SMITHSONIAN MISCELLANEOUS COLLECTIONS
VOLUME 91, NUMBER 1

Johnson Fund

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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(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°33′45″ N. Long. 66°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°, about 9 miles from the light, we lowered a 35-foot ½-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°31′20″ N. Long. 66°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°, 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°31′30″ N. Long. 66°21′30″ W. January 31, 1933
Lat. 18°31′20″ N. Long. 66°22′30″ W.

Punta Cerro Gordo bore 156° and Garza Island 212°. 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°31′45″ N. Long. 66°24′00″ W. January 31, 1933
Lat. 18°31′45″ N. Long. 66°26′30″ W.

Punta Puerto Nueva bore 180° and Garza Island 151°. 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° and Punta Tortuguera 220°.

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°37′00″ N. Long. 66°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 ¾-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° 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°30′45″ N. Long. 66°04′30″ W. February 1, 1933
Lat. 18°30′50″ N. Long. 66°01′15″ W.

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

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°30′45″ N. Long. 66°00′50″ W. February 1, 1933
Lat. 18°31′00″ N. Long. 65°55′15″ W.

We lowered an otter trawl with new large boards at 11:35 a.m. Punta Cangrejos bore 161° and Punta Vacia Talega 120°. At the close of the haul Punta Vacia Talega bore 159° and Punta Cangrejos 235°. 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°31′30″ N. Long. 65°55′30″ W. February 1, 1933
Lat. 18°33′15″ N. Long. 65°56′45″ W.

When we lowered the modified fish trawl at 1:35 p.m., Punta Vacia Talega bore 165° and Punta Morro 255°. When the trawl was taken in, Punta Vacia Talega bore 165°, Punta Morro 246°. 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°31′30″ N. Long. 65°55′30″ W. February 1, 1933
Lat. 18°30′20″ N. Long. 65°57′00″ W.

At the start Punta Vacia Talega bore 168°, Punta Morro 255°. At the close of the haul Morro Castle Light bore 254° and Punta Maldonado 205°. 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°29′20″ N. Long. 66°05′30″ W. February 2, 1933
Lat. 18°30′24″ N. Long. 66°04′15″ W.

At the start, at 9:55 a.m., Morro Castle Light bore 242° and the west point of Cabras Island 255°. When we hauled in at 10:35 a.m. Morro Castle Light bore 259°, Cabras Island 264°. 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°32′15″ N. Long. 66°04′10″ W. February 2, 1933
Lat. 18°32′50″ N. Long. 66°01′00″ W.

At the start Morro Castle Light bore 220° and Cabras Island 228°. At the close of the haul Morro Castle Light bore 234° and Punta Cangrejos 167°. 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°31′00″ N. Long. 66°00′15″ W. February 2, 1933
Lat. 18°30′30″ N. Long. 66°01′45″ W.

At the start, 12:30 p.m., Morro Castle Light bore 249° and Punta Maldonado 158°. When the trawl was taken in at 1:30 p.m. Morro Castle Light bore 245° and Salinas Island 256°. 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°31′05″ N. Long. 66°02′15″ W. February 2, 1933
Lat. 18°30′30″ N. Long. 66°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°31′00″ N. Long. 66°04′10″ W. February 2, 1933
Lat. 18°30′30″ N. Long. 66°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°31′45″ N. Long. 66°03′00″ W. February 2, 1933
Lat. 18°30′30″ N. Long. 66°03′15″ W.

At the start, 3:55 p.m., Morro Castle Light bore 231° and Punta Salinas 249°. At the close at 5.10 p.m., Morro Castle Light bore 229° and Punta Salinas 257°. 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°29′40″ N. Long. 66°08′30″ W. February 3, 1933
Lat. 18°31′00″ N. Long. 66°10′15″ W.

At the start, at 9:07 a.m., the west point of Cabras Island bore 176°, Morro Castle Light 139°. When the haul was surfaced at 9:50, the west point of Salinas Island bore 222° and Morro Castle Light 121°. 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°30′00″ N. Long. 66°10′30″ W. February 3, 1933
Lat. 18°30′00″ N. Long. 66°12′20″ W.

