus*, can no longer be considered sufficient. Baylis (1929) described a species, *S. guntheri*, without spines, which he placed in that genus, and this view cannot be criticized, for Mueller and Van Cleave (1932) have shown that spines in these forms are merely modified edges of posteriorly projecting annules. The presence or absence of spines is apparently not correlated with other characters such as the stoma, vagina, origin of uteri, or number of genital papillae.

*Ascarophis cestus* is similar to *A. acipenserina* (syn. *Cyclozone acipenserina* Dogiel, 1932) in having a cuticular "collar," a character upon which the genus *Cyclozone* was based. Dogiel considered the collar as a homolog of cordons characteristic of the Acuariinae. As may easily be seen from the accompanying illustration (pl. 1, fig. 8),

this does not appear to be a correct interpretation, since young adult specimens show merely a slight wrinkling of the cuticle in this region, the wrinkling becoming more pronounced with age. The most outstanding difference between *A. cestus* and *A. acipenserina* is that the esophagus is only 9 to 16 percent of the body length in the former species, whereas it is 37 to 47 percent of the body length in the latter species. Tendencies toward cuticular modification are present in some other species of the genus, but such modifications usually take the form of serrate annules.

#### REFERENCES

BAYLIS, H. A.

1929. Parasitic Nematoda and Acanthocephala collected in 1925-1927. Discovery Reports, vol. 1, pp. 541-560.

MUELLER, F. F., and VAN CLEAVE, H. J.

1932. Parasites of Oneida Lake fishes. Part II. Descriptions of new species and some general taxonomic considerations, especially concerning the trematode family Heterophyidae. Roosevelt Wild Life Ann., vol. 3, no. 2, pp. 79-138.

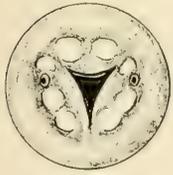
#### EXPLANATION OF PLATE

*Parathelandros anolis*, n. sp.

- FIG. 1. Head of female, *en face* view.
- FIG. 2. Esophageal region of female, lateral view.
- FIG. 3. Cross-section of male, showing lateral alae.
- FIG. 4. Posterior end of male, lateral view.
- FIG. 5. Cross-section of female, showing sublateral alae.
- FIG. 6. Tail of female, lateral view.

*Ascarophis cestus*, n. sp.

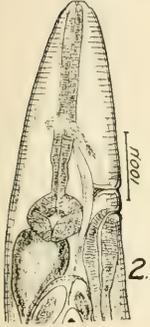
- FIG. 7. Head, *en face* view.
- FIG. 8. Head, dorso-ventral view.
- FIG. 9. Vulvar region of female, lateral view.
- FIG. 10. Caudal region of male, somewhat twisted.



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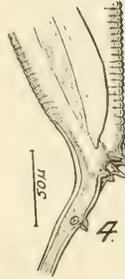
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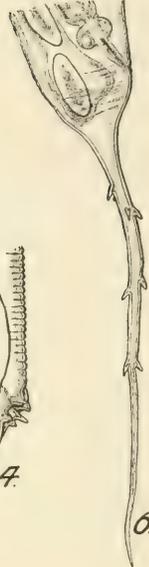
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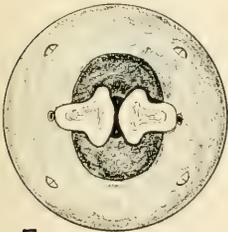
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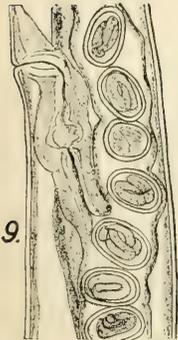
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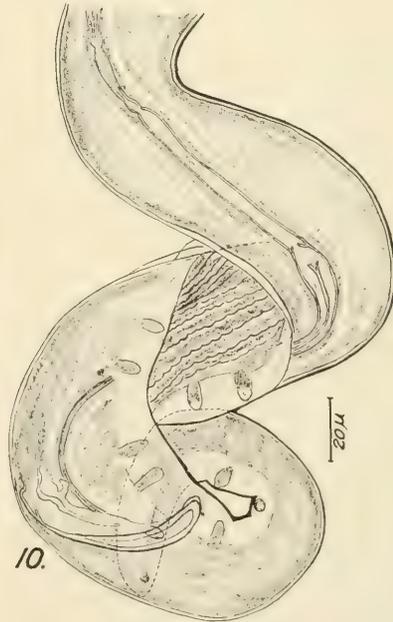
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9.



10.

NEW NEMATODES  
(For explanation, see page 4.)







SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 12

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

THREE NEW AMPHIPODS

BY

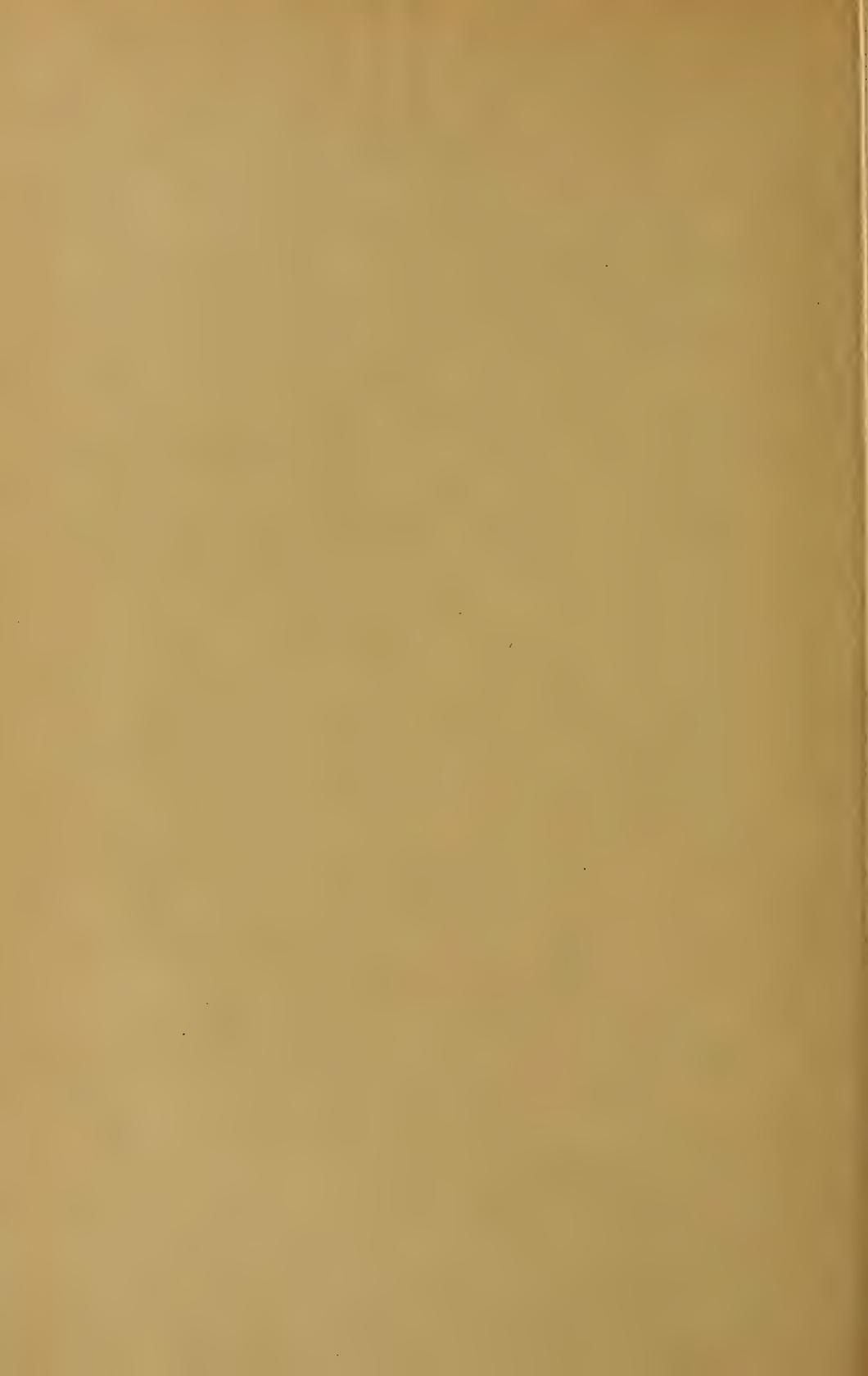
CLARENCE R. SHOEMAKER

Assistant Curator, Division of Marine Invertebrates,  
U.S. National Museum



(PUBLICATION 3246)

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SMITHSONIAN MISCELLANEOUS COLLECTIONS  
VOLUME 91, NUMBER 12

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# THREE NEW AMPHIPODS

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## Johnson Fund

### THREE NEW AMPHIPODS

By CLARENCE R. SHOEMAKER

*Assistant Curator, Division of Marine Invertebrates, U.S. National Museum*

The Amphipoda taken by the first Johnson-Smithsonian Deep-Sea Expedition in the Puerto Rican Deep in 1933 consist chiefly of known forms of Hyperiidea, but among the Gammaridea are three species new to science, which I here designate as *Cyphocaris johnsoni*, *Westwoodilla longimana*, and *Rhachotropis lobata*.

#### CYPHOCARIS JOHNSONI, n. sp.

*Male*.—First thoracic segment produced forward into a long, narrow, slightly up-curved process somewhat like that of *C. richardi*. Head rather deep, with a long narrow eye, the facets of which are long and point obliquely toward a central wavy line. Antenna 1 not half the length of antenna 2. Antenna 2 longer than the entire animal. Side-plate 2 deeper than 1 or 3. Side-plate 4 as deep as 5 and apparently narrower than in the other species of the genus. Side-plate 5 long in proportion to its width. Gnathopods 1 and 2 and peraeopods 1 and 2 about normal. Peraeopod 3 with second joint much more than twice as long as its side-plate, proportionately narrow and armed with serrations along about two thirds of the upper margin, third to seventh joints combined not half as long as second joint. Peraeopod 4 slightly shorter than 5, second joint moderately expanded, hind margin with a few serrations and produced downward into a pointed lobe. Peraeopod 5, second joint moderately expanded, hind margin slightly convex, bearing many serrations and produced downward into a pointed lobe, seventh joint very short. Uropod 1 extending backward farther than 2, which reaches back as far as 3. Uropods about normal in form. Telson very narrow and nearly twice as long as uropod 3, cleft for about seven eighths of its length, with lobes sharply pointed, but having no spines or setae.

*Length*.—About 19 mm.

*Holotype*.—U.S.N.M. no. 69101, taken at station 97, latitude 18°37'30" N. to 18°38'15" N., longitude 65°02'15" W. to 65°00'30" W., March 3, 1933, 310 to 400 fathoms.

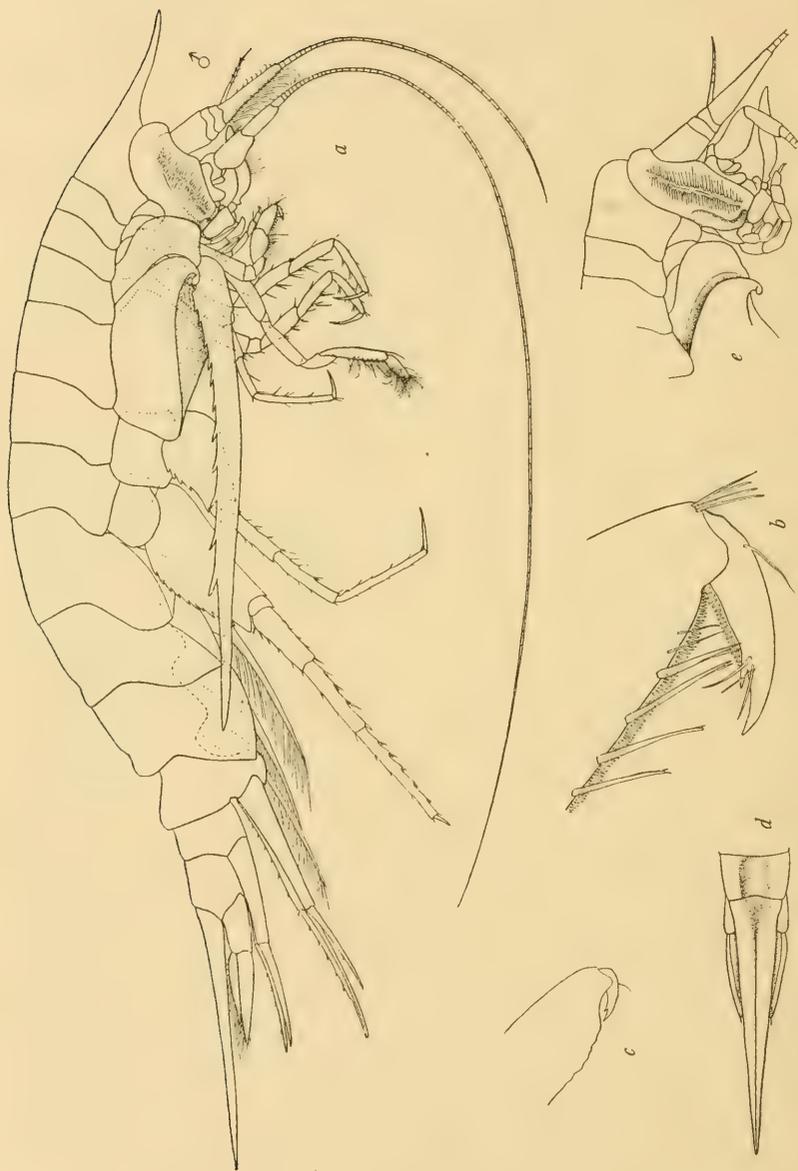


FIG. 1.—*Cyphocaris johnsoni*, new species. *a*, entire animal ♂; *b*, gnathopod ♂ greatly enlarged; *c*, gnathopod ♀ greatly enlarged; *d*, telson ♀; *e*, head of female.

The female closely resembles the male except in the following characters. First thoracic segment not produced beyond the head. Peraeopod 3 with second joint somewhat shorter, and the serrations of upper margin extending only about half its length; third to seventh joints combined a little over half the length of the second joint.

**WESTWOODILLA LONGIMANA, n. sp.**

This specimen is not perfect, but I believe there is quite enough to establish the species. Only parts of the antennae are present. The last three pairs of peraeopods and the last two pairs of uropods are missing. This species appears to be nearest to *Westwoodilla rectirostris* as figured by Chevreux.<sup>1</sup>

Head with frontal process rather short, strongly arched, and ending in a short, outward-curved rostrum. Eyes apparently large but very poorly defined. Side-plate 1 not projecting so far forward as shown by Chevreux for *W. rectirostris*. Gnathopod 1 about as shown by Chevreux for *W. rectirostris*. Gnathopod 2 with fifth and sixth joints subequal in length and very elongate. Palms of gnathopods defined by a shallow notch and a long slender spine. Peraeopods 1 and 2 alike, sixth joint obliquely truncate and bearing many long, curved, terminal spines. Telson oval, apex slightly flattened and bearing several minute spinules.

*Length*.—About 5 mm.

*Holotype*.—U.S.N.M. no. 68326, taken at station 84, latitude 18°32'30" N. to 18°39'00" N., longitude 65°18'30" W. to 65°17'00" W., February 26, 1933, probably 300 to 350 fathoms. The type female was the only specimen taken.

*Remarks*.—The frontal process is much more strongly deflected than in *Westwoodilla rectirostris*; the fifth and sixth joints of gnathopod 2 are much more elongate than in *W. rectirostris*. As figured by Della Valle,<sup>2</sup> the sixth joint of peraeopods 1 and 2 of *W. rectirostris* is distally rounding and not obliquely truncate as in *W. longimana*. Della Valle figures the telson of *W. rectirostris* with the lateral margins slightly concave, whereas in *W. longimana* the telson is oval in outline.

**RHACHOTROPIS LOBATA, n. sp.**

*Female*.—Head, rostrum prominent, curving slightly downward, apex rounding; lower lateral corner nearly quadrate. Eyes rather large and bulging laterally from the head. Antennae about normal.

<sup>1</sup> Mem. Soc. Zool. France, vol. 23, pl. 13, figs. 19-22, 1911.

<sup>2</sup> Fauna und Flora des Golfes von Neapel, Gammarini, pl. 33, figs. 14, 15, 1893.

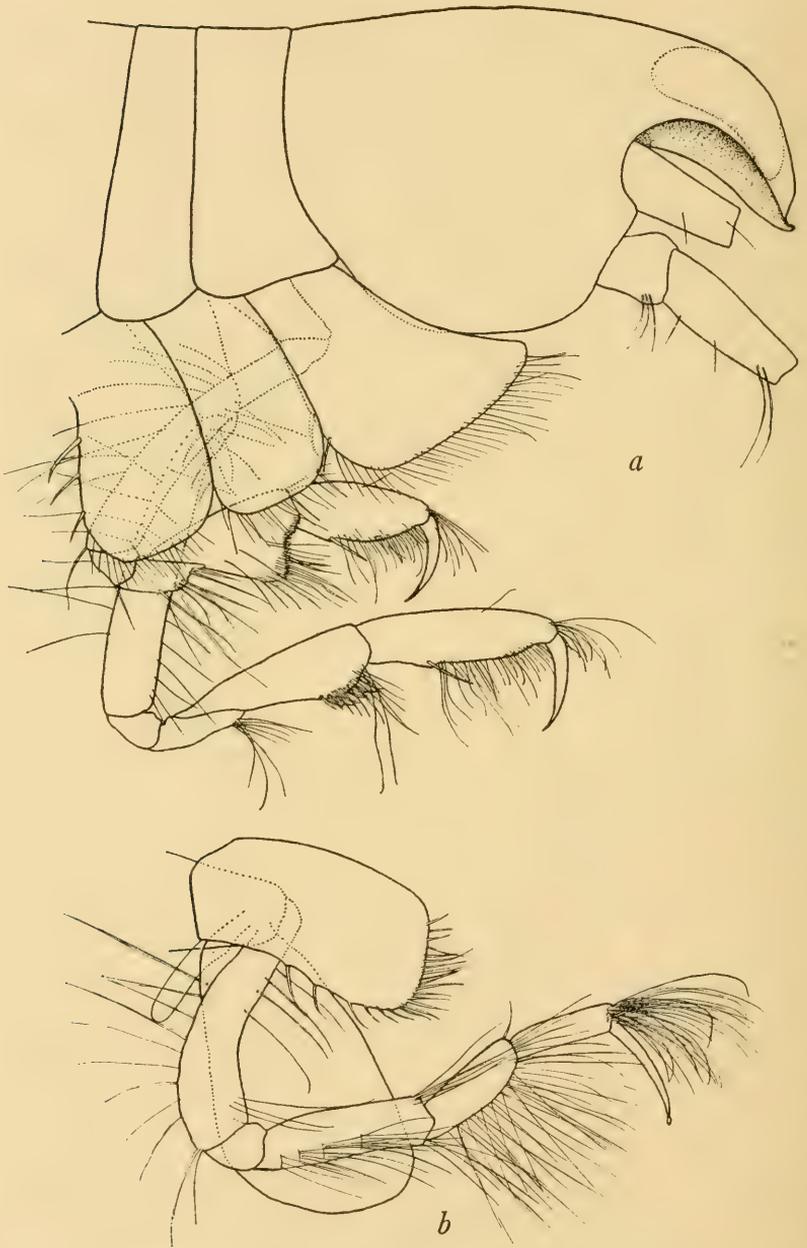


FIG. 2.—*Westwoodilla longimana*, new species. Female: *a*, anterior end of animal; *b*, peraeopod 1.

Gnathopods normal. Peraeopod 1, dactyl as long as sixth joint. Peraeopod 2, dactyl longer than sixth joint. Peraeopod 3, second

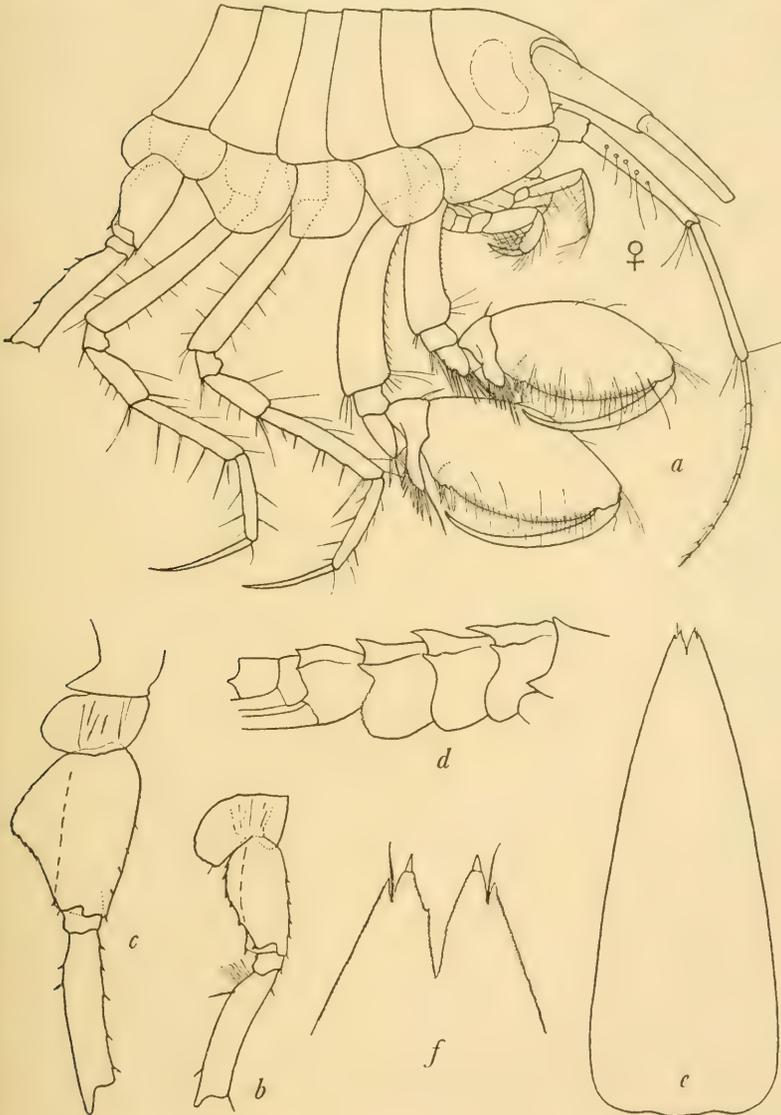


FIG. 3.—*Rhachotropis lobata*, new species. Female. *a*, anterior end of animal; *b*, peraeopod 4; *c*, peraeopod 5; *d*, posterior end of animal, on smaller scale than anterior end; *e*, telson, greatly enlarged; *f*, end of telson showing lobes.

joint slightly expanded, hind margin slightly convex. Peraeopod 4 like peraeopod 3, but second joint a little more expanded. Peraeopod

5, second joint much more expanded than 4, with hind margin produced backward into a blunt lobe. Hind margin of seventh thoracic segment bearing a short median dorsal tooth. Pleon segments 1 to 3 bearing a median dorsal tooth, on either side of which is a lateral tooth. Pleon segment 4 with a low median dorsal ridge ending in a small tooth, on either side of which is a very small lateral tooth. Pleon segment 3 with postero-lateral margin finely serrate. Uropods normal. Telson not reaching end of uropod 3, converging by gently convex lateral margins to a narrow apex, which is cleft by a very shallow notch forming short dehiscent pointed lobes, each of which bears a notch and a setule on the outer margin.

*Length.*—6.5 mm.

*Holotype.*—U.S.N.M. no. 69102, taken at station 101, latitude  $18^{\circ}40'30''$  N. to  $18^{\circ}45'40''$  N., longitude  $64^{\circ}50'00''$  W. to  $64^{\circ}48'00''$  W., March 4, 1933, 190 to 300 fathoms.





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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
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TO THE PUERTO RICAN DEEP

# A NEW GENUS OF BRITTLESTARS FROM PUERTO RICO

(WITH ONE PLATE)

BY

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Curator, Division of Echinoderms,  
U.S. National Museum



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CITY OF WASHINGTON  
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MAY 21, 1934



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### A NEW GENUS OF BRITTLESTARS FROM PUERTO RICO

BY AUSTIN H. CLARK

*Curator, Division of Echinoderms, U.S. National Museum*

(WITH ONE PLATE)

One of the most interesting of the echinoderms obtained by the First Johnson-Smithsonian Deep-Sea Expedition was a curious ophiuran representing a new genus of the family Hemieryalidae.

The family Hemieryalidae as at present understood includes ten genera, of which six occur in the West Indies. Of these six West Indian genera, four are known only from the Caribbean region, one is found also in other parts of the tropical Atlantic, and one is represented also in the Galápagos Islands.

The new genus may be known as—

#### QUIRONIA, n. gen.

*Diagnosis.*—Resembling *Sigsbeia*, but with a single large genital slit in each interbrachial space that passes between the arm bases just beyond the mouth shields; with the arms narrower and shorter and more abruptly separated from the disk, and six instead of five in number; and with the plates on the disk more numerous, smooth, and less regularly arranged.

*Genotype.*—*Quironia johnsoni*, n. sp.

#### QUIRONIA JOHNSONI, n. sp.

*Locality.*—Caroline station 45; west of Puerto Rico (lat.  $18^{\circ}13'10''$  N., long.  $67^{\circ}25'30''$  W.—lat.  $18^{\circ}14'30''$  N., long.  $67^{\circ}25'30''$  W.); 20 to 40 fathoms; February 13, 1933. One specimen (U.S.N.M. no. E.3265 [type]).

*Description.*—The disk is 6.8 mm in diameter between the bases of opposite arms, rather high, with the portion within the inner ends of the radial shields flattened. The central portion of the disk is covered by a considerable number of plates of very different sizes, of which six, situated at the inner ends of the pairs of radial shields,

are larger than the others, with broadly rounded outer edges and with the outer portion somewhat swollen. The radial shields are rounded triangular and are about twice as long as broad. The shields of each pair are separated by a column of usually four plates, of which the innermost is trapezoidal and much longer and broader than the others. Interradially, the radial shields are separated by a column of two or three more or less oblong plates.

The six arms are 18 mm long and 1.8 mm wide at the base. They are narrow, about 2.6 times the diameter of the disk in length, and taper evenly from the base to the tip. Their bases are separated by a distance of 1.1 mm, the interbrachial margins of the disk being straight, so that the arms and the disk are rather abruptly differentiated.

The earliest upper arm plates are fan-shaped with broadly truncated lateral angles; they are about half again as broad as long and are in contact by their proximal angles. After the sixth or seventh they gradually become separated and reduced in size, so that at the arm tip they are very small and are separated for about their own length. In the earlier portion of the arm they are slightly swollen.

The supplementary arm plates resemble those in *Sigsbeia murrhina*. They decrease in size distally and at the arm tips are simply minute plates attached to the lateral angles of the upper arm plates.

The side arm plates are large, slightly swollen, and in contact dorsally.

The under arm plates resemble those in *Sigsbeia murrhina*.

The single tentacle scale is subcircular.

On the second pore there is a single short and very broad arm spine that resembles the tentacle scale. At the second, third, and fourth pores there are two very short and broad spines, which are only slightly, and sometimes not at all, longer than broad. From this point onward the upper arm spine very slowly diminishes in size, the lower remaining the same, until near the arm tip the upper spine disappears, the lower concurrently becoming somewhat longer and slightly recurved and acquiring several stout, glassy spinules on the lower side of the tip.

The jaws are triangular with the outer apex more or less blunted and are about half again as long as broad at the base.

There are three mouth papillae on each side, which form a continuous narrow line along the jaws. The first mouth papilla is the longest and broadest and tapers somewhat distally. The second mouth papilla is narrower, and the outermost is broader again, but

smaller than the first. There are four thick and stout teeth, which have more or less rounded ends; the uppermost tooth is sunken well below the level of the jaws. There are no tooth papillae.

The adoral shields resemble those of *Sigsbeia murrhina*.

The mouth shields are smaller than are those of *S. murrhina*, owing to the absence of an aboral lobe, the shields being bordered aborally by a straight line bordering the genital slit.

In each interbrachial space there is a single conspicuous genital slit, which passes between the arm bases just beyond the mouth shield.

The color abactinally is a very pale ecru drab with an irregular central patch of white, becoming darker beyond the arm bases. The seventh upper arm plate, and every fifth one beyond, is white. The color actinally is white.

#### EXPLANATION OF PLATE

##### PLATE I

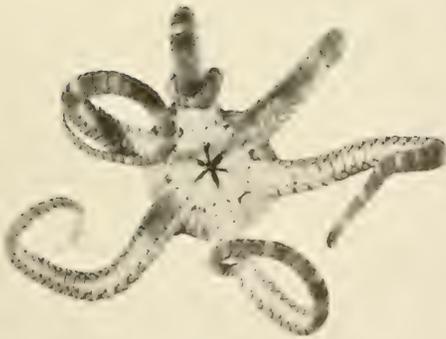
FIG. 1. *Quiroonia johnsoni*, n. gen., n. sp., the type specimen (U.S.N.M. no. E.3265) from *Caroline* station 45, abactinal view.  $\times 3$ .

FIG. 2. *Quiroonia johnsoni*, n. gen., n. sp., the type specimen (U.S.N.M. no. E.3265) from *Caroline* station 45, actinal view.  $\times 3$ .





1



2

QUIRONIA JOHNSONI  
(For explanation, see page 3.)







SMITHSONIAN MISCELLANEOUS COLLECTIONS  
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TO THE PUERTO RICAN DEEP

# A NEW STARFISH FROM PUERTO RICO

(WITH ONE PLATE)

BY

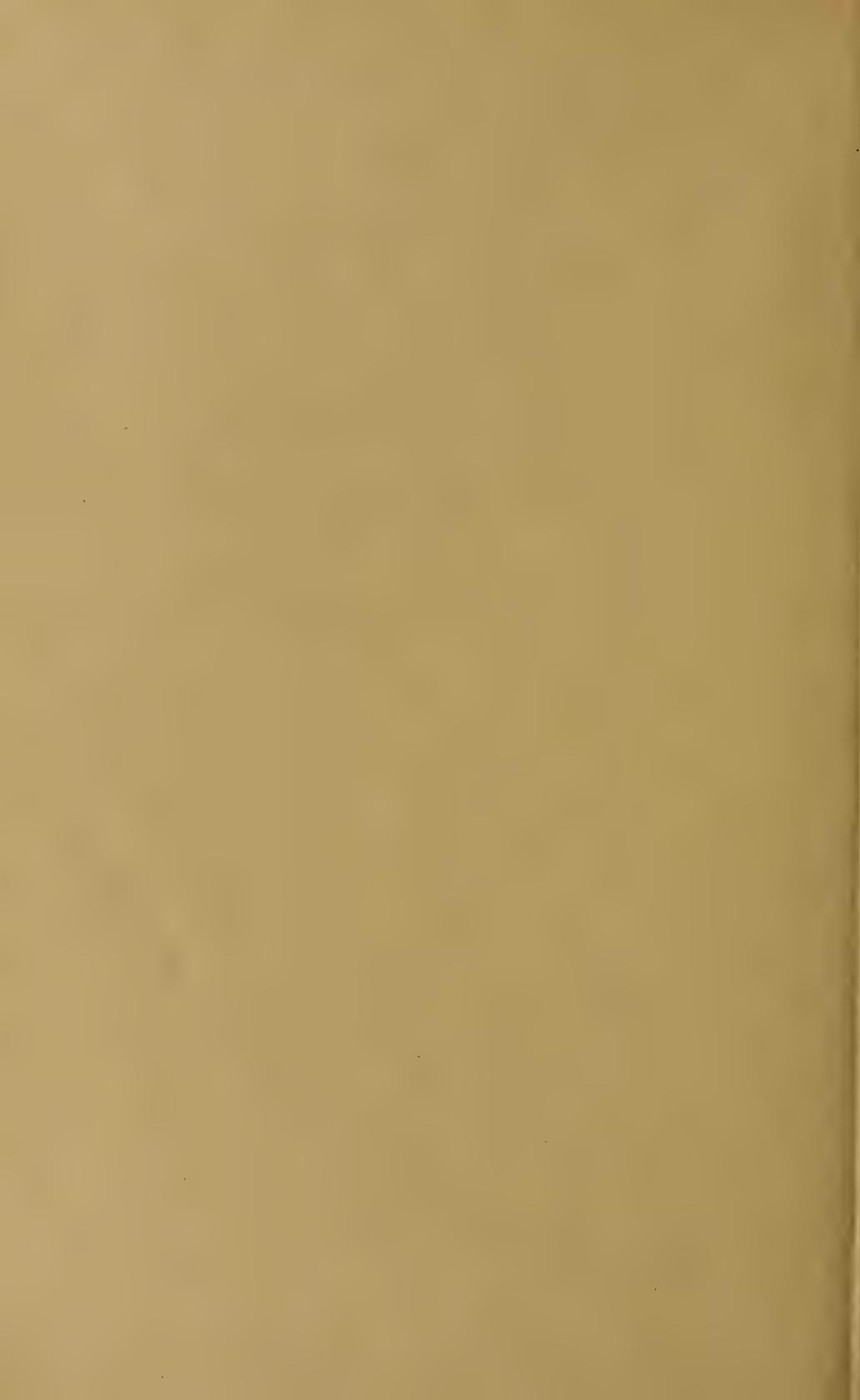
AUSTIN H. CLARK

Curator, Division of Echinoderms,  
U.S. National Museum



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### A NEW STARFISH FROM PUERTO RICO

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Curator, Division of Echinoderms, U.S. National Museum

(WITH ONE PLATE)

Among the starfishes obtained by the First Johnson-Smithsonian Deep-Sea Expedition on the 1933 cruise are two specimens of a new species of *Odinia*. The discovery of a species of *Odinia* in the West Indian region is especially interesting, as the family Brisingidae, to which it belongs, although well represented on the Atlantic coasts of Africa and of Europe, is known from the Caribbean region only from the single somewhat problematical genus *Hymenodiscus*, which was described from a single species represented by two evidently young individuals.

This new species of *Odinia* may be known as—

#### ODINIA ANTILLENSIS, n. sp.

*Locality*.—Caroline station 47; west of Puerto Rico (lat.  $18^{\circ}17'20''$  N., long.  $67^{\circ}25'$  W.—lat.  $18^{\circ}17'05''$  N., long.  $67^{\circ}24'45''$  W.); 280 to 340 fathoms; February 13, 1933. One specimen (U.S.N.M. no. E.3266 [type]).

*Description*.—The disk is 27 mm in diameter; the border, which is 5 mm high, rises abruptly at an angle of about  $65^{\circ}$  from the arm bases to the flat abactinal surface. The abactinal surface is entirely covered with small polygonal plates elevated in the center, which become larger and more solid toward the margin. There are long and conspicuous papulae in practically all the interstices between these plates. Each plate bears on its elevated irregular central portion a group of 2 to 16 (usually 4 to 10) short spines of various lengths, the longest of which seldom exceeds in height half the length of the plate, and also several to many pedicellariae. Narrow bare channels run down the beveled border of the disk between the arm bases and are continued outward between the arm bases as much broader and more conspicuous bare channels 2 mm in width for a distance of about 8 mm over eight or nine apposed pairs of marginal plates.

The madreporite is situated on the sloping side of the disk just at the edge of the abactinal surface. It is 2.5 mm in diameter and about 1 mm high, with almost vertical sides.

The rays are 15 in number (in both specimens) and are about 250 mm in length from the edge of the disk. The thickest and highest portion, at the sixth or seventh adambulacral from the last marginal, is 8 mm high and 8 mm broad, the ray here being evenly convex abactinally. Just beyond the genital region the rays are 7 mm broad and 5 mm high.

The genital region of the rays is about 40 mm long. It is only very moderately swollen and tapers gradually distally. It is completely covered with small, lobed, overlapping plates elevated in the center and bearing a small spine, more rarely two or three, with many pedicellariae, and with papulae in the interstices between the plates. Irregularly interspersed between the plates of the genital region along the sides of the ray are a few larger plates bearing longer spines.

The costae in the proximal half of the genital region are irregular, usually very short, and are scarcely to be distinguished from the general plating of the area. They occur opposite every third adambulacral plate. The few larger spines in this region are seen to be more or less definitely associated with them. In the outer half of the genital region the costae are in the form of narrow bands of slightly elevated plates running across the arms, though scarcely distinguishable in the median line. On either side of the arm they bear from two to four spines, which are much longer than the spines on the adjacent plates. There are nine costae in all in the genital region, of which the first five are incomplete in varying degrees, the first two being scarcely more than indicated above the adambulacrals.

Beyond the genital region the dorsal plates abruptly become smaller and wholly separated; continuing to decrease in size, and also in number, they disappear entirely after about 15 mm. Pedicellariae in this area are excessively abundant, and they remain abundant to the arm tips. Beyond the genital region there are two greatly reduced bands of plates representing costae. Just above every third adambulacral beyond the genital region is a row of four stout plates, each of which bears a long, slender, sharp spine; the lowest of these spines is the longest, 8 to 9 mm in length, the next two are almost as long, and the uppermost, or fourth, is the shortest, much shorter than the others. On the distal portion of the arms these combs of spines become more widely spaced, occurring above every fourth, or

sometimes fifth or even sixth, adambulacral, and the uppermost (fourth) spine decreases in size and disappears. Terminally, the combs consist of two long spines and a very short third.

The mouth plates are large, somewhat longer than the two following adambulacrals taken together, with the portion beneath the first tentacle reaching half the lateral length. They are in close apposition both radially and interradially, and the adjoining radial portions of adjacent plates form a broad band beneath each ambulacral groove. Each plate bears usually five very short spines, none of which is as long as the distance from the proximal edge of the plate to the first tentacle. One or two of these spines are on the midradial edge of the plate at or near the distal end, and the remainder are on the proximal border.

The adambulacral plates are about twice as broad as long, becoming longer in the distal half of the rays. Each bears a prominent furrow spine. These are at first small and pointed, increasing in length to the fifth and following, which are about 4.5 mm long. The sixth and the succeeding 23 to 25 are broadened, widening gradually from the base to the abruptly truncated tip, and chisel-shaped, the tip being strongly curved with the concavity outward. The following spines soon become slender and sharp again. Terminally, the furrow spines become gradually reduced to fine needlelike spines no longer than the plates themselves.

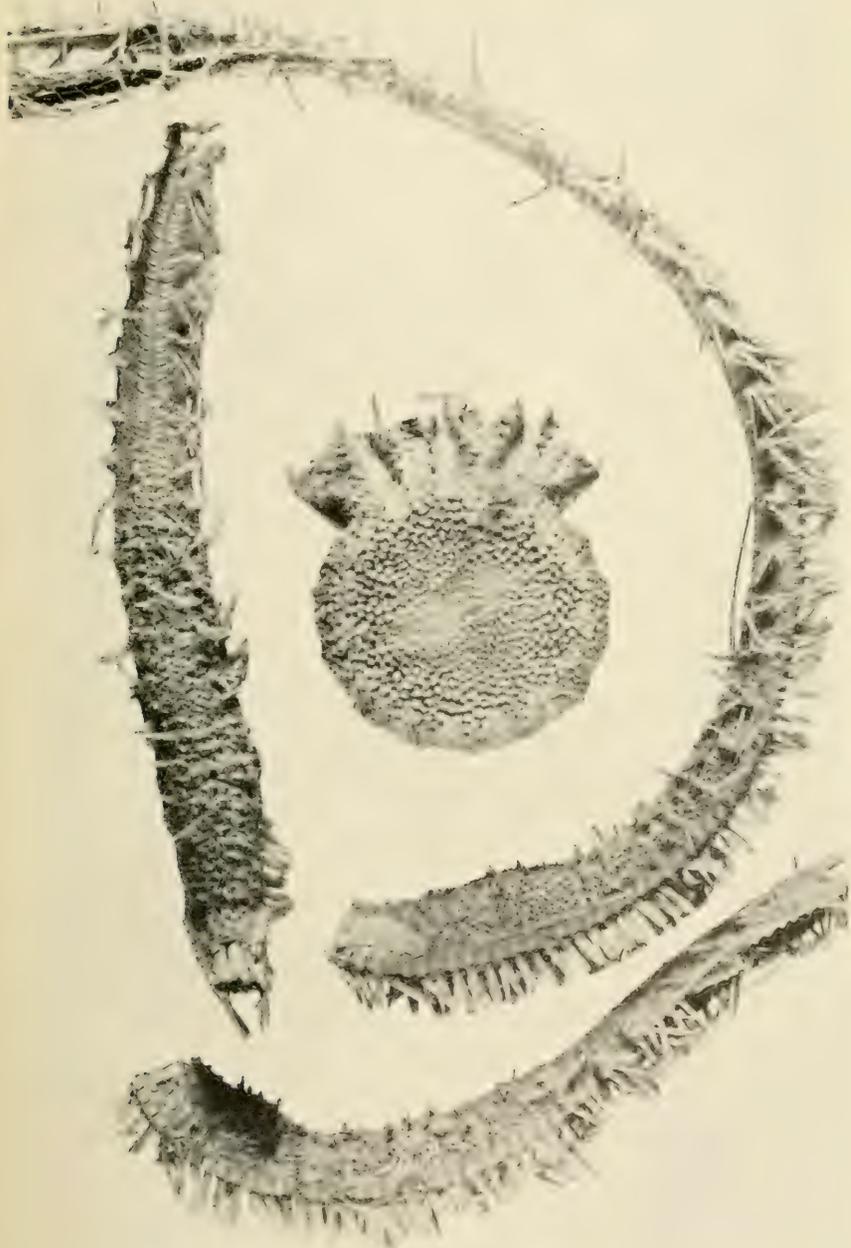
*Remarks.*—This new species appears to be most closely related to *Odinia semi-coronata* (Perrier), which was dredged by the *Talisman* at station 73, south of the Canary Islands, in 1,056 to 1,435 meters.

#### EXPLANATION OF PLATE

##### PLATE I

*Odinia antillensis*, n. sp., the type specimen (U.S.N.M. no. E.3266) from Caroline station 47; disk and portions of three rays.  $\times 1\frac{1}{2}$ .





**ODINIA ANTILLENIS**  
(For explanation, see page 3.)







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# TWO NEW CONGRID EELS AND A NEW FLATFISH

(WITH ONE PLATE)

BY

EARL D. REID

Aid, Division of Fishes, U.S. National Museum

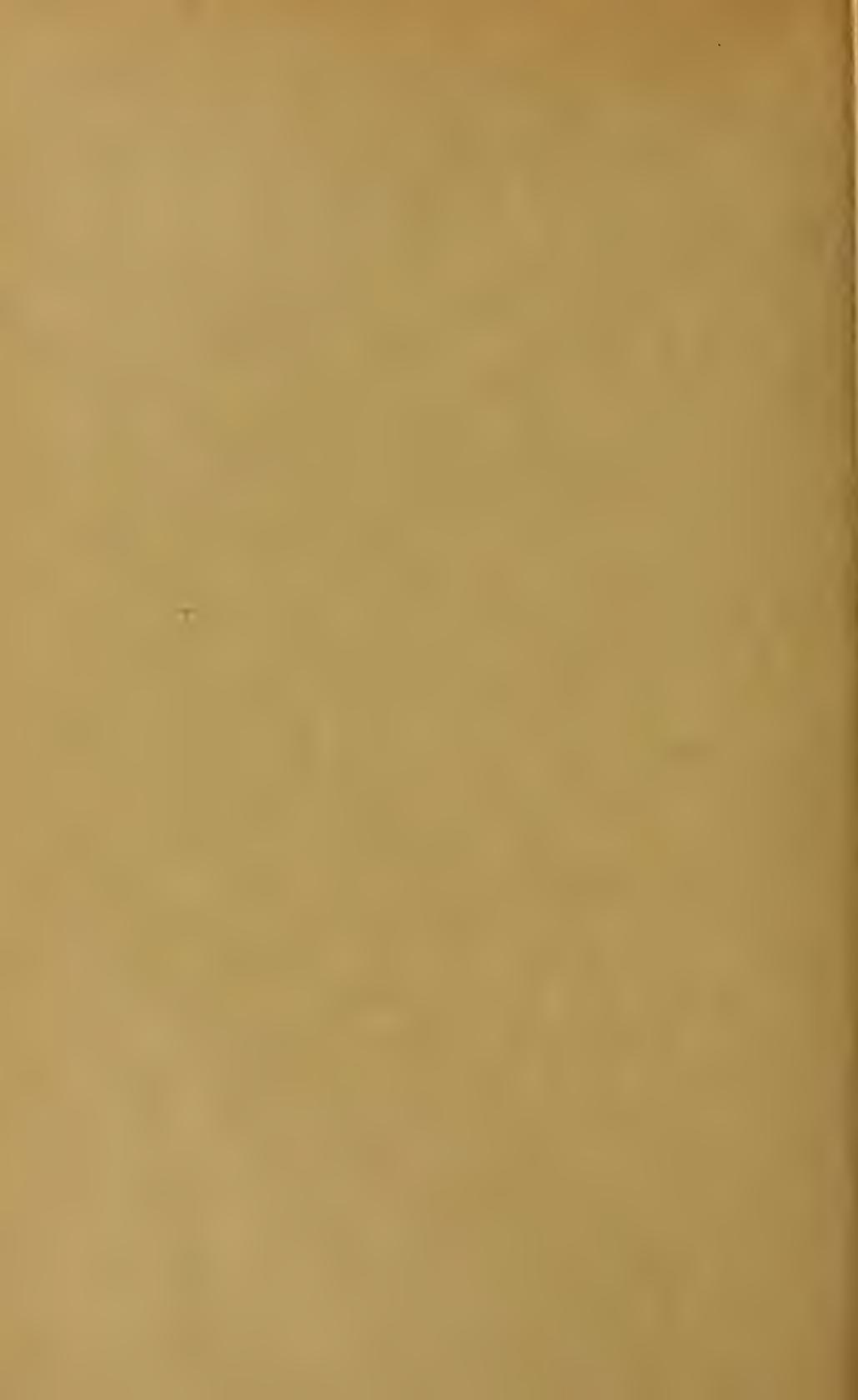


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### TWO NEW CONGRID EELS AND A NEW FLATFISH

By EARL D. REID

*Aid, Division of Fishes, U.S. National Museum*

(WITH ONE PLATE)

Examination of the fishes of the families Congridae and Pleuronectidae obtained by the First Johnson-Smithsonian Deep-Sea Expedition reveals three undescribed forms, two of which belong to the former and one to the latter group.

#### Family CONGRIDAE

Comparison of the present congrids with material in the National Museum and examination of the literature leads to uncertainty as to the proper generic assignment of these specimens. It would seem that the confusion regarding the generic relationship of the congrid eels is due, at least in part, to the flexibility of the characters upon which several of the genera are based. Parr,<sup>1</sup> in his discussion of *Ariosoma* and related genera, points out the unreliability of the definition of tooth characters as construed by various authors, showing that interpretation of the definitions as well as of the tooth characters themselves is more or less a matter of individual notion. The genus *Ariosoma*, as now understood, embraces several closely related groups, the ultimate separation of which must be accomplished before we can hope for an understandable taxonomic arrangement of the congrids. These groups can be worked out and properly classified only when studied on a cosmopolitan basis, as there can be no doubt that generic relationship among the congrid eels is distributed over widely separated areas. As pointed out above, tooth character alone has very little value, since the variations are so extensive that intergradations are found throughout the group almost without exception. However, the shape and position of the dental plates, spacing of the groups, and width of the bands of teeth seem to be the most reliable dental characters for purposes of generic distinction.

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<sup>1</sup> Bull. Bingham Oceanogr. Coll., vol. 3, art. 5, pp. 19-31, 1932.

P. Bleeker<sup>2</sup> described and figured the peculiar bonelike supports of the upper lip in *Uroconger lepturus* (Richardson), and in a recent paper P. J. Schmidt<sup>3</sup> describes and figures the labial elements and throws further light upon their structure and function. Schmidt erred in his structural description of these bony rays in denying their connection or articulation with other bones of the head, stating that they were free elements of the lip and not connected with any facial bones. This author also refers to the porelike slits in the lip as pocketlike invaginations between the labial bones, which facilitate the stretching out of the membrane, and says they are not muciferous pores as was generally supposed.

Examination of the congrid material in the National Museum reveals the presence of these labial elements in various degrees of development throughout the entire group of congrids. The bones are present and can be detected with the aid of a pointed instrument in genera with a free superior margin to the upper lip (example *Ariosoma*), though the development is comparatively rudimentary in eels of this type. In *Uroconger lepturus* the bony rays reach their peak of development and are useful as distendable supports of the labial membrane. Partial dissection of a paratype of one of the new forms reveals a longitudinal bony muciferous canal extending from near the base of the anterior nostril, laterally just above the lip, to the posterior border of the orbital rim, where it bends upward following the curvature of the eye. The interior, superior, and inferior walls of the tube are bony. The exterior is open the entire length and covered only by the skin. There are three small processes along the inferior flange of the tube projecting into the labial membrane and appearing as minute subdermal points on the oral edge of the lip. Examination of *U. lepturus* reveals the same basic principle of development of the labial bones. In genera in which the upper lip is without a free superior margin (example *Congrina*) the labial bones reach the extreme margin of the lip and in some instances project prominently beyond the margin. The muciferous pores of the lip in this type of eel communicate with the facial muciferous canal by very short tubes, it being possible to insert a bristle in one slit and extract it from another. The writer, in one of his new forms, inserted a bristle in the anterior pore and passed it along the tube to a point opposite the posterior border of the eye, showing that these slitlike openings are vents of the muciferous channel and not pocketlike pits for facilitating expansion of the labial membrane, as contended by Schmidt.

