
THE POLYCHAETOUS ANNELIDS OF PORTO RICO.

BY

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The material here described was collected by the expedition sent to Porto Rico in the winter of 1898-99, by Hon. George M. Bowers, United States Commissioner of Fish and Fisheries. The collection included 85 species of Polychætes, of which 32, so far as I could determine, are new. All observations were made on preserved material. Where no other preserving fluid is indicated in descriptions of color, etc., it will be understood that the specimen was in alcohol. If formalin was used, that fact is noted in the description.

For assistance in procuring literature I am indebted to Dr. H. M. Smith, of the United States Commission of Fish and Fisheries, Prof. H. C. Bumpus, of Brown University, and Prof. H. P. Johnson, of the University of California.

All the figures in the text were drawn by the author.

Family SYLLIDÆ.

• SYLLIS Sav.

Syllis spongiphila Verrill.

Syllis spongiphila Verrill, Trans. Conn. Acad., vol. 4, pl. 24, figs. 10, 10a, 1881; Rept. U. S. F. C. for 1883, pl. 42, figs. 183, 183a; Proc. U. S. Nat. Mus. 1885, p. 435.

Professor Verrill describes the color as yellowish white. He does not say if that is the case in the living animal. Most of these agree with his description, but in some the anterior portion of the body was colored a dark brown by two rather broad brown bands in each segment. In the intersegmental constrictions is a narrower band, more sharply defined and denser in color. The eyes are farther removed from the base of the middle antenna in these than in those figured by Verrill and the terminal joint of the seta has more numerous teeth.

Collected from Boqueron Bay, station 6065, Arroyo, Puerto Real, on corals at Mayaguez.

Syllis complanata, n. sp.

Body very much flattened, with row of dark-brown spots around posterior edge of head and across posterior portion of each segment. Similar spots scattered irregularly over rest of body. Tentacles and all cirri articulated, with row of pigment granules around each annulus. Median tentacle longer than lateral, about four times as long as head. Two tentacular cirri, dorsal one rather longer than median tentacle, ventral one shorter. Palps thick at base, tapering to rounded apex. Eyes four, anterior pair the larger. Arrangement of pigment such as to give the appearance of a deep cleft on posterior margin of head. (Fig. 1.) Parapodium uniramous, with several stout aciculae. Setae few, compound, with long terminal articles; latter with stout subterminal tooth and row of smaller teeth behind it. No tooth in pharynx. The specimen, from Ponce, was not complete; about 150 segments present. Length, 44 mm.; width, 2 mm.

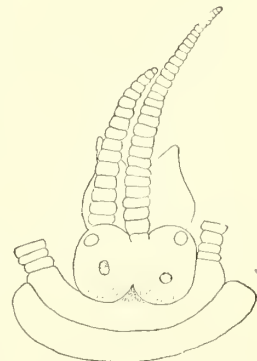


FIG. 1.—Head of *S. complanata* $\times 36$. Right paired antenna removed to show the palp.

Family HESIONIDÆ.

HESIONE Sav.

Hesione proctochona Schm.

Hesione proctochona Schmarda, Neue Wirbellose Thiere, 1861, p. 79, pl. 28, fig. 226.

Fallacia proctochona Webster, Annelids from Bermuda, Bull. U. S. F. C. 1884, p. 311, pl. 8, fig. 21.

Hesione vittigera Ehlers, Annelids of the Blake, Mem. Mus. Comp. Zool., Cambridge, 1887, p. 143, pl. 41, figs. 1-4.

Hesione pratexta Ehlers, *ibid.*, p. 147, pl. 41, figs. 5, 6.

According to Schmarda's original description, the anterior portion of *H. proctochona* is characterized by the absence of antennæ, the presence of eight pairs of tentacular cirri, and four eyes. There are sixteen setigerous segments, and the anus is surrounded by a funnel-like expansion, whose edges are prolonged into ten conical projections. He also describes, but does not figure, two long anal cirri. Dorsal surface brown, each segment divided into ten bands by transverse white lines. Between every two of these lines is a broader white band. A small knob on either side, in front of each parapodium.

Webster (*loc. cit.*) describes from Bermuda specimens which he identifies as this species. To Schmarda's description he adds the following points: There are two very minute antennæ, so small as to escape detection with a hand lens; each parapodium bears on its outer, upper angle a slender, lip-like projection, and the ante-anal segment has no setæ, but bears two very long cirri.