When the 6-foot trawl was lowered at 10:00 a.m., the east point of Salinas Island bore 188° and Morro Castle Light 117°. When the trawl was taken up at 10:40, Morro Castle Light bore 109° and the west point of Salinas Island 145°. 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°30′15″ N. Long. 66°12′45″ W. February 3, 1933
Lat. 18°30′30″ N. Long. 66°14′50″ W.

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

The result was a water haul.

STATION 19. Lat. 18°31′10″ N. Long. 66°15′45″ W. February 3, 1933
Lat. 18°32′30″ N. Long. 66°19′35″ W.

An otter trawl was lowered at 11:54 a.m., the west point of Salinas Island bearing 120°, Punta Cerro Gordo 256°. When the trawl was taken up at 1 p.m., Punta Cerro Gordo bore 193°, and the west point of Salinas Island 115°. 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°40′30″ N. Long. 66°19′00″ W. February 3, 1933
Lat. 18°38′30″ N. Long. 66°25′45″ W.

A modified young-fish trawl was put overboard at 3:05 p.m., Morro Castle Light bearing 138°, Punta Cerro Gordo 187°. 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°30′20″ N. Long. 66°10′30″ W. February 4, 1933
Lat. 18°31′15″ N. Long. 66°12′20″ W.

When a 6-foot beam trawl was let down at 9:05 a.m. Morro Castle Light bore 125°, west point of Salinas Island 208°. When the trawl was brought in at 9:52, Morro Castle Light was bearing 121° and the west point of Salinas Island 160°. 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°30′30″ N. Long. 66°12′45″ W. February 4, 1933
Lat. 18°32′15″ N. Long. 66°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° and Punta Cerro Gordo 252°. When the trawl was brought up at 11:00, the west point of Salinas Island bore 129° and Punta Cerro Gordo 234°. 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°32′15″ N. Long. 66°17′45″ W. February 4, 1933
Lat. 18°32′00″ N. Long. 66°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°, the west point of Salinas Island 108°. 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°32′30″ N. Long. 66°21′00″ W. February 4, 1933
Lat. 18°31′45″ N. Long. 66°19′15″ W.

When the otter trawl was put overboard at 2:15 p.m. Punta Cerro Gordo bore 167°, the east point of Salinas Island 108°. When it was brought in at 4:00, the east point of Salinas Island bore 112° and Punta Cerro Gordo 206°. 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°32′15″ N. Long. 66°22′10″ W. February 7, 1933
Lat. 18°32′05″ N. Long. 66°22′10″ W.

A 3-foot dredge was put overboard at 9:45 a.m., when Salinas Island bore 109°, Punta Cerro Gordo 157°. When the dredge was surfaced at 10:35, Salinas Island gave a bearing of 108° and Punta Cerro Gordo 149°. 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°30'20" N. Long. 66°22'05" W. February 7, 1933
Lat. 18°30'30" N. Long. 66°23'05" W.

When the 3-foot dredge was let down at 11 : 10 a.m., Salinas Island bore 100°, Punta Cerro Gordo 125°. When it was brought up at 11 : 45, Punta Cerro Gordo gave a bearing of 117° and Garza Island 161°. 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°39'50" N. Long. 66°21'30" W. February 7, 1933
Lat. 18°39'30" N. Long. 66°26'00" W.

When the 4-foot circular intermediate net was lowered at 12: 50 p.m., Punta Cerro Gordo bore 172° and Morro Castle Light 130°. 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°31'40" N. Long. 66°12'00" W. February 8, 1933
Lat. 18°32'00" N. Long. 66°14'45" W.

When the 3-foot dredge was put over at 10: 30 a.m., Morro Castle Light bore 128° and Salinas Island 169°. When it was hauled in, Morro Castle Light bore 118° and Salinas Island 137°. 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°40'30" N. Long. 66°20'00" W. February 8, 1933
Lat. 18°40'30" N. Long. 66°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°40′30″ N. Long. 66°30′00″ W. February 8, 1933
Lat. 18°40′30″ N. Long. 66°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°27′20″ N. Long. 67°12′50″ W. February 9, 1933
Lat. 18°25′50″ N. Long. 67°14′55″ W.