<sup>2</sup> Atlas Ichth. Ind. Neerl., vol. 4, p. 29, pl. 149, fig. 1, 1864.

<sup>3</sup> C.R. Acad. Sci. U.R.S.S., 1929, pp. 189-193, figs. a-d.

Parr<sup>4</sup> has given a useful discussion of the congridrids related to *Ariosoma*, in which he synonymizes a large number of genera and shows that Jordan and Hubbs' revision of the Japanese genera<sup>5</sup> (the only recent revisional attempt of any great scope) cannot be accepted without modification. No one seems to have utilized the labial bones in defining genera, save in the case of *Uroconger* (Bleeker, Schmidt), although these structures seem to be important.

The writer has studied a number of species of congridrids from both the Atlantic and the Indo-Pacific and finds that most of them fall into apparently well-defined genera, based on the formation of the labial bones, the presence or absence of a free upturned upper lip, and the form of the vomerine patch of teeth. Of *Ariosoma* and related groups, the following have been studied: *A. selenops* Reid, *A. balaerica* (de la Roche),<sup>6</sup> *A. gilberti* (Ogilby), and several Japanese forms, which may (according to Jordan and Hubbs) be referable to distinct genera. Of *Promyllantor*, two species, *P. alcocki* Gilbert and Cramer and *P. perturbator* (Parr), have been examined. The type specimens of the type species of all the genera referred below to the synonymy of *Congrina* (save *Pseudoxenomystax dubius* Breder) have been studied, as well as examples of *Bathyuroconger braueri* (Weber and de Beaufort) and of *Uroconger lepturus* (Richardson). The writer cannot see that *Uranconger* Fowler and *Microcephalocongrus* Fowler differ from the species of *Congrina* in anything but relatively unimportant specific differences.

The key given is entirely provisional, since many more species and genera will have to be examined to determine their exact relationships, but it is felt that the groupings adopted are more natural than any hitherto proposed.

#### KEY TO GENERA OF CONGRIDAE DISCUSSED IN THIS PAPER

- 1a. Upper lip turned upward into a flange; bones of the facial canal not sending pointed processes into the upturned lip-flange.  
*Ariosoma* Swainson (and related genera).
- 1b. Upper lip without flange; bones of facial canal sending pointed processes to edge of lip.
  - 2a. Teeth of vomer not extending far back on the shaft in a single series; inner bony casing of facial canal sending 2 or 3 short processes downward to edge of the moderately extensible upper lip.

<sup>4</sup> Bull. Bingham Oceanogr. Coll., vol. 3, art. 5, pp. 19-31, 1932.

<sup>5</sup> Mem. Carnegie Mus., vol. 10, no. 2, pp. 191-197, 1925.

<sup>6</sup> American specimens; Norman (Ann. Mag. Nat. Hist., ser. 9, vol. 15, p. 314, 1925) gives data to show that the American *Ariosoma opisthophthalma* (Ranzani) differs from *A. balaerica*.

- 3a. Teeth very short, the patches almost pavementlike in appearance; vomerine patch of teeth widened posteriorly, covering much of roof of fore part of mouth, and confluent with the premaxillary patch; top of snout swollen.....*Promyllantor* Alcock.
- 3b. Teeth longer, the patches never with the appearance of being pavementlike, vomerine patch never widened but always narrowed posteriorly and distinctly separated from the premaxillary patch; top of snout little or not at all swollen.
- 4a. Snout considerably projecting, all of the premaxillary teeth visible from directly below with mouth tightly closed; dentition normal, the teeth not greatly enlarged; color not blackish.  
*Congrina* Jordan and Hubbs.
- 4b. Snout scarcely longer than lower jaw, nearly all the premaxillary teeth hidden when viewed from directly below with mouth closed; dentition very strong, teeth of premaxillary, front of vomer, and front of lower jaw greatly enlarged canines; blackish eels from deep water.....*Bathyrucogonger* Fowler.
- 2b. Teeth of vomer extending backward in a single series to below middle of eye; bony casing of facial canal sending 2 or 3 long slender processes far backward and downward to support the very extensible upper lip.  
*Uroconger* Kaup.

#### ARIOSOMA Swainson

#### ARIOSOMA SELENOPS, n. sp.

Text-fig. 1

*Holotype*.—U.S.N.M. no. 93310 (Field no. 653), 475 mm standard length; *Caroline* station 101, due north of Tobago Island, latitude  $18^{\circ}40'30''$  N., longitude  $64^{\circ}50'00''$  W., to latitude  $18^{\circ}45'40''$  N., longitude  $64^{\circ}48'00''$  W., March 4, 1933, otter trawl, 190 to 300 fathoms.

*Paratypes*.—U.S.N.M. nos. 93311-93312 (Field nos. 638-639), two specimens, 343 to 414 mm standard length; from *Caroline* station 100, due north of Tobago Island, latitude  $18^{\circ}38'45''$  N., longitude  $64^{\circ}52'45''$  W., to latitude  $18^{\circ}40'15''$  N., longitude  $64^{\circ}50'15''$  W., March 4, 1933, otter trawl, 100 to 300 fathoms.

Body elongate, scaleless, the caudal portion compressed posteriorly. Head 5.9 in total length; snout to vent 2.3; tail 1.6; tip of snout to dorsal origin 6.1; isthmus to vent 3.9. Snout 5 in head; maxillary 3.7; mandible 4; pectoral fin 2.8; longitudinal diameter of orbit (including adipose membrane) 5.2; vertical diameter 8, equal to inter-orbital; depth of head at end of second third 2.7; body at vent 3.2. Width of isthmus unusually narrow, 13.3 in length of head or about equal to base of pectoral. Width of head at end of second third 3.4; body at vent 4.6. Teeth small, sharp, conical, in bands on the jaws. Premaxillary and vomerine groups not separated by an interspace but forming a continuous patch anteriorly, extending back on

the shaft of the vomer in an oblong patch of more or less bluntish teeth to opposite the anterior edge of eye. Lateral teeth in four irregular rows becoming broader anteriorly, all of nearly uniform size and loosely attached, being depressible backward. A few teeth in the premaxillary group slightly enlarged and caninlike. Tongue free anteriorly and laterally, narrow and acutely pointed. Snout projecting slightly beyond tip of mandible so that the foremost teeth of the premaxillary group are visible when viewed from beneath. Anterior nostril in a short tube near tip of snout; posterior one in a small pore-like opening well before eye. Eyes large, about equaling snout, with

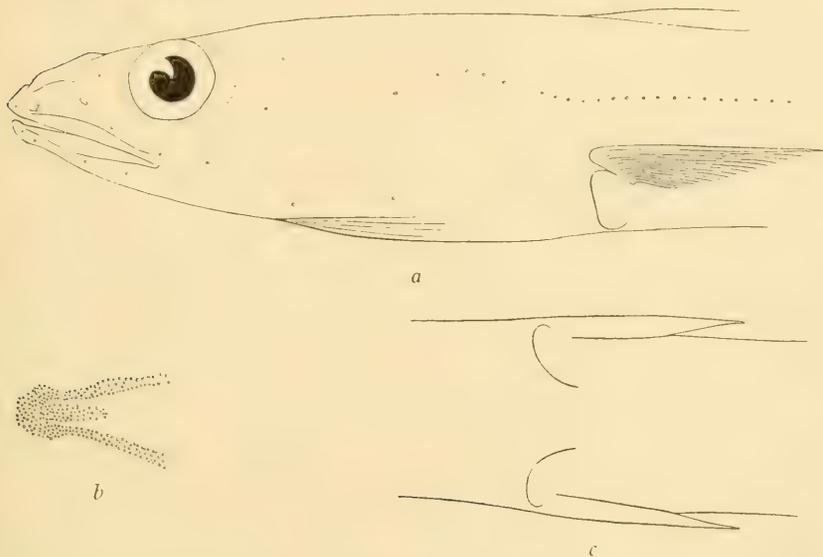


FIG. 1.—*Ariosoma selenops*. Holotype, U.S.N.M. 93310. *a*, Side view of head; *b*, upper dentition; *c*, isthmus. Natural size. Drawings by Mary Wallach.

conspicuous adipose membrane partly concealing the orbital rim. Gill-openings large, vertical, extending from upper third of pectoral base to ventral surface, where they are separated by a narrow isthmus about equal to pupil diameter. Gape moderate, about reaching opposite the anterior edge of pupil. Lips forming a thin flange with a free superior border, the basal portion behind the outer fold concealing small bony supports similar to those found in *Uroconger lepturus* Richardson. Though distinctly present, they are much smaller than those found in the above-mentioned species and are probably not functional as distensible supports of the lip. Pores of the head small, few in number and not especially noticeable, one at the base of the nostril tube pos-

teriorly, one above the upper lip at a point midway in the length of the gape, one below the eye, and two behind the orbit. There is a linear series of six small pores on the mandible below the lower lip, followed by two on the subbranchial region. The lateral line originates midway between the eye and gill-opening and continues to the hypural. There are 166 pores in its course, the last 6 or 7 without external openings. The eleventh above the pectoral base, twentieth above tip of pectoral, and fifty-seventh above the vent. Vertical fins of medium height confluent around the caudal. Color faded in alcohol to a light brownish, the ventral surface lighter. Dorsal fin with a black margin, anal with a black border posteriorly, pectoral pale. Surface of head and body sprinkled with fine dark points, most noticeable on the branchial region, about the eye, and at the corner of the mouth, where they form dark shades.

This species is very closely related to *Congromuraena mellissii* Günther,<sup>7</sup> agreeing perfectly with Günther's brief diagnosis of his St. Helena specimen. However, a second example recorded and figured from the type locality by Cunningham<sup>8</sup> shows that our fish disagrees with that species in having a longer snout, smaller mouth, lower fins, and a very different gill-opening. It differs from *Ariosoma balaerica* (Delaroché)<sup>9</sup> in the more anterior insertion of the dorsal fin, longer tail, and in the much narrower isthmus, which in our specimen is much narrower than in any other congrid eel the writer has seen.

Measurements of the three specimens in millimeters are given below. Under each measurement three figures are given, referring, in order, to the three specimens.

Total length 475, 414, 345; head 80, 74, 62; snout to vent 202, 177, 145; vent to end of tail 274, 236, 195; orbit length including adipose eyelid 15.5, 15, 12; snout 16, 15, 12; maxillary 21.5, 19, 18; mandible 20, 17.5, 16.5; pectoral fin 28, 23, 20; branchial opening 13, 11, 9; tip of snout to dorsal origin 78, 73, 62; isthmus to vent 120, 104, 85; depth of head at end of its second third 30, 27, 22; width of head at same point 23.7, 22, 18; depth of body at vent 25, 22, 18; width of body at vent 17.5, 16, 13; width of isthmus 6.5, 5, 4.7; width of interorbital 10, 9, 7.3; eye, vertical diameter 10, 9, 8.5; height dorsal fin 7, 6, 4; longest ray of dorsal fin 11, 10, 8; height anal fin 5, 4, 4; pores in lateral line 160+6, 160+8, 160+7.

<sup>7</sup> Cat. Fish. British Mus., vol. 8, p. 42, 1870.

<sup>8</sup> Proc. Zool. Soc. London, 1910, p. 93, pl. 4, fig. 1.

<sup>9</sup> See Norman (Ann. Mag. Nat. Hist., ser. 9, vol. 15, p. 314, 1925), for probable differences between *balaerica* and the American *opisthophthalma*.

## CONGRINA Jordan and Hubbs

- Congrina* Jordan and Hubbs, Mem. Carnegie Mus., vol. 10, no. 2, p. 196, 1925 (genotype *Congermuraena aequorea* Gilbert and Cramer).  
*Hildebrandia* Jordan and Evermann, Proc. California Acad. Sci., ser. 4, vol. 16, no. 15, p. 502, 1927 (genotype *Congermuraena flava* Goode and Bean).  
*Pseudoxenomystax* Breder, Bull. Bingham Oceanogr. Coll., vol. 1, no. 1, p. 6, 1927 (genotype *P. dubius* Breder).  
*Microcephalocongrus* Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 85, p. 270, 1934 (genotype *Bathycongrus megalops* Fowler).  
*Uranoconger* Fowler, tom. cit., p. 274, 1934 (genotype *U. odontostomus* Fowler).

The following species are referred to *Congrina*: *C. aequorea* (Gilbert and Cramer), *C. retrotincta* (Jordan and Snyder) *C. stimpsoni* (Fowler), *C. megalops* (Fowler), *C. odontostomus* (Fowler), *C. flava* (Goode and Bean), *C. roosendaali* (Weber and De Beaufort), *C. nitens* (Jordan and Bollman), and *C. dubia* (Breder). The figure and description of *Pseudoxenomystax* are so similar to my new species (especially in view of Parr's remarks) that I believe it belongs here. The new species differs from all these in various proportional measurements. It is especially close to *C. retrotincta* but differs in the shorter preoral length of the snout and in having a distinct black margin the full length of the vertical fins. From *C. dubia* it is distinguished by the longer trunk, more attenuated tail, and by the shape of the vomerine patch of teeth.

## CONGRINA THYSANOCHILA, n. sp.

Text-fig. 2

*Holotype*.—U.S.N.M. no. 93434 (Field no. 137); 250 mm standard length; from *Caroline* station 23, off Punta Cerro Gordo, north coast of Puerto Rico, latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}17'45''$  W., to latitude  $18^{\circ}32'00''$  N., longitude  $66^{\circ}21'15''$  W., February 4, 1933, otter trawl, 260 to 360 fathoms.

*Paratype*.—U.S.N.M. no. 93466 (Field no. 640); 225 mm standard length; from *Caroline* station 100, due north of Tobago Island, latitude  $18^{\circ}38'45''$  N., longitude  $64^{\circ}52'45''$  W., to latitude  $18^{\circ}40'15''$  N., longitude  $64^{\circ}50'15''$  W., March 4, 1933, otter trawl, 100 to 300 fathoms.

Body elongate, compressed posteriorly, with the caudal region attenuated, though the fin distinct. Head 6.4 in the standard length; tip of snout to dorsal origin 5.6; to vent 2.7; isthmus to vent 4.3. Eye 5 in head; snout 4; maxillary 2.6; mandible 3.2; pectoral fin 3.6; depth of head at end of second third 2.6; width at same point 3.1. Gill-openings extending downward and forward, about equal to interorbital or

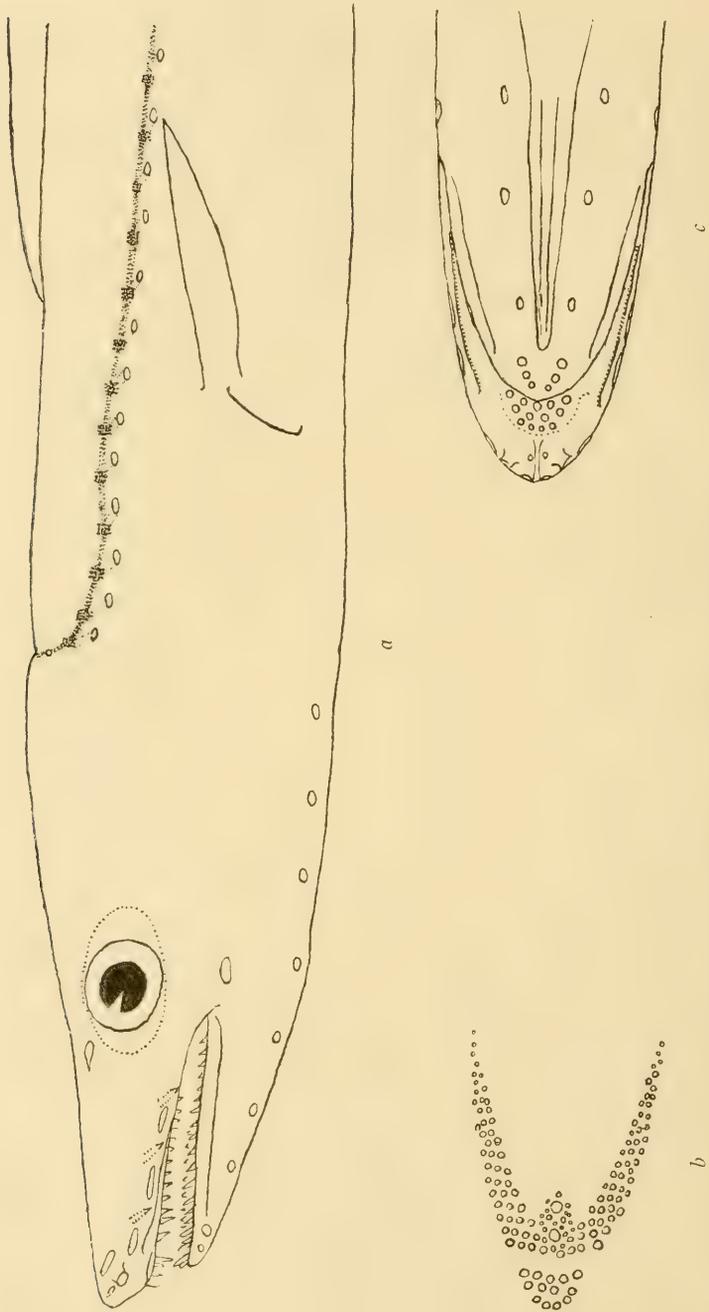


FIG. 2.—*Congrina thysanochila*. Holotype, U.S.N.M. 93434. *a*, Side view of head; *b*, upper dentition; *c*, under view of head.  $\times 3$ . Drawings by the author.

half longitudinal diameter of orbit. Depth of body at vent equal to length of lower jaw, width at same point equal to length of snout. Isthmus much broader than depth of branchial opening, nearly equal to longitudinal diameter of the eye. Gape moderate, reaching opposite posterior edge of pupil. Upper jaw longer than lower, the preoral length about equal to pupil diameter. Anterior nostril in a short tube close to rostral pit. Posterior nostril in a longitudinal slit at upper front edge of eye with flanged edges folding over the opening anteriorly. There are five large slitlike pores or pits on the side of the snout, two between the anterior nostrils, an oblong one just above the base of and one just behind the nostril, and two in the upper lip. There are three pairs of pores just below the tip of the mandible, the posterior pair largest, followed by a linear series of seven along the lower jaw and throat. There is a large pore behind the corner of the mouth below the posterior edge of the pupil. Eyes covered by a pronounced adipose membrane concealing the orbital rim. Lip extending forward to opposite the hindmost premaxillary teeth, where it is joined by an inner lip provided with a finely fringed edge and extending longitudinally between the outer lip and the maxillary band of teeth. The upper lip is provided with small bony stays similar to those found in *Uroconger lepturus* (Richardson). Teeth small, sharp, conical, in bands on the maxillary and mandible, in five irregular rows, the width anteriorly tapering to one or two series near the posterior end. Premaxillary teeth in an oval patch, a few of which are small canines, even the hindmost visible from directly beneath when the mouth is closed. There are about 15 teeth in the premaxillary group. There are 14 teeth in a more or less diamond-shaped patch on the vomer, 2 on the median line in the center of the group enlarged and caninelike. The actual shape of the vomerine patch is obscured by confluence with the maxillary bands. All of the larger teeth in the mouth are depressible posteriorly. The maxillary band of teeth does not extend around the head of the vomer but ceases laterally, leaving a naked area between the premaxillary and vomerine groups, against which the tip of the mandible closes. The lateral line originates in a white pore on the median line at the occiput and descends to the side of the nape, bending backward at a sharp angle, and rises slightly over the branchial region and gradually descends to the side. It is situated in a groove marked out by rectangular dark spots. A subline of white pores follow the course of the dark spots in an alternating manner, and each pore appears to be connected with a dark area by a tube running obliquely upward and forward. The two lines are well separated anteriorly, gradually fusing to a single line on the posterior part of the body. There are 31 pores in its course

to a point opposite the vent. Dorsal origin above the third seventh of the pectoral length, opposite the eighth pore in the lateral line. Color light brownish-gray above, lighter below, the color well contrasted on the side of the head. Vertical fins with a conspicuous narrow black margin becoming more pronounced posteriorly but not involving the median caudal rays. Pectorals slightly shaded distally.

The collection contains two examples of this eel, the larger a female with well-developed ova.

### Family PLEURONECTIDAE

#### POECILOPSETTA Günther

#### POECILOPSETTA ALBOMARGINATA, n. sp.

#### Plate 1

*Holotype*.—U.S.N.M. no. 93303 (Field no. 626); 98 mm standard length; from *Caroline* station 100, due north of Tobago Island, latitude  $18^{\circ}38'45''$  N., longitude  $64^{\circ}52'45''$  W., to latitude  $18^{\circ}40'15''$  N., longitude  $64^{\circ}50'15''$  W., March 4, 1933, otter trawl, 100 to 300 fathoms.

*Paratypes*.—U.S.N.M. no. 93304 (Field nos. 624, 625, and 627); three specimens, 105 to 116 mm standard length; same data as holotype.

Head 4.5, depth 2.4 in standard length. Upper eye 2.4 in head, its upper anterior rim impinging upon the dorsal profile, forming a deep notch before eye. Snout 3.1 in head. Dorsal 59 to 64. Anal 51 to 53. Both fins of equal height, 1.7 in head. Right pectoral with 9 rays, its length 2 in head, that of left side slightly longer. Ventrals symmetrical, their tips about reaching third anal ray. Caudal rounded-acuminate, the middle rays greater than length of head, 4.2 in standard length. Depth of caudal peduncle nearly twice its length, 1.5 in head. Scales 19-64-26, rather deciduous, ctenoid on eyed (right) side, cycloid on blind side. Eight rows on cheek. No scales on snout, interorbital, or maxillary. Lateral line forming a high curve anteriorly, which is somewhat flattened on the top, and from there descending almost perpendicularly to the midsides, where it meets the straight part at a right angle. There are 71 to 74 pores in its course to base of caudal. Eyes closely approximated, the upper slightly the larger, the lower usually slightly in advance of the upper. Maxillary little curved, 3.7 in head. Mouth small, oblique. Lower jaw projecting, the mandible with a small knob. Teeth irregularly uniserial on the jaws, slightly larger and more numerous on the blind side. No teeth on vomer or palatines. Gill rakers 10 short points, about 4 in pupil. Interorbital very narrow, naked, cov-

ered with loose skin. Origin of dorsal on left side above pupil, tips of the anterior rays free for over half their length but not elevated. Color pale yellowish-gray; membranous edge of scale pockets dark. Dorsal, anal, and right ventral blackish, with a narrow pale base and a fine milk-white border. Caudal pale grayish with a fine white border, the middle rays darker distally. A black spot with indefinite boundaries large as eye, on upper and lower outer rays of caudal at about the middle of its length. Pectoral blackish. Viscera showing through on right side as a dark blotch. Left (blind) side without markings of any kind.

Norman<sup>10</sup> has revised the species of *Poecilopsetta*. Only two species have been known from the New World, *P. beanii* (Goode) and *P. inermis* (Breder). *P. albomarginata*, which has been compared directly with the type and other material of *P. beanii*, differs from this species in the deeper body, the larger scales, the coloration, and other respects. It appears to differ strikingly from *P. inermis*<sup>11</sup> in the milk-white fin edging, the absence of any trace of color pattern on the blind side, and especially in the strongly ctenoid scales of the eyed side.

<sup>10</sup> Treubia, vol. 13, livr. 3-4, pp. 423-426, 1931.

<sup>11</sup> Breder, C. M., Bull. Bingham Oceanogr. Coll., vol. 1, art. 1, p. 87, fig. 36, 1925.





**POEILOPSETTA ALBOMARGINATA**  
Holotype, U.S.N.M. 93303. Natural size.







SMITHSONIAN MISCELLANEOUS COLLECTIONS  
VOLUME 91, NUMBER 16

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# NEW MARINE MOLLUSKS

(WITH THREE PLATES)

BY

LOIS F. GOREA

Student Assistant, The George Washington University



(PUBLICATION 3258)

CITY OF WASHINGTON  
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### NEW MARINE MOLLUSKS

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(WITH THREE PLATES)

Among other Turritid mollusks obtained by the First Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep is a small well-defined group consisting of six species, only one of which has been previously described, namely, *Drillia interpleura* Dall and Simpson.<sup>1</sup> This group appears to be unnamed and is here given the name *Buchema*, a new subgenus of *Carinodrillia* Dall. The five new species, the names of which have been derived from Puerto Rican mythology, are here described and figured.

I wish here to express my appreciation to the authorities of the United States National Museum for having extended to me the use of laboratory facilities and collections in making this study and the necessary comparative work. I am especially indebted to Dr. Paul Bartsch, Curator of the Division of Mollusks and Cenozoic Invertebrates, United States National Museum, for many helpful suggestions, and to Mrs. Aime Awl, United States National Museum, for retouching the photographs.

#### BUHEMA, n. subgen.

The present paper deals with a group of moderate-sized, rather heavy shelled mollusks which resemble the members of the genus *Carinodrillia* Dall,<sup>2</sup> of which *Carinodrillia halis*, Dall, is the type. They differ from *Carinodrillia* in having the nuclear whorls without a median carina. Here they are rounded, the early whorls smooth, succeeded by a finely axially, closely lirate portion that passes into an axially slender ribbed part, which in turn passes into the postnuclear sculpture. The sculpture of the postnuclear whorls consists of strong

<sup>1</sup>Dall, William Healey, and Simpson, Charles Torrey. The mollusca of Porto Rico. Bull. U.S. Fish Commission, vol. 20, for 1900, 1st pt., p. 386, pl. 57, fig. 21, 1902.

<sup>2</sup>Proc. U.S. Nat. Mus., vol. 56, p. 17, 1919.

axial ribs which weaken on the posterior sinus. The axial ribs and intercostal spaces are crossed by rather heavy spiral cords, finer spiral lirations between the heavier cords, and hairlike incremental lines. The combination of these last two elements produces a fine clothlike pattern, while their junction sometimes almost appears granulose. The columella is stout, and there is a weak umbilical chink at its anterior termination. The aperture is rather short, deeply channeled anteriorly and posteriorly, the posterior sinus falling a little anterior to the summit. The outer lip is protracted into a clawlike element between the anterior limit of the posterior sinus and the stromboid notch.

*Type*.—*Buchema tainoa*.

**CARINODRILLIA (BUHEMA) TAINOA, n. sp.**

Plate 1, figs. 5, 6; plate 2, fig. 7; plate 3, fig. 1

Shell rather large, elongate-conic. Nucleus amber-colored, remainder of shell of various shades of brown, the intercostal spaces darker than the ribs. Summit of the whorls marked by brown spots separated by lighter-colored intervals. Nuclear whorls 2.2, the first 1.9 well rounded, smooth, the last .3 marked by fine axial lirations, slightly retractively curved at the summit, which become narrow axial riblets before passing into the postnuclear sculpture. Postnuclear whorls rounded, marked by very heavy humplike axial ribs which terminate at the anterior margin of the posterior sinus. Of these ribs, which are about as broad as the spaces that separate them, 9 occur upon the first and second, 10 upon the third and fourth, and 11 on the fifth and last whorls. In addition, the entire surface of the shell is marked by fine incremental lines. The spiral sculpture consists of strong cords, which are equal in strength and pass over the axial ribs. The spaces between them are almost as wide as the cords. Of the cords, three are present on the first to fourth whorls, and four on the fifth and sixth. There is a moderately strong cord at the appressed summit on all the whorls. In addition to the strong sculpture, there is a secondary and much weaker spiral sculpture consisting of fine lirations which are present on the posterior sinal region and between the strong cords over the axial ribs. Of these, three are present on the first whorl between the cord at the summit and the cords anterior to the sinus. On the second whorl four occur between the cord at the summit and the first strong cord. The third whorl is marked by seven lirations in the posterior sinal region, and two between the first and second, second and third, and third cord and the suture. On the fourth whorl there are 14 between the cord at the summit and the first strong

cord, 3 between the first and second cords, and 2 between the second and third and third cord and the suture. Two lirations are present on the fifth whorl between the cord anterior to the summit and the summit, 15 between the moderately strong cord and the first strong cord anterior to the sinus, 4 between the first and second and second and third, and 3 between the third and fourth and the fourth cord and the suture. The sixth whorl is marked by 3 lirations between the summit and the moderately strong cord anterior to it, 20 between the latter cord and the first strong cord, 4 between the first and second, and 5 between the second and third and third and fourth. Periphery of the last whorl well rounded. Base well rounded, marked by the continuation of the axial ribs which seem to bifurcate, and three spiral cords which are a little weaker than those on the spire. The junctions of these cords with the axial ribs form small tubercles which are most pronounced on the second cord. There are four lirations in the space between the first basal cord and the cord posterior to it, and three between the first and second and second and third cords. Columella stout, moderately short, with an umbilical chink at its tip. It is marked by eight spiral cords equal to those on the base and separated by spaces equal to the cords. There are three spiral lirations between the first and second and second and third cords. Aperture moderately large, deeply channeled anteriorly and posteriorly, the posterior sinus falling a little anterior to the summit. The outer lip is protracted into a clawlike element between the anterior limit of the posterior sinus and the stromboid notch. There is a heavy varix a sixth of a turn behind the outer lip. The inner lip is reflected over the columella as a heavy callus which extends over the parietal wall and forms a knob at its junction with the outer lip.

*Type*.—U.S.N.M. no. 429215, collected at station 104 in 80 to 120 fathoms between latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. and latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W. It has 8.7 whorls and measures: Length, 14.2 mm; greater diameter, 5.9 mm.

U.S.N.M. no. 429217 contains nine specimens from the type locality.

**CARINODRILLIA (BUHEMA) SUIMACA, n. sp.**

Plate 1, figs. 3, 4; plate 2, fig. 1; plate 3, fig. 3

Shell of medium size, elongate-conic, light brown. Nuclear whorls 2.1, the early portion well rounded, smooth, followed by a short portion marked by axial lirations which in turn passes into the last .5 marked by equally spaced, slender, almost vertical axial riblets which are slightly retractively curved at the summit. Postnuclear whorls

rounded, marked by heavy humplike axial ribs which attain their greatest development on the anterior two-thirds of the whorls. Of these ribs, which are about twice as wide as the spaces that separate them, 8 occur upon the first and second, 9 upon the third, 10 upon the fourth, 12 upon the fifth, and 9 upon the last whorl. In addition, the entire surface of the shell is marked by fine incremental lines. The spiral sculpture consists of heavy spiral cords, which cross the axial ribs. Of these cords, two occur upon the first three postnuclear whorls which are separated by spaces equal to them in width, while three are present on the fourth. Of these, the first is a little less strong than the other two. On the fifth whorl four of the strong cords are present, of which the third is a little less strong than the other three, which are about equal. The last whorl has five of these strong cords, of which the third and fifth are not quite as strong as the others. In addition to these, there are two moderately strong cords at the appressed summit of all the whorls but the first, which has one. In addition to the heavy spiral sculpture there is a secondary and much weaker sculpture which consists of fine spiral lirations. Of these there are three present on the first postnuclear whorl between the cord at the summit and the two strong cords anterior to the sinus. On the second whorl between the two moderate cords at the summit and the two strong cords anterior to the sinus, the sinal region is marked by six lirations, while three are present between the two strong cords. On the third whorl 11 lirations occur between the cords at the summit and the first strong cord anterior to the sinus, and 5 between the two strong cords. Between the two moderate cords at the summit of the fourth whorl one spiral liration is present, while nine occur between the moderate cords and the first strong cord, three between the first and second strong cords, and eight between the second and third. The fifth whorl is marked by 2 spiral lirations between the two cords at the summit, 14 lirations from the second cord at the summit and the first strong cord, 6 between the first and second strong cords, 2 between the second and third, and 5 between the third and fourth. There are nine lirations between the fourth cord and the suture. The last whorl, like the fifth, has two spiral lirations between the cords at the summit. The sinal region is marked by 16 spiral lirations while the spaces between the 5 strong cords anterior to the sinus are marked by 5 lirations between the first and second, 2 between the second and third, 5 between the third and fourth, and 2 between the fourth and fifth. The combination of the fine spiral lirations and the incremental lines produces a clothlike pattern, and the junction of these two fine elements gives to the shell a finely granulose aspect.

The periphery of the last whorl is marked by a spiral cord which is equal in strength to the five posterior to it. Base stout, moderately long, marked by the continuation of the axial ribs, and three spiral cords. There are eight spiral lirations between the periphery and the first basal cord, five between the first and second cords, and six between the second and third. Columella stout, moderately long, marked by seven spiral cords which are of the same strength as those on the base. Between the last basal and first columellar cord there are 10 spiral lirations. Nine spiral lirations are present between the first and second columellar cords, nine between the second and third, five between the third and fourth, four between the fourth and fifth, three between the fifth and sixth, and two between the sixth and seventh. Aperture moderately long, deeply channeled anteriorly and posteriorly, the posterior sinus falling a little anterior to the summit. The outer lip is protracted between the anterior channel and the posterior sinus into a clawlike element. There is a heavy varix a little beyond the edge of the outer lip. The inner lip is reflected over the columella as a heavy callus which extends over the parietal wall and forms a knob at its junction with the outer lip which projects into the posterior sinus.

*Type*.—U.S.N.M. no. 430160, collected at station 16 in 38 fathoms between latitude  $18^{\circ}29'40''$  N., longitude  $55^{\circ}08'30''$  W. and latitude  $18^{\circ}31'00''$  N., longitude  $66^{\circ}10'15''$  W. It has 6.5 whorls and measures: Length, 12.3 mm; greater diameter, 4.5 mm.

U.S.N.M. no. 430851 is a single specimen from the type locality.

**CARINODRILLIA (BUCHEMA) MAMONA, n. sp.**

Plate 2, figs. 2, 3, 5; plate 3, fig. 4

Shell of medium size, elongate-conic, yellowish horn-colored. Nuclear whorls 2.8, the first 2.6 well rounded, smooth, the last .2 marked by three slender equally spaced axial riblets which are slightly retractively curved at the summit. Postnuclear whorls rounded, marked by heavy, humplike axial ribs which evanesce in the posterior sinial region, attaining their greatest development on the anterior two-thirds of the whorls. Of these ribs, which are separated by spaces about equal to them, nine occur upon the first and second, and eight upon the remaining whorls. In addition, the shell is marked by fine incremental lines. The spiral sculpture consists of strong spiral cords which pass over the heavy axial ribs. Of these cords, two occur upon the first and second, two upon the third with the appearance of a third cord posterior to the others, and three upon the remaining whorls.

These cords are equal in strength and are separated by spaces almost twice as wide as the cords. There is a moderately strong cord a little anterior to the appressed summit on all the whorls. The finer spiral sculpture consists of lirations which occur in the spaces between the stronger cords. Three of these are present in the space between the cord anterior to the summit and the summit. The posterior sinial region is marked by 4 lirations upon the first whorl, 6 upon the second, 8 upon the third, 14 upon the fourth, 20 upon the fifth, and 22 upon the last. Between the cords which pass over the axial ribs, four lirations are present on the second whorl, while on the third whorl two are present between the first and second cords, and four between the second and third. On the fourth whorl four occur between the first and second cords, and nine between the second and third. The fifth whorl has four lirations between the first and second cords, nine between the second and third, and five between the third and the suture. The junction of the spiral lirations and the incremental lines gives to the shell a granulose aspect. Periphery of the last whorl rounded. Base rounded, moderately short, marked by the continuation of the axial ribs and three spiral cords which are not quite as strong as those on the spire. The space between the first cord posterior to the suture and the first basal cord is marked by 10 spiral lirations. The space between the first and second cords is marked by seven lirations and between the second and third by eight. Columella stout, moderately short, marked by eight spiral cords equal in strength to those on the base. Between the last basal and first columellar cord nine lirations are present. Seven occur between the first and second columellar cords, five between the second and third and third and fourth, and three between the fourth and fifth. Aperture moderately long, deeply channeled anteriorly and posteriorly, the posterior sinus being a little anterior to the summit. The outer lip is protracted into a clawlike element between the anterior limit of the posterior sinus and the stromboid notch. There is a heavy varix a quarter of a turn behind the outer lip. The inner lip is reflected over the columella as a heavy callus which extends over the parietal wall and forms a shelf over the posterior sinus at its junction with the outer lip.

*Type*.—U.S.N.M. no. 430993, collected at station 26 in 30 to 40 fathoms between latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. and latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W. It has 8.3 whorls and measures: Length, 10.4 mm; greater diameter, 4.3 mm.

**CARINODRILLIA (BUCHEMA) APITOA, n. sp.**

Plate 1, figs. 1, 2; plate 2, fig. 6; plate 3, fig. 2

Shell of medium size, elongate-conic, yellow. Nuclear whorls 2.3, the first 2 well rounded, smooth, the last .3 marked by fine axial lirations which pass into slender, evenly spaced axial riblets, slightly retractively curved at the summit, which in turn pass into the adult sculpture. Postnuclear whorls rounded, marked by heavy humplike axial ribs which evanesce in the posterior sinial region attaining their greatest development on the anterior two-thirds of the whorl. Of these ribs, which are about as wide as the spaces that separate them, eight occur upon the first and second, nine upon the third and fourth, and eight upon the last. In addition, the entire surface of the shell is marked by fine incremental lines. The spiral sculpture on the first postnuclear whorl may be worn, at least it is not apparent. Beginning with the second and continuing over all the whorls there is a moderately strong cord a little anterior to the summit. From the third whorl on, two spiral cords pass over the axial ribs between which two much slenderer cords are present on the fourth and last whorls. In addition, there are fine spiral lirations on the posterior sinial region and between the cords anterior to the sinus. About 15 may be counted on the last turn between the humps marking the posterior limit of the ribs and the moderately strong cord at the summit. Periphery of the last whorl well rounded. Base short, moderately round, marked by three spiral cords which are a little weaker than those on the spire, the space between the first of which and the cord posterior to it is marked by four spiral lirations. Between the first and second basal cords there are five lirations, and four between the second and third. Columella stout, marked by six strong spiral cords which are about a third as wide as the spaces that separate them. The spaces between these cords are also marked by feeble spiral lirations. Aperture pear-shaped, strongly channeled anteriorly and posteriorly, the outer lip protracted into a clawlike element between the anterior limit of the posterior sinus and the stromboid notch, and provided with a heavy varix a slight distance behind its edge. The inner lip is reflected over the columella as a heavy callus which extends over the parietal wall and forms a knob at its junction with the outer lip.

*Type*.—U.S.N.M. no. 430037, collected at station 104 in 80 to 120 fathoms between latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. and latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W. It has 7.8 whorls and measures: Length, 9.9 mm; greater diameter, 4.8 mm.

U.S.N.M. no. 429625 is an additional specimen collected at station 55 in 17 fathoms.

**CARINODRILLIA (BUHEMA) LIELLA, n. sp.**

Plate 2, fig. 4, 8, 9; plate 3, fig. 5

Shell of moderate size, elongate-conic, yellowish white. Nuclear whorls 2.3, the first 2 well rounded, smooth, the last .3 marked by slender equally spaced axial riblets which are slightly retractively slanting at the summit. Postnuclear whorls rounded, marked by heavy, humplike axial ribs which evanesce in the posterior sinal region and attain their greatest development on the anterior two-thirds of the whorls. Of these ribs, which are as broad as the spaces that separate them, eight occur upon the first, nine upon the second to fourth, eight upon the fifth, and nine upon the remaining. In addition the shell is marked by fine incremental lines which are retractively slanting in the posterior sinal region. The spiral sculpture on the first postnuclear whorl is too worn to describe, but from the second to the last whorl the heavy axial ribs are crossed by three strong spiral cords. These are equal in strength and are separated by spaces almost twice as wide as the cords. There is a strong cord a little anterior to the appressed summit of the whorls which is equal in strength to those on the ribs. In addition to the strong spiral sculpture the posterior sinal region and the spaces between the cords anterior to the sinus are marked by fine spiral lirations. Of these, three are present on the sixth whorl between the first and second cords, and two between the second and third. On the seventh whorl there are four lirations between the three cords anterior to the sinus and between the third cord and the suture. Six are present on the eighth whorl between the three cords and between the third cord and the suture. The combination of the incremental lines and the spiral lirations produces a fine clothlike pattern. Periphery of the last whorl rounded. Base well rounded, short, marked by the continuation of the axial ribs, and three spiral cords which are equal in strength to those on the spire. The space between the first cord posterior to the suture and the first basal cord is marked by four spiral lirations. There are five lirations between the first and second cords, and four between the second and third. Columella stout, moderately short, with an umbilical chink at its tip. It is marked by the feeble continuation of the axial ribs, and seven spiral cords equal to those on the base. The spaces between these cords are likewise crossed by feeble spiral lirations. Aperture moderately short, deeply channeled anteriorly and posteriorly, the posterior sinus falling a little anterior to the summit. The outer lip is protracted into a clawlike element between the anterior limit of the posterior sinus and the stromboid

notch. The inner lip is reflected over the columella as a heavy callus which extends over the parietal wall and forms a small knob at its junction with the outer lip.

*Type*.—U.S.N.M. no. 429337, collected at station 56 in 17 fathoms in Samaná Bay, between latitude  $19^{\circ}10'15''$  N., longitude  $69^{\circ}27'20''$  W. and latitude  $19^{\circ}10'15''$  N., longitude  $69^{\circ}28'05''$  W. It has 10.8 whorls and measures: Length, 15 mm; greater diameter, 5.5 mm.

U.S.N.M. no. 430160a is a specimen from station 16 dredged in 38-95 fathoms.





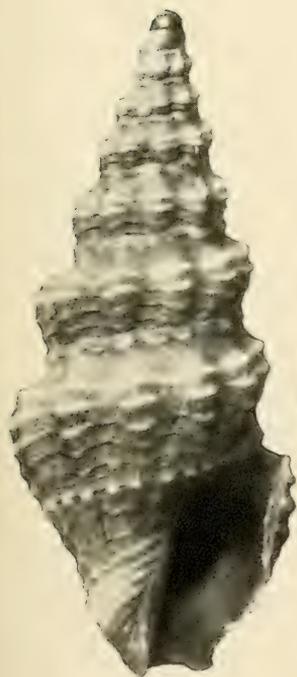
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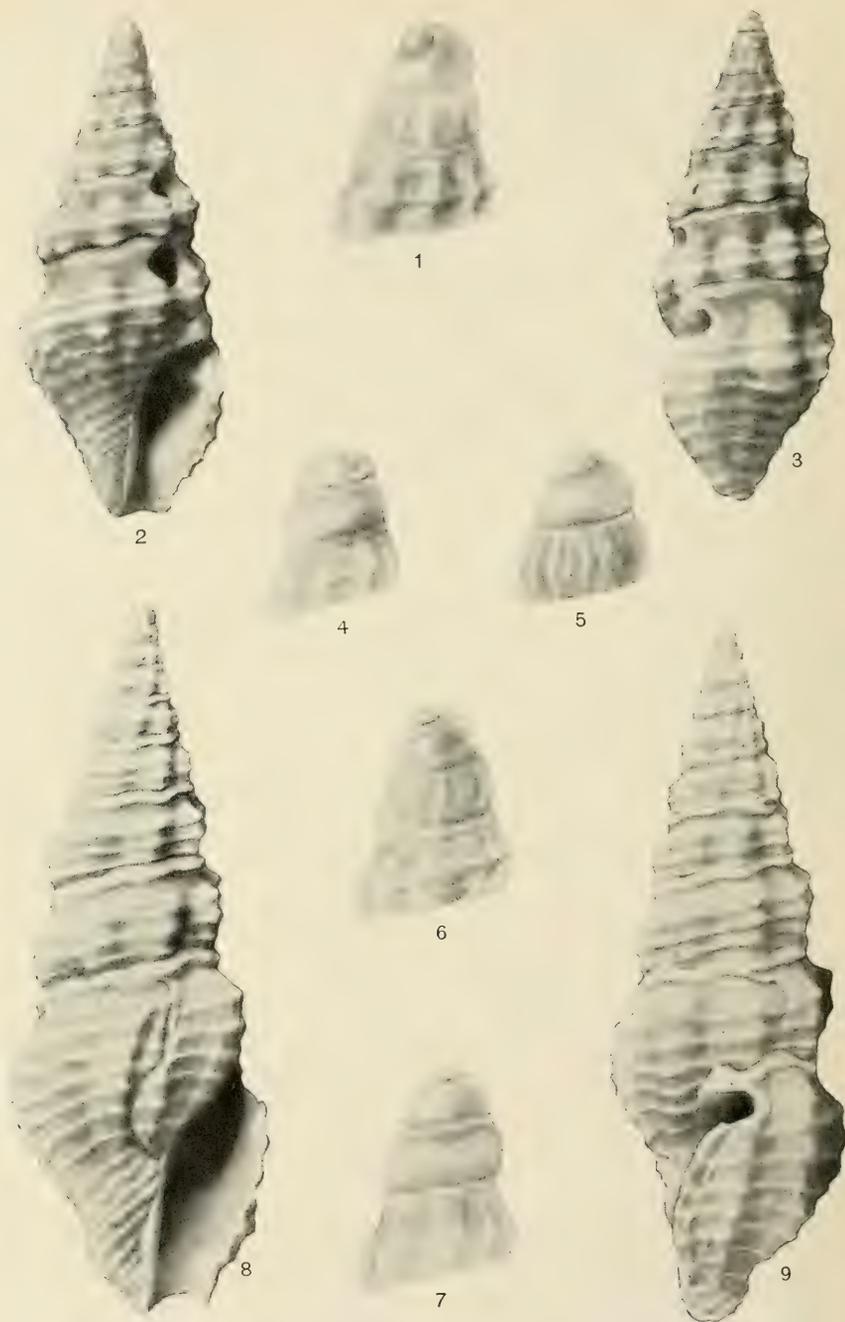
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6

## NEW MARINE MOLLUSKS

- |  |  |
|--|--|
| 1. <i>Carinodrillia (Buchema) apitoa.</i>  | 4. <i>Carinodrillia (Buchema) suimaca.</i> |
| 2. <i>Carinodrillia (Buchema) apitoa.</i>  | 5. <i>Carinodrillia (Buchema) tainoa.</i>  |
| 3. <i>Carinodrillia (Buchema) suimaca.</i> | 6. <i>Carinodrillia (Buchema) tainoa.</i>  |



## NEW MARINE MOLLUSKS

- |   |  |
|---|--|
| 1. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>suimaca</i> . | 6. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>apitoa</i> . |
| 2. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>mamona</i> .  | 7. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>tainoa</i> . |
| 3. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>mamona</i> .  | 8. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>liclla</i> . |
| 4. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>liclla</i> .  | 9. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>liclla</i> . |
| 5. <i>Carinodrillia</i> ( <i>Buchema</i> ) <i>mamona</i> .  |  |



5



4



3



2



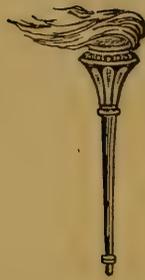
1

**NEW MARINE MOLLUSKS**

1. *Carinodrillia* (*Buchema*) *tainoua*.
2. *Carinodrillia* (*Buchema*) *epitoua*.
3. *Carinodrillia* (*Buchema*) *surimaca*.
4. *Carinodrillia* (*Buchema*) *mamoua*.
5. *Carinodrillia* (*Buchema*) *hella*.







SMITHSONIAN MISCELLANEOUS COLLECTIONS  
VOLUME 91, NUMBER 17

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# NEW SPONGES FROM THE PUERTO RICAN DEEP

BY  
M. W. de LAUBENFELS  
Pasadena, California



(PUBLICATION 3283)

CITY OF WASHINGTON  
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### NEW SPONGES FROM THE PUERTO RICAN DEEP

By M. W. DE LAUBENFELS

*Pasadena, California*

In the comprehensive and extensive collection of sponges made by the First Johnson-Smithsonian Deep-Sea Expedition, there are an exceptionally large number of new species—in fact, nearly one-fourth of the total number. Many of these may actually have been collected and described before, but unrecognizably, because in the descriptions made more than 50 years ago very little attention was paid to those microscopic characters that today are considered of primary importance.

In the entire collection, upon which a final report is in progress, there are only a few species belonging to the Calcarea (or Calci-spongiae), and somewhat more of the Hexactinellida (or Hyalospongiae), but apparently no new species of either of these two orders. All the new species are representatives of the Demospongiae. Twenty-seven new species are described. These belong to 17 families, of which 4 are new, and 26 genera, of which 11 are new.

#### HALINIDAE, n. fam.

This family is established to replace Pachastrellidae Hentschel, because *Halina* Bowerbank (1858, p. 288) (not the nomen nudem *Halina* of Grant, 1830, p. 844), which receives *Dercitus* Gray (1867, p. 542) in synonymy, not only is an older genus than *Pachastrella* Schmidt (1868, p. 15) but is also more thoroughly typical of the group here represented.

#### PACHASTRELLA Schmidt

##### PACHASTRELLA DILIFERA, n. sp.

*Holotype*.—U.S.N.M. no. 22331; from station 43, latitude 18°02'00" N., longitude 67°51'15" W. to latitude 18°03'45" N., longitude 67°48'10" W., February 11, 1933, 240 to 300 fathoms.