Ehlers (*loc. cit.*) compares his new species, *H. vittigera*, with *H. proctochona*. As between *H. vittigera* and *H. proctochona*, as described by Schmarda, the agreements and differences are as follows: Both have 16 tentacular cirri and 4 eyes; neither has tentacles. (Note Webster's discovery of tentacles in *H. proctochona*.) *H. vittigera* has 15 setigerous segments, *H. proctochona* has 16; the ante-anal segment in the former has long cirri, while in the latter it is setigerous. (Note, again, Webster's description of this segment in *H. proctochona*, which removes this distinction.) Ehlers's pl. 41, fig. 1, shows unmistakably 16 bundles of setæ, which leads to the suggestion that possibly there might have been an error in the description. It seems probable that the two may agree in this respect. *H. vittigera* has two unequal, lip-like projections on the dorsal surface of the parapodium, which are absent in *H. proctochona*. (Note, again, Webster's description of one such lip in the latter.) There are no conical projections surrounding the anal opening in *H. vittigera*, as described for *H. proctochona*.

The Porto Rico collection contained a large number of specimens of this genus, which show so many resemblances to both the above species that it is very doubtful if the two are distinct. Number of setigerous segments, 16. There are eight pairs of tentacular cirri, four eyes, and two very rudimentary antennæ, visible only on very careful examination. Dorsal surface marked with transverse brown lines, leaving a broader white band at anterior end of each segment. The outer angle of the parapodium bears two short lips. These may be nearly equal in size, or one may be very small and easily overlooked. The ante-anal segment bears no setæ, but two long cirri. In favorable specimens the edge of the anal funnel is seen to be drawn out into conical processes, though the structures were lost in most of the specimens.

The Porto Rico specimens agree with *H. proctochona* in the number of setigerous segments, in the possession of rudimentary antennæ, and in having lobes on the anal funnel. They agree with *H. vittigera* in having two lobes to the dorsal parapodial lip, the smaller being frequently very small. In all other respects they agree with both species. Since, except in the first of the above-described features, the differences are points which might easily escape detection, I am convinced that the species are identical, and have included all of the Porto Rico specimens of *Hesione* under the species *H. proctochona*.

Under the name *H. pratexta*, Ehlers describes another species differing from *H. vittigera*, in having longitudinal instead of transverse brown marking, and in having but a single dorsal lip to the parapodium. Two specimens from Porto Rico show these longitudinal markings, but agree in the structure of their parapodia with *H. vittigera*. Ehlers suggests that the differences between *H. vittigera* and *H. pratexta* are merely sexual. This suggestion is probably correct.

Collected from Arroyo, Mayaguez, Hucars, Boqueron Bay, Playa de Ponce reef, Ensenada Honda (Culebra), Guanica Bay, Fajardo, Puerto Real, Porto Rico, Ponce, stations 6072, 6080, 6092, 6096, 6098.

The last specimen had fifteen setigerous segments and the markings of *H. pratexta*.

PODARKE Ehlers.

Podarke agilis Ehlers.

Podarke agilis Ehlers, Die Borstenwürmer, p. 197, pl. 8, figs. 9-11.

A single specimen I have referred, rather doubtfully, to this species. The anterior end was mutilated, so that it was impossible to compare the cirri with Ehlers's description. The median antenna is proportionately longer than in Ehlers's description, and the number of body segments greater. Collected from Puerto Real.

CASTALIA Sars.

Castalia longicirrata, n. sp.

Head roughly shield-shaped, its posterior end prolonged into two diverging processes. (See fig. 2.) Antennæ delicate, a trifle longer than palps. Palps 2-jointed, terminal joint conical, narrower than basal. When proboscis is protruded the head abuts on a conical process borne on dorsal surface of proboscis, which looks, in surface view, like a very thick median antenna. (Fig. 2, *pr.*). Four eyes, the anterior nearly twice as large as posterior. Body of 19 segments. Anteriorly, dorsal ramus of parapodium not more than one-third the length of ventral and much narrower. Toward the posterior end the ventral rami increase very much in thickness and the difference between the two is more pronounced. Each has a stout, black aciculum. Setae of ventral bundle compound. (Fig. 3.) Those of dorsal bundle long, acicular, transversely striated, minutely serrated near the end. The eighteenth segment without parapodia, but, I think, with cirri. The posterior end was too badly mutilated to determine this point with certainty. Two anal cirri. Ventral cirrus reaching beyond tip of parapodium. Dorsal cirrus very long, in length equaling four times the diameter of the body.

Color pale yellow, with marked iridescence. An indication of transverse markings could be seen on most of the segments, looking as if the color originally present had been removed by the alcohol.

Collected from station 6079.

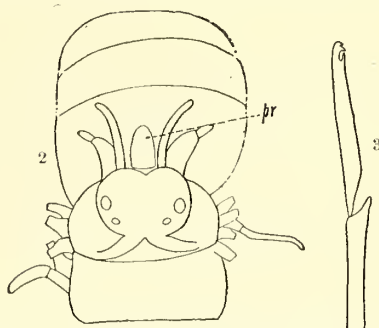
Castalia mutilata, n. sp.