When the 3-foot dredge was lowered at 8:52 a.m., Borinquen Light bore 58° and Jiguero Light 209°. When it was raised at 9:40, Borinquen Light bore 54° and Jiguero Light 198°. 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°25′50″ N. Long. 67°14′55″ W. February 9, 1933
Lat. 18°23′50″ N. Long. 67°17′35″ W.

When the 3-foot dredge was put overboard at 9:42 a.m., Borinquen Light bore 54° and Jiguero Light 198°. When the dredge was landed, Borinquen Light bore 53° and Jiguero Light 148°. 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°24′15″ N. Long. 67°17′50″ W. February 9, 1933
Lat. 18°26′40″ N. Long. 67°14′00″ W.

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

It yielded a few heteropods and three deep sea fish.

STATION 34. Lat. 18°26′15″ N. Long. 67°12′50″ W. February 9, 1933
Lat. 18°24′00″ N. Long. 67°16′30″ W.

When the 5-foot beam trawl was lowered at 11:45 a.m., Borinquen Light bore 45° and Jiguero Light 217°. When it was surfaced at 3:05 p.m., Jiguero Light bore 174° and Borinquen Light 49°. 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°23′40″ N. Long. 67°16′45″ W. February 9, 1933
Lat. 18°24′45″ N. Long. 67°14′15″ W.

When the 6-foot beam trawl was lowered at 3:11 p.m., Borinquen Light bore 50° and Jiguero Light 168°. When it was surfaced at 4:55, Borinquen Light bore 43° and Jiguero Light 215°. 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°21′50″ N. Long. 67°30′15″ W. February 10, 1933
Lat. 18°14′20″ N. Long. 67°38′25″ W.

When the otter trawl was lowered at 8:36 a.m., the west point of Desecheo Island bore 25° and Punta Cadena 104°. When it was surfaced, the west point of Desecheo Island bore 45° and the north cape of Mona Island 240°. 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°13′50″ N. Long. 67°39′20″ W. February 10, 1933
Lat. 18°11′55″ N. Long. 67°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° and the north cape of Mona Island 241°. When it was surfaced at 12:15 p.m., the west point of Desecheo Island bore 48° and the north cape of Mona Island 242°. 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°11′55″ N. Long. 67°42′50″ W. February 10, 1933
Lat. 18°10′00″ N. Long. 67°46′00″ W.

The 3-foot dredge was put overboard at 12:23 p.m., the west point of Desecheo Island bearing 48° and the north cape of Mona Island 242°. When it was surfaced at 1:50, Mona Light bore 224° and the north cape of Mona Island 245°. 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°10′00″ N. Long. 67°46′00″ W. February 10, 1933
Lat. 18°10′10″ N. Long. 67°50′30″ W.

When the 4-foot dredge was put overboard at 2:20 p.m., Mona Light bore 224° and the north cape of Mona Island 345°. When it was surfaced at 3:45, Mona Light bore 183° and the west point of Mona Island 238°. 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°09′30″ N. Long. 67°51′30″ W. February 10, 1933
Lat. 18°09′20″ N. Long. 67°54′40″ W.

When the 3-foot dredge was let down at 3:57 p.m., the east point of Mona Island bore 170° and the west point 237°. When it was surfaced, the east point of Monito Island bore 275° and the west point of Mona Island 205°. 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°01′55″ N. Long. 67°55′05″ W. February 11, 1933
Lat. 18°01′50″ N. Long. 67°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° and the west point of the island 326°. When it was raised at 1:50 p.m., Mona Light bore 7° and Punta Caigo ó no Caigo 300°. The depth was 240 to 360 fathoms.

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

STATION 43. Lat. 18°02′00″ N. Long. 67°51′15″ W. February 11, 1933
Lat. 18°03′45″ N. Long. 67°48′10″ W.

When the tangle was put overboard at 1:00 p.m., Mona Light bore 8° and Punta Caigo ó no Caigo 297°. 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°11′00″ N. Long. 67°32′45″ W. February 11, 1933
Lat. 18°11′20″ N. Long. 67°31′05″ W.