The specimen is lamellate, triangular, about 7 mm thick, 10 by 15 cm in extent. The color, preserved dry, is very pale; the consistency is

friable. The surface is even, with no detachable ectosome, but at the surface tangent spicules (or clads of spicules) make a tangent network. The numerous conspicuous oscules average about 1 mm in diameter and occur about 7 to the square centimeter. The internal structure is rather confused, with large spicules optically evident. The megascleres comprise calthrops, with rays each about  $50\ \mu$  by  $625\ \mu$ , and oxeas  $60\ \mu$  by  $3,500\ \mu$ . The microscleres consist of streptasters or spirasters with scarcely any spiral to the main shaft whatever, and with a great many long spines, so that the total mass has a diameter of  $10\ \mu$  as compared to a length of only  $15\ \mu$ . The spirasters bear resemblance to caterpillars. There are also metastasters, with only 6 to 12 rays each, the outside dimensions of the entire spicule being about  $40\ \mu$  to  $50\ \mu$ . Microrhabds  $3\ \mu$  by  $155\ \mu$  are rather common. Furthermore, occasional reduction-derivatives of the metastasters are present, having only 2 or 3 rays.

Interesting comparisons may be drawn between this species and *Pachastrella monilifera* Schmidt (1868, p. 15), a cosmopolitan species that has been recorded from the West Indies. It is conceivable that the present specimen represents an uncommon malformation of *monilifera*, though there are sufficient points of difference to render such a hypothesis improbable. *P. monilifera* does not have the long raphides, but instead centrotylote microrhabds only  $10\ \mu$  to  $20\ \mu$  long. Instead of the large metastasters and the peculiar caterpillarlike spirasters, it has rather commonplace small spirasters about  $14\ \mu$  long. *P. cribrum* Lebewohl (1914, p. 78), from Japan, may possibly be related here. Its larger metastasters are smaller than those of *dilifera*, the smaller spirasters much shorter and with fewer spines, and the microrhabds twice as thick without being longer.

#### Family CORTICIDAE Vosmaer

##### ROOSA, n. gen.

This genus is proposed for the one new species described below, having as spicules diacts with peculiar medial distortions. The occurrence of a few rare triacts and angular diacts confirms the hypothesis that the spicules are probably reduced calthrops.

*Genotype*.—*Roosa zyggompha*, new species.

##### ROOSA ZYGGOPHHA, n. sp.

*Holotype*.—U.S.N.M. no. 22277; from station 17, latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}10'30''$  W. to longitude  $66^{\circ}12'20''$  W.,

February 3, 1933, 46 to 90 fathoms. In addition to this specimen, I have studied the species freshly collected near the Dry Tortugas, Fla.

The specimen from Puerto Rico is lamellate, 3 by 20 by 35 mm in size. As preserved in alcohol it is blue, and its consistency is much like that of cheese, dense and easily cut. The surface is smooth, lipostomous, without any detachable dermis. The endosome is exceedingly dense, with only small chambers and canals. The spicules are abundant diacts, bent several times about the middle of each spicule. The two straight ends seldom are directly in line with each other, which (as mentioned above) may be accounted for on the basis that they are reduced triacts or tetractinal spicules.

This seems to be a well-marked species, with no very close relatives.

#### Family ANCORINIDAE Gray

Following Hentschel, 1923, this family is here considered to include Theneidae Sollas.

#### ANCORINA Schmidt

#### ANCORINA FENIMOREA n. sp.

*Holotype*.—U.S.N.M. no. 22289.

*Other specimens*.—U.S.N.M. nos. 22288 and 22297.

Three or more specimens of this species were collected at station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

The specimen here selected (because of its internal structure) as the type is an amorphous mass about 9 by 12 by 18 cm. Each of the others is irregularly ramose, with fingerlike projections about 5 to 10 mm in diameter and 5 to 7 cm long. The color internally is uniformly drab. The exterior of the type specimen is only slightly darker than this, but both of the other specimens have relatively much darker ectosomes. The consistency is stiff, woodlike. The surface is even, with optical evidence of contained detritus. The pores and oscules do not show. The endosome is very dense, almost completely packed with spicules, only small canals and chambers occurring. The megascleres are almost exclusively large oxeas, often as much as  $50\ \mu$  in diameter and more than 1 mm long. Smaller ones are also very common. After careful search a few dichotriaenes with shafts about  $45\ \mu$  by  $1,100\ \mu$  long were found in the type, and in each of the other

specimens a few prodiaenes of about the same size. The microscleres, which are abundant, are chiefly asters and raphides. The latter are not spined, but instead are lumpy, about  $60 \mu$  long, and  $1 \mu$  to  $3 \mu$  in diameter. The euasters are in places common and in places rare, and seem not to be spined at all. The ends are hastate, so that it is difficult to term them either oxete or strongylote.

This species is remarkable among those in the genus *Ancorina* for its lack of anatriaenes. Another having this same characteristic is *A. osculifera* Dendy (1924, p. 300), from the Antarctic, but that has no dichomodifications to its megascleres, and its microrhabds are distinctly strongylote. Another interesting comparison is to *A. cerebrum* Schmidt (1862, p. 46), the type of the genus—a Mediterranean sponge that has many more triaenes than in *fenimorca*, and has distinctly lumpy armed asters of two size ranges.

Named for E. R. Fenimore Johnson, a member of the expedition.

#### HEZEKIA, n. gen.

Judged from the literature, sponges referable to the family Ancorinidae but lacking euasters are relatively rare, although three genera so characterized are found among the specimens obtained by the First Johnson-Smithsonian Deep-Sea Expedition, one of which is here named. This genus is characterized perhaps most decisively by its possession of only spiny microrhabds as microscleres. Its megascleres include oxeas, orthotriaenes, and anatriaenes.

*Genotype and only species.*—*Hezekia demera*, new species.

#### HEZEKIA DEMERA, n. sp.

*Holotype.*—U.S.N.M. no. 22286.

*Other specimens.*—U.S.N.M. nos. 22284, 22285, and 22287.

Four specimens were collected at station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

This sponge is amorphous, the diameter usually 2 to 4 cm, with irregular semidigitate processes about 1 cm in diameter by 1.2 cm high. The color is drab, with a much darker ectosome, the latter frequently brown or reddish brown. The consistency is hard, but somewhat elastic, like cartilage. The surface is even, but occasionally slightly hispid in a few places. Undoubted oscules could not be made out, but the surface is abundantly perforated with minute openings, presumably pores,  $25 \mu$  to  $65 \mu$  in diameter. The endosome is dense, fine-grained, with only minute canals. Even the flagellate chambers are exception-

ally small, being only  $15\ \mu$  or  $16\ \mu$  in diameter. The megascleres comprise oxeas and orthotriaenes, the latter with rhabd diameter up to about  $20\ \mu$  and length considerably over 1 mm. The oxeas are of similar proportion; their ratio toward the triaenes varies greatly, sometimes one and sometimes the other being more abundant. Anatriaenes are rare, but when they do occur they are characterized by a peculiar angular bend in each clad, instead of the ordinary symmetrical curve. In the type specimen there are numerous triaenes in which the clads are so reduced that each is merely a rounded lump at that end of the spicule. The microscleres are distinctive and exceedingly abundant, especially in the ectosome. They are minutely spiny or lumpy microrhabds only  $1\ \mu$  thick and seldom more than  $5\ \mu$  long, but a few are as much as  $8\ \mu$ .

Occasionally one sees, not in boiled-out spicule mounts but in sections of the sponge flesh, what at first appear to be asters. They are usually irregular in shape, but once in a while they are nearly circular in outline,  $18\ \mu$  in diameter. They may be rosettelike aggregations of the acanthorhabds comparable to the grouping of anisochelas found in such genera as *Mycale*; again, they may be mere clusters of crystals precipitated by the preservation of the specimen. They are mentioned to indicate the difficulties involved in deciding whether a species contains asters.

The microsclere spiculation of this sponge is so distinctive that it is difficult to cite close comparisons with other species.

#### NEOTHENEA, n. gen.

This genus, like *Hezekia*, is remarkable for lack of euasters. But for this character it may be compared to *Thenea* Gray. The megascleres are dichotriaenes, large and smaller oxeas, metasters, and bent microrhabds that may be reduced asters.

*Genotype*.—*Neothenea enae*, new species.

#### NEOTHENEA ENAE, n. sp.

*Holotype*.—U.S.N.M. no. 22321; from station 37, latitude  $18^{\circ}13'50''$  N., longitude  $67^{\circ}39'20''$  W. to latitude  $18^{\circ}11'55''$  N., longitude  $67^{\circ}42'50''$  W., February 10, 1933, 160 to 200 fathoms.

This specimen is a mass 2 by 6 by 7 cm, apparently broken off from a much larger original flabellate structure, though the original external form must be merely hypothetical. The color is whitish in alcohol, and the consistency is mediocre. The surface is hispid, almost felt-like, shaggy. There is a distinct cortex, a little over  $500\ \mu$  thick. There

are external openings, apparently pores, about  $100\ \mu$  in diameter. The oscules were not found, perhaps having occurred on the portion of the specimen not collected. The internal structure is clearly radiate, the spicules being optically evident. The megascleres are large oxeas,  $70\ \mu$  by  $3,000\ \mu$  in size, and from that up to at least 12 mm long. Some, which are possibly to be regarded as in a separate size category, are only about  $10\ \mu$  by  $210\ \mu$ . There are dichotriaenes with rhabds about  $50\ \mu$  to  $100\ \mu$ , total length to be measured in terms of millimeters. The microscleres comprise metasters about  $30\ \mu$  in greatest extent, with 5 to 15, usually about 8 or 9, rays. There are also once-bent rhabds with oxeote ends, total length about  $40\ \mu$ ; these may be interpreted as asters from which all but two rays have been lost.

An interesting species to compare here is *Pachastrella fusca* Lebewohl (1914, p. 82), a Japanese sponge that should be transferred to the genus here established. This has roughened microrhabds and two sizes of metasters, but otherwise resembles *N. enae* closely. The genus can not only be compared to *Thenea*, which has euasters in addition to the spiculation of this genus, but also to *Vulcanella* Sollas, which has similar spiculation but has calthrops added.

The species is named for Ena Douglass, who accompanied the expedition.

#### KAPNESOLENIA, n. gen.

This genus resembles *Tethyopsis* Stuart, which, however, lacks the dichotriaenes and has euasters, and *Monosyringa* Brondsted, which also has distinctive euasters.

*Genotype and only species.*—*Kapnesolenia fisheri*, new species.

#### KAPNESOLENIA FISHERI, n. sp.

*Holotype.*—U.S.N.M. no. 22370; from station 99, latitude  $18^{\circ}39'30''$  N., longitude  $64^{\circ}56'00''$  W. to latitude  $18^{\circ}40'$  N., longitude  $64^{\circ}51'$  W., March 3, 1933, 180 to 200 fathoms.

At least two specimens of this sponge were taken at this station, and judged from the fragments, an indeterminate number of additional ones. The principal mass is an almost perfect sphere about 1 cm in diameter, from which extends just one chimneylike hollow tube with paper-thin walls, the total length reaching 8 cm. The color is white and the consistency cartilaginous. The surface is smooth, and the structure of the spherical portion is conspicuously radiate. On the surface it bears pores visible to the naked eye, minute and occurring about 5 to the square millimeter. Abundant dichotriaenes are present

in which the dichotomously branched portion of each clad is longer than the unbranched proximal portion. The chord diameter is about  $800\ \mu$ , the rhabd  $70\ \mu$  by  $2,000\ \mu$ . There are also a few anatriaenes, chord about  $80\ \mu$ , rhabds  $10\ \mu$  by  $1,000\ \mu$ . The microscleres are chiefly abundant spiny microrhabds  $2\ \mu$  by  $9\ \mu$ , mainly in the ectosome. There is a slight tendency for the spines to be nodally arranged. On a few of these microscleres the spines are very thick and coarse, in which cases not so many occur. Such spicules reach external dimensions of  $3\ \mu$  by  $15\ \mu$ .

In addition to *Tethyopsis* and *Monosyringa*, a third closely related genus is *Tribrachion* Weltner, of which the genotype, *T. schmidtii* Weltner (1882, p. 50), is a West Indian species. The external shape is similar, but the dichotriaenes seem lacking and the anatriaenes common. There are euasters in *schmidtii*, but I could not find them in *fisheri*, and the streptasters were only slightly bent spirasters with rather long spines. This must nevertheless be regarded as the species most closely related here.

Named for Prof. Walter K. Fisher, of Stanford University.

#### Family GEODIIDAE Gray

Considered here to include Erylidae Sollas.

#### ERYLUS Gray

##### ERYLUS ALLENI, n. sp.

*Holotype*.—U.S.N.M. no. 22268; from station 16, latitude  $18^{\circ}29'40''$  N., longitude  $66^{\circ}08'30''$  to latitude  $18^{\circ}31' N.$ , longitude  $66^{\circ}10'15''$  W., February 3, 1933, of 38 to 95 fathoms.

This specimen is a cylindrical structure 1.5 cm in diameter, 2.5 cm high, with one conspicuous cloaca or oscule apically located. The color is pale gray. The consistency is astonishingly spongy. The surface is skinlike, even. The pores are abundant, about  $400\ \mu$  apart,  $40\ \mu$  to  $80\ \mu$  in diameter. The internal structure is like "crumb-of-bread", minutely cavernous. The spicules are chiefly oxea,  $12\ \mu$  by  $660\ \mu$ , and triaenes that are almost calthrops. The clads are  $13\ \mu$  by  $200\ \mu$  to  $300\ \mu$ , the rhabds  $13\ \mu$  by  $250\ \mu$  to  $300\ \mu$ . The most conspicuous microscleres are the ectosomal aspidasters, which are  $35\ \mu$  by  $70\ \mu$  in greatest dimensions. Those that seem to be most fully developed have conspicuously granular surfaces and reach a total thickness of about  $5\ \mu$ . As is usual in this genus, they overlap to make a special armor. There are two distinctive size ranges of euasters. The larger ones,

with only about a dozen rays, reach about  $30\ \mu$  in greatest diameter. The smaller, with about twice as many rays, are only about  $7\ \mu$  in greatest diameter. There are also microrhabds  $1\ \mu$  by  $37\ \mu$ , which may possibly be faintly microspined.

The other species of the genus *Erylus* that seems to be the closest to the new species *alleni* is *E. proximus* Dendy (1916, p. 258), from the Indian Ocean. This has the diactinal spicules frequently modified to strongyles or oxeas and has only one type of euasters, which have strongylote ends, instead of the oxeote ends found in *alleni*.

Named for Dr. E. J. Allen, director of the Marine Biological Association of Great Britain, at Plymouth, England.

### Family TETHYIDAE Gray

#### TETHYCORDYLA, n. gen.

This group is here established for a sponge with spicules much like those of the genus *Tethya* except that the microscleres do not have the large conspicuous centrum; there is also a symmetrical stipitate external form.

*Genotype*.—*Tethycordyla thyris*, new species.

#### TETHYCORDYLA THYRIS, n. sp.

*Holotype*.—U.S.N.M. no. 22368.

Three specimens were collected at station 99, latitude  $18^{\circ}39'30''$  N., longitude  $64^{\circ}56'00''$  W. to latitude  $18^{\circ}40'$  N., longitude  $64^{\circ}51'$  W., March 3, 1933, 180 to 200 fathoms.

These specimens consist each of an almost perfectly spherical mass, 6 mm in diameter, on a stalk that is about 1 mm in diameter by 12 to 20 mm long. Around the periphery of the spherical portion, that is, in a position that would be equatorial were the stalk regarded as polar, occurs a series of three or four circular marks. Each circle is 1 mm in greatest diameter; the mark is a groove about  $500\ \mu$  deep and wide; the central disk is level with the general surface of the sponge. Their exact nature is not here interpreted. The only apparently proper openings are abundant small ones, probably pores, each about  $15\ \mu$  in diameter and each about  $50\ \mu$  from its neighbor. The color is pale drab as preserved in alcohol, and the consistency is cartilaginous. The surface is covered with an exceedingly low hispidation and, furthermore, is in a pattern slightly resembling that of small plates, some  $800\ \mu$  in diameter. The megascleres are  $10\ \mu$  to  $35\ \mu$  in diameter, and are usually several millimeters long. They are in many cases fusiform strongyles, but frequently unequally ended, so that the shape approxi-

mates that of a style. The microscleres are exceedingly abundant euasters, usually varying from  $10\ \mu$  to  $50\ \mu$  in total diameter, with all ranges of intermediate sizes between these extremes. In addition, a few are much larger, ranging up to as much as  $150\ \mu$  total diameter. In general the larger ones have smooth oxecote rays, and the smaller ones have more rays, which are strongylote or rounded on the ends, and faintly roughened. Some of the smaller ones have such thick short rays that they almost appear to have centra, or may even resemble knobby spherules.

This is a well-marked new type of sponge, with no very close relatives. The nearest approach is the genus *Tethya*, which has a peculiar surface covered with mushroomlike projections, which may correspond to the equatorial marks of *thyris*. It is by no means so pronouncedly stipitate and has definite spherasters, but its megascleres resemble those of *Tethycordyla*.

#### Family SUBERITIDAE Schmidt

##### PSEUDOSUBERITES Topsent

##### PSEUDOSUBERITES MELANOS, n. sp.

*Holotype*.—U.S.N.M. no. 22360.

The only specimen of this species in the Johnson collection was taken, according to the label, at station 40, but the date, latitude and longitude, and depth, according to the station record, are those of station 80. This was February 26, 1933, latitude  $18^{\circ}19'05''$  N., longitude  $65^{\circ}19'20''$  W. to latitude  $18^{\circ}19'10''$  N., longitude  $65^{\circ}19'40''$  W., 9 to 10 fathoms.

This species is massive, the specimen being rather digitate, 4 by 11 by 35 mm. The color is black, and the consistency is spongy to cartilaginous. The surface is even, lipostomous, and the internal structure is considerably confused. The spiculation consists exclusively of tylostyles about  $10\ \mu$  by  $200\ \mu$ .

I am familiar with this species in the vicinity of Tortugas, north of Cuba, where I have studied the sponge fauna at considerable length. It is remarkable for its black color, which is found or approached in only one other species of the genus—*Suberites montiniger* Carter (1880, p. 256). This is an Arctic species and rather briefly described, but its color seems to have been slightly different, its spiculation of somewhat different sizes, and it was provided, even though a small specimen, with conspicuous oscules. Burton (1929, p. 446) correctly referred it to the genus *Pseudosuberites* because of its possession of dermal tangent spicules, which are also found in *P. melanos*.

**STYLOSPIRA, n. gen.**

This genus is proposed for a sponge having no spicules other than peculiar spirally twisted styles.

*Genotype*.—*Stylospira mona*, new species.

**STYLOSPIRA MONA, n. sp.**

*Holotype*.—U.S.N.M. no. 22324; from station 38, latitude 18° 11' 55" N., longitude 67° 42' 50" W. to latitude 18° 10' N., longitude 67° 46' W., February 10, 1933, 240 to 260 fathoms.

This specimen is doughnut-shaped, 1.5 by 3 by 3.5 cm, outside measurements. The central hollow perhaps represents a place where the sponge grew around some foreign material, which has since been removed, and seems to have no physiological significance in the sponge itself. The color is nearly white as preserved in alcohol, and the consistency is difficult to describe inasmuch as it shows some hard stony characteristics, but in other ways is compressible, almost spongy. The surface is even and minutely punctiform. The apertures, which are exceedingly minute, presumably represent pores, now closed; the oscules could not be located. The interior is minutely cavernous, or "crumb-of-bread", in structure. The spiculation as to megascleres consists of large monaxons 20  $\mu$  by 500  $\mu$ , each bent rather sharply near the blunt end. In fact, they are usually bent two to four times, and most of them have at that end a swelling or tylote modification, which is not always directly at the end, so that the spicules may be regarded as styles that are partially tylote. The bends are frequently so placed that the blunt end of the spicule is actually spiral in shape. This is an unusual spicule type but is found, together with rhabdostyles, in the sponge described as *Microciona pusilla* by Carter (1876, p. 239). This should be transferred to the genus *Rhabdosigma*, whose genotype, *Sigmaxinella mammillata* Whitelegge (1907, p. 512), an Australian species, also has very similar megascleres. Carter's specimen was from the West Indies, but *R. mona* appears to have none of the peculiar sigmas characteristic of *Rhabdosigma*; instead it possesses raphides, about 2  $\mu$  by 150  $\mu$  in size, as microscleres. With the possible exception of *Rhabdosigma pusilla*, mentioned above, *Stylospira mona* seems to have no close relatives.

**RIDLEIA Dendy****RIDLEIA DENDIIA, n. sp.**

*Holotype*.—U.S.N.M. no. 22323; from station 38, latitude 18° 11' 55" N., longitude 67° 42' 50" W. to latitude 18° 10' N., longitude 67° 46' W., February 10, 1933, 240 to 260 fathoms.

This specimen is partly a hollow digitate structure 1 by 1 by 6.5 cm, with walls 2 mm thick, or slightly thicker. To this are added some vague fragments, apparently indicating that this is a process broken off from a more or less massive main portion. The color as preserved in alcohol is whitish, with a decidedly yellowish tinge. The consistency is stony but brittle. The surface is almost level, but does possess numerous low tubercles. It is lipostomous, no oscules or pores being evident, unless the central hollow be regarded as a cloaca or oscule. The internal structure is densely crowded, in a confused manner, with spicules not symmetrically placed; they are tylostyles with fusiform shafts. Their total dimensions are about  $20\ \mu$  by  $500\ \mu$ . The dermal spicules are not conspicuously smaller than those in the endosome.

The only other species at present recorded from the genus *Ridleia* is *oviformis* Dendy (1888, p. 515). It was a flask-shaped sponge with a hollow prolongation similar to the one obtained by this expedition, but its spicules were not only much smaller,  $2\ \mu$  by  $200\ \mu$  to  $14\ \mu$  by  $900\ \mu$ , but in addition the dermal ones were definitely smaller than the rather scanty endosomal ones. This is clearly the species closest to the new one here described.

Named for the late Prof. Arthur Dendy, of London.

#### Family AXINELLIDAE Ridley and Dendy

##### ANACANTHAEA Row

##### ANACANTHAEA REA, n. sp.

*Holotype*.—U.S.N.M. no. 22301.

There were two specimens each collected at station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

Each specimen is amorphous, the irregular mass being in one case 3 by 4 by 5 cm and in the other 5 by 7 by 8 cm. The color is pinkish gray, the consistency cartilaginous, difficult to cut. There is evidence of a cortex, and the surface is pronouncedly tuberculate, with tubercles about 2 mm across and 1 mm high. As seen from above, these tubercles are arranged over the surface so as to appear as hexagonal areas. Perhaps the pores are in the cracks between these tubercles. They, and the oscules, could not be made out with certainty. The internal structure is dense, heavy, and with conspicuously granular amoebocytes. There is a peripheral region in which the spicules are almost at right angles to the confused core. The spicules themselves consist of diactines,  $2\ \mu$  to  $7\ \mu$  in diameter and about  $300\ \mu$

long. These superficially appear as oxeas, but in reality their exact nature cannot be made out easily. At each end of the spicule there is a series of stages like steps, each successively suddenly smaller than the proximal one, until the distal unit is very minute.

This peculiar spiculation is found as an unusual modification in many sponges, but its extreme development is found in only a few genera, of which a typical one is *Anacantha* Row, whose other species (*A. nivea* Row, 1911, p. 329) was from the Red Sea and had its surface marked by grooves into polygonal areas, indicating close relationship to the West Indian sponge *A. rea*. Its color, however, was white, instead of dark pinkish gray, and its spicules about half again as large.

#### Family HALICHONDRIIDAE Gray

##### DACTYLELLA Thiele

##### DACTYLELLA RHAPHOXEA, n. sp.

*Holotype*.—U.S.N.M. no. 22303; from station 26, latitude 18°30' 20" N., longitude 66°22'05" W. to latitude 18°30'30" N., longitude 66°23'05" W., February 7, 1933, 33 to 40 fathoms.

This specimen has a small central mass, about 1.5 cm in diameter, from which arise three digitate projections, 5 to 7 mm in diameter and reaching a total length, in one case at least, of 6 cm. The color is dark pinkish gray. The consistency is cartilaginous, and the surface is even. The dermal structures are very fleshy, pierced by apertures about 200  $\mu$  in diameter, covered with sieves in which the openings are about 30  $\mu$  only. It is not clear whether these are oscules or pores, or if perhaps some may not be inhalant, while others are exhalant. The internal structure is dense, fine-grained. There is an axial region of parallel spicules making up the bulk of the sponge, around which a vague external portion comprises spicules more or less in confusion, not in any definite layer; nor is there any sharp dividing point between the endosome and ectosome. The spicules are altogether oxeas of tremendous size variation, frequently reaching 15  $\mu$  by 5,000  $\mu$ , but also very abundant ones are only 1  $\mu$  by 50  $\mu$ ; this is especially true of those in the dermis. Possibly the larger ones are megascleres and the smaller ones microscleres, but the considerable number of intermediate forms renders this doubtful.

The only other species at present referred to the genus *Dactylella* is *hilgendorfi* Thiele (1898, p. 56), a Japanese sponge that agrees rather closely with the West Indian form *D. rhapsodia*, except that

the spicules are much larger, reaching a size of  $25\ \mu$  by  $1,600\ \mu$ ; and I do not find any reference in the description of *hilgendorfi* to the dermal sieves that are so characteristic of *rhaphoxea*.

#### HYMENIACIDONIDAE, n. fam.

This group is separated from the Axinellidae by the possession of a smooth or fleshy ectosome in contrast to the hispid one of erect spicules characteristic of proper Axinellidae. It is related to that family, like it having a plumose to confused interior, few microscleres, and a ready transition of megascleres between the monactinal and diactinal forms.

#### VILES, n. gen.

This genus is erected for sponges much like *Acanthella* Schmidt but having oxeas for main spicules instead of styles. The flexuous oxeas found in *Viles* as auxiliary spicules much resemble the illustrations to which Carter (1876, p. 459) applies the generic designation of *Ophiraphidites*, but since otherwise this presumed genus of Carter's is utterly unrecognizable, one cannot say whether it is congeneric with *Viles*.

*Genotype*.—*Viles ophiraphidites*, new species.

#### VILES OPHIRAPHIDITES, n. sp.

*Holotype*.—U.S.N.M. no. 22334; from station 45, latitude  $18^{\circ}13'10''$  N., longitude  $67^{\circ}25'30''$  W. to latitude  $18^{\circ}14'30''$  N., longitude  $67^{\circ}25'30''$  W., February 13, 1933, 20 to 40 fathoms.

The specimen is a subspherical mass 2 by 3 by 4 cm, about half covered by a calcareous layer that seems to be algal. The sponge may have grown into the mass of algae, rather than having been overgrown by it. The color is dark gray, with a slightly pinkish shade that may not be proper to the species. The consistency is slightly spongy but in general mediocre. The surface is uneven but not pronouncedly hispid, merely irregularly covered with low lumps. The pores are not evident, but there is an oscule about 2 mm in diameter. The internal structure is confused, with evident spicules, presenting a type of arrangement difficult to describe except by comparison to some such tetraxonid genus as *Pachastrella*. The larger spicules are oxeas, nearly straight, reaching a maximum size of  $20\ \mu$  by  $1,000\ \mu$ , but oftener about  $12\ \mu$  by  $600\ \mu$ . Among them, and binding them together, are sinuous, much-curved diactines, which are essentially oxeas but almost attain the shape of ends that would cause them to be termed strongyles.

The diameter of each is about  $5 \mu$ , and the length, if straightened out, would be nearly  $300 \mu$ .

As noted above, there is some slight indication of relationship in general to the genus *Acanthella*, but no one species of sponge appears to be closely related to *Viles ophiraphidites*.

#### DENSA, n. gen.

This genus is established for a sponge that shows very close relationship to the genus *Hymeniacion* Bowerbank in every respect, including the arrangement of the spicules and the endosome and ectosome, except that as spicules there are oxeas only, and not styles as characteristic of *Hymeniacion*. Further comparison might be made to the genus *Collocalypta* Dendy, which reads on paper as if it might be closely related, but it is sharply separated by having a notable quantity of spongin and even more colloidal jelly conspicuously present. The genus *Hoplochalina* Lendenfeld resembles *Densa* in some respects, but is notably fibro-reticulate in architecture. *Halichondria* Fleming itself deserves comparison here, but it is a genus not nearly so dense and possesses a conspicuous detachable dermis. As noted above, the evidence would seem to be of closest relationship with *Hymeniacion*.

*Genotype*.—*Densa araminta*, new species.

#### DENSA ARAMINTA, n. sp.

*Holotype*.—U.S.N.M. no. 22298; from station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

The specimen is an irregularly lobate mass, 3 by 5 by 8 cm. The color is greenish black as to exterior, over a pale drab interior. The consistency is somewhat compressible, easily torn, and might be described as mediocre. The surface is microtuberculate, optically even, being well rounded over the protrusions. The dermis is not easily detachable, being a confused mass of spicules blending into the confused breadlike cavernous interior. The oscules and pores could not be made out. The spiculation consists exclusively of oxeas, of which typical sizes may be listed as follows:  $4 \mu$  by  $100 \mu$ ,  $5 \mu$  by  $140 \mu$ ,  $3 \mu$  by  $90 \mu$ .

Sponges having such simple spiculation may appear in print as though closely related, but actually they may be quite distinct genetically. There are many species in several genera which on paper bear some resemblance to *D. araminta*, but in view of the information at present available close relationships cannot be established.

**OXEOSTILON Ferrer-Hernández****OXEOSTILON BURTONI, n. sp.**

*Holotype*.—U.S.N.M. no. 22347; from station 52, latitude  $19^{\circ}10'25''$  N., longitude  $69^{\circ}20'55''$  W. to latitude  $19^{\circ}10'05''$  N., longitude  $69^{\circ}21'25''$  W., February 16, 1933, 14 to 22 fathoms.

This specimen is a mass about 3 by 6 cm, having an irregular surface. It is profusely covered with grooves about 3 mm deep and of similar width, separated from each other by protrusions and ridges of approximately the same dimensions. The color is pale drab, and the consistency is notably spongy. The surface is minutely hispidated, not by protruding spicules alone, but by little fibers scarcely  $50\ \mu$  in diameter and less than  $500\ \mu$  high. In some of the grooves there seems to be a sort of dermis, roofing over subdermal cavities. If there were pores in this dermis, they are closed, because at present the surface does not reveal any evident openings. Internally there is a confused structure, with a much denser axial region making up about one-third of the total diameter of the sponge, but not having sharply defined boundaries. The spicules show great variation both in size and shape, some being clearly oxeas, others being definitely styles. Representative spicule measurements, selected from many to give an indication of the variation, are as follows:  $22\ \mu$  by  $330\ \mu$ ,  $24\ \mu$  by  $400\ \mu$ ,  $6\ \mu$  by  $520\ \mu$ . In general the styles and oxeas are of about the same size, although the styles show perhaps greater variation than the diactines.

The one other species at present referred to *Oxeostilon* is *annandalei* Ferrer-Hernández (1922, p. 255). Unlike the West Indian form, this one from Spain has a smooth surface without the fibrous hispidation, and some of the spicules are faintly polytylote, or malformed in other ways. No other species can be cited at present as being closely related here.

Named for Maurice Burton, of the British Museum.

**OPHLITASPONGIDAE, n. fam.**

This family is established for genera from the family Microcionidae de Laubenfels that differ from typical species of that group in having the echinating spicules not at all spined. While at first glimpse this appears as a fine distinction, it will be noted that for just this slight variation the family approaches closely to Axinellidae, which is often regarded as far removed from Microcionidae. In order to distinguish this new family from Axinellidae, one must point out that many (but by no means all) of the genera in Ophlitaspongidae have the tylote modification of their exclusively monaxon megascleres, and that they

often have microscleres of more or less elaborate form. The general architecture is plumose because of the smooth spicules echinating the tracts or fibers.

**AXOCIELLA** Hallmann

**AXOCIELLA CALLA**, n. sp.

*Holotype*.—U.S.N.M. no 22333; from station 45, latitude 18° 13' 10" N., longitude 67° 25' 30" W. to latitude 18° 14' 30" N., longitude 67° 25' 30" W., February 13, 1933, 20 to 40 fathoms.

This specimen looks like a cylindrical sponge, but actually it is encrusted on a gorgonian stem. It reaches a diameter of 15 mm; one portion is 11 cm long and another is 16 cm long, on the same basal gorgonian. As preserved in alcohol the color is a medium gray (the label bears a notation that there is a color sketch), and the consistency is spongy. The external surface is porous, or even cavernous. It is possible that the sponge had died before collection and was partially macerated, but the histological condition is not such as to make this certain. Because of this porous or almost honeycomb structure, the oscules and pores are atypical. The gross chambers continue on down into the endosome, being frequently about 1 mm in diameter. Between them there are ascending tracts containing spongin and ranging from 60  $\mu$  to 140  $\mu$  in diameter. In these the spicules are arranged in such an axinellid or plumose fashion that nearly all could be said to be echinating rather than coring. These megascleres are monaxons that range from plain styles to subtylostyles and have average dimensions of about 10  $\mu$  by 150  $\mu$ , but the range in size is considerable. The microscleres include abundant palmate isochelas about 20  $\mu$  long and toxas only once bent, the distal extremities being practically straight; these range from 40  $\mu$  to 130  $\mu$  in total length.

It is difficult to discuss the relationships of this species because, although no sponges at present referred to the genus *Axociella* are close to it, the genus has been generally overlooked, and it is quite likely that a careful search (especially a study of original specimens) will disclose that many species now referred to other genera should be transferred to *Axociella*. Some of these may prove to be closely related to the West Indian form *A. calla*. The cavernous structure, however, is seldom associated with species having isochelas as compared to anisochelas, for which latter see the genus *Mycale* Gray. Another genus to be noted in this regard is *Thalysias* Duchassaing de Fombressin and Michelotti, of which the genotype should be fixed as *T. virgultosa* D. & M. (1864, p. 86) (they regard this as identical with *Spongia virgultosa* Lamarck, 1813, p. 446, but this is doubtful). *Thalysias* differs from *Axociella* in having spiny echinating spicules.

## Family MYXILLIDAE Topsent

## ANOMOLISSA, n. gen.

This genus is erected for a specimen that, as in the genus *Lissodendoryx* Topsent, has special dermal diacts over endosomal monacts, and microscleres that in general are arcuate chelas. These latter are, however, curiously malformed, and the special dermal spicules are erect oxeas instead of tornotes.

*Genotype and only species.*—*Anomolissa amaza*, new species.

## ANOMOLISSA AMAZA, n. sp.

*Holotype.*—U.S.N.M. no. 22348.

Four specimens were collected at station 52, latitude  $19^{\circ}10'25''$  N., longitude  $69^{\circ}20'55''$  W. to latitude  $19^{\circ}10'05''$  N., longitude  $69^{\circ}21'25''$  W., February 16, 1933, 14 to 22 fathoms.

These specimens are all smoothly rounded amorphous masses, two of them having long, thin, twisted projections 3 to 4 mm thick and about 4.5 cm long. The main masses of all are about 1 to 2 cm in diameter. The color is very pale, and the consistency cartilaginous. The surface is hispid with projecting spicules, some more than  $1,000 \mu$  long. The pores and oscules cannot be made out. The internal structure is in general radiate, densely packed with spicules. As noted above, the ectosomal specialization is a dense palisade of erect spicules perpendicular to the main mass of the sponge. These are oxeas, often about  $4 \mu$  by  $130 \mu$ ; some are larger, however, and there are all intermediates up to the much larger spicules of the radiate endosome. Two sorts of endosomal megascleres are present; there are first the large oxeas mentioned above, which attain a maximum size of at least  $50 \mu$  by  $1,500 \mu$ . The typical endosomal spicules are styles,  $11 \mu$  by  $390 \mu$ . The abundant microscleres are technically arcuate isochelas, but they are twisted, slightly unequally ended, and the prongs are very sharp, suggestive of the unguiferate type, rather than smoothly rounded.

This species is to be compared carefully with the one described originally as *Desmacidon titubans* by Schmidt (1870, p. 55), for which Topsent (1928, p. 206) proposed the subgenus *Anomomycale*. It seems to me advisable to regard this as a valid genus, instead of merely a subgenus, and I therefore propose that such a change be now established. *Anomomycale* is not recorded in the literature as having dermal diacts, and it does have sigmas and a moderately reticulate arrangement of the megascleres. Its chelas were curiously malformed in a way that may indicate genuine close relationship to *Anomolissa amaza*, but this may be a coincidence.

## Family LATRUNCULIIDAE Topsent

## ALCYOSPONGIA, n. gen.

This genus is proposed for a specimen bearing some apparent relationship to the genus *Podospongia* du Bocage which is usually placed in the family Latrunculiidae. The West Indian specimen, however, has straight streptasters not conspicuously symmetrical as are those of *Podospongia*, and a slight but perhaps significant difference in architecture in that the central point to the radiate structure of the mass of the sponge is basal, that is, near the pedestal, rather than centrally located within the spherical main portion. Consequently the family allocation must be regarded as dubious. The diagnosis of *Alcyospongia* may be given as sponges with stalk and root, radiate structure in the main mass, spiculation of oxeas to which straight streptasters are added, the latter frequently showing nodal arrangement of spines.

*Genotype and only species.*—*Alcyospongia india*, new species.

## ALCYOSPONGIA INDIA, n. sp.

*Holotype.*—U.S.N.M. no. 22365.

The one specimen and some doubtful fragments were collected at station 81, latitude  $18^{\circ}29'45''$  N., longitude  $65^{\circ}25'50''$  W. to latitude  $18^{\circ}35'30''$  N., longitude  $65^{\circ}23'54''$  W., February 26, 1933, 200 to 400 fathoms.

This sponge has its main body not quite spherical, about 10 mm in diameter. The stalk is 1 mm in diameter and attains a total length of 20 mm. At the lower end it divides first once dichotomously, and then each branch divides into several fine rootlike structures. The color as preserved in alcohol is very pale, nearly white. The consistency is softly spongy. The surface is even, and there is no easily detachable ectosome. The pores are abundant, easily seen with the unaided eye, about 1 mm apart; no especially large ones could be made out, and the exhalant apertures are therefore unknown. The architecture is in general radiate, and is described under the foregoing generic diagnosis. The fibers, which spread out into the head of the sponge from the stalk, are each about  $140\ \mu$  in diameter. The principal spicules are oxeas, about  $10\ \mu$  by  $500\ \mu$  in dimensions, but so frequently broken that the maximum sizes cannot be given with certainty. The microscleres show considerable variation. Some of the simpler ones are scarcely more than acanthoxea, or spiny rhabds, about  $40\ \mu$  to  $50\ \mu$  long, with spines about  $3\ \mu$  to  $5\ \mu$  high. There is a pronounced tendency, however, for the spines to be grouped in two nodes along

the length of the rhabds, and in some individual spicules the symmetry is so great as to resemble the peculiar microscleres of the genus *Didiscus* Dendy.

As indicated above, systematic allocation of this sponge is rather difficult. The general external appearance is much like that of *Podospongia*, but the internal architecture differs in a way that may or may not be highly significant. Some of the microscleres bear a strong resemblance to those found in *Podospongia*, but against this is the possibility that the resemblance may be merely a coincidence. *Podospongia* is from deep water in the eastern Atlantic but at about the same latitude as *Alcyospongia india*, which is also from rather deep water.

#### ADOCIIDAE, n. fam.

This family name is proposed for the group hitherto called Gelliidae Ridley and Dendy, the new name being necessary because Burton (1934, p. 530) demonstrates that the type specimen of the type species of the genus *Gellius* is an exceedingly minute, possibly pathological, or very juvenile sponge, so that we must regard *Gellius* Gray as an unrecognizable genus.

#### STRONGYLOPHORA Dendy

##### STRONGYLOPHORA RAMPA, n. sp.

*Holotype*.—U.S.N.M. no 22386.

*Other specimens*.—U.S.N.M. nos. 22387, 22273, 22254, and 22305.

The type specimen is from station 104, latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. to latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W., March 8, 1933, of 80 to 120 fathoms. Another specimen was collected at the same station. One was taken at station 26, February 7, 1933, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., 33 to 40 fathoms. Two were collected at station 17, February 3, 1933, latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}10'30''$  W. to latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}12'20''$  W., of 46 to 90 fathoms. One was taken at station 16, on the same day, latitude  $18^{\circ}29'40''$  N., longitude  $66^{\circ}08'30''$  W. to latitude  $18^{\circ}31'00''$  N., longitude  $66^{\circ}10'15''$  W., 38 to 95 fathoms.

The type specimen and no. 22305 are cylinders 7 cm in diameter and about equal in height. No. 22273 is also cylindrical, but the other three are not so symmetrical and are slightly smaller than the type. The color as preserved in alcohol is gray, and the consistency is slightly spongy but easily broken or torn. The pores are abundant, minute,

in exceptional cases as much as  $170\ \mu$  in diameter, and number about 10 to the square millimeter. The oscules are not evident, and we may assume that the exhalant openings resemble the inhalant. The ectosome contains numerous tangent spicules and may be removed with moderate ease, so that there may be said to be a special dermal skeleton. The genotype and no. 22305 possess in the center of the upper surface a peculiar depression, which in general tapers to the bottom like an inverted cone, and on the walls of this depression at intervals between the top and the bottom occur sharp ridges running quite around it. Were this a single ridge that descended to the bottom in a spiral, one would suspect that the sponge had grown around a snail shell, but the indications are positively to the contrary. There are relatively large canals that ascend through the sponge parallel to the curved sides, perpendicular to the flat base. These are about 2 or 3 mm in diameter. They do not communicate with the exterior by any conspicuous opening through the dermis at all but are roofed over by the above-mentioned special tangent dermal skeleton. The internal structure in general is cavernous. Some foreign material is present, and in a few cases there are vague tracts about  $150\ \mu$  in diameter crowded with spicules and containing some spongin. The principal spicules are strongyles of astonishingly regular size and shape, the thickness varying only between about  $12\ \mu$  and  $13\ \mu$ , and the length only between about  $330\ \mu$  and  $380\ \mu$ . In addition to these there are microrhabds or oxeas  $2\ \mu$  to  $3\ \mu$  in diameter and  $100\ \mu$  to  $300\ \mu$  long. In the type specimen I find what I take to be embryos; these are about  $650\ \mu$  in diameter, subspherical, and nearly black.

*Strongylophora* in general is an East Indian or Indian Ocean genus, and none of the other hitherto described species has microscleres nearly so long as the microxeas of *rampa*, and furthermore all the other species have at least some of the megascleres much larger than any of those in *rampa*. That two specimens out of four have the same sort of peculiar concavity is significant. This species is so common that one would strongly suspect its occurrence in some earlier collections, but since there seems no way of telling which of many earlier names was given to it, we are forced to describe it as a new species.

#### Family COELOSPHAERIDAE Hentschel

##### COELOSPHAERELLA, n. gen.

This designation is proposed for a small group of species resembling *Coelosphaera* but having palmate isochelas instead of arcuate, and

toxas instead of sigmas. To this genus should be transferred *Coclosphaera toxifera* Wilson (1925, p. 435) and *Histoderma vesiculata* Dendy (1905, p. 166).

*Genotype*.—*Coelosphaerella johnsoni*, new species.

#### COELOSPHAERELLA JOHNSONI, n. sp.

*Holotype*.—U.S.N.M. no. 22364; from station 81, latitude 18°29'45" N., longitude 65°25'50" W. to latitude 18°35'30" N., longitude 65°23'54" W., February 26, 1933, 200 to 400 fathoms.

This specimen is an almost perfect sphere, 14 mm in diameter. Here and there from its surface protrude processes about 2 mm in diameter and 3 mm high. About half of these are open at the end, as if they were oscules, and about half are closed, as if they were fistules. The color is pale, almost white, and the consistency mediocre. The ectosome is readily detachable, because it overlies extensive subdermal cavities. Many of the spicules in it are tangentially arranged. Pores could not be made out, unless they are represented by the fistular projections, and, as mentioned above, other surface structures are perhaps to be interpreted as oscules. The endosomal structure is rather cavernous, and contains relatively few spicules. The chief rigidity of the sponge comes from the ectosome. The principal spicules are strongyles, 9  $\mu$  by 420  $\mu$ , to which are added as microscleres palmate isochelas 15  $\mu$  long and toxas of typical shape 70  $\mu$  to 140  $\mu$  long.

The closest relative of this species seems to be *C. toxifera*, from the Philippines, but that species had much larger megascleres and chelas; the former about 16  $\mu$  by 360  $\mu$  and the latter 20  $\mu$ . In many other ways, however, the relationship is clearly very close.

Named for Eldridge R. Johnson, sponsor of the expedition.

#### INFLATELLA Schmidt

#### INFLATELLA BARTSCHI, n. sp.

*Holotype*.—U.S.N.M. no. 22391; from station 104, latitude 18°30'40" N., longitude 66°13'20" W. to latitude 18°30'10" N., longitude 66°13'50" W., March 8, 1933, 80 to 120 fathoms.

There are two specimens of this sponge, each consisting of a basal mass 4 or 5 cm long, from which arise about a dozen fistules, 2 mm in diameter, with exceedingly thin walls, only about 80  $\mu$  thick. The color is green as preserved in alcohol, and the texture is fragile. The surface is even, glossy, smooth; no pores or oscules other than the above mentioned fistules could be made out. The internal structure is amorphous. The spicules are strongyles only 5  $\mu$  by 250  $\mu$ .

Quite a few species are referred to the genus *Inflatella*, practically all representing Arctic or Antarctic specimens and all having spicules more than twice as large in each dimension as those of *bartschi*. Very probably all these other described species are synonymous and should have as their name *Inflatella pellicula*, the genotype, which was first described by Schmidt (1875, p. 117). The Antarctic specimens may perhaps be separated from the Arctic ones on the strength of more elaborate architecture, in which case they should be referred to as *Inflatella tubulosa*, which was first described as *Joyeuxia tubulosa* by Topsent (1904, p. 206).

Named for Dr. Paul Bartsch, director of the expedition.

#### Family DESMACIDONIDAE Gray

##### GELLIODES Ridley

##### GELLIODES LEUCOSOLENIA, n. sp.

*Holotype*.—U.S.N.M. no. 22378; from station 102, latitude 18° 50' 30" N., longitude 65° 43' 00" W. to latitude 18° 51' N., longitude 64° 33' W., March 4, 1933, 90 to 500 fathoms.

This is a massive sponge 1 by 1 by 2 cm and nearly white. The consistency is soft. The pores and oscules could not be made out. The surface is superficially smooth, although made up of erect spicules, packed together perpendicularly to the main mass. The outstanding characteristic of this sponge is the peculiar structure, which is much like that of the calcareous genus *Leucosolenia* Bowerbank. The entire sponge consists of a mass of frequently anastomosing tubes, each a little over 1 mm in diameter, the walls being compounded out of more or less reticulate fibers, each 100  $\mu$  in diameter, and rendering the walls about this same thickness. So many of these tubes come up to an end at the surface that it is rendered papillate; at the surface these structures are usually about 400  $\mu$  in diameter. The meshes enclosed between the tubes vary greatly in size, but average approximately 1 mm in greatest diameter and are rather rounded in outline. The spicules are oxeas 9  $\mu$  by 140  $\mu$ , and not only densely crowd the fibrous tracts, but are packed in the soft parts around the fibers, perpendicular to them, leaving little room for any flesh whatever. There are, however, cavities here and there, which are presumably flagellate chambers. They are 20  $\mu$  by 35  $\mu$  to 45  $\mu$  by 65  $\mu$  in dimensions. The microscleres are sigmas of some variation in size, but averaging about 40  $\mu$  chord.

This is a strongly marked species; there is no other *Gelliodes* even remotely resembling it; in fact, the habitus is so peculiar that one is

tempted to erect for it a new genus, but the spiculation and the minute architecture are so nearly like *Gelliodes* that we may use that generic name for the present.

Family HALICLONIDAE de Laubenfels

HALICLONA Grant

HALICLONA PELLASARCA, n. sp.

*Holotype*.—U.S.N.M. no. 22336; from station 45, latitude  $18^{\circ}13'10''$  N., longitude  $67^{\circ}25'30''$  W. to latitude  $18^{\circ}14'30''$  N., longitude  $67^{\circ}25'30''$  W., February 13, 1933, 20 to 40 fathoms.

The specimen as preserved is a lamellate structure with some faint indications that it may have been a crust that was pried loose from a substratum to which it had not made firm attachment. The size is 1 by 5 by 8 cm. The color is dark drab to walnut brown, and the consistency is softly spongy, easily cut. The surface is even, and the pores and oscules dubiously made out; there are minute openings, a few of which reach the diameter of  $500\ \mu$ . The internal structure is fleshy, the dense protoplasmic ground mass containing an isodictyal reticulation of spicules after the type sometimes called "renierid". Here and there are vague tracts of ascending fibers; they consist of scarcely more than three spicule rows and are about  $15\ \mu$  in total diameter. The spicules are oxeas only, the size about  $5\ \mu$  by  $165\ \mu$  to  $8\ \mu$  by  $240\ \mu$ .

This species is remarkable for the enormous quantities of dark protoplasmic structure present, resembling in this respect a species that may possibly be closely related. It was described as *Amphimédon variabilis* by Duchassaing de Fombressin and Michelotti (1864, p. 80) and was preserved dry, which renders precise comparison difficult. Its spicules were much smaller than those of *pellasarca*, being only  $2\ \mu$  by about  $100\ \mu$ , and even so they are not certainly proper. Duchassaing and Michelotti's specimen possibly may even be a keratose sponge. On the other hand, it and *H. pellasarca* may be two variant forms of one species. Since this is merely surmise without sound basis of evidence, I describe the specimen as a new species.

HALICLONA PODATYPA, n. sp.

*Holotype*.—U.S.N.M. no. 22305.

This and a similar specimen were collected at station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

The two specimens are each about 4 by 5 by 15 cm in size. The color is pale drab, and the consistency is spongy but with a much stiffer ectosome than the endosome. The cortex is a much denser structure than the internal portion, but it scarcely can be described as a special dermal skeleton, as it is merely a confused mass of fibers and spicules not spaced so widely as is the case below. The pores are not conspicuous, but the oscules are remarkable; they are located about 5 mm apart over almost the entire surface of the sponge, and average about 2 mm in total diameter. Unlike the oscules of most sponges they are not round in outline, but exceedingly irregular. Some are Y shaped, others heart-shaped, but the commonest form resembles that of a human footprint. The endosomal structure consists of a subrectangular reticulation of spongin fibers containing numerous rows of spicules. The total diameter is about  $50\ \mu$  to  $150\ \mu$ . Among these fibers occur a good many interstitial spicules, somewhat smaller than those in the fibers. These occasionally make a vague isodictyal reticulation themselves. The spicules are only oxeas varying from about  $4\ \mu$  by  $119\ \mu$ , in the fibers, to  $2\ \mu$  by  $90\ \mu$  only in the interstitial structures.

The fibrous structure of this species is by no means common, but the most striking thing of all, as mentioned above, is the strange shape of the oscules.

### Family SPONGIIDAE Gray

#### HIRCINIA Nardo

#### HIRCINIA RAMOSA, n. sp.

*Holotype*.—U.S.N.M. no. 22317.

*Other specimens*.—U.S.N.M. nos. 22258, 22278, and 22397.

The type is from station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms. The others were collected at station 10, latitude  $18^{\circ}29'20''$  N., longitude  $66^{\circ}05'30''$  W., to latitude  $18^{\circ}30'24''$  N., longitude  $66^{\circ}04'15''$  W., 120 to 160 fathoms; station 17, latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}10'30''$  W. to latitude  $18^{\circ}30'00''$  N., longitude  $66^{\circ}12'20''$  W., 46 to 90 fathoms; and station 104, latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. to latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W., 80 to 120 fathoms. All are cylindrical and ramose. The type is 1 cm in diameter, having about half a dozen branches, attaining a total maximum height of some 20 cm. The others vary from 7 to 15 mm in diameter, and are all somewhat shorter. The color is drab, and the consistency is very spongy. The surface is sharply conulose with conules about 1 to 2 mm high and 2 to 3 mm apart. The

pores and oscules are notably difficult to make out for this genus, in which the pores, at least, are usually conspicuous, and the oscules also frequently striking. The endosome is precisely that typical of the genus. The fascicular, main, or ascending tracts are made of spongin and cored with some detritus; their individual fibers are about  $170\ \mu$  in diameter. The rounded intrafascicular meshes are about  $100\ \mu$  by  $200\ \mu$ . The total diameter of the fascicular tracts is about  $800\ \mu$ . The meshes between them are 1 to 3 mm in diameter. The flesh is moderately crowded with filaments as typical of the genus *Hircinia*, diameter about  $3\ \mu$ , the tylole heads are nearly spherical,  $10\ \mu$  in diameter.

Schmidt (1862, p. 34) described a Mediterranean species as *Filifera variabilis*. His description is almost unrecognizable, but his reference to violet color is notable. Schultze (1879, p. 12) described a species as *Hircinia variabilis*, which is presumably the same as that of Schmidt, but the color is not violet. Throughout the West Indian region there occurs commonly a species that answers in general to the description of *variabilis* Schultze, though it is exceedingly doubtful whether this is *variabilis* of Schmidt, in which case a new name will need to be established for the later species. For this purpose the name *variata* may be employed. From this species *ramosa* may be separated, first in the extreme ramose form characteristic of the latter, *variata* being usually almost massive, although sometimes prolonged into cylindrical projections. A much more important distinction is that *ramosa* is lipostomous, whereas *variata* typically possesses conspicuous and rather numerous oscules.

#### POLYFIBROSPONGIA Bowerbank

#### POLYFIBROSPONGIA ECHINA, n. sp.

*Holotype*.—U.S.N.M. no. 22315; from station 26, latitude  $18^{\circ}30'20''$  N., long.  $66^{\circ}22'05''$  W., to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., February 7, 1933, 33 to 40 fathoms.

This specimen comprises a basal mass about 5 by 7 cm, from which arise processes 1.5 cm in diameter and 2 to 4 cm high. The surface is black exteriorly over a gray interior. The consistency is very spongy. The surface is thrown into tubercles or conules about 2 mm high and 4 mm apart, the apices of each of which may again be divided into 2 to 5 minute processes or protruding fiber ends. The pores could not be made out, and only one obvious oscule can be found; it is terminal, 2 mm in diameter. The endosome is densely reticulate, with small fibers of clear spongin, not at all cored, which make polygonal meshes much like those of the genus *Hippospongia*

Schulze. The mesh is often about  $400\ \mu$  in diameter but varies from  $100\ \mu$  to  $700\ \mu$ . As in the genus *Spongia*, here and there throughout the reticulation are special ascending fibers much larger than the others, ranging from about  $50\ \mu$  to  $100\ \mu$ . These have about the central third cored profusely with minute fragments of detritus. They are not cored uniformly spaced throughout the mesh, but instead 2 to 4 of them are found close together, united by numerous secondary connectives about  $20\ \mu$  in diameter and resembling the common type of fibers throughout the sponge. These connectives may be compared to the rungs of a ladder, but the openings between them are less often rectangular than somewhat oval in outline. This whole formation of grouped ascending fibers with connectives may be referred to as fasciculated principal fibers. In both the principal and secondary fibers the longer axes of the meshes are frequently directed toward the surface of the sponge, making a distinctive pattern, though one by no means peculiar to this species.

Discussion of the relationships of *echina* is difficult at this time, because the majority of the sponges that should be allocated to the genus *Polyfibrospongia* at present are scattered among various other genera. I am elsewhere undertaking a revision of this and related species and therefore postpone further discussion.

#### LITERATURE CITED

BOWERBANK, JAMES SCOTT.

1858. On the anatomy and physiology of the Spongiadae. Phil. Trans. Roy. Soc. London, vol. 148, pp. 279-332, 4 pls.

BURTON, MAURICE.

1929. Porifera. Pt. 2, Antarctic sponges. British Antarctic (*Terra Nova*) Expedition, 1910, Zoology, vol. 6, no. 4, pp. 393-458, 9 figs., 5 pls.  
1934. Sponges. Great Barrier Reef Expedition, 1928-29, Scientific Reports, vol. 4, no. 14, pp. 513-622, 33 figs., 2 pls.

CARTER, HENRY JOHN.

1876. Descriptions and figures of deep-sea sponges and their spicules, from the Atlantic Ocean, dredged up on board H. M. S. *Porcupine*, chiefly in 1869. Ann. Mag. Nat. Hist., ser. 4, vol. 18, pp. 226-240, 307-324, 388-410, 458-479, 5 pls.  
1880. *Spongia*. In W. S. M. D'Urban's "The zoology of Barents Sea." Ann. Mag. Nat. Hist., ser. 5, vol. 6, pp. 256-257.

DENDY, ARTHUR.

1888. Studies on the comparative anatomy of sponges. I, On the genera *Ridleya*, n. gen., and *Quasillina* Norman. Quart. Journ. Micr. Soc., ser. 2, vol. 28, pp. 513-529, 1 pl.  
1905. Report on the sponges collected by Professor Herdman, at Ceylon, in 1902. In W. A. Herdman's "Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar," pt. 3, suppl. 18, pp. 57-246, 16 pls.

1916. Report on the Homosclerophora and Astrotetrazonida collected by H. M. S. *Sealark* in the Indian Ocean. Trans. Linn. Soc. London, ser. 2, Zoology, vol. 17, pt. 2, pp. 225-271, 5 pls.
1924. Porifera. Pt. 1, Non-Antarctic sponges. British Antarctic (*Terra Nova*) Expedition, 1910, Zoology, vol. 6, no. 3, pp. 269-392, 15 pls.
- DUCHASSAING DE FONBRESSIN, PLACIDE, and MICHELOTTI, GIOVANNI.  
1864. Spongiaires de la mer Caraïbe. Nat. Verh. Wetensch. Haarlem, vol. 21, pt. 3, pp. 1-124, 25 col. pls.
- FERRER-HERNÁNDEZ, FRANCISCO.  
1922. Más datos para el conocimiento de las esponjas de las costas españolas. Bol. Pesca, vol. 7, pp. 247-272, 9 figs., 2 pls.
- GRANT, ROBERT EDMOND.  
1830. [Article on Zoophytology.] Edinburgh Encyclopaedia, vol. 18, pp. 838-846.
- GRAY, JOHN EDWARD.  
1867. Notes on the arrangement of the sponges, with the description of some new genera. Proc. Zool. Soc. London, 1867, pp. 492-558, 2 pls.
- HENTSCHEL, ERNST.  
1923. Porifera. In W. Kükenthal and T. Krumbach's "Handbuch der Zoologie," vol. 1, pp. 307-418, figs. 288-377.
- LAMARCK, JEAN BAPTISTE PIERRE ANTOINE DE MONET.  
1813. Sur les Polyptiers empâtés. Ann. Mus. Hist. Nat., vol. 20, pp. 294-312, 370-386, 432-458.
- LEBWOHL, FRIEDRICH.  
1914. Japanische Tetraonida. Journ. Coll. Sci. Imp. Univ. Tokyo, vol. 35, art. 2, pp. 1-116, 9 pls.; art. 5, pp. 1-70, 2 pls.
- ROW, RICHARD WILMER HAROLD.  
1911. Report on the sponges collected by Mr. Cyril Crossland in 1904-5. Pt. 2, Non-Calcareous. Journ. Linn. Soc. London, Zoology, vol. 31, pp. 287-400, 26 figs., 7 pls.
- SCHMIDT, (EDOUARD) OSCAR.  
1862. Die Spongien des adriatischen Meeres, 88 pp., 7 pls.  
1868. Die Spongien der Küste von Algier. Mit Nachträgen zu den Spongien des adriatischen Meeres (Drittes Suppl.), 44 pp., 5 pls.  
1870. Grundzüge einer Spongien-Fauna des atlantischen Gebietes, 88 pp., 6 pls.  
1875. Spongien. Jahresb. Comm. wiss. Unters. deutschen Meere in Kiel, 1872-1873, vol. 2/3, pp. 115-120, 1 pl.
- SCHULZE, FRANZ EILHARD.  
1879. Untersuchungen über den Bau und die Entwicklung der Spongien. Achte Mittheilung. Die Gattung *Hircinia* Nardo und *Oligoceras* n. g. Zeitschr. Wiss. Zool., vol. 33, pp. 1-38, 4 pls.
- THIELE, JOHANNES.  
1898. Studien über pazifische Spongien. Zoologica, vol. 24, pp. 1-72, 8 pls.
- TOPSENT, ÉMILE.  
1904. Spongiaires des Açores. Résult. Camp. Sci. Albert I<sup>er</sup>, Prince de Monaco, fasc. 25, pp. 1-280, 18 pls.  
1928. Spongiaires de l'Atlantique et de la Méditerranée, provenant des croisières du Prince Albert I<sup>er</sup> de Monaco. Résult. Camp. Sci. Albert I<sup>er</sup>, Prince de Monaco, fasc. 74, pp. 1-376, 11 pls.

## WELTNER, WILHELM.

1882. Beiträge zur Kenntniss der Spongien. Inaugural-Dissertation Univ. Freiburg, 66 pp., 3 pls.

## WHITELEGGE, THOMAS.

1907. Scientific results of the trawling expedition of H. M. C. S. *Thetis* off the coast of New South Wales. Pt. 10, Sponges. Austral. Mus. Mem., vol. 4, pp. 487-515, 2 pls.

## WILSON, HENRY VAN PETERS.

1925. Silicious and horny sponges collected by the U. S. Fisheries steamer *Albatross* during the Philippine expedition, 1907-1910. U. S. Nat. Mus. Bull. 100, vol. 2, pp. 273-532, 16 pls.









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TO THE PUERTO RICAN DEEP

# NEW MONOGENETIC TREMATODES FROM MARINE FISHES

(WITH ONE PLATE)

BY

EMMETT W. PRICE

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U.S. Department of Agriculture



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(WITH ONE PLATE)

Among the several lots of monogenetic trematodes collected from marine fishes by the first Johnson-Smithsonian Deep-Sea Expedition were two species which appear to be new; these are described below.

#### Family CAPSALIDAE

#### Subfamily BENEDENIINAE

#### **ANCYROCOTYLE BARTSCHI, n. sp.<sup>1</sup>**

Plate 1, figs. 1, 2

*Description.*—Body elongate, rectangular, 826 to 970  $\mu$  long by 255 to 270  $\mu$  wide (immature specimens). Anterior haptors or attaching organs suckerlike, 80  $\mu$  in diameter, situated toward posterior ends of fleshy pads. Posterior haptor suckerlike, sessile, surrounded by narrow, delicate, marginal membrane, armed with three pairs of hooks and 14 marginal hooklets. Hooks of first pair straight, 20 to 23  $\mu$  long, directed forward and outward; hooks of second pair strongly recurved, immediately posterior to those of first pair, 68 to 76  $\mu$  long from proximal end to height of curve, directed backward and outward, tips directed forward; hooks of third pair relatively broad and flat, lateral to hooks of second pair, 25 to 28  $\mu$  long, tips slender and recurved; marginal hooklets 10  $\mu$  long. Oral aperture somewhat triangular, about 150  $\mu$  from anterior end of body; pharynx subglobular, 100  $\mu$  long by 120  $\mu$  wide; esophagus very short or absent; intestinal branches simple, without lateral or median diverticula, not united posteriorly. Common genital aperture sinistral, at level of equator of pharynx. Cirrus pouch 160  $\mu$  long by 40  $\mu$  wide, its base posterior to pharynx and slightly to right of median line. Testes elongate oval, 180  $\mu$  long by 80  $\mu$  wide, equatorial. Ovary oval, immediately pre-

<sup>1</sup> Named in honor of Dr. Paul Bartsch, director of the expedition.

testicular. Ootype oval, median, immediately anterior to ovary. Vagina short, opening near inner limit of left cecum about  $57 \mu$  posterior to level of base of pharynx.

*Host*.—*Naucrates ductor* (Linn.).

*Location*.—Gills.

*Distribution*.—Station 86 (lat.  $19^{\circ}30'30''$  N., long.  $65^{\circ}14'00''$  W.).

*Type Specimen*.—U.S.N.M. Helm. Coll. no. 8804; paratype no. 8805.

The above description is based on two specimens, both of which were immature.

Parona and Perugia (1895) described a monogenetic trematode, *Placunella vallei*, collected in 1894 by A. Valle from *Naucrates ductor* at Trieste, which may be the same species as that described here as *Ancyrocotyle bartschi*. Their description of *P. vallei* was incomplete and except for the relative size and distribution of the large hooks of the posterior haptor might apply equally well to a number of species of the related genus *Benedenia*. Later Parona and Monticelli (1903) redescribed *P. vallei* and made it the type of the genus *Ancyrocotyle*; the redescription was based apparently on the original specimens. Parts of their description check well with that of *A. bartschi*, but in other respects there are notable differences. In the redescription only two pairs of hooks are reported, but in their discussion it was stated that they were unable to find the others, suggesting that they might have become lost. They also described and showed in their illustrations only a single, preovarial testis; however, as the specimens were old and not in good condition, it is conceivable that an error was made in interpreting the various structures. The presence of a single preovarial testis, assuming that no mistake was made, distinguishes *A. bartschi* from *A. vallei*. There is a difference also in the morphology of the hooks of the second pair, but more material is required before it can definitely be stated that this difference is valid.

## Family DACTYLOGYRIDAE

### Subfamily TETRAONCHINAE

#### **ANCYROCEPHALUS ATHERINAE, n. sp.**

Plate 1, figs. 3, 4

*Description*.—Body more or less fusiform in outline,  $325 \mu$  long by  $95 \mu$  wide, anterior end more attenuated than posterior end. Cephalic glands few in number, lying on each side near posterior end of pharynx, and opening to exterior through three pairs of prominent

head organs located at anterior end of body. Posterior haptor about  $57\ \mu$  wide, with two pairs of large hooks supported by two transverse, heavily cuticularized bars, and with 14 marginal hooklets; hooks of anterior pair  $30\ \mu$  long, those of posterior pair  $25\ \mu$  long; anterior transverse bar almost straight,  $34\ \mu$  long, posterior bar bow-shaped,  $20\ \mu$  long; marginal hooklets varying from 8 to  $25\ \mu$  long, the three most anterior pairs much longer than the others (pl. 1, fig. 4c). Oral opening ventral,  $75\ \mu$  from anterior end; pharynx oval,  $35\ \mu$  long by  $20\ \mu$  wide; esophagus very short; intestinal branches slender, their tips approaching near posterior end of body proper. Brain antero-dorsal to oral opening; eyes present, anterior pair smaller and less pigmented than posterior pair. Genital aperture median, about  $120\ \mu$  from anterior end of body. Cirrus about  $20\ \mu$  long, its morphology not ascertainable. Testis elongate, about  $75\ \mu$  long by  $30\ \mu$  wide, postequatorial. Ovary linguiform, about  $75\ \mu$  long by  $30\ \mu$  wide at anterior end, overlapping testis. Vitelline follicles relatively large and extending from level of posterior end of pharynx to posterior end of body proper. Vagina short, opening at left margin of body about  $133\ \mu$  from posterior end, communicating proximally with a large globular seminal receptacle. Ootype oval, median, its posterior end surrounded by relatively large unicellular glands. No eggs observed.

*Host.*—*Atherina araea* Jordan and Gilbert.

*Location.*—Gills.

*Distribution.*—Samaná Bay, near Santa Barbara de Samaná, Dominican Republic.

*Type specimen.*—U.S.N.M. Helm. Coll. no. 8806; paratypes no. 8807.

This small delicate species was found on the gills of about one-third of the specimens of *Atherina araea* examined; they were not abundant, only two or three individuals being found on each infested fish.

*Ancyrocephalus atherinae* may be easily distinguished from all other species of the genus by the unequal length of the marginal hooklets of the posterior haptor; these hooklets in the other species are approximately equal in length.

#### REFERENCES

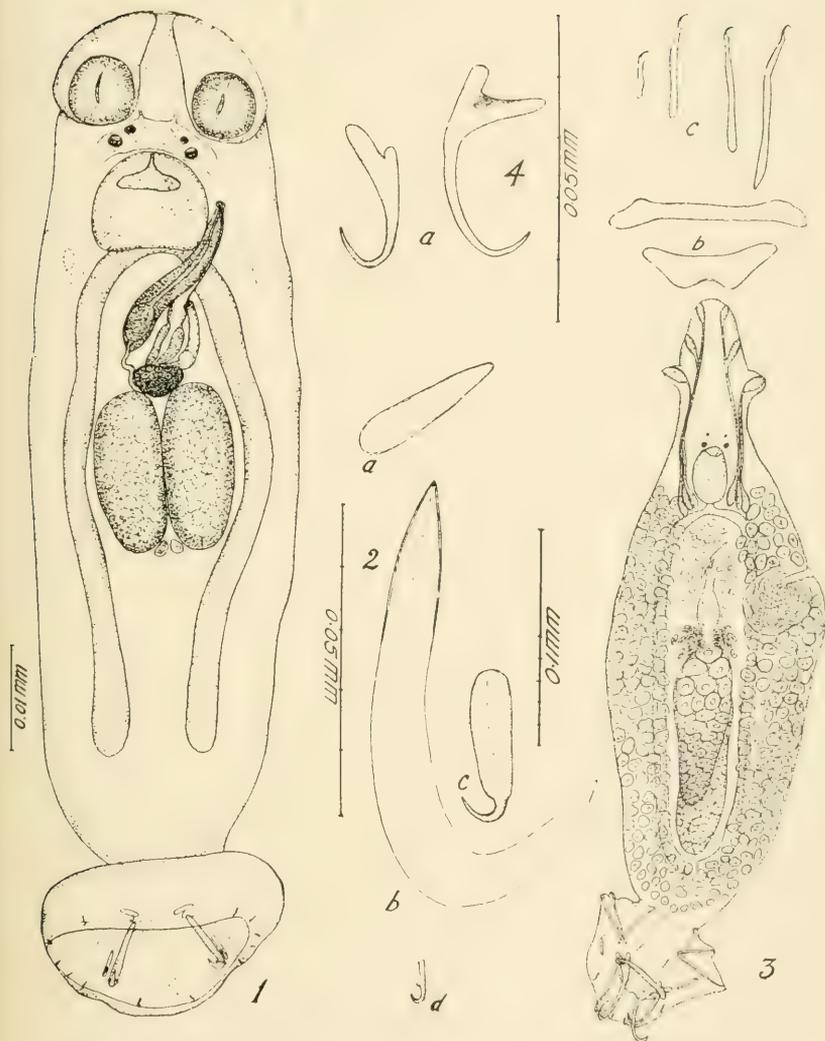
PARONA, CORRADO, and MONTICELLI, F. S.

1903. Sul genere *Ancyrocootyle* (n.g.). Arch. Parasitol., Par., vol. 7, no. 1, pp. 117-121, pl. 3, figs. 1-6, March 15.

PARONA, C., and PERUGIA, A.

1895. Sopra due nuove specie di trematodi ectoparassiti di pesci marini. (*Phylline monticellii* e *Placunella vallei*). Atti Soc. Ligust. Sci. Nat. e Geogr., Genova, vol. 6, no. 1, pp. 84-87, 2 figs., March.





## NEW MONOGENETIC TREMATODES FROM MARINE FISHES

1. *Ancyrocotyle bartschi*, n. sp., complete worm, ventral view.
2. *Ancyrocotyle bartschi*, n. sp., hooks of posterior haptor: a, hook of first pair; b, hook of second pair; c, hook of third pair; d, marginal hooklets.
3. *Ancyrocephalus atherinae*, n. sp., complete worm, ventral view.
4. *Ancyrocephalus atherinae*, n. sp., armature of posterior haptor: a, large hooks; b, cuticular supporting bars; c, marginal hooklets.











SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 19

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Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

NEW PARASITIC COPEPODS

(WITH THREE PLATES)

BY

CHARLES BRANCH WILSON

State Teachers College, Westfield, Mass.



(PUBLICATION 3298)

CITY OF WASHINGTON  
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12. THREE NEW AMPHIPODS. By Clarence R. Shoemaker. June 1, 1934. 6 pp., 3 figs. (Publ. 3246.)
13. A NEW GENUS OF BRITTLESTARS FROM PUERTO RICO. By Austin H. Clark. May 21, 1934. 3 pp., 1 pl. (Publ. 3248.)
14. A NEW STARFISH FROM PUERTO RICO. By Austin H. Clark. May 23, 1934. 3 pp., 1 pl. (Publ. 3249.)
15. TWO NEW CONGRID EELS AND A NEW FLATFISH. By Earl D. Reid. June 9, 1934. 11 pp., 1 pl. (Publ. 3251.)
16. NEW MARINE MOLLUSKS. By Lois F. Corea. Sept. 18, 1934. 9 pp., 3 pls. (Publ. 3258.)
17. NEW SPONGES FROM THE PUERTO RICAN DEEP. By M. W. de Laubenfels. Dec. 24, 1934. 28 pp. (Publ. 3283.)
18. NEW MONOGENETIC TREMATODES FROM MARINE FISHES. By Emmett W. Price. Nov. 8, 1934. 3 pp., 1 pl. (Publ. 3286.)

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### NEW PARASITIC COPEPODS

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(WITH THREE PLATES)

Among the valuable collections obtained during the first Johnson-Smithsonian Deep-Sea Expedition was one made up of the copepods parasitic upon the fish of the region just north of Puerto Rico. Although this included but a few species, the number of specimens was unusually large and the collection proved interesting for several reasons. In the first place it came from a region upon the fish parasites of which there have been up to the present time no available data. Again, the present collection contains an exceptionally large number of males and with reference to that sex supplies information hitherto unknown and much desired. We find here for the first time authentic males of *Nesippus crypturus*, females of which were described 70 years ago. The males of *Pandarus cranchii* are larger than any previously reported and the three largest ones are covered with blotches of the same dark pigment that characterizes the mature female. Three specimens of a male *Specilligus curticaudis*, first described by Dana 80 years ago as a new genus and species, are now found to be simply the copepodid stage of the male of *Pandarus cranchii*. Finally, three new species were found and are here described, and three other species, already known, were taken from unnamed shark hosts, *Alebion carchariae* Krøyer, *Perissopus communis* Rathbun, and *Krøyeria gracilis* Wilson.

#### CALIGUS LOBATUS n. sp.

Plate I, figs. 1-10

*Occurrence*.—A dozen females and two males were taken from the outside surface and gills of a pilotfish, *Naucrates ductor*.

*Type*.—A single female, U.S.N.M. no. 64059. The other specimens become paratypes, U.S.N.M. no. 64060.

*The female*.—Carapace ovate, considerably less than half the entire length and strongly narrowed anteriorly, with convex lateral margins and broadly rounded posterior lobes. Frontal margin with a shallow median depression but no incision, the two frontal plates combined less than half the width of the carapace. Lunules large, nearly circular, comparatively close together and scarcely projecting beyond the frontal margin. Posterior sinuses narrow, median lobe less than half the entire width and projecting but little behind the lateral lobes. Free thorax segment small, two-thirds as wide as the median lobe of the carapace, its lateral margins projecting for the attachment of the fourth legs. Genital segment ovate, one-third longer than wide, narrowed anteriorly and widest considerably behind the center, with strongly convex lateral margins and broadly rounded posterior lobes, which reach beyond the center of the basal abdominal segment. Abdomen two-segmented, two-thirds as long as the genital segment, the two segments about the same length and width, with straight and parallel sides. Caudal rami small, parallel, slightly widened at their distal end, each armed with five short setae.

First antennae with a stout basal segment and a short and slender terminal segment. Second antennae rather stout, the strong terminal claw bent into a half circle and armed with a large spine on its inner surface near the base (fig. 3). First maxilla of the usual pattern; second maxilla long and slender, the proximal segment enlarged at its base, the distal segment with a knifelike process on its inner margin beyond the center, and tipped with two unequal curved claws. Maxilliped stout, the basal segment with a tiny spine on its inner surface, the terminal claw curved into a semicircle and sharply pointed (fig. 5).

First legs with a rudimentary two-segmented endopod on the posterior margin of the basipod (fig. 8); the exopod is two-segmented, the terminal segment without the usual setae on its posterior margin. The furca has an elongated U-shape, the prongs nearly parallel and about as long as the basal portion. Second and third legs of the customary pattern, but with exceptionally long setae; fourth legs three-segmented, the basal segment longer than the other two combined, the middle segment the shortest. The basal and second segments each carry a spine at the outer distal corner, the terminal segment has three spines on its outer margin and one at the tip. Each of these spines has at its base a small semicircular lamina fringed with hairs. No rudimentary fifth legs can be detected anywhere on the genital segment. Total length 4.50 to 4.75 mm. Length of carapace 2 mm, width 1.90 mm. Length of genital segment 1.65 mm. Length of abdomen 1.16 mm.

*The male*.—Carapace more than half the entire length and a little longer than wide, narrowed anteriorly less than in the female. Frontal margin with no trace of a median depression or incision; posterior sinuses small and shallow. Median lobe more than half the width of the carapace and projecting considerably behind the lateral lobes, with an evenly rounded posterior margin. Free segment short, its lateral margins scarcely projecting at all for the attachment of the fourth legs. Genital segment narrow, not much wider than the free segment and almost twice as long as wide, without any trace of posterior lobes. Abdomen two-segmented, the distal segment twice as long as the proximal, both segments of the same width, which is half that of the genital segment. Caudal rami longer than wide, enlarged posteriorly and each armed with five setae, three of which are three times the length of the ramus while the other two are much shorter.

Appendages like those of the female, but the terminal claw of the second antenna has two spines on its inner margin and that of the maxilliped has one spine on the inner margin near the base. The fourth swimming legs nearly reach the posterior margin of the genital segment and their armature is like that in the female.

Total length 4.2 mm. Carapace 2.3 mm long, 1.9 mm wide.

*Remarks*.—The posterior lobes of the genital segment in the female are exceptionally long and wide, and the specific name alludes to this. When taken in connection with the two abdominal segments of equal length, they furnish a quick identification of the species. The identity can then be confirmed by the structure of the second antennae, the furca, and the first and fourth swimming legs.

**NESIPPUS CRYPTURUS** Heller, new male

Plate 1, figs. 11, 13, 14; plate 3, figs. 28-32

*Occurrence*.—More than 60 females were taken from the gills and throats of two large sharks, and nearly as many males from the outer skin and fins of the same hosts. The females were described 70 years ago by Heller but these are the first males to be found. Males, U.S.N.M. no. 64057; females, U.S.N.M. no. 64058.

*The male* (fig. 28).—Width of the cephalothorax one-half greater than its length on the midline; frontal plates distinct but rather narrow; posterior lobes broadly rounded and short, not reaching the center of the lobes of the second segment. Second, third, and fourth segments the same length but diminishing considerably in width. Second segment with well-rounded lateral lobes reaching almost to the posterior margin of the third segment, fourth segment much

narrower than the genital segment and without dorsal plates. Genital segment nearly as long as the three free thorax segments combined, narrowed anteriorly and widened posteriorly, the posterior corners distinctly bilobed, the inner lobes projecting backward on either side of the abdomen. Spermatophore receptacles large and elliptical, each containing a single spermatophore with a long coiled tube.

Appendages like those of the female with the usual sexual modifications. In the first maxilla (fig. 13) the tip on the anterior margin projects strongly and its two segments are much larger than in the female; the ventral palp also forms a distinct lobe with the two processes on its upper margin. The second maxilla is exactly like that of the female except that its terminal claw is not as sharply pointed (fig. 14). In the maxilliped just inside the cup-shaped prominence on the distal margin of the end segment are two hemispherical protuberances with rough surfaces (fig. 30). When the claw shuts down, it lies between these protuberances with its tip inside the cup and is thus held rigidly in place.

The arrangement of the spines and setae on the swimming legs is as follows. First exopod 1-0, 4-3; endopod 0-1, 0-3. Second exopod 1-1, 4-4; endopod 0-1, 0-5. Third exopod 1-1, 3-6; endopod 0-0, 0-7. Fourth exopod 4-4; endopod 0-4.

Total length 5 to 6.5 mm. Width of cephalothorax 3 to 4 mm, length on the midline 2.38 mm.

*Remarks.*—Heller's description and figures of the female of this species show that he did not have fully matured specimens, and no other author has even mentioned the species except Bassett-Smith. As the females carrying egg strings differ somewhat from Heller's immature specimens, a new description will be published later.

#### NESIPPUS GRACILIS, n. sp.

Plate 2, figs. 15-27; plate 3, fig. 33

*Occurrence.*—Three females and six males of another species of *Nesippus* were obtained from the same hosts in company with the preceding specimens. They are smaller in size and quite different in structural details, and since in the female the genital segment, like that of *crypturus*, has long and broad posterior lobes which conceal the abdomen and caudal rami in dorsal view, the specimens cannot be referred to any described species but must be established as new.

*Types.*—Females, U.S.N.M. no. 64055; cotypes: males, U.S.N.M. no. 64056.

*The female.*—Cephalothorax, including the posterior lobes, less than half the entire length (42 percent) and a little wider than long, the frontal margin strongly curved and emarginate at the center, the posterior corners produced into short lobes narrowed distally. Second and third segments slightly fused centrally but completely separated laterally. The posterior corners of the second segment each carry a rectangular lobe projecting diagonally backward inside the carapace lobes and reaching beyond the tips of the latter. The third segment is considerably narrower than the second but its posterior corners are slightly prominent. The fourth segment carries a pair of fused dorsal plates, the combined width of the plates and segment being equal to that of the third segment and a little more than half that of the genital segment. These plates are semicircular in outline and cover the posterior portion of the dorsal surface of the segment. In front of them the anterior part of the segment is narrowed into a short neck, which is the same width as the narrowed posterior portion of the third segment (fig. 15).

The outline of the genital segment is an elongated ellipse, twice as long as wide, divided in front of the center by lateral sinuses and a ventral groove into two unequal portions. The anterior portion is narrowed into a short neck behind the fourth segment, which is the same width as the neck between the third and fourth segments and gives the latter segment a peculiar isolated appearance. The corners of this anterior portion of the genital segment are narrowly rounded. The posterior portion of the segment is twice the length of the anterior and a little wider, with parallel lateral margins and broadly rounded posterior lobes. The sinus between the lobes is wider and deeper than in *crypturus* and shows a little of the abdomen at its base. Otherwise the abdomen and caudal rami are completely concealed in dorsal view, since the lobes reach far behind the tips of the rami.

The abdomen is quadrangular in outline with small circular lobes at its anterior corners, one-jointed, and attached to the ventral surface of the genital segment in front of the base of the posterior sinus. The caudal rami are small and curved in toward each other, the two together about as large as the abdomen. The posterior end of each ramus is triangularly tapered, with two terminal setae at the apex of the triangle and one at each lateral corner.

The appendages are similar to those of *crypturus*, with the following differences. The second antenna (fig. 17) has a shorter and stouter terminal claw, which is considerably enlarged and distinctly segmented near its base. The first maxilla (fig. 18) has a single

minute segment instead of two at its apex, and the rudimentary palp is made up of three fingerlike processes without setae. The second maxilla (fig. 19) has a shorter second segment, and the terminal claw, instead of being cylindrical and uniformly curved for its entire length as in *crypturus*, is flattened and bent at right angles near the tip. In the maxilliped the terminal claw has its basal three-fifths enlarged into an elliptical pad from which projects the slightly curved distal two-fifths, the tip of which fits into the cup. The basal pad carries on its lateral surface a process terminating in a small curved accessory claw (fig. 20).

The arrangement of the spines and setae on the swimming legs is as follows. First exopod 1-0, 4-3; endopod 0-0, 0-3. Second exopod 1-1, 4-5; endopod 0-1, 0-7. Third exopod 1-1, 4-4; endopod 0-1, 0-4. Fourth exopod 5-0; endopod 1-0. The fourth exopod is twice the length of the endopod, and its five coarse spines are bunched around its tip. The fifth legs are each replaced by two small spines on the ventral surface of the posterior lobes of the genital segment and are very difficult to discern.

Total length of female 5.6 mm. Length of cephalothorax, including the posterior lobes, 2.60 mm. Width of cephalothorax 2.90 mm. Length of genital segment 3.10 mm; width of same 1.63 mm.

*The male.*—Cephalothorax wider than long and more than half the entire length including the posterior lobes. The frontal margin is strongly curved and emarginate at the center; the posterior lobes are short and narrowly rounded. The second segment is longer than either the third or fourth and without lateral lobes. The third and fourth segments are transversely elliptical with strongly convex lateral margins. The genital segment is as wide as the fourth segment and one-fourth longer, with convex lateral margins and short posterior lobes. The abdomen is one-segmented, very short on the lateral margins and twice as long on the midline, with the posterior corners obliquely truncated. The caudal rami are circular, each a third as large as the abdomen, with four curved setae of about the same length.

The appendages are like those of the female, with a few modifications. The basal portion of the terminal claw of the second antenna is relatively larger and the basal pad on the terminal claw of the maxilliped is longer and wider (fig. 33). The arrangement of the spines and setae on the first three pairs of legs is exactly the same as in the female, but the setae are relatively much larger and their plumes longer and denser. In the fourth legs the exopod has four spines and four setae and the endopod has three terminal setae and one on the

inner margin near the tip, with no spines. Each fifth leg consists of a fingerlike process tipped with a seta and another seta in front of the base of the process. These fifth legs stand out from the ventral surface of the genital segment in such a way that they are invisible in dorsal view. The drawing in figure 27 was made under a cover glass, which turned the fifth leg sidewise and made it appear to project beyond the lateral margin of the segment.

Total length of male 4 to 5 mm. Length of cephalothorax 2.50 mm; width of same 2.60 mm.

*Remarks.*—Superficially, in size and general appearance the females are so similar to *Nesippus occultus* that they were first referred to that species. The males, however, are extremely dissimilar, and on closer examination the females revealed sufficient differences to constitute a new species. The distinctive characters are the rectangular lobes of the second thoracic segment, the isolated appearance of the fourth segment, the slenderness of the genital segment and the length of its posterior lobes, and the structural details of the appendages. If the number of specimens obtained is any criterion, *gracilis* is a much rarer species than *crypturus*.

#### KRØYERIA DISPAR, n. sp.

Plate 3, figs. 34-42

*Occurrence.*—Three females belonging to this new species were obtained from the gills of an unnamed shark.

*Type.*—U.S.N.M. no. 64053; paratypes, U.S.N.M. no. 64054.

*The female.*—Carapace one-half wider than long; cephalic area triangular with all three sides convex, the base forming the frontal margin and projecting in front of the lateral area. Posterior lobes short and broadly rounded, slightly reentrant on the outer margin near the tip and not quite reaching the posterior margin of the median lobe. Styliform process straight and stout, just reaching the posterior margin of the second segment. Second, third, and fourth segments about the same length and width, which is less than half the width of the carapace. Each of these segments carries a pair of dorsal plates, and there is a fourth pair on the median lobe of the carapace. These plates are small and closely adherent to the dorsal surface; those of each pair meet on the midline, are of a different shape from the other pairs, and are much smaller than the surface to which they are attached.

The fused fifth and genital segment is slightly narrower than the fourth segment anteriorly and is tapered posteriorly to the width of

the abdomen. It is six times as long as wide and its lateral margins are nearly straight. The abdomen is one-sixth as long and less than half as wide as the fused segment; it is made up of two segments, the basal one-half as long again and a little wider than the terminal segment. The caudal rami are longer than the terminal segment, four times as long as wide, and nearly parallel.

The first antennae are entirely concealed in dorsal view, six-segmented and sparsely armed with spines without any setae; the second antennae are tipped with a stout chela. The movable claw of the chela has a minute spine on its inner margin near the base, and the rigid finger is hollowed for the reception of the tip of the claw. The first maxilla is two-segmented, the terminal segment twice as long as the basal, bent abruptly near its proximal end and armed in the angle of the bend with a small process tipped with a seta. At the tip of the maxilla are two long unequal spines, which are rather stout and slightly curved. The second maxilla is three-segmented, the basal segment stout, the second segment very short and the third segment enlarged distally and tipped with two stout curved claws. This third segment is as long as the other two combined, and its enlarged tip forms beneath the bases of the claws a lobe which is covered with small spines. Behind the bases of the claws on the lateral and dorsal surfaces of the segment are fringes of long hairs. The basal segment of the maxilliped has a large rounded protuberance on its inner margin at the center, and an angular process at the distal end outside the base of the claw. The latter is stout, considerably enlarged at its base and bent abruptly at right angles over the apex of the protuberance on the basal segment.

The four pairs of legs are biramose, each ramus three-segmented, and the arrangement of the spines and setae as follows: First exopod 1-1, 1-1, 2-5; endopod 0-1, 0-1, 0-6. Second exopod 1-1, 1-1, 2-5; endopod 0-1, 0-2, 0-6. Third exopod 1-1, 1-1, 2-4; endopod 0-1, 0-2, 0-6. Fourth exopod 1-1, 1-1, 1-4; endopod 0-1, 0-1, 0-4. Fifth legs lacking.

*Remarks.*—This species is unlike others of the genus in several particulars, whence its specific name. The carapace is exceptionally widened, the second maxillae and maxillipeds are more like those of *Krøyerina*, and the middle segment of the second and third endopods carries two setae. But the presence of well-developed stylets, the shape of the carapace, and the presence of dorsal plates on the free segments correspond with those features of the present genus.

## EXPLANATION OF PLATES

## PLATE I

*Caligus lobatus*, n. sp., and *Nesippus crypturus*, new male

- FIG. 1. *Caligus lobatus*, dorsal view of female.  
 FIG. 2. Dorsal view of male.  
 FIG. 3. Second antenna, female.  
 FIG. 4. Second maxilla.  
 FIG. 5. Maxilliped.  
 FIG. 6. Maxilliped, male.  
 FIG. 7. Furca.  
 FIGS. 8-10. First, second, and fourth swimming legs, female.  
 FIG. 11. *Nesippus crypturus*, mouth tube and first maxillae, male.  
 FIG. 12. Lateral view of first maxilla, female.  
 FIG. 13. Lateral view of first maxilla, male.  
 FIG. 14. Second maxilla, male.

## PLATE 2

*Nesippus gracilis*, n. sp.

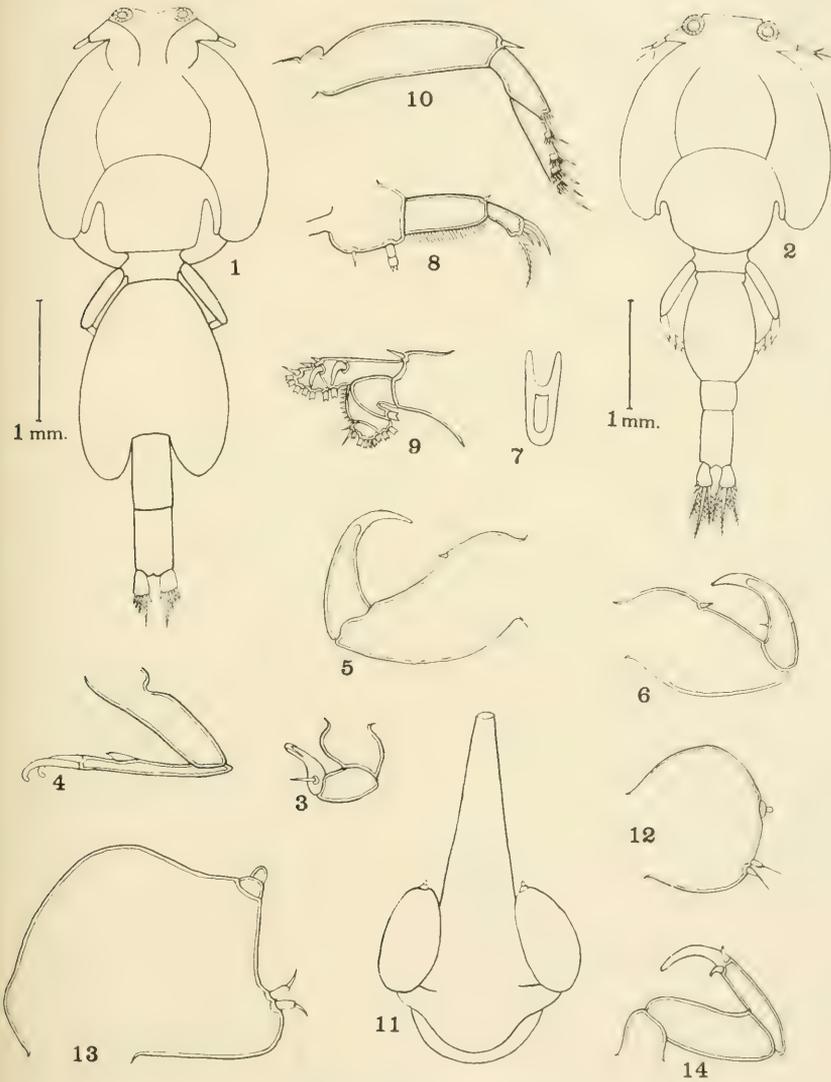
- FIG. 15. Dorsal view of female.  
 FIG. 16. Dorsal view of male.  
 FIG. 17. Second antenna, female.  
 FIG. 18. First maxilla.  
 FIG. 19. Second maxilla.  
 FIG. 20. Maxilliped, male.  
 FIGS. 21-24. First, second, third, and fourth swimming legs, female.  
 FIGS. 25-27. First, fourth, and fifth legs, male.

## PLATE 3

*Nesippus crypturus*, new male, and *Krøyeria dispar*, n. sp.

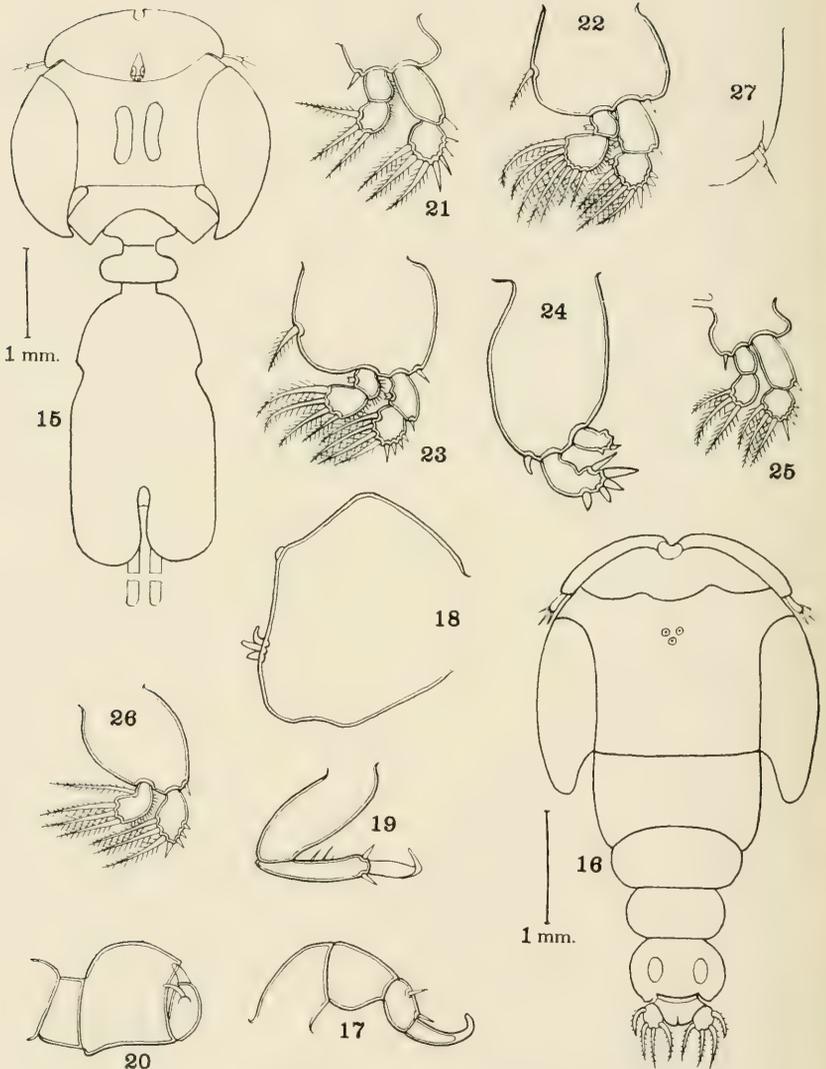
- FIG. 28. *Nesippus crypturus*, dorsal view of new male.  
 FIG. 29. Second antenna.  
 FIG. 30. Maxilliped.  
 FIGS. 31-32. First and fourth swimming legs.  
 FIG. 33. Maxilliped of male *Nesippus gracilis*.  
 FIG. 34. *Krøyeria dispar*, dorsal view of female.  
 FIG. 35. Second antenna.  
 FIG. 36. First maxilla.  
 FIG. 37. Second maxilla.  
 FIG. 38. Maxilliped.  
 FIGS. 39-42. First, second, third, and fourth swimming legs.





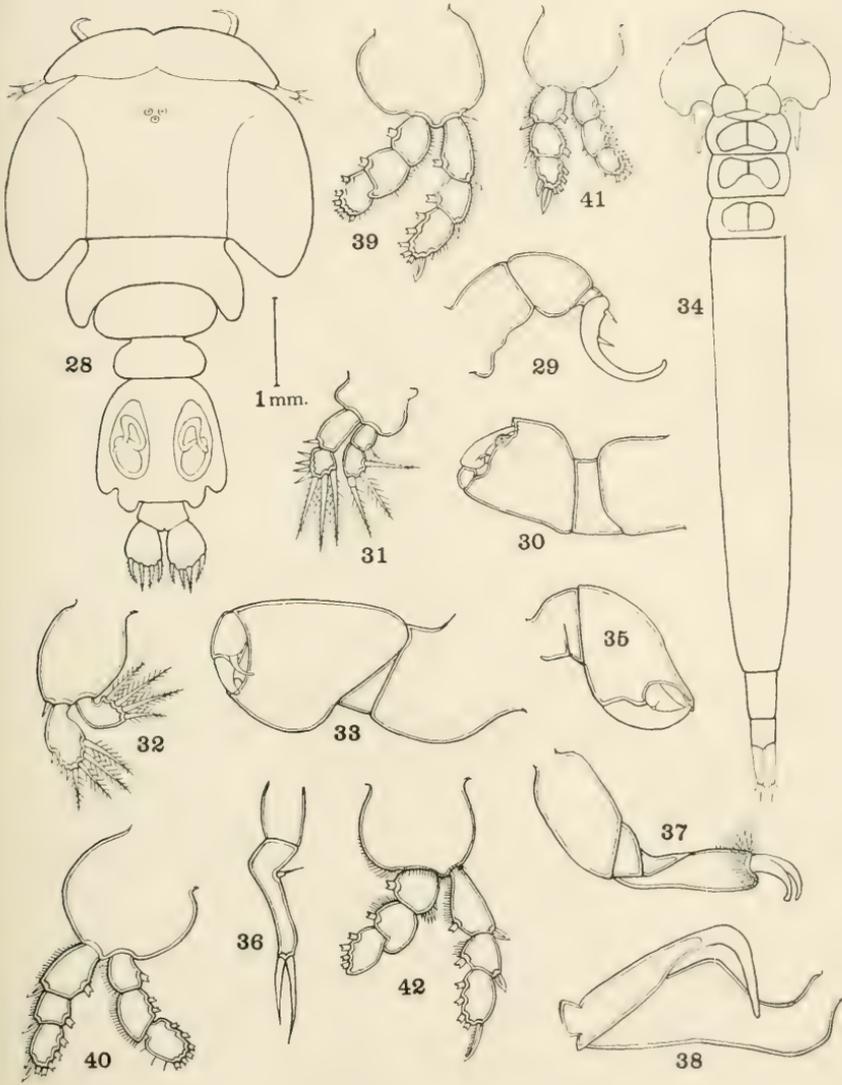
**NEW PARASITIC COPEPODS**

(For explanation, see page 9.)