When the 6-foot beam trawl was lowered at 4:00 p.m., the west point of Desecheo Island bore 40° and the north cape of Mona Island 258°. When the haul was completed, the east point of Monito Island bore 275° and the west point of Mona Island 205°. 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°13′10″ N. Long. 67°25′30″ W. February 13, 1933
Lat. 18°14′30″ N. Long. 67°25′30″ W.

When the tangle was lowered at 11:00 a.m., Jiguero Light bore 44° and the east end of Desecheo Island 345°. At the completion of the haul at 11:48, Jiguero Light bore 50° and the east end of Desecheo Island 342°. 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°14′40″ N. Long. 67°25′20″ W. February 13, 1933
Lat. 18°17′20″ N. Long. 67°25′00″ W.

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

This haul cost the loss of our tangle.

STATION 47. Lat. 18°17′20″ N. Long. 67°25′00″ W. February 13, 1933
Lat. 18°17′05″ N. Long. 67°24′45″ W.

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

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°19′40″ N. Long. 67°20′30″ W. February 13, 1933
Lat. 18°19′50″ N. Long. 67°21′45″ W.

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

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

STATION 49. Lat. 18°16′12″ N. Long. 67°31′20″ W. February 14, 1933
Lat. 18°14′18″ N. Long. 67°35′30″ W.

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

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

STATION 50. Lat. 18°15′35″ N. Long. 67°31′35″ W. February 14, 1933
Lat. 18°18′00″ N. Long. 67°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. 19°10′50″ N. Long. 69°20′15″ W. February 16, 1933
Lat. 19°10′35″ N. Long. 69°20′45″ W.

Samaná Bay, Dominican Republic

At the start at 10:55 a.m., Punta Gordo bore 59° and Cape Corozos 278°. At the finish at 11:05, Punta Gordo bore 60° and Cape Corozos 285°. 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°10′25″ N. Long. 69°20′55″ W. February 16, 1933
Lat. 19°10′05″ N. Long. 69°21′25″ W.

Samaná Bay, Dominican Republic

A 6-foot beam trawl was lowered at 11:27 a.m., when Cape Alcatraz bore 93° and Cape Corozos 288°. When the net was surfaced at 11:42, Cape Alcatraz bore 89° and Cape Corozos 292°. 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°10′05″ N. Long. 69°21′25″ W. February 16, 1933
Lat. 19°09′50″ N. Long. 69°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° and Cape Corozos 292°. When it was surfaced at 1:00 p.m., Cape Alcatraz bore 86° and Cape Corozos 307°. 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°10′05″ N. Long. 69°26′10″ W. February 16, 1933
Lat. 19°10′10″ N. Long. 69°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° and Cape Corozos 61°. 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°10′25″ N. Long. 69°30′05″ W. February 16, 1933
Lat. 19°10′35″ N. Long. 69°30′40″ W.

Samaná Bay, Dominican Republic

When the dredge was put overboard at 2:42 p.m., Cape Lorenzo bore 158° and Punta Mangle 72°. When it was surfaced at 2:58, Punta Mangle bore 7° and the east end of the dock 299°. 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°12′55″ N. Long. 69°08′35″ W. February 18, 1933
Lat. 19°16′45″ N. Long. 69°04′45″ W.

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

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

STATION 61. Lat. 19°24′45″ N. Long. 69°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° and Punta Pescadores 255°. The net struck bottom at 12:15 p.m. and was lost.

STATION 62. Lat. 19°25′45″ N. Long. 69°09′00″ W. February 18, 1933
Lat. 19°27′45″ N. Long. 69°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° and Cape Samaná Light 176°. When the gear was surfaced at 4:03 p.m., Cape Cabron bore 159° and Cape Samaná Light 147°.

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°54′00″ N. Long. 65°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°28′55″ N. Long. 65°45′55″ W. February 23, 1933
Lat. 18°31′00″ N. Long. 65°46′42″ W.

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

STATION 65. Lat. 18°28′48″ N. Long. 65°45′54″ W. February 23, 1933
Lat. 18°30′24″ N. Long. 65°46′18″ W.

When the tangle was put overboard at 12: 57 p.m., Cape San Juan Light bore 125° and the buoy off Punta Picua bore 174°. When it was surfaced at 1: 58, the Cape San Juan Light bore 130° and the buoy 171°. 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°28′48″ N. Long. 65°45′54″ W. February 23, 1933
Lat. 18°29′30″ N. Long. 65°45′48″ W.

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

The dredge was lost.

STATION 67. Lat. 18°30′12″ N. Long. 65°45′48″ W. February 23, 1933
Lat. 18°32′18″ N. Long. 65°46′12″ W.

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

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° 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°23′00″ N. Long. 65°36′25″ W. February 24, 1933
Lat. 18°23′35″ N. Long. 65°37′10″ W.

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

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

STATION 69. Lat. 18°23′55″ N. Long. 65°37′00″ W. February 24, 1933
Lat. 18°24′30″ N. Long. 65°38′30″ W.

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

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

STATION 70. Lat. 18°29′25″ N. Long. 65°45′55″ W. February 24, 1933
Lat. 18°38′08″ N. Long. 65°50′30″ W.

When the otter trawl was put overboard at 10: 11 a.m., Cape San Juan Light bore 127° and the buoy off Punta Picua 175°. When it was surfaced at 12: 21, Cape San Juan Light bore 139° and Morro Castle Light 240°. 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°38′08″ N. Long. 65°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°38′08″ N. Long. 65°50′30″ W. February 24, 1933

The snapper was again put overboard and yielded similar results.

STATION 73. Lat. 18°36′50″ N. Long. 65°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°36′55″ N. Long. 65°51′40″ W. February 24, 1933
Lat. 18°36′10″ N. Long. 65°48′30″ W.

The otter trawl was put overboard at 3:15 p.m., when Cape San Juan Light bore 135° and Morro Castle Light 241°. When it was surfaced at 6:00 Cape San Juan Light bore 141° and Morro Castle Light 246°. From 4:20 to 4:48 we changed course gradually from 360° to 141°, 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 Icacos 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°24′40″ N. Long. 65°33′40″ W. February 25, 1933
Lat. 18°27′35″ N. Long. 65°33′35″ W.

When we lowered the tangle at 10:23 a.m., Cape San Juan Light bore 242°, Las Cucarachas Light 257.5°. When it was surfaced at

11:10, Cape San Juan Light bore 216° and the east end of Palominos Island 183°. The haul was made in 26 fathoms.

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

STATION 76. Lat. 18°27′35″ N. Long. 65°33′35″ W. February 25, 1933
Lat. 18°30′55″ N. Long. 65°33′05″ W.

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

This was a water haul.

STATION 77. Lat. 18°25′30″ N. Long. 65°33′36″ W. February 25, 1933
Lat. 18°27′30″ N. Long. 65°32′36″ W.

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

It yielded only one batfish.

STATION 78. Lat. 18°27′30″ N. Long. 65°32′36″ W. February 25, 1933
Lat. 18°29′42″ N. Long. 65°31′15″ W.

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

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°30′30″ N. Long. 65°31′00″ W. February 25, 1933
Lat. 18°30′05″ N. Long. 65°25′10″ W.

When the otter trawl was lowered at 2:43 p.m., Cape San Juan Light bore 218.5° and the east end of Palominos Island 197°. When it was surfaced at 5:02, Cape San Juan Light bore 238° 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°29′45″ N. Long. 65°25′50″ W. February 26, 1933
Lat. 18°35′30″ N. Long. 65°23′54″ W.

When the otter trawl was lowered at 12:07 p.m., Cape San Juan Light bore 238° and Fungy Bowl Rock 155.5°. When it was surfaced at 1:53, Cape San Juan Light bore 226° and Fungy Bowl Rock 174°. 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°31′15″ N. Long. 65°28′10″ W. February 26, 1933
Lat. 18°32′45″ N. Long. 65°23′45″ W.

When the otter trawl was again put overboard at 3:09 p.m., Cape San Juan Light bore 226° and Fungy Bowl Rock 148°. When it was surfaced at 4:25, Cape San Juan Light bore 232° and Fungy Bowl Rock 172°. 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°32′54″ N. Long. 65°23′42″ W. February 26, 1933
Lat. 18°32′15″ N. Long. 65°18′45″ W.