NEW PARASITIC COPEPODS

(For explanation, see page 9.)



NEW PARASITIC COPEPODS  
(For explanation, see page 9.)







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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
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TO THE PUERTO RICAN DEEP

# BOLLMANIA LITURA, A NEW SPECIES OF GOBY

(WITH ONE PLATE)

BY

ISAAC GINSEBURG

U. S. Bureau of Fisheries



(PUBLICATION 3299)

CITY OF WASHINGTON  
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### BOLLMANIA LITURA, A NEW SPECIES OF GOBY<sup>1</sup>

By ISAAC GINSBURG  
*U. S. Bureau of Fisheries*

(WITH ONE PLATE)

The first Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep obtained a specimen of a goby which proves to be a new species, described below.

#### **BOLLMANIA LITURA, n. sp.**

*Description of type.*—Body and head of medium depth, well compressed. Eye notably large, its diameter considerably greater than length of snout. Mouth medium, notably oblique, terminal, lower jaw projecting; a horizontal through anterior edge of upper lip about passing through lower margin of eye; maxillary ending on a vertical through middle of eye. Tongue fleshy, broad, free for a considerable distance, its anterior margin very moderately and broadly emarginate. Teeth in narrow bands of three irregular rows, extending nearly to angle of mouth; teeth in outer row of upper jaw and in inner and outer rows of lower jaw moderately enlarged; enlarged outer teeth of upper jaw extending nearly to angle of mouth; enlarged outer teeth of lower jaw smaller than those of upper jaw, extending only to approximately halfway between symphysis and angle of mouth; inner row of lower jaw having some of the teeth situated at the side somewhat larger than those at the symphysis, but no well-marked caninoids anywhere. Isthmus moderately broad, attachment of gill membrane approximately under margin of preopercle.

Scales large, in 28 oblique rows from upper angle of pectoral to base of caudal; scales completely covering body and entire belly, continuous on side around base of ventral to chest as far as gill opening; scales present on base of pectoral, on antedorsal distance as far as the eyes, and on cheek; scales on side of body and caudal peduncle weakly ctenoid, having one marginal row of comparatively small spinules, the others cycloid and somewhat smaller; opercle probably having one or

<sup>1</sup> Published by permission of the U. S. Commissioner of Fisheries.

two scales only at upper anterior corner. (As in the other species of its genus, the scales are more or less deciduous, and the specimen described has most of the scales missing. The above description is based, therefore, on a study of the scale pockets to a large extent; consequently, a study of specimens having complete scalation may necessitate some changes in the above statements. No scales at all are now present on the opercle, but feeble traces of scale pockets may be discerned.)

First dorsal with seven flexible spines, the middle ones much prolonged, the fourth longest, its tip reaching base of seventh ray of second dorsal when placed flat along the back, the fifth spine but slightly shorter, the third reaching to base of fourth ray, the sixth to base of second ray. Second dorsal and anal each with 12 rays (including the first unbranched ray, and counting the last two, which are approximated at their base, as one); origin of anal under base of second dorsal ray, end of anal base under base of penultimate dorsal ray; posterior rays of vertical fins notably prolonged, especially those of dorsal, when depressed their tip extending for a considerable distance beyond end of hypoural. Pectoral with 20 rays, its tip reaching a vertical through base of second anal ray. Ventral inserted but little behind base of pectoral, its tip reaching slightly past origin of anal; interspinous membrane well developed. Caudal lanceolate, long, nearly equaling one-half the standard length. Anterior nostril with a broad, very low tubule; posterior nostril with its rim hardly raised. (The cutaneous papillae are not well enough preserved to be described accurately, but their distribution apparently does not differ appreciably from the other species of the genus.)

*Measurements.*—A male, 39 mm in standard length. Caudal 49, ventral 31, pectoral 28, greatest depth 25, least depth of caudal peduncle 13, length of head (not including the fleshy border) 31, depth of head directly behind eye 20, width of head at same point 17, postorbital part of head 16, maxillary 15, eye 12, snout 8, and antedorsal distance 36 percent of standard length.

*Color.*—Ground color yellowish, upper third of body and side of head irregularly washed with blackish shades, lower third sparsely and uniformly pigmented with nearly evenly distributed minute chromatophores, underside of belly silvery; a median series of five diffuse, very faint blotches, the first under spinous dorsal, the last at base of caudal most distinct; first dorsal with a posterior black blotch having a rather diffuse boundary, anterior margin of fin with interrupted black streaks, entire fin diffusely shaded with blackish pigment faintly suggesting the following, namely, two lengthwise

streaks at base, and distally in the form of elliptical peripheries having whitish, irregularly shaded centers; second dorsal colored somewhat like the general color pattern as described for the first dorsal; caudal with lower half nearly uniformly dusky, upper half with the pigment concentrated in elliptical peripheries having variously shaded centers, more marked than on the dorsals, produced part of fin and posterior margin blackish; anal and ventral very dark, nearly black; pectoral dusky; upper lip dusky, but the pigment not markedly more intense than on rest of snout, no distinct black band. All fins, except the pectoral, more or less washed and daubed with a whitish color.

*Comparison.*—The specimen described was compared with specimens of all the species of *Bollmania* now known, except (*Gobius*) *Bollmania eigenmanni* Garman. No specimens of the latter are available for comparison, and I had to rely solely on the original account. As compared with the four species of *Bollmania* from the eastern Pacific,<sup>2</sup> *litura* differs chiefly in having fewer rays in the vertical fins. As compared with its two known congeners occurring in the same faunal region with it, *litura* differs from *B. boqueronensis* Evermann and Marsh<sup>3</sup> in having a much more elevated dorsal; and from *B. eigenmanni* (Garman)<sup>4</sup> in having a longer ventral and caudal and in lacking a black band on the upper lip. The presence of a median row of blotches is unique for a species of *Bollmania*. The only other species of this genus which apparently approach *litura* in this respect are *B. macropoma* Gilbert and *B. chlamydes* Jordan from the Pacific, which were originally described as having the sides with vertical dusky bars. The specimens of the latter two species which I examined are now faded, and the color cannot be compared.

*Holotype.*—U.S.N.M. no. 93797. A male, *Caroline* station 59. Samaná Bay, Dominican Republic, trawled in 18 to 19 fathoms, on a mud bottom. The type is the only specimen now known.

<sup>2</sup> See Jordan and Evermann, U. S. Nat. Mus. Bull. 47, pt. 3, pp. 2238-2239, 1898.

<sup>3</sup> Bull. U. S. Fish Comm., vol. 20, pt. 1, p. 298, fig. 92, 1902.

<sup>4</sup> Bull. Lab. Nat. Sci., State Univ. Iowa, vol. 4, no. 1, p. 88, pl. 3, fig. 1, 1896.





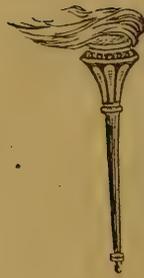
BOLLMANIA LITURA. FROM THE TYPE











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# FOURTEEN NEW SPECIES OF FORAMINIFERA

(WITH THREE PLATES)

BY

JOSEPH A. CUSHMAN

Cushman Laboratory for Foraminiferal Research, Sharon, Mass.



(PUBLICATION 3327)

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*Cushman Laboratory for Foraminiferal Research, Sharon, Mass.*

(WITH THREE PLATES)

American workers on the foraminifera have long desired to have material from that area dredged by the *Challenger* and represented by the two famous *Challenger* stations 23 and 24. In the volume, "Summary of Results", Brady lists 155 separate species and varieties from station 23, and 241 from station 24. This alone would indicate the extreme richness of this area as far as the foraminifera are concerned. These stations are also important as being the type localities for numerous species described by Brady. Although the *Albatross* did some dredging in this general area, the exact stations were not occupied. The area on the north coast of Puerto Rico, as is known to those of us who have sailed over it, is one of rough seas, and it is difficult for an ordinary ship to do deep-sea dredging. When the *Challenger* herself made these two stations, one of the men was lost during the operations.

It has been left to the Johnson-Smithsonian Deep-Sea Expedition to reexplore this area. The large size of the vessel used, the *Caroline*, practically 280 feet in length, with a draft of  $17\frac{1}{2}$  feet, a beam of 38 feet, and equipped with a 50-ton Sperry gyrostabilizer, which keeps her on an almost even keel in all kinds of weather, made it possible to work off this rough area to the north of Puerto Rico. The stations occupied, particularly numbers 36, 91, 93, 94, and 95, cover the region of the two *Challenger* stations, and a preliminary study of the material has shown that most, if not all, of the species described and listed by Brady from this area are present in the samples dredged by the *Caroline*.

The study of this material is therefore particularly important in giving more material for these particular stations. The author has been fortunate in having had placed at his disposal some small amounts of the original *Challenger* material from these two famous stations, but the amount has been insufficient to give the large series of specimens which are desirable. So it is a matter of congratulation that this

expedition has made available an adequate amount of material from this region.

In the preliminary studies, a considerable number of new forms have been found, and these are here described with illustrations of the holotypes, and occasionally of other specimens to make the species more adequately known.

**REOPHAX TRILATERALIS, n. sp.**

Plate I, figs. 1-4

Test elongate, angled, with three distinct faces generally flattened, and the angles prominent but somewhat rounded, sides nearly parallel, triangular in transverse section; chambers few, indistinct; sutures indistinct; wall very coarsely arenaceous, composed of angular fragments rather neatly cemented, the surface only slightly roughened; aperture terminal, rounded, circular to narrowly elliptical. Length up to 1.75 mm; diameter 0.70-0.90 mm.

*Holotype*.—U.S.N.M. no. 26181; from station 13, latitude 18°31' 05" N., longitude 62°02'15" W. to latitude 18°30'30" N., longitude 66°04'05" W., 200 to 300 fathoms.

**NOURIA JOHNSONI, n. sp.**

Plate I, figs. 5, 6

Test somewhat longer than broad, very slightly compressed, periphery broadly rounded, greatest breadth somewhat below the middle, base rounded or somewhat truncate, apertural end rounded, truncate; chambers comparatively few, and more or less involute, irregularly biserial in the adult; sutures very slightly depressed, strongly oblique; wall thin, composed of elongate sponge spicules arranged longitudinally to the test, rather neatly cemented, occasionally with the ends projecting toward the base; aperture fairly large, generally rounded or elliptical. Length up to 1.50 mm; breadth 0.65-0.75 mm; thickness 0.55-0.65 mm.

*Holotype*.—U.S.N.M. no. 26183; from station 25, latitude 18°32' 15" N., longitude 66°22'10" W. to latitude 18°32'05" N., longitude 66°22'10" W., 240 to 300 fathoms.

This species somewhat resembles others of the genus known from the Pacific, but is much more rounded.

**VERNEUILINA SPICULOTESTA, n. sp.**

Plate I, figs. 7, 8

Test elongate, 2 to 2½ times as long as broad, the early portion irregularly triangular in transverse section, somewhat twisted, triserial throughout, although in the last-formed whorl two chambers make up

a very large part of the apertural view, greatest breadth at the apertural end; chambers distinct, becoming somewhat inflated in the adult; sutures distinct, depressed; wall largely composed of fragments of sponge spicules firmly cemented and forming a rather neatly finished test on the exterior; aperture elongate, narrow, at the base of the inner margin of the last-formed chamber. Length 0.85-1.20 mm; diameter 0.55-0.65 mm.

*Holotype*.—U.S.N.M. no. 26185; from station 93, latitude 18°38'00" N., longitude 65°09'30" W. to latitude 18°37'45" N., longitude 65°05'00" W., 350 to 400 fathoms.

This is a unique species in the peculiar shape of the test and the unusual character of the wall. It is rather common in some of the dredgings from the Puerto Rican Deep.

#### GAUDRYINA d'Orbigny, 1839

##### Subgenus SIPHOGAUDRYINA, n. subgenus

*Subgenotype*.—*Gaudryina (Siphogaudryina) stephensoni* Cushman.

Test with the early stages triserial, usually triangular with sharp angles, one of the ridges becoming divided and forming a quadrangular test with four distinct angles, usually somewhat compressed with two narrow sides and two broad sides, one of which is somewhat wider than the other, the angles frequently expanded into fistulose processes, which become broken on the exterior, showing a row of openings along the angles of the test, end view usually quadrangular. Upper Cretaceous to Recent.

#### GAUDRYINA (SIPHOGAUDRYINA) COMPRESSA, n. sp.

Plate 1, figs. 9a, 9b

Test about twice as long as broad, much compressed, the flattened sides showing the biserial arrangement very broad, the other two sides narrow, truncate, angles with tubular projections usually broken at the tip, showing a double series of openings, apertural end obliquely truncate; chambers numerous, low and broad, increasing gradually in size as added, only slightly inflated, triserial in the young stages, and biserial in the adult; sutures distinct, very slightly depressed, nearly at right angles to the elongate axis; wall finely arenaceous with a few coarse fragments, a large proportion of cement giving a fairly smooth surface; aperture narrow, elongate, in a distinct reentrant at the inner margin of the last-formed chamber. Length 0.50-0.60 mm; breadth 0.28-0.32 mm; thickness 0.15-0.20 mm.

*Holotype*.—U.S.N.M. no. 26187; from station 104, latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. to latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W., 80 to 120 fathoms.

This species somewhat resembles *Gaudryina* (*Siphogaudryina*) *siphonifera* (H. B. Brady), which is characteristic of the Indo-Pacific. In the Atlantic species, however, the test is smaller, more complex, and the tubular projections more numerous but less elongate.

#### CRIBROGOËSELLA, n. gen.

*Bigenerina* H. B. Brady (not d'Orbigny), Rep. Voy. *Challenger*, Zoology, vol. 9, p. 371, 1884.

*Genotype*.—*Bigenerina robusta* H. B. Brady.

Test elongate, subcylindrical, the early portion tapering, later portion with the sides nearly parallel, rounded in transverse section, earliest whorl with four or five chambers, rapidly reducing to three, and then to a biserial stage which continues for a considerable period, followed in the adult by uniserial chambers, interior undivided; wall arenaceous; aperture in the biserial portion at the inner margin of the last-formed chamber, in the uniserial portion becoming terminal, central, and gradually increasing from one opening in the early stage to many in the adult, occupying the central portion of the terminal face. Miocene to Recent.

This genus apparently is derived from *Goëssella* by the addition of the apertural characters, having a cribrate terminal face with the apertures represented by numerous, small, rounded openings in the middle portion.

Apparently this genus developed in the West Indian region directly from *Goëssella* in the Miocene, as it is found in the Miocene of Trinidad, and continues in the same general region to the present oceans, the type species having been described from *Challenger* material from off the West Indies.

#### CRIBROGOËSELLA BRADYI, n. sp.

Plate I, figs. 10, 11

*Textularia agglutinans* (part) H. B. Brady (not d'Orbigny), Rep. Voy. *Challenger*, vol. 9, pl. 43, fig. 12 (not figs. 1-3), 1884.

Test large, much elongate, gradually tapering from the subacute initial end, greatest breadth toward the apertural end, early stages with as many as five chambers, reducing to three, and soon becoming biserial, the megalospheric form becoming uniserial in the adult; cham-

bers distinct, somewhat inflated, particularly in the later portion, somewhat broader than high, increasing rather gradually in size as added; sutures distinct, becoming more depressed in the later portion, in the biserial stage usually about at right angles to the elongate axis; wall very finely arenaceous, rather smoothly finished except for a series of longitudinal depressions, particularly in the biserial portion; aperture in the biserial stage at the base of the inner margin of the last-formed chamber, later becoming divided into two or more elongate openings, and in the adult megalospheric form with numerous small rounded openings in the terminal face. Length up to 3.50 mm; diameter 0.80 mm.

*Holotype*.—U.S.N.M. no. 26189; from station 93, latitude  $18^{\circ}38'00''$  N., longitude  $65^{\circ}09'30''$  W. to latitude  $18^{\circ}37'45''$  N., longitude  $65^{\circ}05'00''$  W., 350 to 400 fathoms.

This large species was found by Brady in the *Challenger* material from this same general region and was referred by him to d'Orbigny's *Textularia agglutinans* in the above reference. In our figured specimen it is difficult to make out the terminal apertures, as they are too filled with foreign material, but in the type species of the genus they are very distinct.

#### TRILOCULINA NASUTA, n. sp.

Plate 2, figs. 1-3

Test very elongate, slender, the apertural end continued out into a long, slender neck, three chambers visible from the exterior in the adult, periphery broadly rounded; chambers distinct, inflated, of a peculiar shape, the apertural end greatly extended into a somewhat compressed neck, convex on the outer side, and concave on the inner, the basal portion distinct, expanded, somewhat curved, covering the elongate neck of the preceding chamber; sutures distinct, strongly depressed; wall smooth, imperforate, calcareous; aperture rounded, reniform, usually with a slight tooth on the inner margin, and a distinct lip. Length up to nearly 1.00 mm; breadth 0.18-0.20 mm; thickness 0.12 mm.

*Holotype*.—U.S.N.M. no. 26192; from station 26, latitude  $18^{\circ}30'20''$  N., longitude  $66^{\circ}22'05''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}23'05''$  W., 33 to 40 fathoms.

This is a very peculiar species, with its very elongate, compressed neck and peculiarly shaped chambers. It is rather common at some of the stations.

**TRILOCULINA FENIMOREI, n. sp.**

Plate 2, figs. 4, 5

Test somewhat longer than broad, periphery truncate and keeled at the angles, basal and apertural ends extended, the former into a subacute point, the latter into a broader, expanded neck, typically showing strong, transverse folds; chambers very distinct, quadrangular in transverse section, the periphery truncate or slightly concave, the angles distinctly raised; sutures fairly distinct, somewhat depressed; wall fairly smooth, matte, imperforate, calcareous; aperture circular at the end of a distinct, expanded neck. Length up to 0.80 mm; breadth 0.35-0.40 mm; thickness 0.25 mm.

*Holotype*.—U.S.N.M. no. 26194; from station 26, latitude 18°30' 20" N., longitude 66°22'05" W. to latitude 18°30'30" N., longitude 66°23'05" W., 33 to 40 fathoms.

This species is peculiar in its general shape, particularly in the large, expanded neck with transverse folds, and is fairly common in this material.

**PYRGO JOHNSONI, n. sp.**

Plate 2, figs. 6-8

Test short and broad, length and breadth about equal, periphery very broadly rounded, in end view broadly elliptical, the base extended back somewhat, forming a distinct lobe, apertural end also somewhat extended; chambers strongly inflated, distinct, only two visible in the adult; sutures distinct, depressed; wall smooth, imperforate, calcareous; aperture nearly circular, with a distinct, thickened lip and a simple tooth somewhat expanded at the inner end and in side view rising above the lip. Length 1.10-1.25 mm; breadth 0.85-1.00 mm; thickness 0.80 mm.

*Holotype*.—U.S.N.M. no. 26196; from station 26, latitude 18°30' 20" N., longitude 66°22'05" W. to latitude 18°30'30" N., longitude 66°23'05" W., 33 to 40 fathoms.

This species is distinct in the peculiar form of the basal and apertural ends of the adult chamber.

**PYRGO JUGOSUS, n. sp.**

Plate 2, figs. 9-11

Test slightly longer than broad, in the adult having the middle of each chamber somewhat produced into a distinct ridge, and in old-age specimens usually having two supplementary ridges at either side, periphery keeled, at the base somewhat serrate; chambers distinct,

inflated; sutures distinct, slightly depressed; wall smooth except for the keel and the ridges, imperforate, calcareous; aperture narrowly elongate, largely filled by the broad tooth with the ends somewhat expanded. Length 1.00-1.40 mm; breadth 0.90-1.10 mm; thickness 0.90 mm.

*Holotype*.—U.S.N.M. no. 26198; from station 104, latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. to latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W., 80 to 120 fathoms.

The series of figures given shows the development of this peculiar, ridged form, which is smooth in the early stages and then develops a single, strong ridge, and, in the adult, supplementary ones in addition.

**PYRGO NASUTUS, n. sp.**

Plate 3, figs. 1-4

Test in the adult in front view about as broad as long, in the early stages usually somewhat longer than broad, periphery strongly keeled and serrate in the adult, apertural end, particularly in the young stages, extended into a much compressed neck, somewhat convex on the dorsal outer side, and flattened or concave on the inner; chambers distinct, inflated; sutures distinct, slightly depressed; wall smooth, imperforate, calcareous; aperture narrow, elongate, somewhat curved without a distinct tooth. Length 0.60-0.75 mm; breadth 0.45-0.60 mm; thickness 0.30-0.35 mm.

*Holotype*.—U.S.N.M. no. 26200; from station 56, latitude  $19^{\circ}10'15''$  N., longitude  $69^{\circ}27'20''$  W. to latitude  $19^{\circ}10'15''$  N., longitude  $69^{\circ}28'05''$  W., 17 fathoms.

The series of figures shows the developmental stages of this unusual form, which may be distinguished particularly by the peculiarly shaped neck.

**GORDIOSPIRA RUGOSA, n. sp.**

Plate 3, figs. 5-7

Test in a somewhat open coil, nearly planispiral, periphery broadly rounded; the coils slightly involute; sutures distinct, depressed; wall imperforate, calcareous, with numerous transverse wrinkles; aperture large, formed by the open end of the tubular chamber. Diameter 0.60-0.75 mm; thickness 0.20-0.22 mm.

*Holotype*.—U.S.N.M. no. 26202; from station 104, latitude  $18^{\circ}30'40''$  N., longitude  $66^{\circ}13'20''$  W. to latitude  $18^{\circ}30'10''$  N., longitude  $66^{\circ}13'50''$  W., 80 to 120 fathoms.

This is a tropical species of this genus which has hitherto been known largely from the Polar regions. It is very strongly rugose.

**GLANDULINA SPINATA, n. sp.**

Plate 3, figs. 8, 9

Test oval or broadly elliptical in front view, with apertural end somewhat produced, circular in transverse section; chambers in the early portion apparently biserial, later uniserial, much involute; sutures largely obscured by the surface ornamentation; wall calcareous, perforate, rather uniformly covered with short, blunt spines; aperture elliptical, at the end of a short neck with a somewhat flaring lip. Length 0.45-0.50 mm; diameter 0.30 mm.

*Holotype*.—U.S.N.M. no. 26204; from station 56, latitude  $19^{\circ}10'15''$  N., longitude  $69^{\circ}27'20''$  W. to latitude  $19^{\circ}10'15''$  N., longitude  $69^{\circ}28'05''$  W., 17 fathoms.

This species apparently belongs in the genus *Glandulina*, and is to be distinguished from other species of that genus by its peculiar surface ornamentation.

**EHRENBERGINA SPINEA, n. sp.**

Plate 3, figs. 10, 11

Test somewhat compressed, in the adult in front view somewhat rhomboid, with each side extended out into an acicular spine, dorsal view with the sides broadly rounded; chambers distinct, only slightly inflated; sutures distinct, somewhat limbate, little if at all depressed; wall smooth, calcareous, finely perforate; aperture narrow, elongate. Height 0.35 mm; breadth including spines 0.60 mm.

*Holotype*.—U.S.N.M. no. 26207; from station 13, latitude  $18^{\circ}31'05''$  N., longitude  $66^{\circ}02'15''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}04'05''$  W., 200 to 300 fathoms.

This species most closely resembles that described by Brady from the Pliocene of the Pacific, as *Ehrenbergina bicornis*. Our Atlantic species however is smaller and much more compressed, with the spines much less developed.

**PEGIDIA CORRUGATA, n. sp.**

Plate 3, figs. 12, 13

Test plano-convex, the dorsal side strongly convex, ventral side flattened, periphery rounded; chambers rather indistinct, four or five making up the last-formed whorl in the adult and largely visible on the dorsal side, ventral side much obscured by the peculiar surface ornamentation; sutures largely obscured, strongly curved, sigmoid on the dorsal side; wall calcareous, distinctly but finely perforate, the dorsal side fairly smooth, ventral side strongly rugose with a peculiar laby-

rinthic pattern of raised, rounded ridges with depressed areas between, covering most of the ventral side and obscuring the structure of the aperture. Diameter 0.85 mm; height 0.50-0.55 mm.

*Holotype*.—U.S.N.M. no. 26210; from station 26, latitude 18°30'20" N., longitude 66°22'05" W. to latitude 18°30'30" N., longitude 66°23'05" W., 33 to 40 fathoms.

This species shows very considerable variation, particularly in the ornamentation of the ventral side, and seems to be distinct from all other known species of the genus.

## EXPLANATION OF PLATES

## PLATE I

- FIGS. 1-4. *Reophax trilateralis*, n. sp.  $\times 30$ . 1, Holotype. *a*, front view; *b*, apertural view.  
 FIGS. 5, 6. *Nouria johnsoni*, n. sp.  $\times 30$ . 5, Paratype. 6, Holotype. *a*, *a*, front views; *b*, *b*, apertural views.  
 FIGS. 7, 8. *Verneuilina spiculotesta*, n. sp.  $\times 40$ . 7, Paratype. 8, Holotype. *a*, front view; *b*, apertural view.  
 FIGS. 9*a*, 9*b*. *Gaudryina (Siphogaudryina) compressa*, n. sp.  $\times 90$ . *a*, front view; *b*, apertural view.  
 FIGS. 10, 11. *Cribrogöcsella bradyi*, n. sp.  $\times 25$ . 10, Holotype. 11, Paratype. *a*, *a*, front views; *b*, *b*, apertural views.

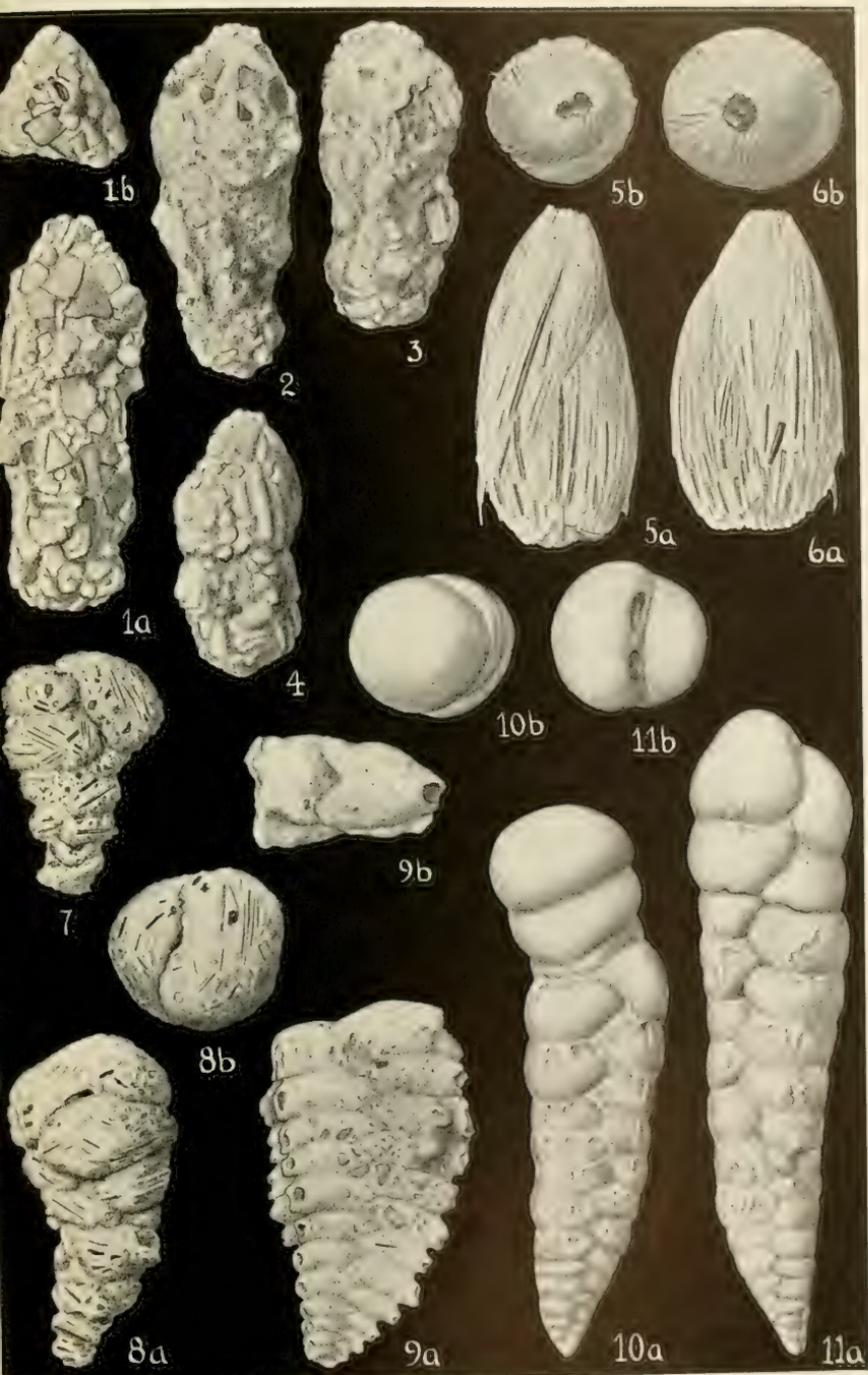
## PLATE 2

- FIGS. 1-3. *Triloculina nasuta*, n. sp.  $\times 70$ . 1, Holotype. *a*, *b*, opposite sides; *c*, apertural view. 2, 3, Paratypes.  
 FIGS. 4, 5. *Triloculina fenimorei*, n. sp.  $\times 50$ . 4, Holotype. *a*, *b*, opposite sides; *c*, apertural view. 5, Paratype.  
 FIGS. 6-8. *Pyrgo johnsoni*, n. sp.  $\times 30$ . 6, Holotype. *a*, side view; *b*, apertural view. 7, 8, Paratypes.  
 FIGS. 9-11. *Pyrgo jugosus*, n. sp.  $\times 30$ . 9, 10, Paratypes. 11, Holotype. *a*, front view; *b*, apertural view.

## PLATE 3

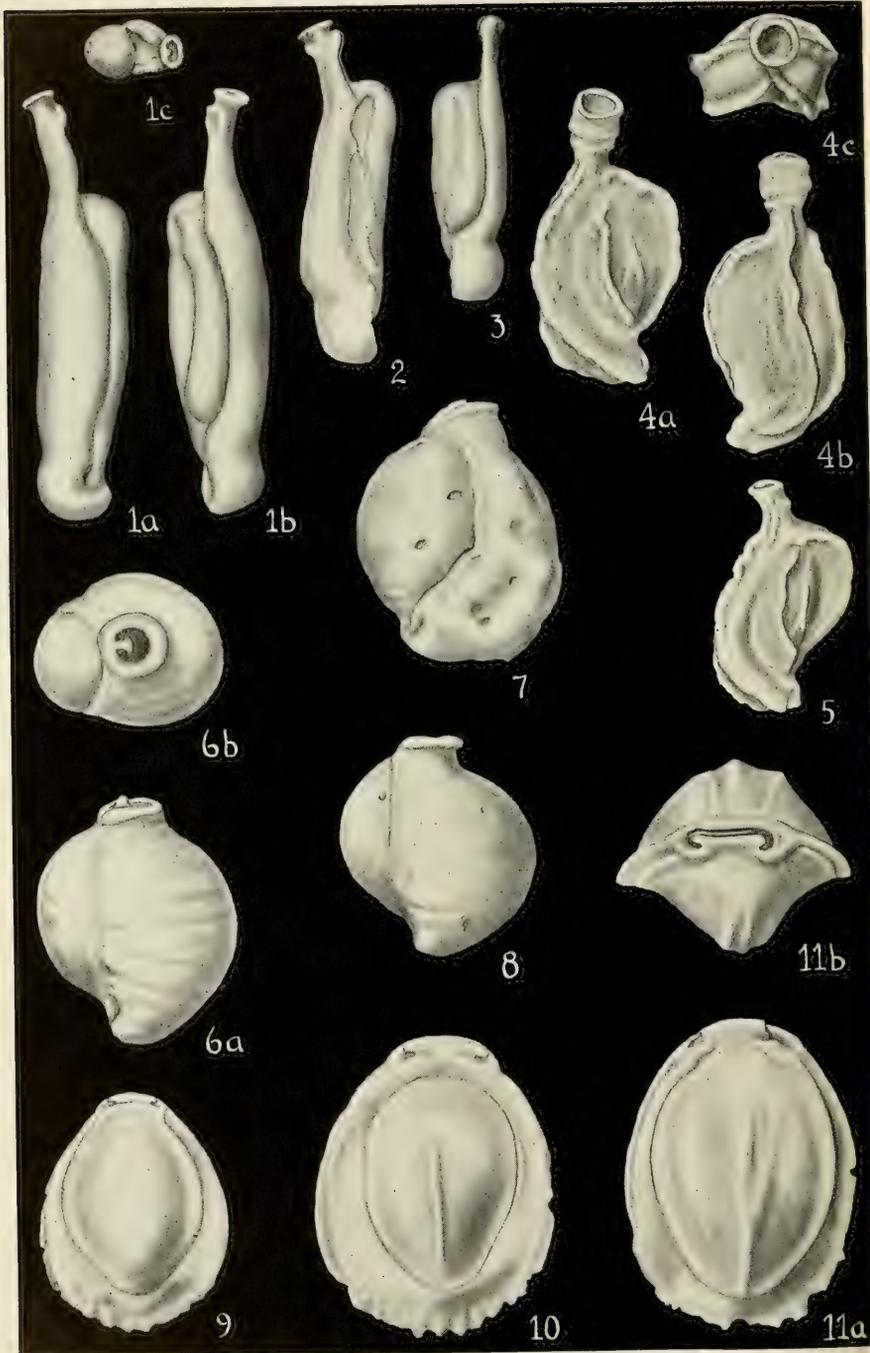
- FIGS. 1-4. *Pyrgo nasutus*, n. sp.  $\times 50$ . 1, Holotype. *a*, front view; *b*, apertural view. 2-4, Paratypes.  
 FIGS. 5-7. *Gordiospira rugosa*, n. sp.  $\times 50$ . 5, Holotype. *a*, side view; *b*, peripheral view. 6, 7, Paratypes.  
 FIGS. 8, 9. *Glandulina spinata*, n. sp.  $\times 70$ . 8, Holotype. *a*, front view; *b*, apertural view. 9, Paratype.  
 FIGS. 10, 11. *Ehrenbergina spinea*, n. sp.  $\times 50$ . 10, Paratype. 11, Holotype. *a*, front view; *b*, apertural view; *c*, basal view.  
 FIGS. 12, 13. *Pegidia corrugata*, n. sp.  $\times 35$ . 12, Holotype. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. 13, Ventral view of paratype.





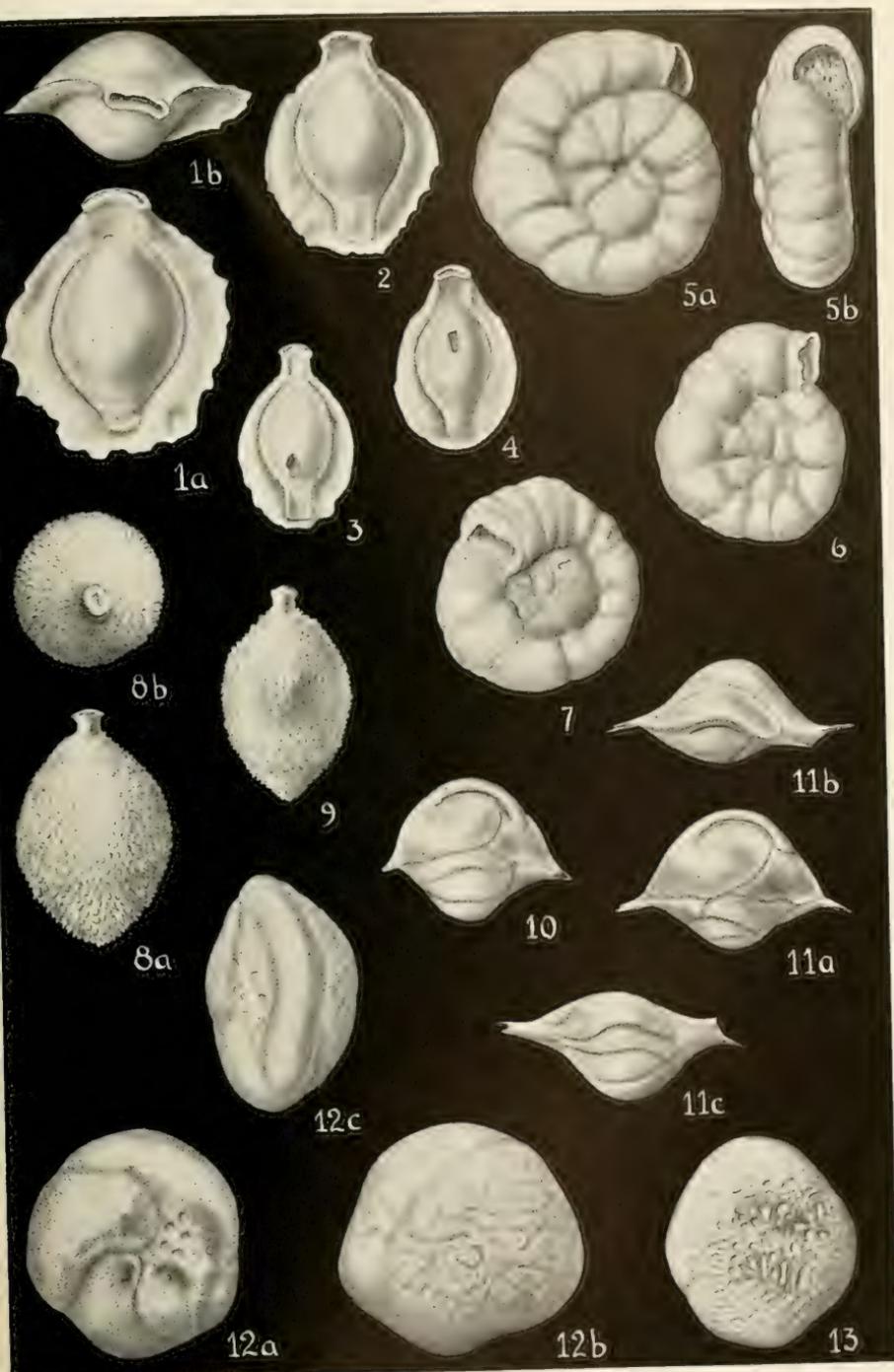
**NEW FORAMINIFERA**

(For explanation, see page 9.)



NEW FORAMINIFERA

(For explanation, see page 9.)



NEW FORAMINIFERA  
(For explanation, see page 9.)







SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 22

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# TWO NEW FORAMINIFERA OF THE GENUS TEXTULARIA

(WITH ONE PLATE)

BY

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*Cushman Laboratory for Foraminiferal Research, Sharon, Mass.*

(WITH ONE PLATE)

In the collections of the Johnson-Smithsonian Deep-Sea Expedition of the cruise of 1933 have been found two species of the genus *Textularia*, which are apparently undescribed forms.

#### TEXTULARIA CALVA, n. sp.

Plate I, figs. 1, 2

Test very large, elongate, roughly triangular in front and side views, almost circular in end view, initial end slightly compressed, pointed in the microspheric form, and rounded in the megalospheric form; chambers numerous, low and broad, increasing in height gradually as added; sutures indistinct except in early portion, somewhat depressed, straight, and slightly oblique; wall coarsely arenaceous, composed of sand grains and calcareous fragments, very roughly finished except on apertural face, where it is rather smoothly finished; aperture, a very low, broad opening at the base of the inner margin of the last-formed chamber; color gray. Length of holotype 1.60 mm; width 1.04 mm; thickness 1.00 mm.

*Holotype*.—U.S.N.M. no. 26179; from station 25, latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}22'10''$  W. to latitude  $18^{\circ}32'05''$  N., longitude  $66^{\circ}22'10''$  W., 240 to 300 fathoms.

In addition to the type locality, I have specimens from station 13, latitude  $18^{\circ}31'05''$  N., longitude  $66^{\circ}02'15''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}04'05''$  W., 200 to 300 fathoms; and station 93, latitude  $18^{\circ}38'00''$  N., longitude  $65^{\circ}09'30''$  W. to latitude  $18^{\circ}37'45''$  N., longitude  $65^{\circ}05'00''$  W., 350 to 400 fathoms.

This species is similar in some respects to *Textularia goëssii* Cushman from the Pacific Ocean near the Hawaiian Islands. *T. goëssii* differs, however, in being more smoothly finished, in having curved sutures, a flattish apertural face, and in having the upper edge of each chamber slightly overhanging.

## TEXTULARIA LATERALIS, n. sp.

Plate I, figs. 3-5

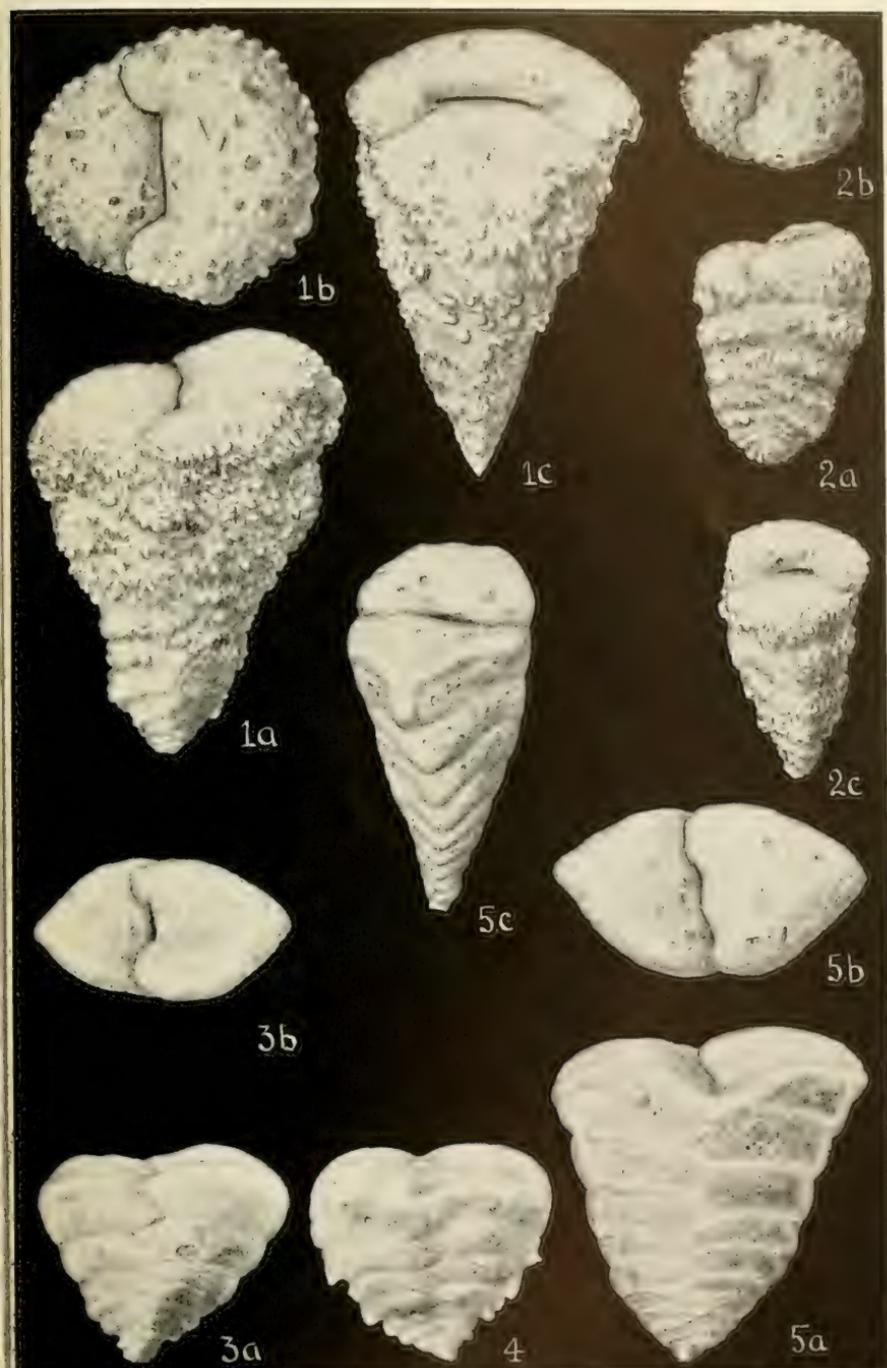
Test subtriangular in outline, slightly longer than wide, somewhat compressed, subrhomboidal in end view, periphery subacute to spinose; chambers numerous, about twice as wide as high, usually rounded at the periphery, but terminating in short, conical spines in some specimens, especially near the initial end, upper margin of chamber very slightly overhanging; sutures distinct, slightly depressed, gently curved in an anterior direction; wall finely arenaceous and rather smoothly finished; aperture a very low opening at the base of the inner margin of the last-formed chamber, with a short lip at the upper edge. Length of holotype 0.71 mm; width 0.70 mm; thickness 0.31 mm.

*Holotype*.—U.S.N.M. no. 26176; from station 25, latitude  $18^{\circ}32'15''$  N., longitude  $66^{\circ}22'10''$  W. to latitude  $18^{\circ}32'05''$  N., longitude  $66^{\circ}22'10''$  W., 240 to 300 fathoms.

Several specimens have also been found at station 13, latitude  $18^{\circ}31'05''$  N., longitude  $66^{\circ}02'15''$  W. to latitude  $18^{\circ}30'30''$  N., longitude  $66^{\circ}04'05''$  W., 200 to 300 fathoms; and at station 93, latitude  $18^{\circ}38'00''$  N., longitude  $65^{\circ}09'30''$  W. to latitude  $18^{\circ}37'45''$  N., longitude  $65^{\circ}05'00''$  W., 350 to 400 fathoms.

## EXPLANATION OF PLATE

- FIGS. 1, 2. *Textularia calva*, n. sp.  $\times 38$ . 1, Microspheric form, holotype. 2, Megalospheric form, paratype. *a, a*, front views; *b, b*, top views; *c, c*, side views.
- FIGS. 3-5. *Textularia lateralis*, n. sp.  $\times 53$ . 3, Paratype. *a*, front view; *b*, top view. 4, Paratype. Front view. 5, Holotype. *a*, front view; *b*, top view; *c*, side view.

**FORAMINIFERA OF THE GENUS TEXTULARIA**

(For explanation, see page 2.)







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# A NEW GENUS OF OPISTHOGNATHID FISHES

BY

GEORGE S. MYERS

Assistant Curator, Division of Fishes, United States  
National Museum



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The presence of a new genus and species of Opisthognathidae among the fishes obtained by the Johnson-Smithsonian Deep-Sea Expedition has made it necessary to examine the scattered literature on the group and some confusing points in its classification.

The trachinoids, as defined by Regan,<sup>1</sup> are not well differentiated from the serranid-like percoids, and certain genera now referred to some of the trachinoid families may be found to be nearer the other group. Ogilby<sup>2</sup> has revised the genera of Opisthognathidae, but he included in this family the peculiar Japanese genus *Owstonia*,<sup>3</sup> which is placed by Jordan, Tanaka, and Snyder<sup>4</sup> and by Jordan<sup>5</sup> in the monotypic family Owstoniidae. To my knowledge this family has never been defined.

*Owstonia* seems to be one of those genera that might be placed with equal propriety either among the anthiine serranids or with the trachinoids. Barnard,<sup>6</sup> when synonymizing Gilchrist's *Parasphenanthias*<sup>7</sup> with *Owstonia*, has pointed out the evident relationship of the latter to *Sphenanthias* Weber.<sup>8</sup> Fowler<sup>9</sup> has resurrected *Parasphenanthias* for a new South African species, and places the genus in the Pseudochromidae. Since I intend to treat this assemblage of genera more fully in the near future, I shall not go further into their relationships at this time, but I wish to point out that *Owstonia*, *Sphenanthias*,

<sup>1</sup> The classification of the percoid fishes. *Ann. Mag. Nat. Hist.*, ser. 8, vol. 12, pp. 111-145, 1913.

<sup>2</sup> *Mem. Queensland Mus.*, vol. 7, pt. 1, pp. 123-124, 1920.

<sup>3</sup> Tanaka, *Journ. Coll. Sci. Imp. Univ. Tokyo*, vol. 23, p. 27, 1908.

<sup>4</sup> *Journ. Coll. Sci. Imp. Univ. Tokyo*, vol. 33, p. 188, 1913.

<sup>5</sup> *Classification of fishes*, p. 231, 1923.

<sup>6</sup> *Ann. South African Mus.*, vol. 21, p. 492, 1927.

<sup>7</sup> Union of South Africa, *Fisher. Mar. Biol. Surv.*, Rept. no. 2 (1921), *Spec. Repts.*, p. 69, 1922.

<sup>8</sup> *Die Fische der Siboga-Expedition. Siboga-Exped.*, vol. 57, p. 210, 1913; Weber and de Beaufort, *Fishes of the Indo-Australian Archipelago*, vol. 6, p. 114, 1931.

<sup>9</sup> *Proc. Acad. Nat. Sci. Philadelphia*, vol. 86, p. 461, 1934.

*Parasphenanthias*, *Loxopseudochromis*,<sup>10</sup> and *Opsipseudochromis*<sup>10</sup> form a closely interrelated group of deep-water fishes that is apparently rather close to the Opisthognathidae but not to the Pseudochromidae. Superficially, all the known forms are recognizable by the hidden black spot on the membrane connecting the maxillary and premaxillary. All the species appear to be red in life.

After the removal of *Owstonia*, the Opisthognathidae seem to form a natural family. Another supposed opisthognathid, *Gnathypops samoensis* Fowler and Silvester,<sup>11</sup> from Samoa, must also be removed from the family. It is a synonym of the Indo-Pacific pseudochromid *Pseudogramma polyacanthus* (Bleeker).<sup>12</sup> The tropical American genera *Rhegma* Gilbert<sup>13</sup> and *Caribrhegma* Breder<sup>14</sup> are both synonyms of *Pseudogramma*. I have examined the holotypes of *Pseudogramma thaumasia* (Gilbert) in the Stanford Museum and of *Pseudogramma gregoryi* (Breder) in the Bingham Oceanographic Collection and compared examples of each with the East Indian species.

The known genera of Opisthognathidae may be distinguished by the following synopsis, taken in part from Ogilby:

#### SYNOPSIS OF THE GENERA OF OPISTHOGNATHIDAE

- 1a. Dorsal spines pungent; cheeks and opercles with scales.  
 2a. Scales moderate in size, about 40 in a longitudinal series from upper part of gill opening to caudal base; gill rakers moderate in number, 38 on first gill arch; anal with 2 spines; dorsal and anal with about 12 soft rays each. . . . . *Lonchistium*, n. gen.  
 2b. Scales small, over 55 in a longitudinal series; gill rakers exceedingly fine and numerous, 64 on first arch; anal with 3 spines; dorsal and anal with 16 to 18 soft rays. . . . . *Lonchopisthus* Gill

<sup>10</sup> *Loxopseudochromis* and *Opsipseudochromis* were described by Fowler (Proc. Acad. Nat. Sci. Philadelphia, vol. 85, pp. 354-357, 1934) as pseudochromids. In the same paper it may be noted that *Elapterostomias philippinus*, described as a stomiatid, is an astronethid, apparently identical with *Borostomias schmidti* Regan and Trewavas; that *Brachypleurops axillaris* is identical with *Citharoides macrolepis* (Gilchrist); that *Macrurocyttus* is not a zeid but is referable to a new family (Macrurocyttidae) and perhaps a new suborder; and that *Brachyglaucosoma*, if a recognizable subgenus, equals *Reganichthys* Ogilby.

<sup>11</sup> Carnegie Inst. Washington Publ. 312, p. 118, fig. 1, 1922.

<sup>12</sup> See Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, vol. 6, p. 119, fig. 21, 1931; also Fowler, U. S. Nat. Mus., Bull. 100, vol. 11, p. 3, 1931.

<sup>13</sup> See Gilbert and Starks, Mem. California Acad. Sci., vol. 4, p. 99, pl. 15, fig. 31, 1904 (Panama Bay).

<sup>14</sup> Bull. Bingham Oceanogr. Coll., vol. 1, art. 1, p. 44, fig. 22, 1927 (Glover Reef, off British Honduras).

- 1b. Dorsal spines flexible, not pungent; cheeks and opercles naked.
- 3a. Dorsal spines distally split into 2 lateral segments.  
*Stalix* Jordan and Snyder
- 3b. Dorsal spines distally entire.
- 4a. Trunk naked anteriorly.....*Merogymnus* Ogilby
- 4b. Trunk fully scaled.
- 5a. Maxillary shorter than head, its distal extremity truncate or notched.....*Gnathypops* Gill
- 5b. Maxillary greatly produced backward in a flexible lamina, about as long as head.  
*Opisthognathus* Cuvier (Oken)

#### LONCHISTIUM, n. gen.

Dorsal and anal spines sharp and stiff. Posterior part of cheeks scaled and a patch of 9 scales on the upper part of the opercle. Scales of body moderate in size, about 40 in a longitudinal series to base of caudal. Gill rakers 38 on first arch. Dorsal with 11 spines and 12 soft rays. Anal with 2 spines and 12 soft rays. Head heavy and thick, not nearly so compressed as in *Lonchopisthus*. Eyes very large. Genotype, *L. lemur*.

#### LONCHISTIUM LEMUR, n. sp.

##### Figure 1

*Holotype*.—U.S.N.M. no. 93459 (Field no. 722), 35 mm standard length; from Johnson-Smithsonian Deep-Sea Expedition station 105, off Punta Boca Juana, Puerto Rico, latitude 18° 30' 50" N., longitude 66° 13' 20" W., to latitude 18° 31' 30" N., longitude 66° 14' 55" W., March 8, 1933, oyster dredge, 150 fathoms.

*Description*.—Unfortunately, the single specimen on which this species is based is in rather poor condition, due largely to its having been taken in the oyster dredge on very rough bottom. The fins are more or less broken, many of the scales have fallen, and the intestine was removed in search of parasites when the specimen was fresh. It is thus impossible to be certain of the length of the caudal and the shape of the dorsal and anal fins, but, after careful examination of the fish, I believe I have succeeded in restoring very nearly the original form of the fins in the accompanying sketch.

Dorsal XI-12. Anal II-12. Pectoral 17 or 18. Pelvic I-5. Caudal 22, counting rudimentary rays above and below. Scales mostly lost, 40 to 42 in a longitudinal series from upper part of gill opening to end of hypural fan.

Head length 2.9, greatest depth (at first dorsal spine) 3.7, least depth caudal peduncle 10, and predorsal length 2.8 times in standard length. Horizontal diameter of eye 2.4 in head. Interorbital width (bony) 3.8 in horizontal diameter of eye.

Measurements in millimeters: Standard length 35; head length 12; horizontal diameter of eye 5; bony interorbital 1.3; greatest depth of body 9.5; least depth caudal peduncle 3.5; snout tip to origin of dorsal fin 12.5; greatest thickness of head 6; snout tip to end of maxillary 6.5.

Head massive and thick. Body rather compressed. Depth decreasing gradually from dorsal origin. Anal base somewhat convex. Maxillary barely extending to hind border of eye, widened posteriorly, the upper part of its end notched. Jaws equal anteriorly. Caudal apparently acuminate. Pectoral extending to over base of first or

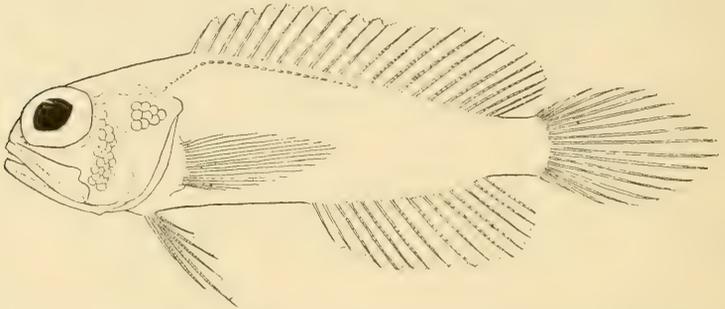


FIG. 1.—*Lonchistium lemur*. Holotype,  $\times 2$ . Drawn by G. S. Myers.

second soft ray of anal fin. Lateral line high, ending below base of first soft dorsal ray. Body and nape fully scaled, the scales terminating abruptly at the superficial line of the skull.

Teeth in jaws long and conical but slightly blunt at tips, fairly evenly spaced and longer in the front than at the sides; a single series in each jaw except for two or three teeth behind the main series at the mandibular symphysis; teeth of lower jaw directed outward rather strongly, especially toward front, those of upper jaw less evidently flaring; a small edentulous place at middle of upper jaw. No teeth on vomer, palate, or tongue.

Gill rakers long and slender at junction of upper and lower limbs but short at ends of arch; 12 rakers on upper limb and 26 on lower limb of first arch, or 38 in all. Branchiostegal rays 6. Gill membranes free from each other and from the isthmus.

Color mostly lost. Scale pockets faintly dark-edged. Dorsal and anal fins faintly dusky toward margins.

*Remarks.*—I have directly compared *L. lemur* with Poey's two type specimens of *Lonchopisthus micrognathus* (U.S.N.M. no. 4785). I find that the scales in the latter are only 63 (instead of 80 or more) in a longitudinal series but that there are 64 gill rakers on the first arch (25 on the upper limb and 39 on the lower). There are 6 branchiostegal rays and the fin counts are as follows: Dorsal XII-17, anal III-16, pectoral 17, and pelvic I-5. The head is much more compressed than in *L. lemur*.

Mowbray<sup>15</sup> has described *Lonchopisthus vanderbilti* from "off the coast of Cuba." From the description, this species seems to differ from *L. micrognathus* Poey chiefly in the slightly larger scales, if it is in fact a distinct species. The gill-raker count is not given. In any case, Mowbray's fish is not at all close to *L. lemur*.

<sup>15</sup> In Borodin, Bull. Vanderbilt Oceanogr. Mus., vol. 1, art. 1, p. 30, 1928.







SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 24

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# FOUR NEW BRITTLESTARS FROM PUERTO RICO

(WITH THREE PLATES)

BY

AUSTIN H. CLARK

Curator, Division of Echinoderms, U. S. National Museum



(PUBLICATION 3378)

CITY OF WASHINGTON  
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### FOUR NEW BRITTLESTARS FROM PUERTO RICO

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(WITH THREE PLATES)

Among the numerous brittlestars obtained by the First Johnson-Smithsonian Deep-Sea Expedition are three new species of the genus *Ophiomusium*, two of which are interesting in having the upper of the two arm spines transformed into a hook curving outward from the arm. There is also a new species of *Ophiocirce*, a genus of the family Ophioleucidae known heretofore only from the Philippine and Lesser Sunda Islands.

#### OPHIOMUSIUM REGULARE, n. sp.

Plate I, figs. 1, 2

*Locality*.—Caroline station 45; west of Puerto Rico (lat.  $18^{\circ}03'45''$  N., long.  $67^{\circ}48'10''$  W.); 240 to 300 fathoms; February 11, 1933. Eighteen specimens (U.S.N.M. nos. E.5194 [type] and E.5195).

*Description*.—The disk is pentagonal, slightly elevated centrally, 8 mm in diameter, and the slender arms are 28 mm long. The plates on the aboral surface of the disk are few in number.

The center of the disk is occupied by a central plate surrounded by five somewhat larger plates radially placed, between the bases of which, and adjoining the central plate, are five small triangular plates. From the outer edge of the radially placed plates to the arm base, separating the radial shields, runs a rather narrow row of four plates, the sides of this row converging for two-thirds of the distance to the arm base and then, on the last two plates, diverging again. In this row the innermost plate is the largest, the second is slightly to considerably shorter, the third is small, less than half the length of the second, and the fourth is somewhat longer than, and about twice as broad as, the third. On either side of the last (fourth) plate a band of low crowded papillae in three to four rows, which is nearly as broad as the length of the plate, separates the distal ends of the

radial shields from the arm base. In the interradial line a row of plates, of approximately the same width as the radial rows, runs from the central rosette to the edge of the disk. This row consists of three plates, first a six-sided plate about half again as long as broad, with the two distal outer sides converging to the rather narrow distal edge on which rests a long plate, more than twice as long as broad, with very slightly converging sides, which is followed by a much shorter, but slightly broader, plate, situated on the edge of the disk. On the outer edges of the radially placed plates and between the bases of the radial and interradial rows are one or two small rounded-triangular plates. The surface of all the plates on the abactinal surface of the disk is studded with small, regular, and closely set tubercles, those on the radial shields being rather larger and more widely spaced than those on the other plates.

On the oral surface the mouth shields are small, longer than broad, the outer half with the sides parallel, the inner half with the sides forming an angle of about  $60^\circ$ . The adoral shields are large, with about the same area as the mouth shields, wedge-shaped with straight sides, the outer end being about twice as broad as the inner. The jaw plates are low triangles bearing on their longest (outer) side a row of five blunt mouth papillae which slowly and gradually diminish in length and width toward the apex, where an unpaired triangular papilla lies on the suture between the jaw plates. The genital slits run from the pointed ventral ends of the bands of papillae that separate the radial shields from the arm bases, beneath the outer sides of the second side arm plates, to the obtuse angle in the lateral borders of the mouth shields. They are bordered with 12 to 14 flattened papillae with broadly rounded ends. Beyond the mouth shields is a large plate of about the same width, about twice as broad as long, which is often divided into two small plates. Beyond this is a larger rounded plate on the edge of the disk, between the upper portion of which and the large genital plate on either side is a single rounded and protuberant plate, with another similar but smaller one just beyond and nearer the interradial line.

There are three pairs of tentacle pores, each with a large rounded tentacle scale situated on the side arm plate.

The first side arm plate beyond the disk bears two short arm spines rather close together near the middle of its outer edge. The second bears one spine above the middle and two, close together, below, or only the latter, and those following to the eighth or tenth bear two short peglike spines close together below the middle. Beyond the eighth to tenth side arm plate the upper arm spine becomes trans-

formed into a stout, glassy tipped hook with the sharp, transparent point directed outward, and a supplementary sharp tooth below it, the lower arm spine remaining short, stout, and peglike.

**OPHIOMUSIUM ROSACEUM**, n. sp.

Plate 2, figs. 3, 4

*Locality*.—*Caroline* station 101; Virgin Islands (lat.  $18^{\circ}45'40''$  N., long.  $64^{\circ}48'$  W.); 300 fathoms; March 4, 1933. One specimen (U.S.N.M. no. E.5196 [type]).

*Description*.—The disk is circular, nearly flat, 6 mm in diameter, and the slender arms are 25 mm long. The plates on the aboral surface are few in number and regular in arrangement.

The center of the disk is occupied by a circular plate surrounded by five rounded slightly larger plates, radially situated, between the inner ends of which, and lying interradially on the central plate, are five small rounded triangular plates. Beyond each of the rounded radially situated plates is a triangular plate with somewhat convex sides that separates the inner thirds, or somewhat more, of the inner ends of the radial shields, which, except for this, are in contact. In the interradiial line lying over the suture between each pair of rounded radially situated plates is a five-sided plate with the angles more or less broadly rounded, somewhat longer than broad, of which the two sides adjoining the radial shields converge to the distal edge, which is of about the same length. On the distal edge of this plate rests a very long plate with diverging sides that extends to the edge of the disk, separating the radial shields. The distal ends of the radial shields are separated from the arm base by a low triangular plate, the obtuse angle of which lies on the line separating the two radial shields of each pair.

On the oral surface the mouth shields are large; their distal edge is longer than the adjoining sides, which make a right angle with it. At the point where these sides turn to converge to the inner angle the plate is abruptly produced laterally in the form of a broad angular point supporting the inner end of the large genital plate. Resting on the distal edge of the mouth shields is a large trapezoidal plate occupying the entire area between the genital plates, which is gradually and regularly curved upward so as to form the interradial-lateral edge of the disk. The jaw plates are large, triangular, and rather more than twice as broad as high. They are bordered with five mouth papillae of uniform height, of which the first and third, counting from the base, are twice as long as the others, or even longer. The apex of the

jaws is provided with a large broadly rounded triangular papilla. The genital slits are strongly sinuous.

There are two pairs of tentacle pores, which are completely closed by single large oval tentacle scales situated on the side arm plates. The under arm plates beyond the second pair of tentacle pores are exceedingly minute.

The first side arm plate beyond the disk bears three short peglike similar arm spines, evenly spaced. The second and following side arm plates bear four, of which the second from the oral side is much stouter than the others, with the inner side strongly convex and a sharp glassy point at the outer side of the distal end. Further out the arm spines become reduced to three, of which the middle one is hooked and curves outward from the arm, and in the outer part of the arm there are only two arm spines, situated close together on about the middle of the side arm plate, the lower very short and of normal form, the upper stouter and hooked.

#### OPHIOMUSIUM ALECTO, n. sp.

Plate 2, figs. 5, 6

*Locality.*—*Caroline* station 100; northeast of Puerto Rico (lat.  $18^{\circ}40'15''$  N., long.  $64^{\circ}50'15''$  W.); 150 fathoms; March 4, 1933. One specimen (U.S.N.M. no. E.5197).

*Description.*—The disk is circular, somewhat elevated, 4 mm in diameter, and the slender arms are 10 mm long.

The center of the disk on the aboral side is occupied by a pentagonal plate with slightly concave sides which is surrounded by a closed ring of five larger seven-sided plates, of which the two distal sides lie on the inner portion of the lower border of the radial shields. In the angles between the plates of this circlet lie pentagonal plates. Beyond each of these pentagonal plates a long plate with slightly diverging sides runs to the edge of the disk and separates the radial shields. The radial shields are separated from the arm bases by a triangular plate not quite twice as broad as long with truncated lateral angles, adjoining which are two small triangular supplementary plates, one on either side.

The oral side of the disk is covered by a thick skin which more or less conceals the outlines of the underlying plates, even when dried. The mouth shields are five-sided, and about as long as broad. In contact with their outer edge is a large trapezoidal plate that occupies the entire space between the genital plates and, turning upward and inward so abruptly as to form a rather sharp keel, forms the side of

the disk. The genital slits are rather short and are slightly sinuous. The papillae bordering the 10 genital slits and the 5 mouth slits are rather abruptly elevated.

There are two pairs of tentacle pores, each of the pores protected by a single large rounded tentacle scale attached to the side arm plate. There are four arm spines, the two lowest longer and stouter than the two uppermost, the second from the oral surface being the largest and longest. The two uppermost arm spines are short and slender; one of these, the shorter, is situated on the upper surface of the side arm plate and is directed forward.

**OPHIOCIRCE ANTILLARUM, n. sp.**

Plate 3, figs. 7-9

*Locality.*—*Caroline* station 99; off the Virgin Islands (lat.  $18^{\circ}40'$  N., long.  $84^{\circ}51'$  W.); 220 fathoms; March 3, 1933. Thirteen specimens (U.S.N.M. nos. E.5198 [type] and E.5199).

*Description.*—The disk is approximately circular, bowing outward between and more or less strongly incurved over the arm bases, flat and thick, 4.5 mm in diameter. The arms are 38 mm long. They are slender and evenly tapering. In cross-section they form aborally a sharp right angle with straight sides; orally they are lower, with a broadly rounded angle; the lateral angles are abrupt, but rounded.

The aboral surface of the disk is densely beset with minute slightly roughened granules which are about twice as large as those on the disk of *Ophiopyren longispinus*. Ordinarily the radial shields are completely covered, but the granules may be rubbed off from their well separated outer ends. Beyond the radial shields the granules extend over the proximal half of the first upper arm plate.

On the oral surface the granules are continued inward over all the plates to the bases of the mouth papillae. They are less crowded here than on the aboral surface. In most instances in the specimens as preserved they have been rubbed off the mouth shields, and more or less extensively removed from the other plates. The mouth shields are triangular with the lateral angles rounded, slightly broader than long. The adoral shields are large with approximately parallel sides. They extend distally for about one-third of their length beyond the lateral angles of the oral shields, and are proximally broadly in contact beyond them. The jaw plates are small, very low triangular. The mouth papillae number seven on each side of the mouth angle. The outermost is large and broadly rounded, and is attached to the adoral shield. The second is similar but slightly smaller, and is attached to

the jaw plate where it adjoins the adoral shield. The third is intermediate between the second and the other four, which are much narrower and pointed, those on either side of the apex of the mouth angle being the longest and most robust. There are four rather long, narrow, lanceolate, pointed teeth, and above these a single similar, but narrower, tooth papilla, almost on a level with the adjacent mouth papillae, which it resembles except that it is longer and stouter.

The second and third under arm plates are slightly broader than long with the distal edge gently concave, the distal angles broadly rounded, and the lateral edges excavated by the oval tentacle pores, and the proximal angles truncated by the side arm plates. Distally the under arm plates become narrower with slightly convex distal ends sometimes with a slight median depression or notch, and the truncation of their proximal angles rapidly increases until after about the fifteenth-seventeenth they end proximally in a sharp or slightly truncated angle, the side arm plates almost or quite meeting beneath them, and are half again as long as their distal edge, just beneath the outer ends of which the circular tentacle pores lie. Further out they become narrowly fan-shaped with a long narrow proximal angle beyond which the sides are excavated by the tentacle pores, and by the meeting of the side arm plates beneath them become separated from each other for a distance equal to about half their length. The distal edge of the under arm plates is convex, that of the larger proximal ones being more or less markedly biconvex with a median sharp or rounded notch. The earlier under arm plates, up to about the twentieth, have a fine median longitudinal line that distally becomes obscure. The surface of the plates is highly polished and glassy, and is finely sculptured with transverse lines.

The second and third upper arm plates are trapezoidal, much broader than long, the fourth is about as long as the distal width, and those following gradually decrease in width, at about the seventeenth becoming narrowly fan-shaped with a very acute proximal angle, and about twice as long as the distal width. Distally they become exceedingly small, and are widely separated by the side arm plates. The aboral surface of the arm is sharply and conspicuously carinate, and the large proximal upper arm plates tend to split into two parts along the carinate midline.

The lateral edges of the arm are more or less sharply carinate, the carinate ridge being sometimes more or less finely spinous. The lateral and aboral carination is accentuated by the slight excavation or depression of the aboral portion of the large side arm plates. The

lateral edges of the side arm plates diverge slightly so that the lateral profiles of the arm are somewhat serrate.

The arm spines are two in number, the lower situated on the lateral carinate ridge and the other just above and almost in contact with it. In the first pair the lower spine is about equal to the length of the succeeding side arm plate, and the higher is about one-third again as long. In the second pair the spines are larger and longer; the lower is nearly equal in length to two side arm plates, and the upper is similar, but longer, equal in length to about two and one-half side arm plates. The spines of the succeeding pairs decrease in length, those of the ninth and following pairs being scarcely longer than a side arm plate. On the outer portion of the arms the spines are similar, from one-third to one-half again as long as a side arm plate, the upper slightly the longer.

The first tentacle pore has two large rounded tentacle scales situated distal to it. The first brachial tentacle pore has two large rounded tentacle scales situated on the abradial side. The pores following have each a single large and conspicuous tentacle scale. At the base of the arms this is about twice as long as broad with the proximal end broadly and evenly rounded, the sides parallel or slightly convergent, and the distal end deeply notched. Outwardly the tentacle scale increases in relative length, becoming about four times as long as broad with a deep and narrow distal notch. Here it is about as long as the distance from its base to the distal edge of the under arm plate next proximal to it. The tentacle scale is thin and strongly curved so that it is approximately one-quarter of a hollow cylinder of equal length. This has the effect of making the outer borders appear much more opaque and dense than the central glassy strip which, in connection with the sharp and produced distal angles, gives the general effect of two spiniform tentacle scales situated side by side.

#### EXPLANATION OF PLATES

##### PLATE I

FIG. 1. *Ophiomusium regulare*, n. sp., the type specimen (U.S.N.M. no. E.5194) from *Caroline* station 45, aboral surface.  $\times 3$ .

FIG. 2. *Ophiomusium regulare*, n. sp., the specimen shown in figure 1, oral surface.  $\times 3$ .

##### PLATE 2

FIG. 3. *Ophiomusium rosaceum*, n. sp., the type specimen (U.S.N.M. no. E.5196) from *Caroline* station 101, aboral surface.  $\times 3$ .

FIG. 4. *Ophiomusium rosaceum*, n. sp., the specimen shown in figure 3, oral surface.  $\times 3$ .

FIG. 5. *Ophiomusium alecto*, n. sp., the type specimen (U.S.N.M., no. E.5197) from *Caroline* station 100, aboral surface.  $\times 3$ .

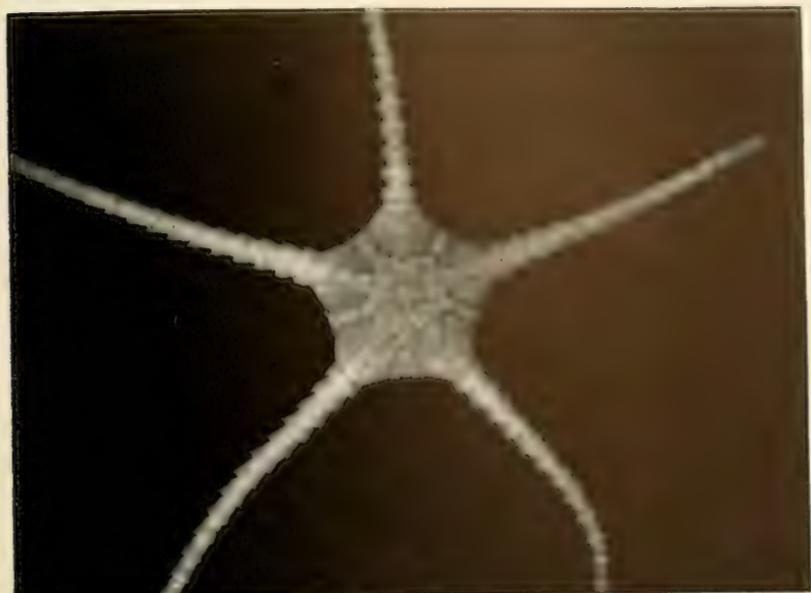
FIG. 6. *Ophiomusium alecto*, n. sp., the specimen shown in figure 5, oral surface.  $\times 3$ .

PLATE 3

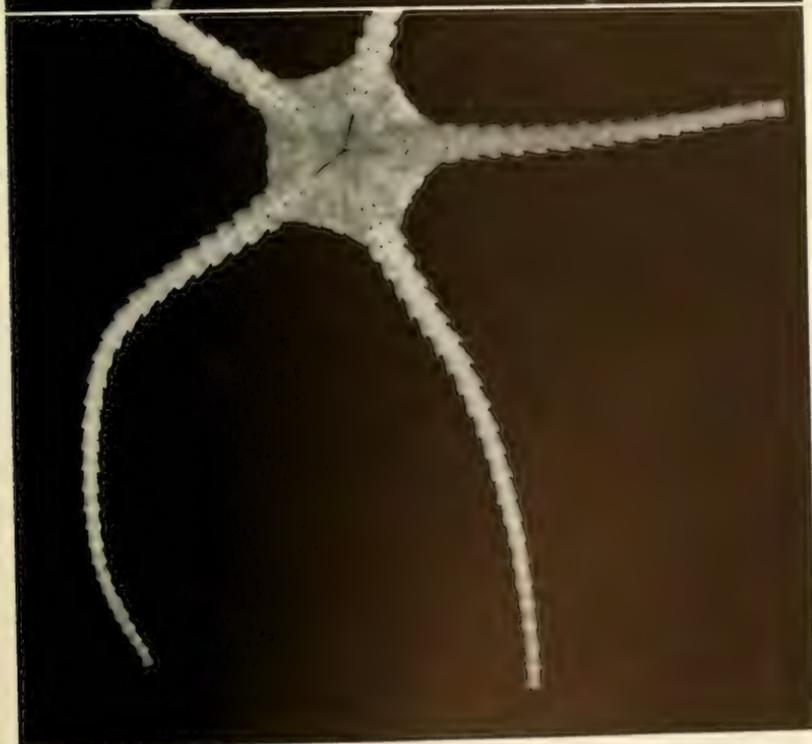
FIG. 7. *Ophiocirce antillarum*, n. sp., the type specimen (U.S.N.M. no. E.5198) from *Caroline* station 99, aboral surface.  $\times 3$ .

FIG. 8. *Ophiocirce antillarum*, n. sp., the specimen shown in figure 7, oral surface.  $\times 3$ .

FIG. 9. *Ophiocirce antillarum*, n. sp., cotypes from *Caroline* station 99 (U.S.-N.M. no. E.5199).  $\times 3$ .

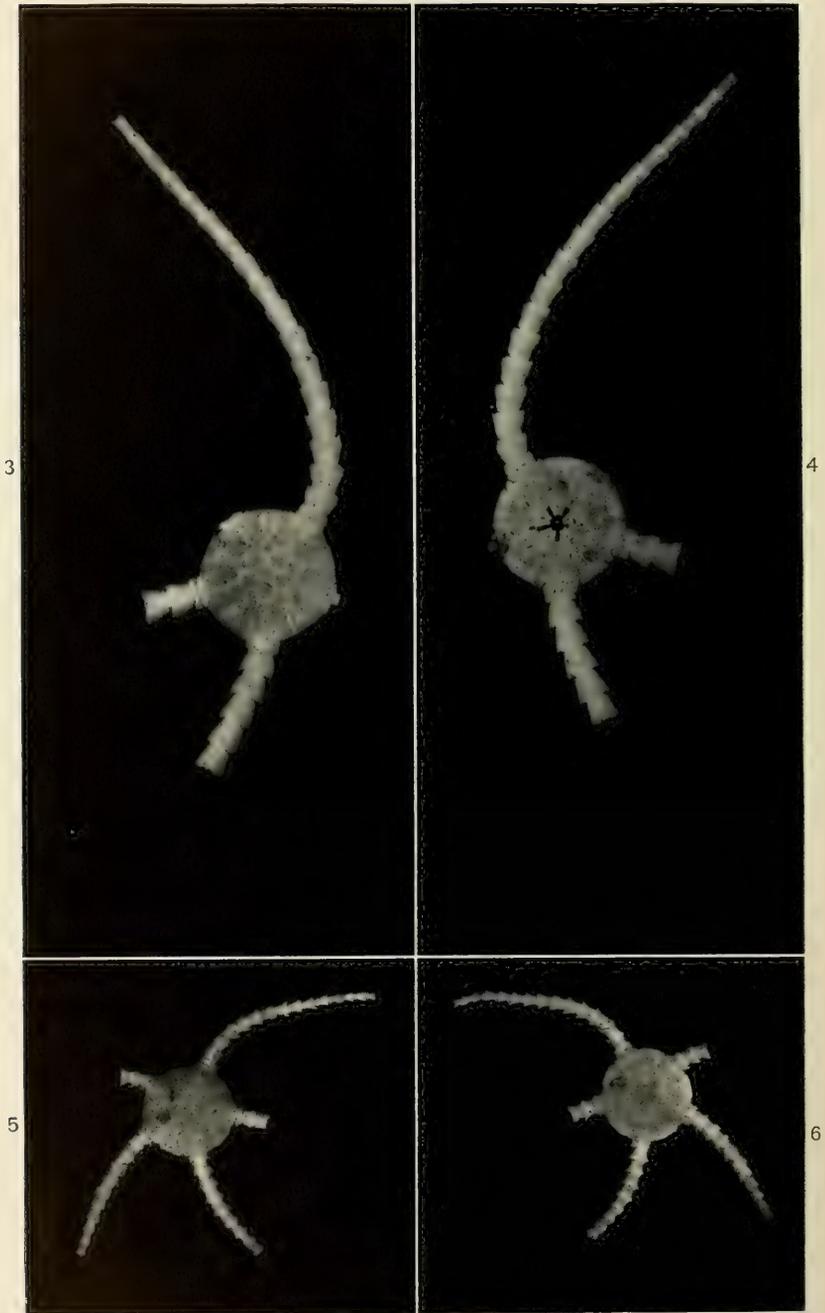


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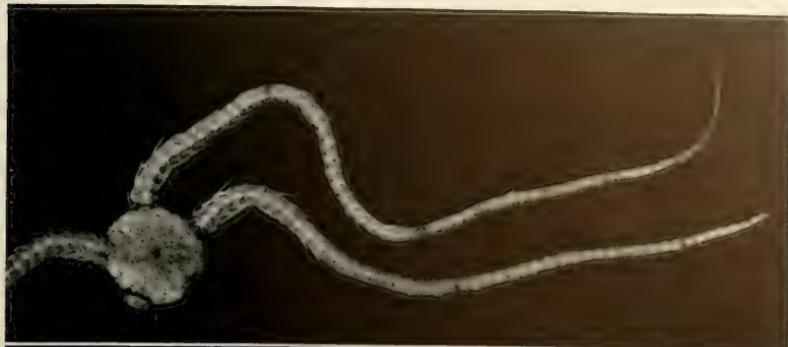


2

**OPHIOMUSIUM REGULARE**  
(For explanation, see p. 7.)



OPHIOMUSIUM ROSACEUM (ABOVE) AND *O. ALECTO* (BELOW)  
(For explanation. see pp. 7, 8.)



**OPHIOCIRCE ANTILLARUM**

(For explanation, see p. 8.)







SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 25

## Johnson Fund

REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
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TO THE PUERTO RICAN DEEP

# A NEW ACTINIAN

BY

OSKAR CARLGREN

Zoological Institute, Lund, Sweden



(PUBLICATION 3401)

CITY OF WASHINGTON  
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### A NEW ACTINIAN

By OSKAR CARLGREN

Zoological Institute, Lund, Sweden

The collection of actinians made by the first Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep, sent to me for report, contained only two species, namely, *Leipsiceras (Bolocera) pollens*, rather briefly described by McMurrich, and a new species belonging to a new genus, which I am here calling *Halcampogeton*.

#### Family HALCAMPOIDIDAE

##### HALCAMPOGETON, n. gen.

Body elongated, divisible into physa, scapus, and capitulum. Scapus with 12 longitudinal rows of solid papillae containing very large nematocysts. No sphincter. Tentacles more or less cylindrical, ordinary long, hexamerously arranged, few. No siphonoglyphs. Mesenteries hexamerously arranged, few, probably never more than six pairs. Pennons of the stronger mesenteries concentrated, on slides more or less kidneylike. Parietal muscles strong. At least the eight "Edwardsia"-mesenteries fertile. Nematocysts large.

The species is separated from all other halcampsoids by the presence of the solid papillae on the scapus and the extraordinarily large nematocysts, especially in the papillae.

*Genotype*.—*Halcampogeton papillosus*.

##### HALCAMPOGETON PAPILLOSUS, n. sp.

Body cylindrical. Papillae in each row about 20 or more. Tentacles and mesenteries 12. Only the eight "Edwardsia"-mesenteries provided with pennons and fertile. Pennons with numerous partly very ramified folds. Parietal muscles with the strongest folds inward, short but broad folds outward. Nematocysts of the papillae 96-108 x 5-5.5 $\mu$ , rather numerous, those of the tentacles 58-67 x about 4.5 $\mu$ , very numerous, those of the actinopharynx partly 53-60 x about 4.5 $\mu$ , partly 38-41 x 4.5-5 $\mu$ , those of the filaments partly 36-41 x 4.5-5 $\mu$ , partly

19-26 x 3-3.5 (4) $\mu$  (probably penicilli). Spirocoridae (spirocysts) of the tentacles 22-50 x about 2.5-7 $\mu$ .

Color in alcohol: Scapus brown, papillae at their apex uncolored. Size: Length of the body 1.5 cm, largest breadth 0.45 cm, length of the tentacles about 0.3-0.4 cm.

*Holotype*.—U.S.N.M. no. 43238.

*Occurrence*.—Station 100, northeast of Puerto Rico (lat. 18°40'15" N., long. 64°50'15" W.); 150 fathoms; 1 specimen.

The single specimen was not well preserved. The scapus had burst in some places, with ejected filaments; probably two tentacles were lost; the actinopharynx was evaginated; and the pennons of the



FIG. 1.—*Halcamptogeton papillosus*.  
A piece of the scapus with two rows  
of papillae.

mesenteries were mostly loosened from the parietal muscles. I think, however, that the description here given is in the main correct.

The column is divisible into three regions, a rounded physa, a long scapus, and a short, thin part, capitulum (or possibly scapulus). The scapus is provided with 12 rows of very distinct and rather high but solid papillae (fig. 1), diminishing in size proximally. The ends of these papillae are flat and broad and their ectoderm considerably higher and of other structure than that of the other parts of the scapus. The apex contains mainly gland cells and rather numerous but very large nematocysts and is not pigmented; the other parts of the scapus-ectoderm are provided with a brownish pigment and exceptionally few but smaller nematocysts. I am not sure that the nematocysts I have found in the macerated preparations really belong to the scapus. The mesogloea of the scapus is thick, especially in the papillae; in the capitulum, thin. There is no sphincter. The tentacles were 10, but as

a part of the capitulum and oral disk was torn off, there may have been 12, possibly arranged in a single cycle. They are cylindrical, with their apex acuminated and rather robust. The structure of the tentacles shows nothing extraordinary. Their longitudinal muscles and the radial muscles of the oral disk are ectodermal and well developed. The evaginated actinopharynx is provided with 12 longitudinal ridges supported by folds of the mesogloea. The ectoderm is high and provided

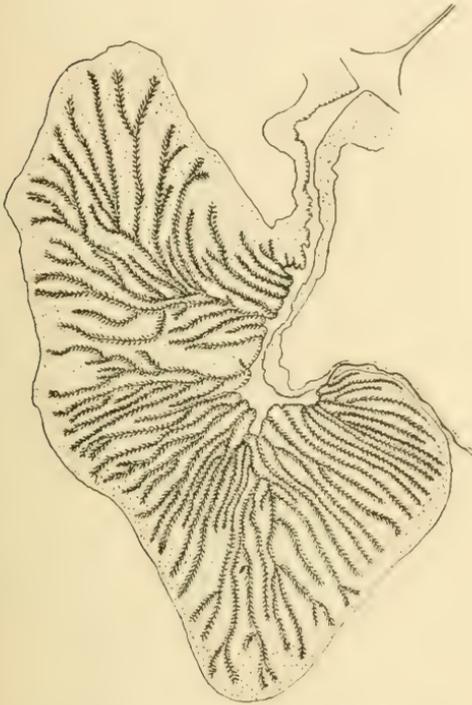


FIG. 2.—*Halcamptogeton papillosus*. Transverse section of the pennon of a dorsolateral mesentery.



FIG. 3.—*Halcamptogeton papillosus*. Transverse section of a parietal muscle in the region of the actinopharynx.

with numerous gland cells, its mesogloea thin. There are no distinct siphonoglyphs. There are 12 mesenteries below the actinopharynx and probably not more in the distal part of the body. I have cross-sectioned a piece containing six mesenteries in the region of the tentacles. Of these, the dorsal directives and three others were perfect; one, forming a pair with a perfect dorsolateral mesentery, was imperfect and without pennon. To judge from the arrangement of these mesenteries, there is no second cycle of mesenteries here and only the "Ed-

wardsia"-mesenteries are perfect and provided with pennons. The pennons (fig. 2) are concentrated and more or less kidneylike in cross-sections, the muscle folds often much ramified. The outer lamellar part of the perfect mesenteries is attached to the pennons on their outside. The parietal muscles present on all 12 mesenteries are strong, the supporting folds of the mesogloea are thin and rather much ramified on the inside, coarse and few on the outside (fig. 3). The parietal muscles are not expanded on the column. The ciliated tracts of the filaments are well developed. Only the 8 "Edwardsia"-mesenteries are provided with testes which are well developed.





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# NEW SPECIES OF MYSIDACID CRUSTACEANS

BY

WALTER M. TATTERSALL

Professor of Zoology, University College, Cardiff, Wales



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### NEW SPECIES OF MYSIDACID CRUSTACEANS

BY WALTER M. TATTERSALL

*Professor of Zoology, University College, Cardiff, Wales*

I am indebted to the courtesy of the United States National Museum for the opportunity of examining the collections of Euphausiacea and Mysidacea made by the Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep of 1933.

The Euphausiacea did not include any new species or unexpected forms and are not further dealt with in this paper. They belonged to well-known West Atlantic tropical species.

Among the Mysidacea I detected specimens of five new species, descriptions and figures of which are offered below. In addition to the new species, mention should be made of the following rare forms also contained in the collection:

- |  |   |
|--|---|
| <i>Lophogaster longirostris</i> Faxon. | Serial numbers 117 and 542.<br>Two specimens. |
| <i>Lophogaster spinosus</i> Ortmann.   | Serial number 495.<br>Four specimens.         |
| <i>Petalophthalmus oculatus</i> Illig. | Serial number 573.<br>Three specimens.        |

*Lophogaster longirostris* has been recorded only once previously, by Faxon (1896), from the Gulf of Mexico. *L. spinosus* is a rare deep-water Atlantic species noted on three occasions only, by Ortmann (1906), Zimmer (1914), and Tattersall (1926), all from the deep water of the Atlantic Ocean. *Petalophthalmus oculatus* is a very remarkable species so far recorded only from the Indian Ocean, Illig (1930).

In order to avoid repetition I give below a list of the localities concerned with this paper, as follows :

Serial number	Station number	Date, 1933	Latitude N.	Longitude W.	Depth in fathoms
27	6	Feb. 1	18°30'45"	66°00'50"	100
117	23	" 4	18°32'00"	66°21'15"	260
173	29	" 8	18°40'30"	66°21'15"	1100
175	30	" 8	18°40'30"	66°36'15"	1200
310 B		" 17	Anchorage, Santa Barbara, Bahamas.		0
321	60	" 18	19°16'45"	69°04'45"	500
358 A		" 23	Anchorage, Puerto Rico.		0
383	74	" 24	18°36'10"	65°48'30"	?
387 B		" 24	Icacos Bay, Puerto Rico.		0
406	} 25	" 25	Luis Pena Channel, Puerto Rico.		0
407 B					
444	82	" 26	18°32'45"	65°23'45"	300
495	86	" 27	19°18'30"	65°16'00"	?
521		Mar. 1	Brewers Bay, Virgin Islands.		0
542	96	" 3	18°37'15"	65°03'00"	300
567	98	" 3	18°39'30"	64°56'00"	300
573	99	" 3	18°40'00"	64°51'00"	220
730	106	" 8	18°31'30"	66°18'20"	?

## Order MYSIDACEA

### Suborder LOPHOGASTRIDA

#### Family LOPHOGASTRIDAE

#### PARALOPHOGASTER HANSEN, 1910

In an earlier paper (Tattersall, 1926) I recorded *Paralophogaster glaber* from six stations in the Western Atlantic, pointing out certain characters in which the specimens differed from Hansen's description and figures (Hansen, 1910). I have now to record a further series of specimens from practically the same area which show the same small differences from the type form. It is obvious that these differences are constant for the area under notice, and the question now arises whether they are to be considered as of specific rank.

Colosi (1930 and 1934) has described three new species of this genus from the Red Sea, *P. sansoi*, *P. microps*, and *P. macrops*. These species are separated from the type on characters of precisely the same order as the differences I have pointed out as existing between the Atlantic specimens already referred to, and *P. glaber* as described by Hansen, namely, the proportions of the antennal scale, the form of the rostral plate, and the details of the armature of the telson. In *P. microps* the size of the eye is the main specific difference.

The characters in question may be briefly reviewed as follows:

*Eyes.*—In *P. microps* the eyes are very small, the cornea being very much shorter than the breadth of the basal joint of the antennular peduncle. In all the other species the eye is large, the cornea considerably broader than the basal joint of the antennular peduncle. There seem to be no tangible differences between the sizes of the eye in *P. glaber*, *P. sanzoi*, and *P. macrops*. The Atlantic specimens are large-eyed.

*Antennal scale.*—In *P. microps* and *P. sanzoi* the antennal scale extends for only one-third of its length beyond the distal end of the peduncle of the antennule. In the other described species the scale extends for one-half of its length beyond the distal end of the antennular peduncle. The Atlantic specimens belong to the first group.

*Rostral plate.*—In all the species the rostral plate is tridentate with the exception of *P. macrops*, in which the median tooth is wanting. In *P. glaber* the rostral plate is semicircular, with the lateral teeth rather far back on the lateral margin. In *P. sanzoi* it is large, with the lateral margins parallel and the whole plate rectangular in form. In *P. microps* it is large with the lateral margins incurving slightly posteriorly. The Atlantic specimens have the rostral plate more like that of *P. glaber* than the other two species, but the lateral teeth are more nearly on a level with the median tooth, so that the lateral margins are longer than in *P. glaber*.

*Telson.*—In this genus the telson is armed distally with two pairs of large spines, between which is a group of smaller spines in a graded series. Between the distal pair of large spines, at the apex of the telson, is a plate armed with five or six teeth, between which are long feathered setae. Proximal to the large spines on each lateral margin are a number of small spines. The details of the armature of the telson in each of the species may be tabulated as follows:

	Pairs of large spines	Spines between large spines	Spines proximal to large spines
<i>P. glaber</i> .....	2	6-7	4
<i>P. sanzoi</i> .....	2	3	8
<i>P. microps</i> .....	2	5	3
<i>P. macrops</i> .....	2	4	3
Atlantic spec. ....	2	3	3-4

It is thus clear that all the established species are very closely allied to one another, but it is equally obvious that the Atlantic specimens are as much entitled to specific rank as any of the species established by Colosi, for the differences from the type are of the same magnitude as in the other species. If the isolated geographical area of the Atlantic

specimens is added to the other differences a further reason for specific separation is apparent. Under the circumstances, therefore, it seems best to separate the Atlantic specimens under a new name, which I propose as *P. atlanticus*. When more material is available from intermediate waters, it may be possible to unite all these species under one name and regard them as races or varieties of a single widely distributed deep-sea species.

**PARALOPHOGASTER ATLANTICUS, n. sp.**

Text figs. 1 and 2

*P. glaber*, Tattersall, 1926.

*Localities*.—Serial numbers 27, 173, 175, 321, 383, 444, 495, 567, 573, 730.

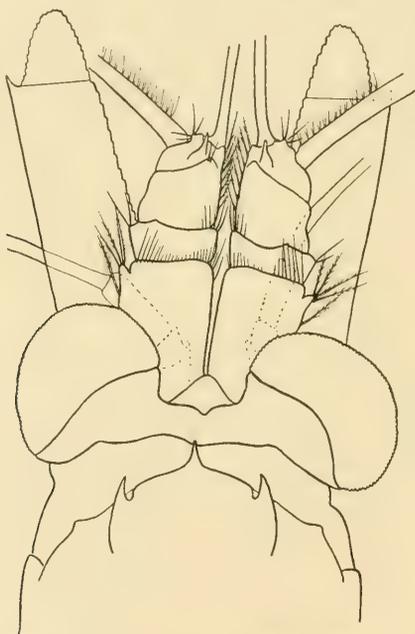


FIG. 1.—*Paralophogaster atlanticus*, n. sp. Dorsal view of anterior end to show the rostral plate, eyes, antennular peduncle and antennal scale.  $\times 50$ .

*Description*.—Agreeing with the description and figures given by Hansen (1910) for *P. glaber* except that (1) the rostral plate is tridentate, more distinctly so than in *P. glaber*, the lateral teeth are more prominent and more on a level with the median tooth, the lateral margins curved (fig. 1); (2) the antennal scale is three and one-half times as long as broad and one and one-half times as long as the an-

tennular peduncle (fig. 1); and (3) the lateral margins of the telson are armed with three or four short and two long spines between which are three smaller spines graded in size (fig. 2).



FIG. 2.—*Paralophogaster atlanticus* n. sp. Telson and uropods.  $\times 50$ .

*Type*.—U.S.N.M. no. 72866.

A key to the species of the genus may be useful, as follows:

1. Eyes small ..... *P. microps* Colosi
- Eyes large ..... 2
2. Antennal scale twice as long as the antennular peduncle..... 3
- Antennal scale one and a half times as long as the antennular peduncle.... 4
3. Rostral plate tridentate..... *P. glaber* Hansen
- Rostral plate without median tooth, front margin slightly convex with a tooth at each corner..... *P. macrops* Colosi
4. Rostral plate tridentate, lateral margins parallel; telson with eight proximal small spines and two distal large spines between which are three graded smaller spines ..... *P. sanzoi* Colosi
- Rostral plate tridentate, lateral margins curved; telson with three to four proximal small spines and two distal large spines between which are three graded smaller spines..... *P. atlanticus* Tattersall

It should be remarked that *P. glaber* and *P. macrops* are very closely similar and differ mainly in the form of the rostral plate. Hansen has figured the rostral plate of a half-grown specimen of *P. glaber* in which the rostral plate is exactly as figured for *P. macrops* by Colosi, that is, the central tooth of the trident is missing and the front margin is slightly convex with a tooth at each corner. Hansen gives the size of adult specimens of *P. glaber* as 18 mm, whereas *P. macrops* was founded on specimens 12-13 mm in length. It is not unlikely that *P. macrops* represents not fully grown specimens of *P. glaber*.

## Suborder MYSIDA

### Family MYSIDAE

#### Subfamily SIRIELLINAE

#### SIRIELLA Dana

#### SIRIELLA OCCIDENTALIS, n. sp.

Text figs. 3 and 4

*Localities*.—Serial numbers 310 B, 358 A, 406, 407 B.

*Description*.—In his Siboga report Hansen (1910) divides the species of *Siriella* into four groups. Using his grouping as a basis, this species belongs to the second group, characterized as follows: End of the telson with three small spines and a single pair of more lateral long spines. Proximal joint of the exopod of the uropods with much more than half of its outer margins furnished with spines, and at least about twice as long as broad. Proximal widened part of the telson with three pairs of marginal spines; spines along the distal third of the lateral margins of the telson closely set but irregular as to length, as several long spines are found, and between each two of these some, or near the end of the telson only two or one, smaller or small spines are inserted. Both rami of fourth pair of male pleopods terminating in very modified setae. Pseudobranchial rami of second to fourth pairs of male pleopods spirally twisted. (Hansen, 1910.)

Within this group the species may further be described as follows:

*Carapace* somewhat produced but leaving the eyes and eyestalks completely uncovered, frontal plate a broad, low triangle with the apex slightly produced into an acute point.

*Eyes* large and black.

*Antennal scale* (text fig. 3a) extending forward as far as the distal end of the antennular peduncle, three and one-fourth times as long as broad, terminal lobe broader than long.