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

It yielded a number of deep-sea fish.

STATION 84. Lat. 18°32′30″ N. Long. 65°18′30″ W. February 26, 1933
Lat. 18°39′00″ N. Long. 65°17′00″ W.

When we dropped the otter trawl at 6:46 p.m., Fungy Bowl Rock bore 197° and Culebrita Light 161°. 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°39'30" N. Long. 65°16'55" W. February 26, 1933
Lat. 18°44'00" N. Long. 65°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°30'30" N. Long. 65°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°30'30" N. Long. 65°14'00" W. February 27, 1933
Lat. 19°18'30" N. Long. 65°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°18'30" N. Long. 65°16'00" W. February 27, 1933
Lat. 19°13'00" N. Long. 65°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°13'00" N. Long. 65°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°13′00″ N. Long. 65°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°13′00″ N. Long. 65°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 2½ feet long, one bobbinet and the other ½-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°37′30″ N. Long. 65°05′00″ W. March 1, 1933
Lat. 18°42′00″ N. Long. 65°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°39′00″ N. Long. 65°05′30″ W. March 2, 1933
Lat. 18°38′00″ N. Long. 65°09′30″ W.

A 6-foot beam trawl was let down at 8:35 a.m., when Culebrita Light bore 202°, the northwest point of St. Thomas 170°. When it was hauled in at 10:00, Culebrita Light bore 193° and the northwest point of St. Thomas 158°. 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°38′00″ N. Long. 65°09′30″ W. March 2, 1933
Lat. 18°37′45″ N. Long. 65°05′00″ W.

When the 3-foot dredge was lowered at 10:10 a.m., Culebrita Light bore 193° and the northwest point of St. Thomas 158°. When it was surfaced at 11:44, Culebrita Light bore 196° and the northwest point of St. Thomas 164°. 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°37′45″ N. Long. 65°05′00″ W. March 2, 1933
Lat. 18°39′00″ N. Long. 65°03′30″ W.

When another 3-foot dredge was put overboard at 11:51 a.m., Culebrita Light bore 196° and the northwest point of St. Thomas 164°. When it was surfaced at 2:10 p.m., Culebrita Light bore 206° and the northwest point of St. Thomas 177°, 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°39′00″ N. Long. 65°03′30″ W. March 2, 1933
Lat. 18°39′00″ N. Long. 65°01′30″ W.

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

STATION 96. Lat. 18°36′00″ N. Long. 65°05′30″ W. March 3, 1933
Lat. 18°37′15″ N. Long. 65°03′00″ W.

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

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°37′30″ N. Long. 65°02′15″ W. March 3, 1933
Lat. 18°38′15″ N. Long. 65°00′30″ W.

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

This haul yielded some very interesting deep-sea fish.

STATION 98. Lat. 18°33′30″ N. Long. 65°00′00″ W. March 3, 1933
Lat. 18°39′30″ N. Long. 64°56′00″ W.

When the otter trawl was put overboard at 12:50 p.m., the northwest point of St. Thomas bore 188° and the west point of Jost Van Dyke Island bore 133°. When it was surfaced at 2:43, the northwest point of St. Thomas bore 199° and the west point of Jost Van Dyke Island 146°. 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°39′30″ N. Long. 64°56′00″ W. March 3, 1933
Lat. 18°40′00″ N. Long. 64°51′00″ W.

When the otter trawl was again put overboard at 3:22 p.m., the northwest point of St. Thomas bore 199° and the west point of Jost Van Dyke Island 146°. When it was surfaced at 4:51, the west point of Jost Van Dyke Island bore 163° and Tobago 173°. 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°38′45″ N. Long. 64°52′45″ W. March 4, 1933
Lat. 18°40′15″ N. Long. 64°50′15″ W.

When the otter trawl was let down at 8:41 a.m., the west end of Tobago Island bore 167° and the west end of Jost Van Dyke Island 154°. When it was surfaced at 10:45, the center of Tobago Island bore 176° and the west end of Jost Van Dyke Island 167°. 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°40′30″ N. Long. 64°50′00″ W. March 4, 1933
Lat. 18°45′40″ N. Long. 64°48′00″ W.