Sixth joint of the endopod of the third to the eighth thoracic limbs (text fig. 3*b*) divided by a suture into two sub-joints; in the third limbs the proximal one is half as long as the distal and the dactylus

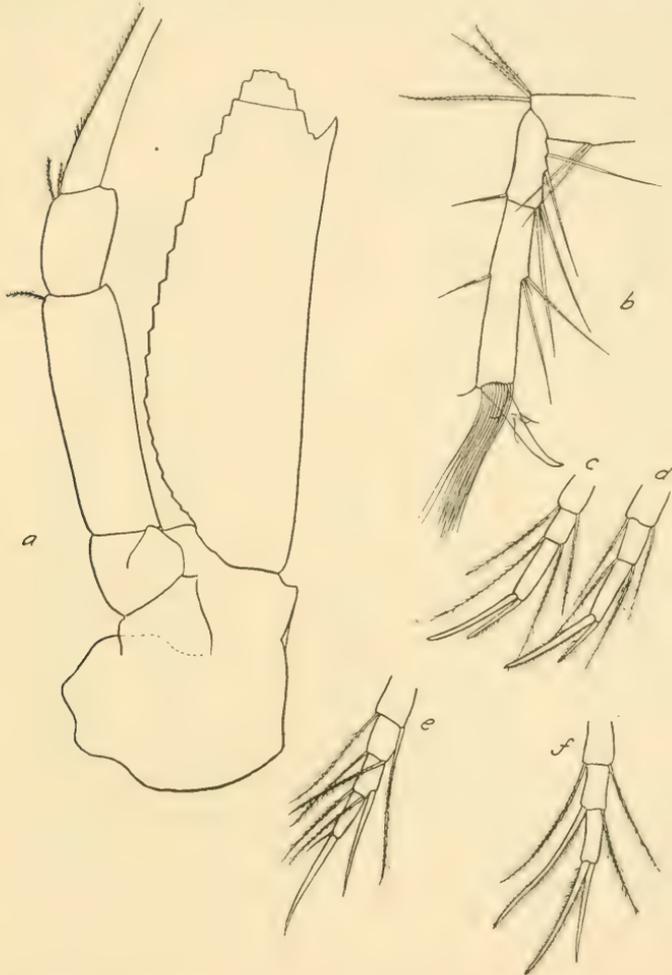


FIG. 3.—*Siriella occidentalis*, n. sp. *a*, antennal scale and peduncle; *b*, sixth and seventh joints of the endopod of a thoracic limb; *c*, distal extremity of the endopod of the third pleopod of the male; *d*, distal extremity of the exopod of the third pleopod of the male; *e*, distal extremity of the endopod of the fourth pleopod of the male; *f*, distal extremity of the exopod of the fourth pleopod of the male. All  $\times 64$ .

is more than one-third but less than one-half of the length of the sixth joint.

*Telson* (text fig. 4*a*) rather narrowly lanceolate in form, three and one-third times as long as broad at the base, lateral margins with

three large proximal spines separated by an interval from the distal series of spines in which the larger spines are separated by groups of three, four, or five smaller spines, apex armed with a single pair of long stout spines, between which are three equal small spines and a pair of plumose setae.

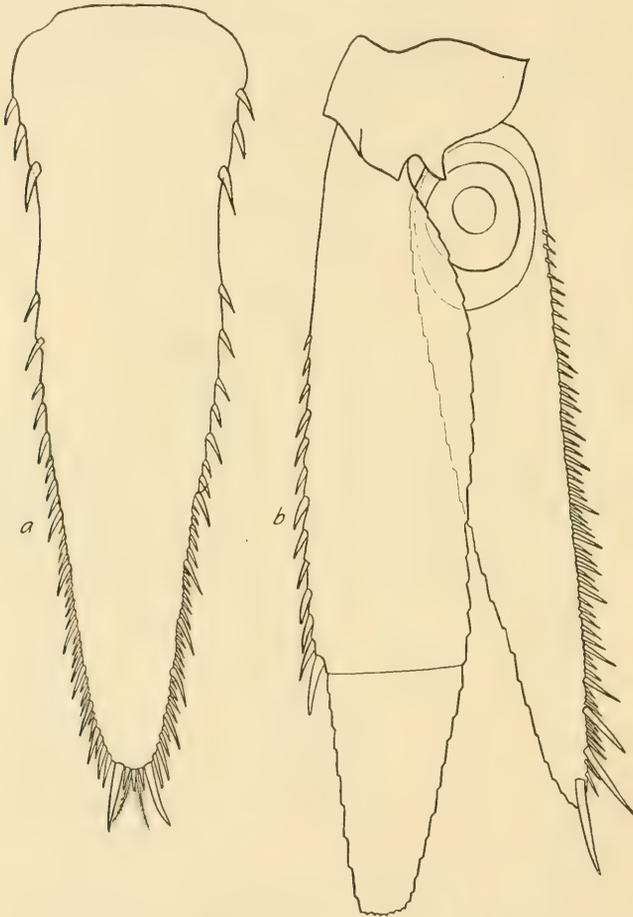


FIG. 4.—*Siriella occidentalis*, n. sp. a, telson; b, uropods. All  $\times 64$ .

*Uropods* (text fig. 4b) with the exopod longer than the endopod; proximal joint of the exopod twice as long as the distal joint, with about 13 spines on the outer margin occupying more than half the margin; distal joint of the exopod almost twice as long as broad; endopod with a closely set row of spines on the inner margin extending from the statocyst to the apex, arranged as larger spines separated by groups of smaller spines.

*Pleopods* of the male with both rami of the third and fourth pairs with modified setae on the terminal and penultimate joints. In the third pair the terminal joint of the endopod (text fig. 3c) bears two modified setae, a large, blunt simple one and a smaller, more acute plumose one. The exopod of the third pair (text fig. 3d) has a pair of similarly modified setae, both plumose, on the terminal joint. In the fourth pair the endopod (text fig. 3e) has the terminal joint furnished with two modified setae, the longer very closely and finely feathered but much stouter than the normal plumose setae arming the rest of the limb, the shorter stout and simple; the penultimate joint has one of its plumose setae modified in the same way as the longer of the two setae on the terminal joint, that is, it is stouter and more closely and finely feathered. The exopod of the fourth pair (text fig. 3f) has the terminal joint armed with one long, stout, simple spiniform seta and a rather short, fine, simple seta; the penultimate joint, in addition to the normal plumose seta at each distal corner, has a single long, stout, simple seta inserted some little way behind the distal margin on one side.

*Length* of adult specimens of both sexes, 10 mm.

*Type*.—U.S.N.M. no. 72867.

*Remarks*.—In the group of species of *Siriella* to which this species belongs *S. occidentalis* is distinguished by having both the third and fourth pleopods of the male furnished with modified setae. Only one other species, *S. anomala* Hansen, has both third and fourth pleopods of the male modified in this way. *S. anomala*, however, has the pseudo-branchial rami of the second to the fourth pleopods of the male nearly straight and not spirally twisted as in *S. occidentalis*.

Otherwise *S. occidentalis* is very closely allied to the other species within its group, especially to *S. inornata* Hansen, and can only be certainly determined from an examination of adult male specimens. The species is apparently a very abundant one in the inshore waters of the islands of the West Indies.

#### Subfamily GASTROSACCINAE

#### GASTROSACCUS Norman

#### GASTROSACCUS JOHNSONI, n. sp.

Text figs. 5-7

*Localities*.—Serial numbers 358 B, 387 B, 406, 407 B, 521.

*Description*.—*Carapace* (text fig. 5a) produced in front into a short triangular rostral plate with a subacute rounded apex; dorsal posterior

margin of the carapace (text fig. 5*b*) with a median triangular lobe and a broad rectangular lobe on each side of it, none of the lobes reflexed.

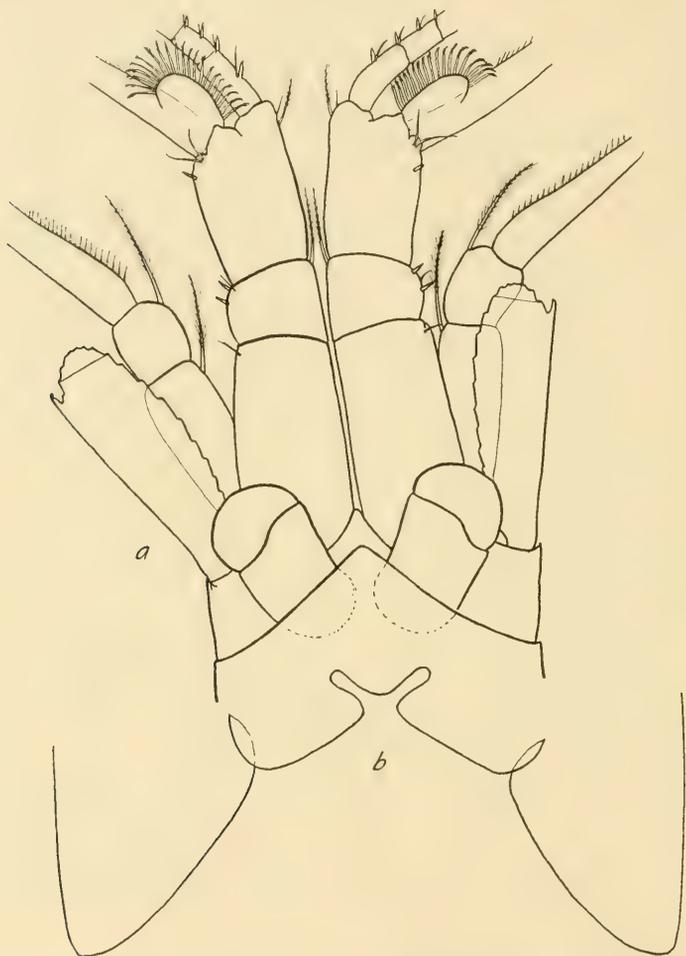


FIG. 5.—*Gastrosaccus johnsoni*, n. sp. *a*, dorsal view of the anterior end to show the rostral plate, eyes, antennular peduncle and the antennal scale; *b*, outline of the posterior margin of the carapace. All  $\times 50$ .

*Eyes* small, including the eyestalks twice as long as broad, cornea occupying the distal third of the whole eye and wider than long.

*Antennular peduncle* (text fig. 5*a*) with the first joint equal to the combined length of the second and third; two spines on the outer margin of the second joint and a similar spine near the distal end of the outer margin of the third joint.

*Antennal peduncle* extending forward to the level of the distal end of the second joint of the antennular peduncle.

*Antennal scale* (text fig. 5a) shorter than the first two joints of the antennular peduncle, about three and one-half times as long as broad, terminal joint marked off by a distinct suture.

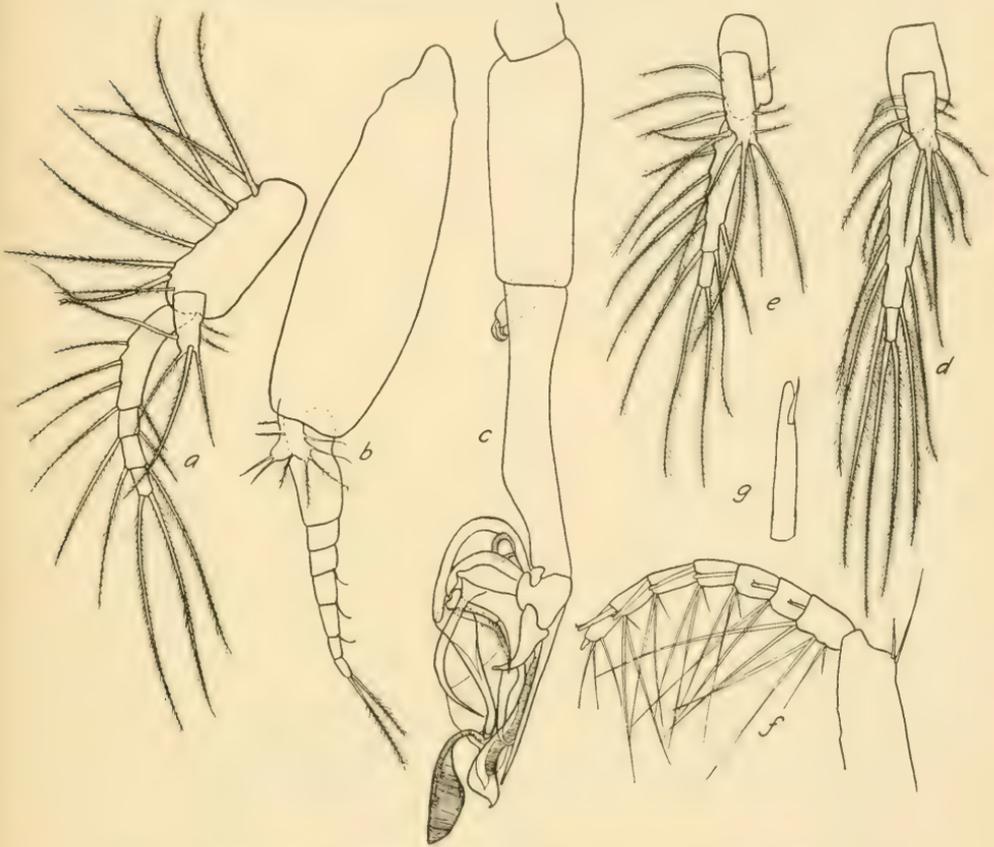


FIG. 6.—*Gastrosaccus johnsoni*, n. sp. a, First pleopod of the male,  $\times 50$ ; b, second pleopod of the male,  $\times 50$ ; c, third pleopod of the male,  $\times 37\frac{1}{2}$ ; d, fourth pleopod of the male,  $\times 50$ ; e, fifth pleopod of the male,  $\times 50$ ; f, sixth and seventh joints of the endopod of one of the thoracic limbs,  $\times 50$ ; g, one of the lateral setae of the sixth joint of the thoracic limbs enlarged.

*Mouth parts and thoracic limbs* essentially as in *G. sanctus*; sixth joint of the endopod of the third thoracic limb (text figs. 6f and 6g) divided into 7 joints, that of the eighth limb into 12 joints, the dactylus in all the limbs reduced; basal plate of the exopod of the first thoracic limb with the outer distal corner rounded, those of the remaining limbs with a distinct tooth at the outer corner.

*Uropods* (text fig. 7b) with 13 spines on the outer margin of the exopod and 2 spines on the inner margin of the endopod.

*Telson* (text fig. 7a), including terminal spines, slightly shorter than the inner uropod, two and one-half times as long as broad at the base, cleft of the usual type and with the usual armature, lateral margin with nine spines extending throughout their entire length, the distal pair of spines on each margin much larger than the rest,

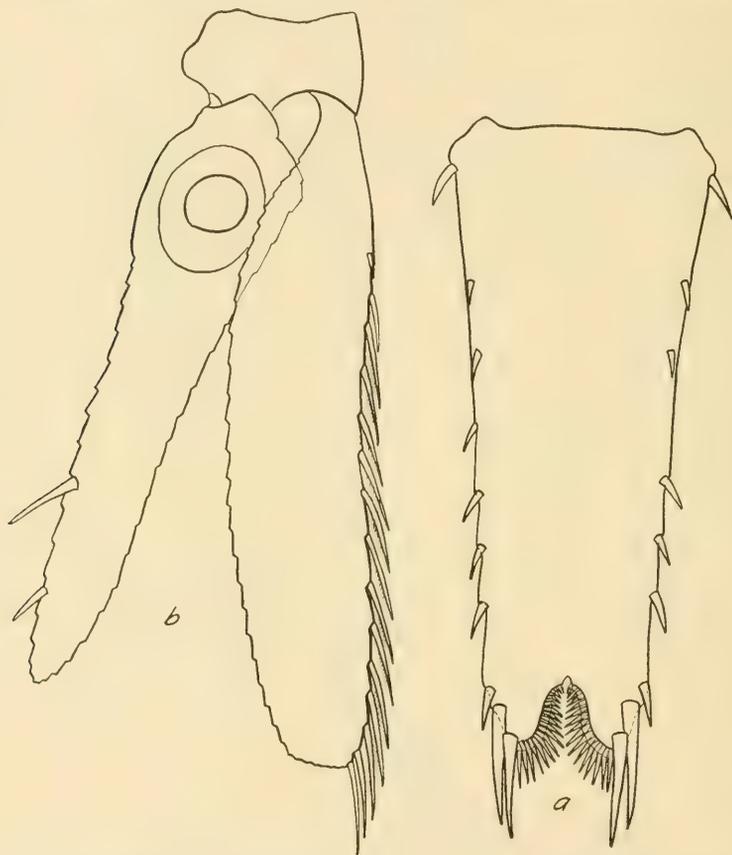


FIG. 7.—*Gastrosaccus johnsoni*, n. sp. a, telson; b, uropods. All  $\times 62\frac{1}{2}$ .

about three times as long as the antepenultimate spines, subequal in length and placed close together.

*Male pleopods* very distinctive, especially those of the second and third pairs; the endopod of all the male pleopods is composed of a single short joint; in the first pair of male pleopods (text fig. 6a) the exopod is much longer than the endopod and is divided into four joints; in the second pair (text fig. 6b), the pleopod is very long and stout, one and one-half times as long as the exopod, the endopod

is single-jointed and furnished with eight or nine delicate plumose setae, the exopod is seven-jointed, the terminal joint furnished with two long plumose setae; in the third pair (text fig. 6c) the protopod is about two and one-half times as long as broad, shorter and not so stout as the protopod of the second pair and shorter than its own exopod, endopod single-jointed and furnished with two short curved spines at the apex, the exopod long and modified in the most extraordinary way into a very complicated copulatory organ. (It is quite impossible to describe this appendage intelligibly, and reference must be made to the figure 6c, where all the essential processes and parts are figured as accurately as possible.) The fourth and fifth pairs of pleopods of the male (text figs. 6d and 6e) are very similar to one another, with short rectangular protopod, a single-jointed endopod and a two-jointed exopod, all furnished with the usual long plumose setae.

*Length* of adults of both sexes 10 mm. The female carries about 25 eggs in the brood pouch.

*Type*.—U.S.N.M. no. 72868.

*Remarks*.—The females of this species are very closely similar to those of most species of the genus, differing only in minor characters. The males, on the other hand, are clearly distinguished by the structure of the pleopods, especially those of the second and third pairs. I know of no other species in which the exopod of the third pair of male pleopods is modified in the same way as in this species, and the form of this pleopod at once distinguishes *G. johnsoni* from all other species of the genus. The second pair of male pleopods are also much more robust than in any other species. *G. johnsoni* is much the most remarkable species in the collection, and I have much pleasure in associating it with the name of the leader of the expedition. It is a very abundant species in the coastal waters of the Virgin Islands and Puerto Rico, where several hundred specimens were captured at night with nets.

#### Subfamily MYSINAE

#### Tribe ERYTHROPINI

#### HYPERERYTHROPS Holt and Tattersall

#### HYPERERYTHROPS CARIBBAEA, n. sp.

Text fig. 8

*Locality*.—Serial number 573, one specimen (male).

*Description*.—Carapace (text fig. 8a) hardly produced into a rostral plate, front margin broadly and evenly arcuate, slightly upturned in lateral view, anterolateral corners produced but rounded.

*Eyes* (text fig. 8a) large, flattened, kidney-shaped, pigment red-brown, without papillae.

*Antennal scale* (text fig. 8a) four times as long as broad, extending forward as far as the distal end of the antennular peduncle, outer margin entire and terminating in a prominent spine extending only slightly beyond the apex of the scale, a small distal joint marked off by a suture; the outer corner of the joint from which the scale springs not produced into a spine.

*Inner uropods* (text fig. 8b) twice as long as the telson with two spines on the inner margin in the region of the statocyst.

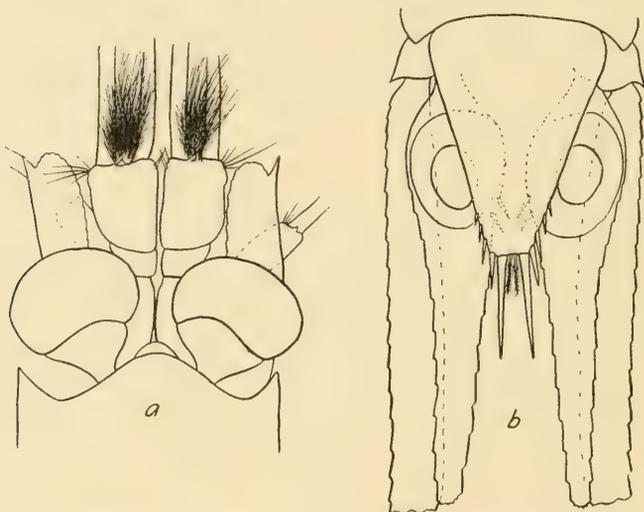


FIG. 8.—*Hypererythrops caribbaca*, n. sp. a, dorsal view of the anterior end of a male specimen to show rostral plate, eyes, antennular peduncle and antennal scale,  $\times 22\frac{1}{2}$ ; b, telson and uropods,  $\times 50$ .

*Telson* (text fig. 8b) one and one-third times as long as broad at its base, having the shape of a truncated triangle extending backward about halfway along the inner uropods, apex truncate, armed with one pair of long powerful spines about half the length of the telson, between which is a pair of short plumose setae; lateral margins with four spines confined to the distal quarter of the margin.

*Pleopods* of the male as in the genus *Erythrops*.

*Length* of an adult male, 8 mm.

*Type*.—U.S.N.M. no. 72869.

*Remarks*.—The single specimen is badly damaged. All the thoracic limbs are broken away, and the outer uropods are likewise broken. I am unable to detect any sternal processes such as are characteristic

of the type species, but the specimen is so imperfect that I cannot be sure that they are really absent. The species is distinguished from the other described forms by the combination of the characters of the eye, antennal scale, and telson. The latter resembles very closely the telson of *Gibberythrops acanthura* (Illig), but the eye and antennal scale are very different from those of this species. In spite of the imperfect condition of the only specimen, I think that the species should be easy to recognize from the characters given above.

#### METAMBLYOPS Tattersall

#### METAMBLYOPS MACROPS, n. sp.

Text figs. 9 and 10

*Locality*.—Serial number 573, one specimen, female.

*Description*.—*Carapace* (text fig. 9a) hardly or not at all produced into a rostral plate, leaving the whole of the eyestalks and eyes, the antennular and antennal appendages completely uncovered, front margin broadly and evenly arcuate, anterolateral corners rounded.

*Eyes* (text fig. 9a) relatively large and on enormous stalks; in lateral view the cornea is large and globular, without papillae, pigment reddish brown.

*Antennal scale* (text fig. 9a) extending for one-quarter of its length beyond the antennular peduncle, rather narrow, six times as long as broad; terminal lobe extending some distance beyond the spine of the outer margin, twice as long as broad, with a distal joint marked off by a suture.

*Telson* (text fig. 9b) narrowly triangular in shape, two and one-half times as long as broad at its base, apex rounded and entire, lateral margins armed along the distal half with about 15 spines increasing somewhat in size toward the apex (spines on the apex broken away so that their exact arrangement cannot be established).

*Uropods* (text fig. 9b) both rather slender, inner one and one-half times as long as the telson, with a single spine on the inner margin in the region of the statocyst; outer twice as long as the telson.

*Length* of an adult female, 11 mm.

*Type*.—U.S.N.M. no. 72870.

The form of the endopods of the second and third thoracic limbs is shown in text figure 10a and 10b. They are of the typical Erythropini form, rather long and slender, the sixth joint of the third endopod divided by a proximal oblique and a distal transverse suture into three subjoints.

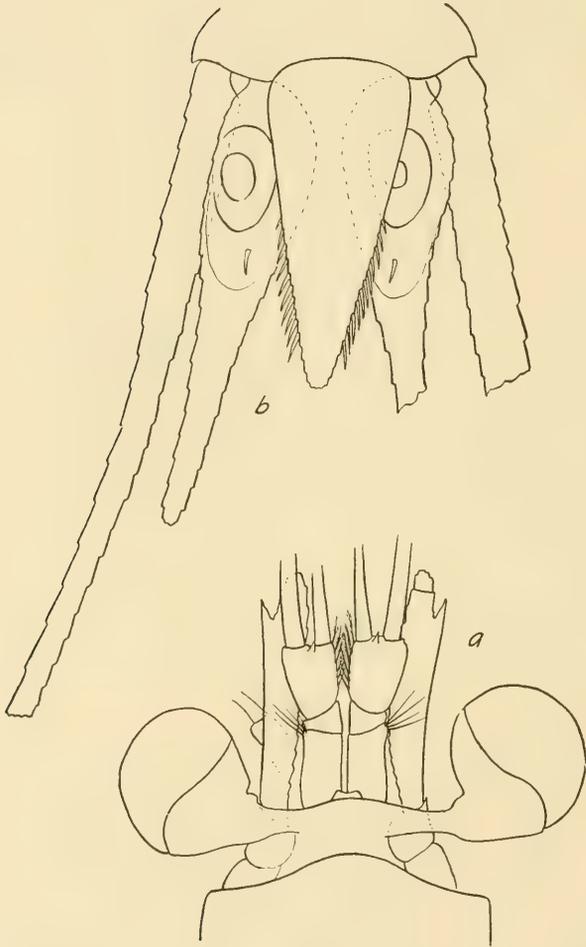


FIG. 9.—*Metamblyops macrops*, n. sp. *a*, dorsal view of the anterior end to show the rostral plate, eyes, antennular peduncle and antennal scale,  $\times 22\frac{1}{2}$ ; *b*, uropods and telson,  $\times 40$ .

*Remarks.*—The exact generic position of this specimen is somewhat doubtful and must remain so until more complete and adult male specimens are available. It differs from the only other described species of the genus, *M. oculata* Tattersall (1911), in the practical absence of a rostral plate, in the large and peculiar form of the eyes,

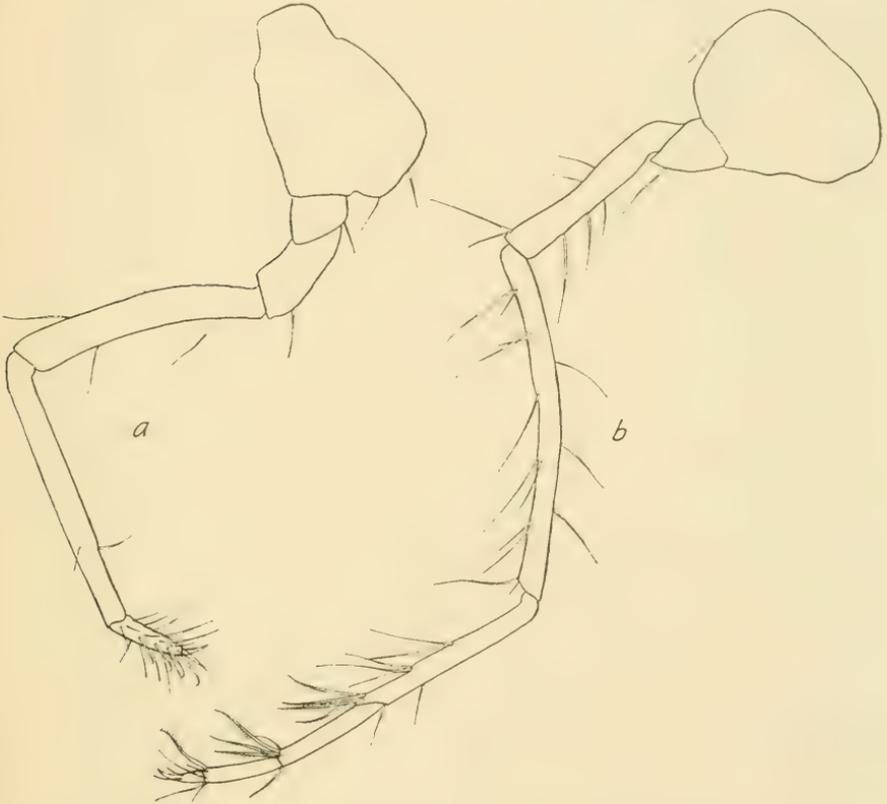


FIG. 10.—*Metamblyops macrops*, n. sp. *a*, endopod of the second thoracic limb; *b*, endopod of the third thoracic limb. All  $\times 50$ .

and in the smaller and narrower antennal scale. On the other hand there is no other genus to which it can be referred. Although the spines on the telson are broken, I think it is clear that the general form and armature of the telson are perhaps nearer to this genus than to any other. I refer it provisionally to *Metamblyops*, and rely on the combination of characters of the carapace, eyes, antennal scale, and telson for its specific recognition.

## REFERENCES

- COLOSI, G.  
1930. Lofogastridi nuovi. Boll. Zool., Ann. 1, no. 4, pp. 119-125, 4 text figs.  
1934. *Paralophogaster macrops*: nuova specie di misidaceo. Boll. Zool. Union Zool. Ital., Ann. 5, no. 2, pp. 43-44, 1 text fig.
- FAXON, W.  
1896. Supplementary notes on the Crustacea. Bull. Mus. Comp. Zoöl. Harvard Univ., vol. 30, no. 3, pp. 153-166, 2 pls.
- HANSEN, H. J.  
1910. The Schizopoda of the Siboga Expedition. Siboga-Expeditie, Monogr. 37, 123 pp., 16 pls., 3 text figs.
- ILLIG, G.  
1930. Die Schizopoden der Deutschen Tiefsee-Expedition. Deutsche Tiefsee-Expedition 1898-1899, bd. 22, hft. 6.
- ORTMANN, A. E.  
1906. Schizopod crustaceans in the U. S. National Museum. The families Lophogastridae and Eucopiidae. Proc. U. S. Nat. Mus., vol. 31, pp. 23-53, pls. 1, 2.
- TATTERSALL, W. M.  
1911. Schizopodous Crustacea from the north-east Atlantic slope. Second supplement. Fisheries, Ireland, Sci. Invest., 1910, vol. 2.  
1926. Crustaceans of the Orders Euphausiacea and Mysidacea from the Western Atlantic. Proc. U. S. Nat. Mus., vol. 69, art. 8, pp. 1-31, pls. 1, 2.
- ZIMMER, C.  
1914. Die Schizopoden der Deutschen Südpolar-Expedition 1901-1903. Deutsche Südpolar-Expedition, vol. 15, Zool. vol. 7, pt. 4, pp. 377-446, pls. 23-26.





SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 27

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
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TO THE PUERTO RICAN DEEP

A NEW SPECIES OF DEEP-SEA FISH, ARGYROPELECUS  
ANTRORSOSPINUS, OF THE FAMILY  
STERNOPTICHIDAE

BY

LEONARD P. SCHULTZ

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U. S. National Museum



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### A NEW SPECIES OF DEEP-SEA FISH, ARGYROPELECUS ANTRORSOSPINUS, OF THE FAMILY STERNOPTICHIDAE

By LEONARD P. SCHULTZ

*Assistant Curator, Division of Fishes, U. S. National Museum*

A study of the fishes of the family Sternoptichidae collected by the first Johnson-Smithsonian Deep-Sea Expedition, 1933, and others in the United States National Museum, has revealed a new species of silver-hatchet fish, *Argyropelecus antrorsospinus*, so named because the single spine at the posterior end of the abdomen curves slightly forward.

#### ARGYROPELECUS ANTRORSOSPINUS, n. sp.

Fig. 1

*Argyropelecus olfersii* (non Cuvier) Goode and Bean, *Oceanic Ichth.*, p. 126, pl. 39, fig. 148 a, 1895.

*Holotype*.—U.S.N.M. no. 102989, 33 mm standard length; from first Johnson-Smithsonian Deep-Sea Expedition, tin tag number 512, station 83, off Culebra Island, latitude  $18^{\circ}32'54''$  N., longitude  $65^{\circ}23'42''$  W., to latitude  $18^{\circ}32'15''$  N., longitude  $65^{\circ}18'45''$  W., February 26, 1933, depth from 250 to 320 fathoms.

The description is based on the holotype and four paratypes, the latter from the following localities, respectively: U.S.N.M. no. 102987, 35 mm standard length, collected by steamer *Albatross*, station 2208, latitude  $39^{\circ}33'00''$  N., longitude  $71^{\circ}16'15''$  W., August 21, 1884; U.S.N.M. no. 35561, 33 mm length, collected by steamer *Albatross*, station 2209, latitude  $39^{\circ}34'45''$  N., longitude  $71^{\circ}21'30''$  W., August 21, 1884; U.S.N.M. no. 33393, 34 mm length, collected by steamer *Albatross*, station 2075, latitude  $41^{\circ}40'30''$  N., longitude  $66^{\circ}35'00''$  W., September 3, 1883 (a rather inaccurate figure of this specimen was published by Goode and Bean, *Oceanic Ichthyology*, pl. 39, fig. 148 a); U.S.N.M. no. 43855, length about 52 mm, *Albatross*, station 2717,  $38^{\circ}24'$  N.,  $71^{\circ}13'$  W., September 18, 1886. This speci-

men, which has been on exhibit for years, is very brittle and is falling to pieces, rendering impossible accurate measurements.<sup>1</sup>

*Description.*—The counts and measurements given outside the parentheses were taken from the holotype, and those inside the parentheses were taken from the four paratypes. All measurements are expressed in hundredths of the standard length. Dorsal spines including rudiments VIII (VIII, VIII, VIII, VIII); dorsal soft rays 9 (9, 9, 9, -); anal rays 8+5 (7+5, 7+5, 7+5, 7+5); pelvic fin rays 6 (-, -, -, -); pectoral fin rays 9 (9, 10, 11, -); gill rakers on anterior margin of first gill arch 8+8 (7+9, 7+9, 8+9, 7+9); branchiostegal rays 9 (-, -, -, -); abdominal plates always 12. The lanterns (fig. 1)

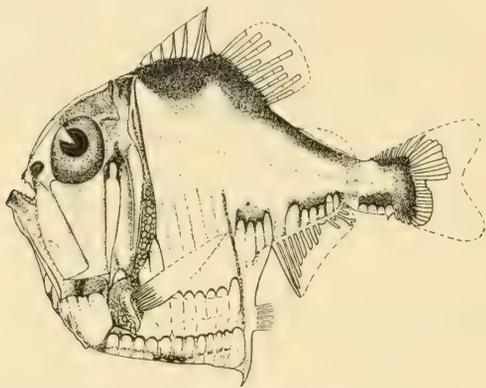


FIG. 1.—*Argyroplecus antrorsospinus* n. sp. Holotype. Standard length 33 mm. Drawn by Jane Roller.

always occur in pairs on holotype and paratypes in the following numbers: Branchiostegals 6; isthmus 6; abdominal (ventral margin of abdomen) 12; anal (along base of anal fin) 6; pre-anal (in front of

<sup>1</sup> The following two specimens, referred to this species, tentatively, and with much uncertainty, are not used in the description of this new species: One, U.S.N.M. no. 102988, collected by steamer *Albatross*, is referred to this species with some uncertainty, as the abdominal spine is broken and there is no spine on the lower margin of the caudal peduncle. This fish was found in a jar containing two station numbers and may have been taken at either one of them. They are: Station 4600, southwest coast of Mexico, Point of Rocks, N. E., 10 miles, latitude 15°36' N., longitude 96°59' W., October 15, 1904, depth 500 fathoms; and station 4436, Harris Point, San Miguel Island, S. 7° E., 9.8 miles, April 15, 1904, depth 264 to 271 fathoms. The other specimen, U.S.N.M. no. 33296, also in poor condition and with the abdominal spine broken off, probably belongs to this species. It was collected by the steamer *Albatross*, station 2043, latitude 39°49'00" N., longitude 68°28'30" W., July 30, 1883. This fish has spines on the ventral portion of the caudal peduncle.

TABLE I.—Counts for *Argyropelecus* Made on Specimens in the United States National Museum  
(Number of fin rays, all rudiments counted as one ray)

Names of species	Dorsal											Anad.				Pectoral				Pelvic	
	Spines			Soft rays								Anterior				Posterior					
	VIII	8	9	6	7	8	4	5	6	9	10	11	9	10	11	6	7				
<i>A. hemigymnus</i> .....		5	—	5	—	—	—	5	—	—	3	—	—	2	3	—	2				
<i>A. offersii</i> .....		2	—	—	2	—	—	2	—	—	1	—	—	1	1	—	2				
<i>A. affinis</i> .....		2	—	—	2	—	—	—	2	—	—	—	—	2	—	—	1				
<i>A. antrorsopinus</i> .....		4	—	4	—	3	1	—	4	—	—	—	—	2	1	1	—				
<i>A. aculeatus</i> .....		2	—	2	—	—	—	—	2	—	—	—	—	—	1	1	1				
<i>A. sladeni</i> .....		3	—	3	—	3	—	—	3	—	—	—	—	—	—	2	—				

Names of species	Number of gill rakers on first arch													
	7+9	7+10	7+11	8+8	8+9	8+10	9+11	9+12	9+13	10+12	10+13	11+13	11+14	
<i>A. hemigymnus</i> .....	—	—	—	—	—	—	2	1	2	5	5	1	1	
<i>A. offersii</i> .....	1	—	—	1	—	—	—	—	—	—	—	—	—	
<i>A. affinis</i> .....	—	—	2	—	—	—	—	—	—	—	—	—	—	
<i>A. antrorsopinus</i> .....	2	—	—	1	—	—	—	—	—	—	—	—	—	
<i>A. aculeatus</i> .....	1	—	—	—	1	—	—	—	—	—	—	—	—	
<i>A. sladeni</i> .....	—	—	—	1	1	1	—	—	—	—	—	—	—	

TABLE 2.—Measurements for *Argyropelecus* Made on Specimens in the United States National Museum  
(All measurements expressed in hundredths of the standard length)

Character	<i>A. hemigymnus</i> (5 fish)	<i>A. olfersii</i> (2 fish)	<i>A. affinis</i> (2 fish)	<i>A. antrosospinus</i> (4 fish)	<i>A. aculeatus</i> (2 fish)	<i>A. stadeni</i> (3 fish)
Length of head.....	31 to 35	31	31	31 to 34	31 to 32	32 to 35
Greatest width of head.....	13 to 18	16.8 to 17	13	16.5 to 18	17 to 18.2	15 to 16.5
Length of snout.....	9 to 12	8 to 9	8.5	9 to 9.5	9.5	8 to 11.3
Width of bony interorbital.....	1.0 to 3.3	2.2 to 3.0	1.3	2.5 to 3.4	3 to 3.3	2.5 to 3.2
Horizontal diameter of eye.....	12 to 17	13	13	12.5 to 14	12.5 to 13	14.5 to 17
Length from tip of snout to rear margin of maxillary.....	27 to 29.5	31	25.8 to 29	29.8 to 33	29 to 31.8	31 to 35
Distance from snout to origin of soft dorsal.....	50 to 53	55.5 to 56.5	51.5	55 to 59	55 to 56	58
Greatest depth of body.....	51.5 to 58.5	75.5 to 76	42 to 44	75 to 82	73 to 78	68 to 75
Least depth of caudal peduncle.....	8.5 to 12	14 to 15.5	10 to 11	12.5 to 14.5	12.5 to 13	10.5 to 13.5
Length of caudal peduncle <sup>a</sup> .....	20.5 to 25	13.5 to 17	20 to 21	14.5 to 17.5	15.5 to 19.5	13.5 to 15
Longest spine of dorsal blade.....	8 to 12	10.5 to 14.5	5.6 to 6.1	14.5 to 18.5	13 to 17	8.2 to 11.5
Length of base of dorsal blade.....	13.5 to 19	18.0 to 20.5	1.6 to 17	19 to 21.5	20 to 21.5	18 to 20
Length of longest gill raker.....	8.8 to 12	7 to 8	7 to 8	7.2 to 11	8.5 to 9.5	9.5 to 11.5
Length of longest pectoral fin ray.....	28 to 34	31	23.5 to 33	34.5 (1 fish)	28.5 to 32.0	31 to 37
Length of abdominal plates.....	34 to 36	39 to 41	34 to 36.5	39.5 to 41	40 to 41.5	40 to 41
Distance from origin soft dorsal to base mid-caudal fin rays.....	50 to 53.5	58.8 to 59	53 to 55.5	56 to 60	53 to 58	56 to 58
Length base soft dorsal fin.....	10.5 to 12.5	16 to 16.8	10.5 to 12	16.8 to 19	17 to 20	14.5 to 15
Length base adipose fin.....	20.5 to 24.5	15 to 16.2	14.5 to 18	16.5 to 19	18.5	.....
Length of nuchal process.....	6.5 to 9	7	8.5 to 9	7.8 to 9	7	8 to 9

<sup>a</sup> From base last anal ray to base mid-caudal fin rays.

anal fin and dorsal to pelvics) 4; suprapectoral (behind and above base of pectoral) 2; subcaudal (underside of caudal peduncle) 4; supra-abdominal (above abdominal series and behind the suprapectorals) 6; preorbital 1; subopercular 1; postorbital (behind and little below eye) 1; and preopercular (below eye and near lower posterior angle of preoperculum) 1. Length of head 34 (33, 32.5, 31, -); greatest width of head 18 (16.5, 16.5, 18, -); length of snout 9.5 (9, 9.5, 9, -); width of bony interorbital 3.3 (2.5, 3.2, 3.4, -); horizontal diameter of eye 13.5 (13, 14, 12.5, -); length from tip of snout to rear margin of maxillary 33.5 (33, 31, 29.8, -); snout to origin of soft dorsal 59 (56, 56.5, 55, -); height of dorsal blade 18.5 (14.5, 16.5, 15, -); length of base of dorsal blade 20 (21.5, 20, 19, -); greatest depth of body (bony ridges or dorsal blade not included) 82 (80, 77.5, 75, -); least depth of caudal peduncle 13.5 (14.5, 12.5, 13.5, -); length of caudal peduncle 16.5 (14.5, 17.5, 16.8, -); length of longest gill raker on first gill arch 11 (7.2, 7.5, 7.8, -); length of abdomen (plates) 41 (41, 39.5, 40, -); distance from origin of soft dorsal to base of caudal fin rays 59 (57.5, 60, 56, -); length of base of soft dorsal 18.5 (19, 17.3, 16.8, -); length of base of adipose fin 18.5 (16.5, 19.0, 19.0, -); length of nuchal process 8 (9, 13, 7.8, -).

This species may be distinguished from all other members of the genus *Argyropelecus* by the data presented in tables 1 and 2 and because it is the only species in which the single spine at the posterior angle of the abdomen curves somewhat forward.

*Argyropelecus elongatus* Esmark, 1871 (Forh. Vidensk. Selsk. Christiania, aar 1870, p. 489), is too briefly described to be recognized. The very inadequate description and poor figure of *Argyropelecus bocagei* Osorio, 1909 (Mem. Mus. Bocage 1, pp. 27-28, pl. 2, fig. 3), is also unrecognizable.







SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 91, NUMBER 28

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## Johnson Fund

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REPORTS ON THE COLLECTIONS OBTAINED BY THE FIRST  
JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

# NEW SPECIES OF HYDROIDS FROM THE PUERTO RICAN REGION

(WITH TWO PLATES)

BY

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University of British Columbia



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### NEW SPECIES OF HYDROIDS FROM THE PUERTO RICAN REGION

By C. McLEAN FRASER

*Department of Zoology, University of British Columbia*

(WITH TWO PLATES)

Through the kindness of the United States National Museum, an opportunity has been afforded to examine the hydroid material collected by the First Johnson-Smithsonian Deep-Sea Expedition, in February and March 1933, at several dredging stations, all in the vicinity of Puerto Rico, in latitude  $18^{\circ}11'55''$  to  $19^{\circ}10'25''$  N., and longitude  $64^{\circ}33'$  to  $69^{\circ}20'45''$  W., in depths from 9 to 300 fathoms.

The collection is of considerable interest because, although there was noticeable activity in hydroid collecting in this general region in the latter portion of the last century, there has been little of it since. Many of the species obtained have not been reported for 40, 50, or 60 years, and, in some instances, the species now appear for the first time since they were originally described. So much is this the case that the best single reference paper is Allman's "Report on the Hydroida Collected During the Exploration of the Gulf Stream by L. F. Pourtales, Assistant United States Coast Survey", published in 1877 in the *Memoirs of the Museum of Comparative Zoölogy at Harvard College*, volume 5, no. 2.

My sincere thanks are due to the United States National Museum for the opportunity of examining this collection. For the drawings I am indebted to Miss Ursula Dale, an Honours student in zoology at the University of British Columbia.

In all, 42 species were obtained in the collection of which 9, here described, appear to be new.

The gonangium of *Halicornaria longicauda* Nutting also is here described for the first time.

#### CLYTIA LAXA, n. sp.

Plate 1, fig. 1

*Trophosome*.—Colony up to 5 cm in height, never entirely erect; main stem stout, fascicled, irregularly and loosely branched; branches

slender and lax, often again branched, giving a flaccid appearance to the whole colony. Hydrothecae irregularly arranged, with long, slender pedicels, somewhat geniculate at the origin, irregularly annulated; there are always annulations at the base of the hydrotheca; they may appear at any other place on the pedicel, but the pedicel is never annulated throughout; hydrothecae, 0.5 to 0.7 mm in length, regularly campanulate, with eight rather sharp, deeply cut teeth on the margin.

*Gonosome*.—Gonangia, 0.7 to 0.9 mm in length, extensively distributed, directly on the main fascicled stem, near the base of the main branches, or in the axils of the smaller branches or pedicels; sessile, or almost so, smooth, oblong or slightly obovate, sometimes narrowing slightly just below the rim.

*Holotype*.—U.S.N.M. no. 43285.

*Distribution*.—East coast of Haiti, lat.  $19^{\circ}10'35''$  N., long.  $69^{\circ}20'45''$  W.; 15 fathoms.

#### SYNTHECIUM GRACILE, n. sp.

Plate 1, fig. 2

*Trophosome*.—Colony unbranched, 10 mm high; internodes short, divided by slightly oblique nodes; one hydrotheca to each internode. Hydrothecae alternate, adherent for about one-third of the length, the basal portion gradually narrowing proximally; distal portion turning outward at an angle of  $35-40^{\circ}$ , tubular. Length of hydrotheca, 0.5 to 0.6 mm, greatest diameter 0.2 mm.

*Gonosome*.—Not observed.

*Holotype*.—U.S.N.M. no. 43286.

*Distribution*.—North of Puerto Rico, lat.  $18^{\circ}30'30''$  N., long.  $66^{\circ}23'5''$  W.; 40 fathoms.

#### SERTULARELLA ORNATA, n. sp.

Plate 1, fig. 3

*Trophosome*.—Stem simple, unbranched, 3 mm high or less, slightly geniculate, divided into regular internodes by rather faint, oblique nodes, each of which bears a hydrotheca; hydrothecae alternate, turned well outward, adnate for a very small portion at the base; cylindrical, or narrowing slightly toward the distal end, with characteristic, strongly crested, transverse rugosities, as many as seven of them; margin with four low but sharp teeth; operculum of four flaps.

*Gonosome*.—Gonangia borne singly, just below the base of one of the proximal hydrothecae, broadly oval, but somewhat distorted, with

rugosities of the same type as those on the hydrothecae, but more numerous, corresponding to the larger size of the gonangium. Margin with four teeth.

*Holotype*.—U.S.N.M. no. 43287.

*Distribution*.—West of Puerto Rico, lat.  $18^{\circ}11'55''$  N., long.  $67^{\circ}42'50''$  W.; 180 fathoms.

#### SERTULARIA SUBTILIS, n. sp.

Plate I, fig. 4

*Trophosome*.—Colony consisting of a single, slender, erect, unbranched stem, 3 mm; the basal portion, nearly one-half, without hydrothecae, smooth, or with one or two annulations; the distal portion is divided into regular internodes, each of which bears a pair of opposite hydrothecae at its distal end (4 pairs of hydrothecae in specimen described); hydrothecae in the pair adnate at the base and then turning gradually outward, so that the distal portion is almost at right angles to the stem. The surface is provided with closely placed, crested annuli. Margin with two strong teeth; operculum of two flaps.

*Gonosome*.—Not observed.

*Holotype*.—U.S.N.M. no. 43288.

*Distribution*.—North of Puerto Rico, lat.  $18^{\circ}23'35''$  N., long.  $65^{\circ}37'10''$  W.; 10 fathoms.

#### AGLAOPHENIA CURVIDENS, n. sp.

Plate I, fig. 5

*Trophosome*.—Colony reaching a height of 6 cm, sparingly branched; the principal portion of the main stem and of the branches, fascicled. The simple portion is divided into regular internodes, with a hydrocladium from each; the hydrocladia alternate from left to right. The hydrothecae are closely placed on the hydrocladium, adnate throughout, rather stout for their depth, with a definite intrathecal ridge about one fourth of the distance from base to margin, reaching entirely across the hydrotheca; margin with seven teeth that are strongly curved inward; the point of the tooth is acute but the tooth is curved in so much that, from the lateral view, it appears rounded or emarginate. The median nematophore is adherent at the base to such an extent that the free portion starts more than halfway up the face of the hydrotheca; it reaches nearly to the margin of the hydrotheca and has an opening at the base of the free portion as well as

one at the end. The supracalycine nematophores are large, reaching for nearly half their length above the margin of the hydrotheca. On the regular, cauline internodes, there are two large cup-shaped nematophores.

*Gonosome*.—Not observed.

*Holotype*.—U.S.N.M. no. 43289.

*Distribution*.—North of Puerto Rico, lat.  $18^{\circ}27'35''$  N., long.  $65^{\circ}33'35''$  W.; 26 fathoms.

#### AGLAOPHENIA MEGANEMA, n. sp.

Plate 1, fig. 6

*Trophosome*.—Colony rather minute, up to 15 mm, simple, unbranched. The basal portion of the stem is divided into irregular internodes by transverse nodes, but just below the first hydrocladium it seems to have a distinct torsion, with two oblique nodes appearing in the torsion. The hydrocladial portion of the stem is divided into regular internodes by transverse nodes, each bearing a hydrocladium from its face; the hydrocladia alternate to one side and the other, but the bases are not far from being in line; the hydrocladia are short, with as many as five hydrothecae, closely placed. The hydrotheca is approximately two-thirds as wide as it is deep, almost completely adherent, with seven rounded, nearly equal teeth on the margin, the median tooth being slightly retrorse and slenderer than the others; there is a definite intrathecal ridge. The median nematophore is long, sometimes overtopping the hydrotheca; the supracalycine nematophores are very pronounced, as they seem to pass right across the hydrocladium to curve upward, reaching higher than the margin of the hydrotheca. The cauline nematophores are of the regular, somewhat triangular type, one at the base of the hydrocladial process and one near the proximal end of the internode.

*Gonosome*.—Not observed.

*Holotype*.—U.S.N.M. no. 43290.

*Distribution*.—North of Puerto Rico, lat.  $18^{\circ}24'30''$  N., long.  $65^{\circ}38'30''$  W.; 9 fathoms.

#### ANTENNELLA CURVITHECA, n. sp.

Plate 2, fig. 7

*Trophosome*.—Colony small and slender, 2.5 mm high, representing a single hydrocladium with 5 or 6 hydrothecae. The basal portion has two or more transverse nodes with no nematophores on the inter-

nodes, or at most one on each. The remainder of the hydrocladium is divided into internodes by alternate transverse and oblique nodes, the internodes being alternately thecate and nonthecate; the thecate internode has an oblique node proximally and a transverse node distally, the nonthecate internode with a transverse node proximally and an oblique node distally. Hydrotheca nearly equal in depth and breadth; the abaxial border is regularly convex but the adaxial border has a distinct concavity. Margin entire. There is a median nematophore at the base of the hydrotheca, one near the distal end of the thecate internode and one on the nonthecate internode; there is a pair of supracalcine nematophores, the end of each fitting into the concavity of the superior border of the hydrotheca.

*Gonosome*.—Not observed.

*Holotype*.—U.S.N.M. no. 43291.

*Distribution*.—North of Puerto Rico, lat.  $18^{\circ}24'30''$  N., long.  $65^{\circ}38'30''$  W.; 9 fathoms.

#### HALICORNARIA LONGICAUDA Nutting

Plate 2, fig. 8

*Halicornaria longicauda* NUTTING, American hydroids, U. S. Nat. Mus. Special Bull. 4, pt. 1, p. 127, 1900.

*Trophosome*.—See Nutting's description.

*Gonosome*.—Gonangia arising from the face of the cauline internodes, just below the hydrocladial processes; sessile, truncated-oval, with a smooth surface. No special protective structures.

*Distribution*.—North of Puerto Rico, lat.  $18^{\circ}24'30''$  N., long.  $65^{\circ}38'30''$  W.; 9 fathoms. North of Culebra island, lat.  $18^{\circ}19'10''$  N., long.  $65^{\circ}19'40''$  W.; 10 fathoms.

#### HIPPURELLA ELEGANS, n. sp.

Plate 2, fig. 9

*Trophosome*.—Colony 35 cm high; stem fascicled throughout the greater portion of its length; 15 cm or more of the basal portion is without branches or hydrocladia; then long slender branches are given off, usually in nearly opposite pairs but sometimes singly, no two, or two pairs, in succession, being in the same plane; the whole distal portion, therefore, has a graceful, bushy appearance. There is no indication of nodes in the stem or in the proximal portion of the branches and but little in the distal portion. The hydrocladia are arranged regularly alternately on the branches, making an angle of

about  $60^\circ$  with the branch; they are all in the same plane. Each hydrocladium arises from a prominent process of the branch and this has a distinct prominence in its axil. In the proximal portion, the nodes are commonly very faint, but they are quite distinct in the distal portion; the internodes are long, each with one hydrotheca near its proximal end. The hydrothecae are long, about twice the width, tubular, or with the sides slightly curved. Margin entire. There are numerous nematophores on the stem and the fascicled portion of the branches; on the simple portion of the branches, there is one on the prominence on the hydrocladial process, another placed laterally and one on the branch where the process joins it; there are two nematophores between two successive hydrocladial processes, in line with these processes; on each internode of the hydrocladium, there is a median nematophore at the base of the hydrotheca, two supracalcine nematophores, projecting well outward, and one median, some distance above the margin of the hydrotheca.

*Gonosome*.—The distal portion of some of the branches become very much modified in connection with the development of the gonangia. In place of the regular hydrocladia, whorls of six, slender, tapering processes, without nodes, appear. These processes curve outward and upward, so that the distal portion is parallel to the branch; there are several nematophores, up to 8, on the adcauline side of each process. The gonangia, singly or in pairs, are placed in the axils of the whorls; they are regularly elliptical, 1.0 mm long and 0.3 mm in diameter, smooth, with little or no pedicel.

*Holotype*.—U.S.N.M. no. 43292.

*Distribution*.—North of Puerto Rico, lat.  $18^\circ 33' 15''$  N., long.  $65^\circ 56' 45''$  W.; 240 fathoms. Off west coast of Puerto Rico, lat.  $18^\circ 24' 45''$  N., long.  $67^\circ 14' 15''$  W.; 80-180 fathoms. North of Puerto Rico, lat.  $18^\circ 31' 30''$  N., long.  $66^\circ 18' 20''$  W.; depth not recorded.

#### STREPTOCAULUS GRACILIS, n. sp.

Plate 2, fig. 10

*Trophosome*.—Colony 8 cm in height; stem fascicled throughout much of its length, unbranched; the proximal half or more without hydrocladia; hydrocladia arranged to form a continuous spiral around the distal portion of the stem. The hydrocladia are divided into long, slender internodes, with the hydrothecae near the proximal end of the internodes; there is a double annulation at the node, which is somewhat oblique. The hydrotheca occupies about two-thirds of the length of the internode, the face of it with an urceolate curve; the

margin is curved like the margin of a pitcher, and there is a slightly curved, sharp, median tooth. There are six or seven septal ridges between the base of the hydrotheca and the base of the supracalcine nematophores; there are numerous nematophores arranged on the portion of the main stem that is free of hydrocladia, one in the axil of each hydrocladium and three others between this and the base of the next hydrocladium. On the hydrocladial internode, there is a median nematophore at the base of the hydrotheca, but free from it, two large supracalcine nematophores and one median near the distal end of the internode.

*Gonosome*.—Not observed.

*Holotype*.—U.S.N.M. no. 43293.

*Distribution*.—North of Puerto Rico, lat.  $18^{\circ}33'15''$  N., long.  $65^{\circ}56'45''$  W.; 240 fathoms.

#### EXPLANATION OF PLATES

(All the figures, unless otherwise indicated, have a magnification of 20 diameters.)

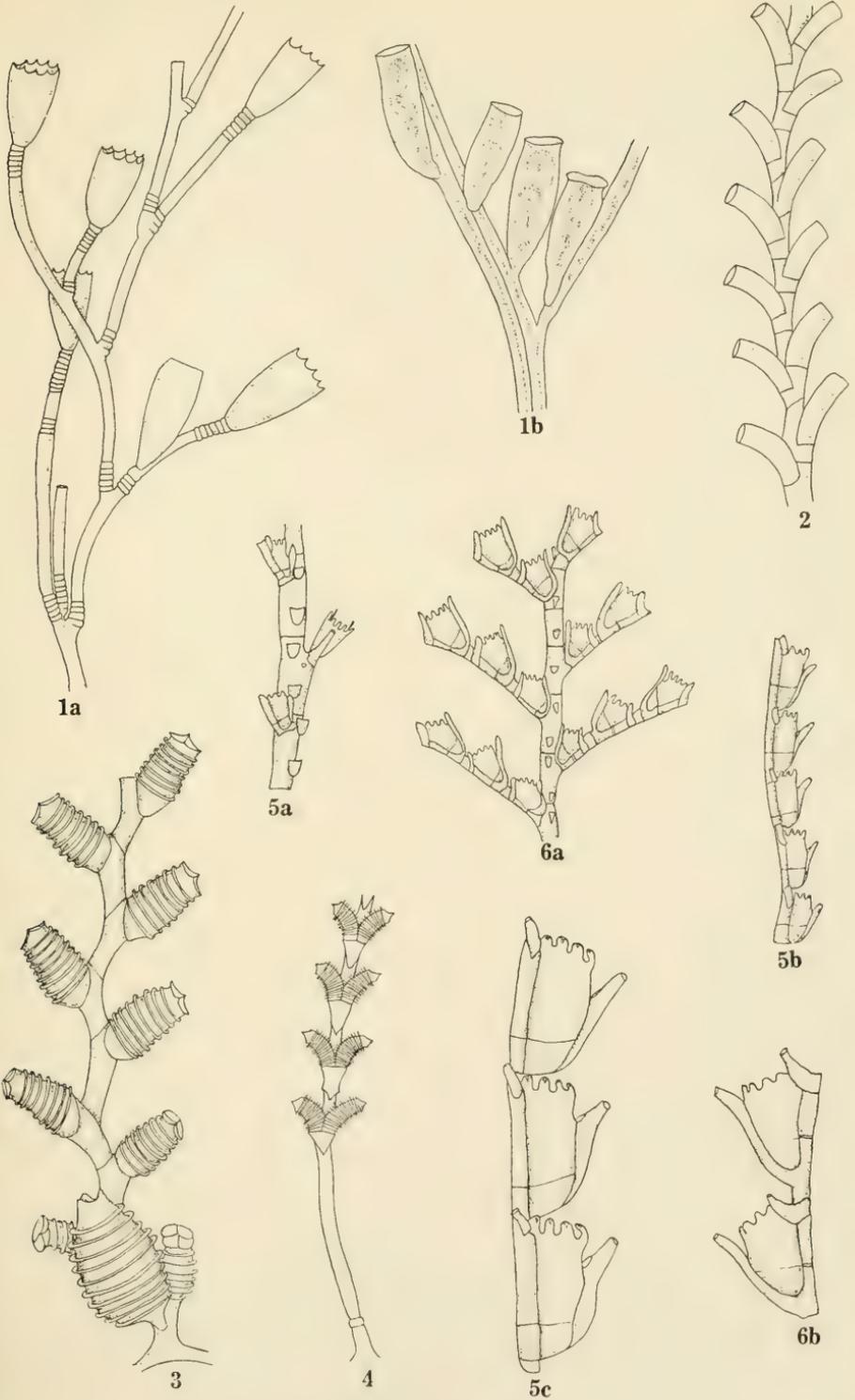
##### PLATE I

- FIG. 1. *Clytia laxa*: *a*, portion of colony showing branching, hydrothecae, and long pedicels; *b*, portion of fascicled stem with gonangia.
- FIG. 2. *Synthecium gracile*: Portion of stem showing arrangement of hydrothecae.
- FIG. 3. *Sertularella ornata*: Portion of colony showing hydrothecae and gonangium.
- FIG. 4. *Sertularia subtilis*: Portion of colony showing hydrothecae.
- FIG. 5. *Aglaophenia curvidens*: *a*, portion of stem showing internodes and origin of hydrocladia; *b*, portion of hydrocladium with hydrothecae; *c*, portion of hydrocladium further enlarged ( $\times 40$ ).
- FIG. 6. *Aglaophenia meganema*: *a*, portion of stem with hydrocladia and hydrothecae; *b*, portion of hydrocladium with hydrothecae, further enlarged ( $\times 40$ ).

##### PLATE 2

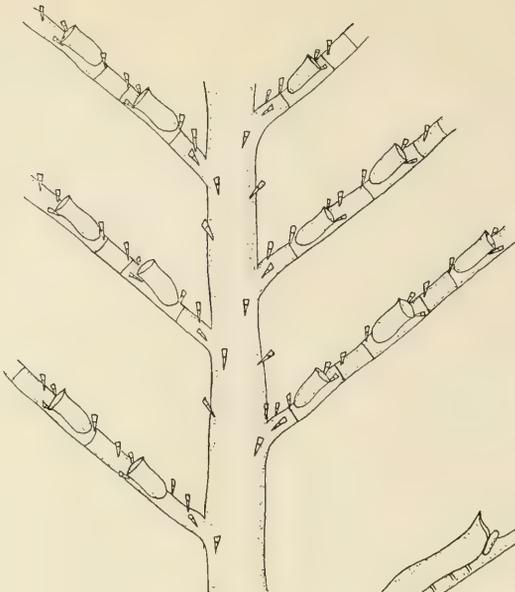
- FIG. 7. *Antennella curvitheca*: *a*, colony showing hydrothecae; *b*, portion of colony further enlarged ( $\times 40$ ).
- FIG. 8. *Halicornaria longicauda*: Portion of colony showing internodes of stem, bases of hydrocladia and gonangia.
- FIG. 9. *Hippurella elegans*: *a*, portion of branch with proximal portion of hydrocladia; *b*, face view of a portion of a hydrocladium; *c*, portion of branch modified to protect the gonangia.
- FIG. 10. *Streptocaulis gracilis*: Portion of fascicled stem and basal portion of a hydrocladium with hydrothecae.







7a



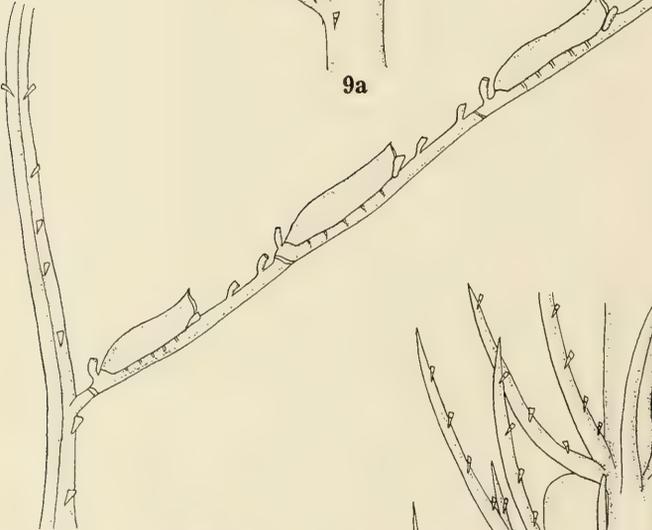
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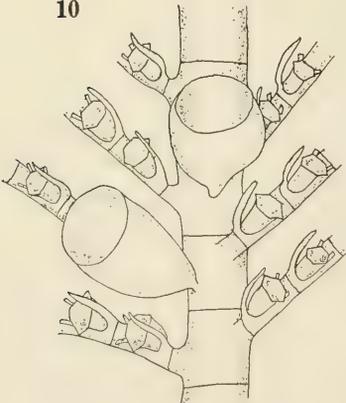
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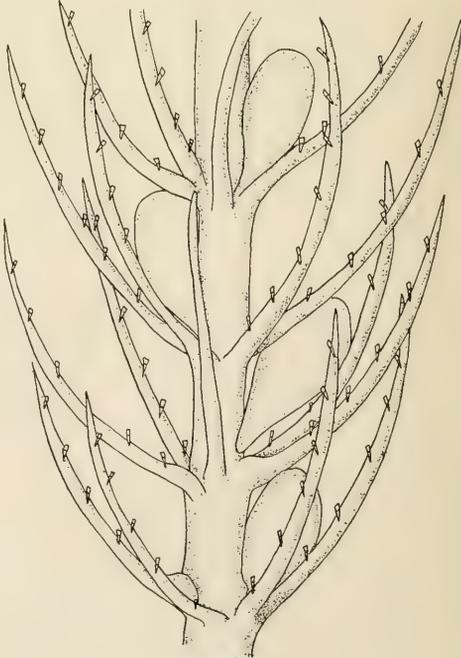
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# A NEW GENUS OF STARFISHES FROM PUERTO RICO

(WITH ONE PLATE)

BY

AUSTIN H. CLARK

Curator, Division of Echinoderms, U. S. National Museum



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### A NEW GENUS OF STARFISHES FROM PUERTO RICO

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(WITH ONE PLATE)

Among the starfishes obtained by the First Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep was a single very small specimen representing a species falling in the family Ganeriidae, though wholly unlike any form now included in that family.

A very similar specimen was described by M. Edmond Perrier in 1881 under the name of *Korethraster radians*. Perrier's description is very sketchy and lacks many essential details. No locality is given for the specimen or specimens upon which it was based, and there are no figures.

In 1883 Perrier listed this species as *Lophaster radians* and gave two localities for it—off Barbados in 56 fathoms, and off Havana in 80 fathoms. In the same memoir he listed and figured it under the name of *Solaster radians*, and reprinted the original description under the new name *Korethraster hispidus*.

The figures of *Solaster radians*, though lacking in essential details, might well have been drawn from the species represented by the specimen dredged by the *Caroline*.

Thanks to the kindness of my friend Dr. Hubert Lyman Clark, I have been permitted to examine the type specimen of Perrier's *Korethraster radians* (M.C.Z. no. 912). This and the *Caroline* specimen agree in all essential particulars, and appear to represent the same species—*radians* Perrier. The generic type represented by *radians*, however, is far removed from *Korethraster*, *Lophaster*, and *Solaster*, which belong to the family Solasteridae.

This generic type may be known as

#### LEILASTER, n. gen.

*Korethraster* (part) E. PERRIER, Bull. Mus. Comp. Zoöl., vol. 9, no. 1, p. 12, June 25, 1881.

*Lophaster* (part) E. PERRIER, Nouv. arch. mus. d'hist. nat., ser. 2, vol. 6, pp. 167, 169, 170, 1883.

*Solaster* (part) E. PERRIER, Nouv. arch. mus. d'hist. nat., ser. 2, vol. 6, p. 184, 1883.

*Diagnosis.*—A genus of Ganeriidae in which the abactinal plates are arranged in regular contiguous longitudinal rows, with a row of enlarged plates separating the abactinal from the lateral surface of each arm; the superomarginals are blocklike, but the inferomarginals are greatly produced outward, forming conspicuous stalks projecting diagonally outward from the arm; there is a single row of contiguous elongated actinal plates; and the adambulacral plates bear two combs of 3-4 spines, a furrow comb and a similar comb on the outer part of the plates, both diagonally placed. Size small, R up to 12 mm. Form stellate, the arms with rather broadly rounded tips.  $R=2.24$  to 2.4 r.

*Genotype.*—*Korethraster radians* Perrier, 1881.

*Affinities.*—The genus *Leilaster* appears to show the closest affinities with *Ganeria*, from which, however, it is rather widely separated.

#### LEILASTER RADIANS (Perrier)

Plate I, figs. 1, 2

*Korethraster radians* E. PERRIER, Bull. Mus. Comp. Zoöl., vol. 9, no. 1, p. 12 (description), June 25, 1881.

*Lophaster radians* E. PERRIER, Nouv. arch. mus. d'hist. nat., ser. 2, vol. 6, p. 167 (listed); p. 169 (*Blake* sta. 292, off Barbados, 56 fathoms); p. 170 (*Blake* sta. 292 [*sic*], Havana, 80 fms.); 1883.

*Solaster radians* E. PERRIER, Nouv. arch. mus. d'hist. nat., ser. 2, vol. 6, p. 184 (56 fms.); pl. 6, figs. 9-11; 1883.

*Korethraster hispidus* E. PERRIER, Nouv. arch. mus. d'hist. nat., ser. 2, vol. 6, p. 212 (description of *K. radians* reprinted; *Blake* sta. 292, Barbados, 56 fms.; *Blake* sta. 000 [*sic*], Havana, 80 fms.); 1883.

*Description of the specimen from the Caroline collection.*—A very small specimen with five short, regularly tapering, bluntly pointed arms. The abactinal surface is elevated, and on each arm is bounded on either side by a regular row of elongate and enlarged plates beyond which the sides drop rather sharply down to the flat abactinal surface. The entire animal is covered with a rather thick skin that partially conceals the underlying plates.  $R=4.7$  mm,  $r=2.1$  mm;  $R$ =about 2.24 r.

The rather conspicuous anus is surrounded by three small plates with the center strongly elevated into a rounded boss. About these is a ring of five large interradial plates. These are thick, with the inner ends broadened and swollen, sometimes bilobed. One of these imbricates laterally over those on either side; another is partly concealed by the overlapping of the plates on either side; the other three overlap the plates on one side and are overlapped by the plate on

the other. From each of these five large interradial plates two regular rows each composed of nine elongate swollen plates run to the arm tips. The proximal plates in these rows, slightly overlapping the large interradial plates, are in contact or nearly so; from this point the rows diverge, each row bounding the abactinal surface of an arm. The plates at first are about three times as long as broad, but they gradually become shorter and at the arm tip are little, or not at all, longer than broad. They are much swollen with high broadly rounded crests, and imbricate adcentrally. Between each two of the large interradials, and therefore between the innermost plates of the two rows running down each arm, is a plate similar to the latter, but somewhat smaller. At the distal end of this on either side and partially overlapping it are two similar but slightly smaller plates lying between the line of union between the first two plates in the two outer rows. Beyond these are three plates forming the bases of three regular rows running to the arm tips. The plates of the central row alternate with the plates of the two outer rows. Each row includes usually nine plates. The plates in these three rows, which fill the area between the two outer rows on each arm, are somewhat more than half as large as the plates in the outer rows; like them, they are highest at the inner ends, and imbricate adcentrally. The elongate swollen central or inner portion of each plate is well separated from that of the plates adjacent. In the interradial areas a rather broad deep groove runs downward to the abactinal surface. Outside each of the rows of plates bordering the abactinal surface of each arm from the second to the fifth plate in each row, runs a row of four plates resembling those in the central portion of the abactinal surface of the arms but narrower. Outside of this row, opposite the junction between the first and second and second and third plates, are two similar but smaller plates.

The superomarginals are seven in number and form a regular row. They are intermediate in size between the plates of the rows bordering the abactinal surface of the arms and the lateral plates of the arms, but are somewhat broader and more regularly swollen, appearing more or less oval. They are about half again as long as their greatest width. They are oblique in position, the actinal ends being more distal than the abactinal, their long axes making an angle of about  $60^\circ$  with the line of the row as a whole. Below each superomarginal is an inferomarginal. The inferomarginals are produced outward in the form of a stout pillar with parallel sides and a broadly rounded tip that is about twice as long as broad at the base. The first three or four of these pillars are separated by about their own width, but

those succeeding are closer together. They are somewhat oblique, their tips being farther from the arm base than their bases.

Between the inferomarginals and the adambulacral plates and adjoining each is a single continuous row of actinal plates. There are two of these under the first inferomarginal, and one long narrow one under each of those following.

There are 13 or 14 adambulacral plates. These at first are slightly broader than long, becoming about as long as broad distally.

The tube feet, which have large sucking disks, are in two rows.

All the plates of the abactinal surface bear numerous—up to a dozen or more—short stout spinelets. These have a broad base, a narrowed column, and the outer half swollen and club-shaped, echinulate, with a broadly rounded tip. These spinelets are set upon the swollen portions of the plates more or less in contact by their broad bases. On the longer plates there are commonly five or six along each side, with one or two additional between the rows. On the more rounded plates there may be six peripheral and one central. They form a very even investment of the abactinal and lateral surfaces.

Each superomarginal bears 10 or 11 of these spinelets, exactly resembling those on the abactinal surface. There are 8 to 10 around the swollen central portion, and 1 or 2 in the middle.

The upper surface of the produced inferomarginals bears eight or nine of these spinelets, commonly arranged in two rows of four or five each, though sometimes irregular. The outermost of these are swollen for their whole length, and therefore appear larger than the others. At the tip of the pillarlike production are three longer, much stouter, strongly echinulate rounded conical somewhat flattened spines. On the actinal side the inferomarginal bears from four to six small slender echinulate spinules without swollen ends which are well separated from each other.

The two basal actinal plates bear three spinules resembling these, but more than twice as large; the actinal plates following bear first two, then one, and distally none.

The first three adambulacral plates bear a comb of four rather long echinulate furrow spines that are webbed for about half their length; the combs on the following adambulacrals consist of three spines. These combs are set obliquely, making an angle of about  $45^\circ$  with the furrow. On the outer portion of the adambulacral plates, away from the furrow margin, is another oblique comb of three similar spines, less completely webbed.

The mouth plates are large and broad, the pairs of mouth plates being somewhat broader than long with the outline of the inner half semicircular. Each mouth plate bears six well spaced spines about its border, of which the innermost is somewhat larger than the others, and the outermost is the smallest. One of the mouth plates of each pair bears an additional spine near its center.

*Description of the type specimen (from Perrier).*—A small species with 5 short blunt arms flattened below, rather strongly convex above;  $R=10$  mm,  $r=4$  mm;  $R=2.5$  r.

Each adambulacral plate bears on the border of the ambulacral groove three rather short divergent spines; outside of these on the ventral surface there is a transverse row of three spines, equally divergent, so arranged that a narrow naked band separates them from the border of the arms, which is definitely marked and fringed with the groups of blunt spinules borne by the abactinal plates; the dorsal ossicles each bear a group of a dozen rather short spinelets, obtuse at the end or even slightly capitate, divergent, longer along the margin of the arms, disposed irregularly on the surface of the plates, though in such a way as to cover their whole surface.

Isolated tentacular pores occur between the plates; there are 11 more or less irregular rows from one side of the arm to the other.

The madreporic plate is rounded, convex, rather small, half concealed among the spinelets of the dorsal surface, situated half way between the actinal surface and the summit of the interbrachial angle.

*Notes on the type specimen.*—Perrier's type specimen is much larger than the specimen collected by the *Caroline*;  $R=12$  mm,  $r=5$  mm;  $R=2.4$  r. Most of the spinelets on the abactinal surface are in place, so that the plates are more or less concealed.

The plates on the abactinal surface are more numerous than is the case in the *Caroline* specimen, and the rows are not quite so regular. The rows bordering the abactinal surface consist of 14 or 15 plates instead of 9, and these plates are not sensibly different from those of the outer rows, which are proportionately more numerous.

The abactinal plates bear 7-15 (usually 8-10) short, stout, club-shaped and echinulate spinules.

Beyond the area delimited by the five interradial plates are rows of papulae that run to the outer third of the arm. The papulae are situated in the depressions between the plates. They are usually solitary, but in a few cases two were noticed in a single depression. There are eight rows of papulae of which the lowest consist of four or five, and those on the abactinal surface of about a dozen.

The madreporite is very small and is situated about one-third of the distance between the anus and the interradian angle. It is naked, shows a few coarse irregular striations, and is almost concealed by the spinelets on the adjacent plates.

There are 14 superomarginals which are somewhat smaller than the plates above them, and are transversely elongate and oblique. Each bears 6-9 spinelets.

The inferomarginals number 14. They bear a diagonal terminal comb of 3-5 (commonly 4) stout, subconical, more or less flattened, echinulate spines on their outer ends, in addition to the spinelets described for the *Caroline* specimen on the abactinal and actinal surfaces.

The actinal plates each have one or two slender and sharp spinelets.

*Localities.*—Blake station 62 Ag.; off Havana, Cuba; 80 fathoms; 1877-78 (Perrier, 1883).

Blake station 292; off Barbados (lat.  $13^{\circ}13'55''$  N., long.  $59^{\circ}38'50''$  W.); 56 fathoms; bottom temperature  $74.5^{\circ}$  F.; bottom, coral, sand, and broken shell; March 9, 1879 (Perrier, 1883).

*Caroline* station 102; northeast of Puerto Rico (lat.  $18^{\circ}51'$  N., long.  $64^{\circ}33'$  W.); 140 fathoms; March 4, 1933 (1, U.S.N.M. no. E.5599; original no. 678).

*Remarks.*—Profs. Walter K. Fisher and Hubert Lyman Clark have both been so kind as to examine the *Caroline* specimen, and we are all three in agreement regarding its disposition.

#### LOPHASTER VERRILLI, n. sp.

*Lophaster radians* VERRILL, Univ. Iowa, Bull. Lab. Nat. Hist., vol. 7, no. 1, p. 51, pl. 5, fig. 2; pl. 7, fig. 3; pl. 9, figs. 1-1c; March 20, 1915.

*Notes.*—Prof. Addison E. Verrill in 1915 described in detail and figured a species that he regarded as representing Perrier's *Korethraster radians*. According to his description and figures, what he had was not Perrier's species, but a true *Lophaster*. A specimen at hand from *Albatross* station 2415 agrees with his description and figures, and was labeled by him *Lophaster radians*. This specimen measures  $R=35$  mm,  $r=10$  mm. The largest specimen mentioned by him measured  $R=40$  mm,  $r=17$  mm. This species may be called *Lophaster verrilli*.

*Localities.*—*Albatross* station 2415; off Fernandina, Fla. (lat.  $30^{\circ}44'00''$  N., long.  $79^{\circ}26'00''$  W.); 440 fathoms; coral, coarse sand, shells, and foraminifera; April 1, 1885 (U.S.N.M. no. 10512).

Several *Albatross* stations in the West Indies (Verrill).

It was taken by the Bahama Expedition [of the University of Iowa] at several stations. The largest . . . was from station 64, in 110 fathoms, off Florida. Smaller ones occurred at sta. 28, off Sand Key, in 116 fathoms; and at sta. 56, Pourtales Plateau, in 220 fathoms. Another (radii 10 mm. and 33 mm.) was from station 62, off Florida, in 80 fathoms. [Verrill].

#### EXPLANATION OF PLATE

##### PLATE I

*Leilaster radians*, a specimen from *Caroline* station 102 (U.S.N.M. no. E.5599), abactinal (upper) and actinal (lower) surfaces; one ray, right in the upper figure, lower left in the lower, has been cleaned to show the plates; the abactinal surface has been almost completely denuded of spinelets.  $\times 4\frac{1}{2}$ .





LEILASTER RADIANS

(For explanation, see page 7.)







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A NEW CORNUCOPINA (BRYOZOA)  
FROM THE WEST INDIES

(WITH TWO PLATES)

BY  
RAYMOND C. OSBURN  
Ohio State University



(PUBLICATION 3584)

CITY OF WASHINGTON  
PUBLISHED BY THE SMITHSONIAN INSTITUTION  
MARCH 14, 1940

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(WITH TWO PLATES)

All the previously known members of this genus are strictly southern in their distribution, being found chiefly in the waters about Australia, the southern part of the Indian Ocean, and Antarctica. Of the 14 species, only 1 is known even to approach the Equator—*C. (Bicellaria) navicularis* (Busk), which was taken by the *Challenger* Expedition off Barra Grande, Brazil, some 9 degrees south of the Equator at a depth of 2,200 fathoms. The occurrence of the present species near Puerto Rico, taken by the Johnson-Smithsonian Deep-Sea Expedition, is therefore worthy of more than passing notice.

The genus *Cornucopina* was erected by Levinsen (Chilostome Bryozoa, pp. 109-110, 1909), who separated out "the majority of the species in the old genus *Bicellaria*." The best account has been given by Harmer (*Siboga* Expedition, 1926) who listed all the species with their known distribution. There is an important typographical error in Harmer's paper (p. 422), which gives the locality "Bay of Biscay" for *C. dubitata* (Calvet), as this species was taken in the Bay of Biscoe, Graham's Land, Antarctica. The genus is distinguished from the well-known *Bicellaria* by the exceedingly tall, stalked avicularia, by the arrangement of the numerous spines, and by the nature of the ovicell.

CORNUCOPINA ANTILLEA, n. sp.

Zoarium erect, stalked, profusely branched. The type specimen, which is about 80 mm. in height, is free from lateral branches for a distance of about 25 mm. above the base, and the "stalk" is conspicuously thickened by the large number of radical fibers, some of which originate high up on the branches. The central stalk and the stems of all the branches are formed primarily by the union of the tubular proximal ends of the biserial, alternating zooecia. The branches subdivide, often several times, giving the colony a beautiful plumose appearance.

Zooecia biserial and alternate, very slightly calcified, nearly transparent averaging about 1 mm. in length. The basal portion is narrowly tubular for about one-half the length, above which the zooecium expands rather suddenly and extends outward at an angle of about 45 degrees. The membranous area occupies practically all of the upper side, extending nearly to the base of the expanded portion, and is turned slightly away from the axis of the stalk. The operculum is semilunar, thickened a little at the border. The distal margin of the zooecium, dorsally, is beset with a row of 4, occasionally 5, exceedingly elongate, tubular, slightly curved spines, which are jointed at the base. The longest spines are more than twice as long as the whole zooecium, reaching a maximum of about 2.50 mm. A smaller spine occurs at one side of the area near its base, and above this there may be another somewhat larger one. There is no indication of a digitiform process, and all of the spines originate separately from the wall of the zooecium.

Avicularia are of two kinds. One of these is excessively elongate, ranging from 0.95 to 1.90 mm., averaging around 1.40 mm. This form originates on one side near the distal end of the aperture. It has a long tubular stalk, jointed at the base, and expands but little until near the distal end. Both beaks are hooked, the mandible more strongly. There is much variation in the size of the mandibulate portion, the largest being only slightly smaller than the zooecia, the smallest very narrow in comparison. This variation in size is not coordinated with the length of the pedicel. The second type of avicularium is very short and small in comparison, being only about 0.20 mm. in length. The mandible is noticeably more transverse than in the elongate form. This type is usually attached laterally near the base of the zooecial expansion. They are much less numerous than the elongate type and seem to appear more frequently just above the bifurcation of a branch. There are some infrequent evidences of intergradation in size, but not in position, between the long and short types.

The ovicells are not abundant, but 1 or 2 appear on nearly every branch. They are moderately large, about 0.32 mm. in width, somewhat globular, the rim of the aperture a little flaring, the surface decorated with radiating lines. They are attached laterally at the distal end of the zooecium, in front of the elongated spines.

The radical fibers arise from the side of the zooecia near the base of the membranous area, more frequently from the basal zooecia of the branches. They follow the stalk down to its point of attachment where they spread out on the substratum for anchorage.

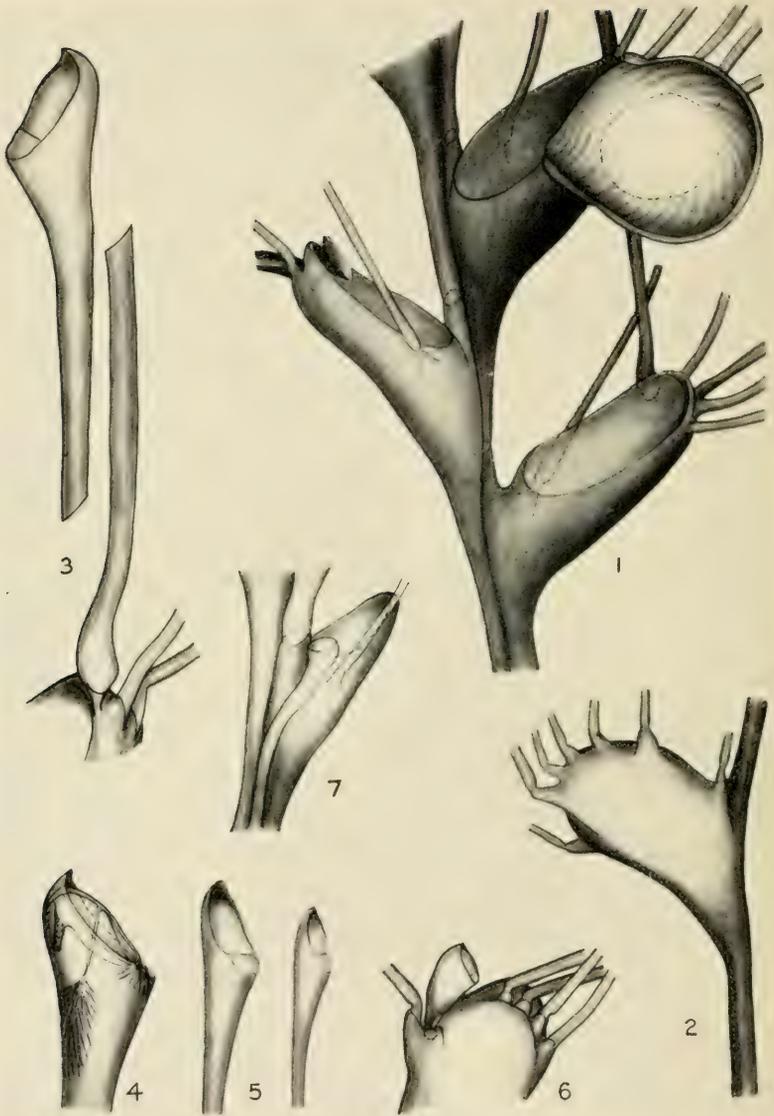
The single type specimen was collected by the Johnson-Smithsonian Deep-Sea Expedition on February 10, 1933, west of Puerto Rico; latitude  $18^{\circ}14'20''$  N., longitude  $67^{\circ}38'25''$  W., at 400 fathoms, U.S.N.M. No. 10087.

The species of *Cornucopina* fall naturally into two groups, depending on the presence or absence of a "digitiform process" for the attachment of the long spines. Since in *C. antillea*, n. sp., the spines are attached singly to the wall of the zooecium, this species belongs in the group that includes the genotype *C. grandis* (Busk), *C. conica* Harmer, *C. polymorpha* (Kluge), *C. lata* (Kluge), *C. infundibulata* (Busk), *C. pectogemma* (Goldstein), and *C. dubitata* (Calvet). It bears a fairly close resemblance to *C. pectogemma* from Marion and Heard Islands in the Indian Ocean, but differs in the form of the long avicularia, the presence of short avicularia, the form of the ovicell, the arrangement of the spines, and other minor characters. All the other species of this group occur in Australian waters or Antarctica.





CORNUCOPINA ANTILLEA, N. SP.  
Colony of *Cornucopina antillea*, 1/2.



*CORNUCOPINA ANTILLEA*. N. SP.

1. Three zoecia of a distal branch, showing ovicell, arrangement of spines, and the base of an elongate avicularium; 2, dorsal view of a single zoecium, showing arrangement of the full complement of 7 spines; 3, large avicularium with long stalk; 4, details of large avicularium; 5, two smaller avicularia (the stalks are as long as in fig. 3); 6, small type of avicularium with short pedicel; 7, origin of radical at side of zoecium.

Drawn by Miss Frieda Busch under camera lucida; all figures to same scale.





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SMITHSONIAN MISCELLANEOUS COLLECTIONS  
VOLUME 91, NUMBER 31

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JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION  
TO THE PUERTO RICAN DEEP

A NEW GENUS AND SPECIES OF EEL  
FROM THE PUERTO RICAN DEEP

BY

EARL D. REID

Division of Fishes, U. S. National Museum



(PUBLICATION 3585)

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## A NEW GENUS AND SPECIES OF EEL FROM THE PUERTO RICAN DEEP

By EARL D. REID

*Division of Fishes, U. S. National Museum*

Further study of the fishes obtained by the First Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep has revealed an interesting form of deep-sea eel. The specimens are very close to *Xenomystax trucidans* Alcock, from the Arabian Sea, but differ notably in the more posterior insertion of the dorsal fin, in the position of the vent, in the broader isthmus, and in color. From *X. atrarius* Gilbert, from off the coast of Ecuador, our specimens are distinguished by the position of the posterior nostrils, by the proportionally longer body, and by the reduced number of branchiostegal rays. Our material differs from *X. rictus* Garman, in addition to the above-mentioned characters, in having the origin of the dorsal fin above the first third of the pectoral length.

Since the position of the posterior nostrils and the reduced number of branchiostegal rays are considered of generic rank, it becomes necessary to propose a new genus for the accommodation of *Xenomystax trucidans* Alcock and my new species.

### Family MURAENESOCIDAE

#### PARAXENOMYSTAX, n. gen.

*Genotype*.—*Paraxenomystax bidentatus*, n. sp.

Body scaleless, long, tapering, the caudal strongly attenuated posteriorly. Vertical fins well developed, continuous with the lanceolate caudal fin. Pectoral fins well developed, narrow, long, and pointed. Origin of dorsal above or slightly behind base of pectorals. Gill openings wide, crescentic, fold of upper membrane descending in front of pectoral base. Branchiostegal rays 8, long, and recurved upward around angle of opercle. Mouth with wide lateral cleft to behind eye. Maxillary little expanded posteriorly. Teeth all slender and sharp, conical, those on the outer margin of jaws in bands and depressible. Maxillary and mandible with a longitudinal edentulous groove extending the entire length of the bone and dividing the bands of teeth into two portions. Posterior nostrils slitlike before eye. Lower jaw

much shorter than the upper, which projects considerably in advance of the tip of the mandible. Tongue largely adnate to the floor of the mouth, though the tip and lateral margins are free. Lips undeveloped, the lateral teeth fully exposed when the mouth is closed. Pores of head slitlike, a laterolateral series on both jaws.

The only other genus in the family Muraenesocidae that this new genus closely resembles may be distinguished from it by the following key:

- 1a. Teeth in the jaws in bands which are divided by a longitudinal edentulous groove extending the entire length of the bone.
- 2a. Posterior nostrils subcircular, situated in the midlength of the snout. Branchiostegal rays 10 or more.....*Xenomystax*.
- 2b. Posterior nostrils slitlike, situated about one diameter of the eye in advance of the orbit, or at about the beginning of the posterior third of the snout length. Branchiostegal rays 8 or fewer...*Paraxenomystax*.

To this new genus I would refer *Xenomystax trucidans* Alcock, which is separated from the new species in the following key:

- 1a. Posterior nostrils slitlike, situated about the diameter of eye in advance of orbit.
- 2a. Gill openings about midway between tip of snout and vent; origin of dorsal fin well in advance of pectoral fin base.....*trucidans*.
- 2b. Gill openings about half length of head nearer tip of snout than vent; origin of dorsal fin above or behind base of pectoral fin.....*bidentatus*.

#### PARAXENOMYSTAX BIDENTATUS, n. sp.

*Holotype*.—U.S.N.M. No. 108444 (field No. 545); 458 mm. standard length; from *Caroline* station 96, latitude  $18^{\circ}36'00''$  N., longitude  $65^{\circ}05'30''$  W., to latitude  $18^{\circ}37'15''$  N., longitude  $65^{\circ}03'00''$  W., March 3, 1933, otter trawl, 270 to 330 fathoms.

*Paratype*.—U.S.N.M. No. 108445 (field No. 15); 354 mm. standard length; from *Caroline* station 1, about 5 miles off Punta Boca Juana, latitude  $18^{\circ}33'45''$  N., longitude  $66^{\circ}15'00''$  W., January 30, 1933, otter trawl, 360 to 600 fathoms.

Body scaleless, covered with very thin delicate skin; subcylindrical, the caudal portion strongly attenuated posteriorly. Vertical fins well developed and continuous with the caudal fin, which is lanceolate and composed of 6 rays. Pectorals long, narrow, about one-third length of snout, with 9 rays. Snout long, evenly tapering forward, sides of snout flat and straight, its width at anterior nostrils equal to its length in front of the tubes.

Tip of snout strongly projecting beyond symphysis of mandible, the preoral length about equal to vertical diameter of eye. Head of vomer entirely preoral and bearing a U-shaped patch of sharp conical

cal teeth, followed by an edentate notch in the upper jaw, which receives the expanded tip of the lower jaw, bearing teeth similar to those on the head of vomer. Shaft of the vomer with 6 or 7 slightly enlarged conical teeth on the midline with smaller teeth on either side continuing backward on the shaft in an irregular double series to below the posterior nostril and thence in a single series to below middle or posterior edge of eye. Maxillary band of teeth divided by a longitudinal naked groove, on the inner side of which is a single series of conical teeth so closely set as to form almost a cutting edge. These teeth lean strongly inward and extend from opposite the rictus of the jaws forward to opposite the middle of the larger teeth on the shaft of the vomer, where they terminate abruptly. The outer band

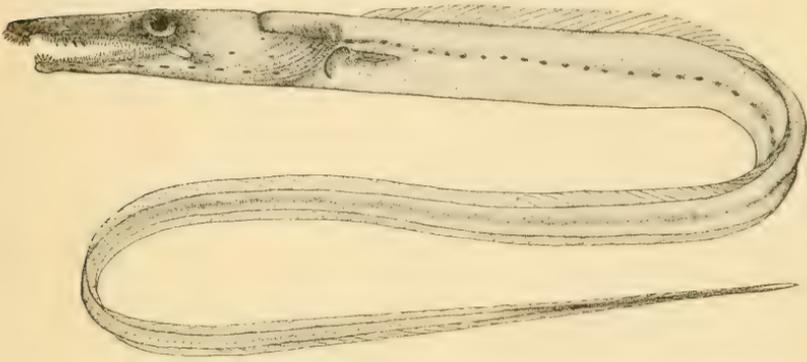


FIG. 1.—*Paraxenomystax bidentatus*, n. sp.

of maxillary teeth are in 5 or 6 irregular series, becoming progressively smaller externally where they are directed obliquely outward. This band is strongly convex in cross-section, the dentigerous surface evenly curved from the horizontal to vertical plane. Mandibular teeth similarly divided, though the edentulous groove is notably narrower. Tip of the mandible with a cluster of slightly enlarged conical teeth about equal to those on the head of the vomer. Lips wholly absent; all the lateral teeth as well as those on the head of the vomer are fully exposed when the mouth is closed. Anterior nostrils tubular, situated laterally and well behind tip of snout. Posterior nostrils slitlike, before middle of eye and situated entirely in the posterior fourth of the snout length. Origin of the dorsal fin above anterior third of the pectoral length, the fin rather high, rays progressively longer and less erectile posteriorly, length of the rays above vent about half the depth of body at this point. Anal similar, but much lower, both confluent with caudal fin, which is lanceolate. Branchial openings wide,

about two-thirds length of pectoral fin or slightly more than width of isthmus. Branchiostegal rays 8, long, and recurved above and before gill openings. Eye elliptical, notably longer than deep, slightly greater than preoral length of snout, the superior rim slightly invading the dorsal profile. Orbit covered by thin transparent skin, without free margin. Tongue long and narrow, only the tip and margin free. Maxillary long, narrow, slightly bent downward below eye, the posterior portion little expanded, reaching to vertical a little behind posterior edge of eye. Head somewhat cavernous, the pores large, slitlike, a small pair just behind extremity of snout, a large linear pair above base of anterior nostril tubes, followed immediately by a similar pair above toothless interspace, a pair above anterior end of inner series of maxillary teeth, a pair below front end of posterior nostrils and a pair below front rim of eye; a series of 8 small round ones across occiput from ends of the maxillaries; a series of 11 pores along lower jaw from its symphysis to below the nape and 3 in a vertical row joining the series of the straight portion of the lateral line. There is a pair of small round pores on the snout just in front of the superior rim of the eye and a larger pair midway between the posterior nostrils and the extremity of the snout. The anus is situated below the thirty-fourth pore of the lateral line and the fifty-first ray of the dorsal fin.

Head 6.3 to 6.8 in standard length; predorsal 5.7 to 6; preanal 2.5 to 2.7; pectoral fin 6.2 to 6.7 in head; caudal fin 3.2 to 6; preoral portion of upper jaw 4.3 in snout; tip of snout to posterior nostril 3.2 to 3.3 in head; length of snout 2.8 to 3.3; mandible 2; maxillary 1.7 to 1.9; gape 2 to 2.2; longitudinal diameter of eye 8.2 to 9; width of body at vent 4.2; depth at same point 4; depth of head at occiput 4.2 to 4.5; width at same point 4 to 4.2; interorbital 5.5 to 5.8 in snout; branchiostegal rays 8.

Color brownish above, lighter on sides and below, the belly with a silvery sheen; top of snout and interorbital much darker. Lower jaw and throat light straw-colored; iris golden, with some dark pigment. Pectoral and vertical fins light, with the dark marginal shading of the latter becoming black posteriorly; the middle caudal rays light brown; peritoneum silvery white.

The type is a female, with eggs about nine-tenths of a millimeter in diameter.

*Measurements of Paraxenomystax bidentatus*

	Type (mm.)	Paratype (mm.)
Standard length .....	458	354
Head to upper end of gill opening.....	67	56
Predorsal .....	76	62
Preanal .....	170	142
Length of pectoral fin.....	10	9
Length of caudal fin.....	11	18 <sup>a</sup>
Preoral length of snout.....	6.5	5
Tip of snout to posterior nostril.....	20	17.5
Length of snout.....	28	22
Length of maxillary.....	39	32
Diameter of eye (horizontal).....	7.5	6.5
Diameter of eye (vertical).....	6	4
Width of body at vent.....	16	10
Depth of body at vent.....	17	13
Greatest depth of head.....	15	13
Greatest width of head.....	16	14
Interorbital .....	4.8	4

<sup>a</sup> Probably the caudal region has been damaged and regenerated.

## LITERATURE CITED

ALCOCK, A.

1894. An account of a recent collection of bathybial fishes from the Bay of Bengal and from the Laccadive Sea. *Journ. Asiatic Soc. Bengal*, vol. 63, pt. 2, p. 134.

1895. *Illus. Zool. Roy. Indian Survey Str. Investigator . . . .*, pt. 3, Fishes, pl. 16, fig. 5.

GARMAN, SAMUEL

1899. Reports on an exploration of the West Coast of Mexico, Central and South America, and off the Galápagos Islands. *Mem. Mus. Comp. Zool.*, vol. 24, pp. 315-316, pl. N.

GILBERT, CHARLES HENRY

1892. Scientific results of the explorations by the U. S. Fish Commission steamer *Albatross*. Descriptions of apodal fishes from the tropical Pacific. *Proc. U. S. Nat. Mus.*, vol. 14, No. 21, pp. 348-349.

JORDAN, DAVID STARR, AND EVERMANN, BARTON WARREN

1896. Fishes of North and Middle America. *U. S. Nat. Mus.*, Bull. 47, pt. 1, p. 361.



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