When the otter trawl was placed overboard at 11:29 a.m., the center of Tobago Island bore 178°, and the west end of Jost Van Dyke Island bore 169°. When it was hauled up at 1:00 p.m., the center of Tobago Island bore 185° and the west end of Jost Van Dyke Island 177°. 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°50′30″ N. Long. 64°43′00″ W. March 4, 1933
Lat. 18°51′00″ N. Long. 64°33′00″ W.

When the otter trawl was lowered at 2:25 p.m., the center of Tobago Island bore 193° and the western end of Jost Van Dyke Island 197°. 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 $\frac{1}{2}$-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°30′50″ N. Long. 66°13′20″ W. March 8, 1933
Lat. 18°31′30″ N. Long. 66°14′55″ W.

When the oyster dredge was again lowered at 10:09 a.m., Morro Castle Light bore 113° and the west end of Salinas Island 138°. When it was surfaced at 10:51, Morro Castle Light bore 113° and the west end of Salinas Island 129°. 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°31′20″ N. Long. 66°16′30″ W. March 8, 1933
Lat. 18°31′30″ N. Long. 66°18′20″ W.

When the otter trawl was again lowered at 11:12 a.m., Morro Castle Light bore 109° and the west end of Salinas Island 119°. When it was surfaced at 12:03 p.m., Morro Castle Light bore 106° and the west end of Salinas Island 113°. 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°32′15″ N. Long. 66°17′45″ W. March 8, 1933
Lat. 18°32′30″ N. Long. 66°22′45″ W.

When the otter trawl was put over at 12:57 p.m., Morro Castle Light bore 112° and the west end of Salinas Island 120°. When it was surfaced at 2:34, Punta Cerro Gordo bore 145° and Garza Island 182°. 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°32′00″ N. Long. 67°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°05′00″ N. Long. 68°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

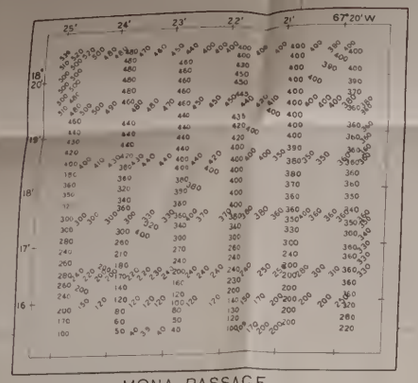
OF THE FIRST

JOHNSON-SMITHSONIAN DEEP-SEA EXPEDITION

1933

PAUL BARTSCH

Director of the Expedition



MONA PASSAGE

Depth detail of Dredging Ground

HISPANIOLA

Santo Domingo

Cabo Engaño

I Saona

Pta Pescadores

Cabo Cabron

Cabo Samana

Sta Barbara de Samana

Pta Gorda

Balandra Hd

Cayo Levantado

BAHIA SAMANA

Cayo Alcatraz

Pta Mangó

Pta de S Lorenzo

MONA PASSAGE

I Desecheo

Pta Jiguero

I Monito

MONA I

North Cape

East Cape

Pta Cabo Rojo

Cabo Rojo

PUERTO RICO

Pta Borinquen

Pta Puerto Nuevo

Pta Cerro Gordo

Pta Boca Juana

Pta Salinas

I Cabras

BAHIA PUERTO REAL

Pta Maldonado

Pta Vacia Talega

Pta Canóvanillas

Pta Picua

Farallon Pk

Playa de Fajardo

Vieques I

Culebra

Cayo Lobos

Cayo Norte

Cayo Luis Peña

Cayo Ballena

Cayo Culebrita

Cayo Lobito

Cayo Hermanos

Cayo Cascajo

Cayo Lobos Cay

Pl Palominos

Fungby Bank

FLAMINGO BAY

Sirena

Culebrita

Culebrita Channel

Saveral I

Ocusenta I

BREWERS BAY

I Anegada

Tobago I

Jost Van Dyke I

Tortola

Virgin Gorda I

St Thomas

St John

VIRGIN ISLANDS

St Croix I

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

Scale .1° Longitude equals 4½ inches

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