Head much broader than long, with anteriorly a median "tongue" marked off by two very indistinct lines. (See fig. 4.) With high power two very delicate processes may be seen at anterior edge (fig. 4, *ant?*); these I interpret as rudimentary antennæ. Palps 2-jointed, terminal joint much longer than basal. Eyes four, the anterior considerably larger than posterior pair. Six pairs of tentacular cirri. Body of 53 segments, broadest anteriorly, and narrowing gradually toward posterior end. Length, 17 mm. Greatest width, 1.5 mm.

Parapodium uniramous, with long conical anterior lip and shorter and more rounded posterior one. Setae in two bundles, all compound, terminal article of most ventrally-placed setae considerably shorter than those of dorsal ones. A delicate ventral cirrus is situated about a quarter of the length of parapodium from its end and reaches to the end of the posterior lip. The dorsal cirrus is very much stouter, placed nearer the body. The terminal articles of all the dorsal cirri and anal cirri had been broken away.

Collected from San Antonio bridge, San Juan.

I have identified these last two specimens as belonging to the genus *Castalia* from Ehler's diagnosis, Die Borstenwürmer, p. 187.



FIGS. 2, 3.—*Castalia longicirrata*. Fig. 2, Head, $\times 14$; *pr*, process on proboscis. Fig. 3, Compound seta, $\times 95$.

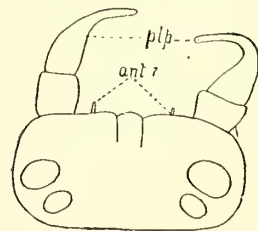


FIG. 4.—Head of *Castalia mutilata*, $\times 26$, *ant?*, antennæ; *plp*, palps.

Family POLYNOIDÆ.

In the following descriptions I have followed Johnson's (Proc. Calif. Acad. Science, vol. 1, No. 5, p. 165) diagnosis of the genera *Polynoe* and *Harmothoe*.

HARMOTHOE Kinberg.

Harmothoe polytricha Schmarda.

Polynoe polytricha Schmarda, Neue Wirbellose Thiere, i. ii, p. 156. Ehlers, Annelids of the Blake, p. 49; pl. 10, figs. 9, 10; pl. 11, fig. 1.

A number of much mutilated specimens, comprising only a few of the most anterior segments and destitute of elytra and dorsal cirri. From the form of the head, parapodia, and tentacles, I have identified them with this species. Ehlers figures only two eyes. These have, in addition, two lateral eyes much larger than the others, and on the side of the head, where they might easily be overlooked. Collected from stations 6079, 6091, 6070, and Mayaguez Harbor.

POLYNOE Sav.

Polynoe brevisetosa Kinberg.

Polynoe brevisetosa Johnson, Proc. Calif. Acad. Sci., vol. 1, No. 5, p. 167; pl. 6, fig. 24; pl. 7, figs. 31, 40, 40a; pl. 8, figs. 46, 46a.

For references to earlier literature see p. 167 of Johnson's paper.

Collected from Puerto Real, Porto Rico, Caballo Blanco Reef, and Guanica Bay.

Polynoe branchiata, n. sp.

Head roughly hexagonal (see fig. 5) with anterior eyes at outer angles. Basal joint of antenna extending a little beyond that of tentacles. Terminal joint of antennae reaching considerably beyond tentacles. Antennae and tentacles brown for over half their length, then a white band, then a second brown band, immediately under the white, swollen end. A delicate acute tip terminates antennae, tentacles, and all cirri. Peristomial cirri shaped like tentacles, with two brown bands, one about half way along their terminal joint, the other just beneath the swollen tip. Dorsal and anal cirri like peristomial, but with only one brown band. Palps long, conical, covered with fine, hair-like papillae.

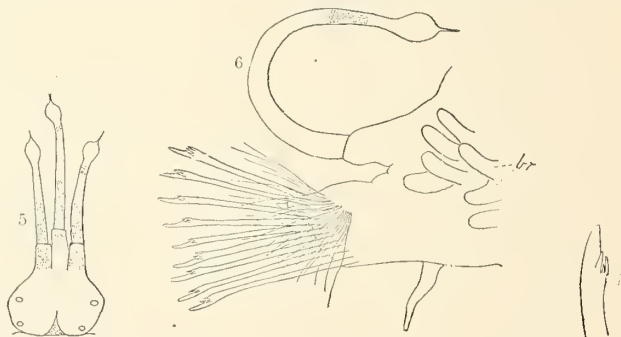
Twelve pairs of elytra. Surface of elytra covered with minute tubercles, with a number of softer, larger, papillae near outer margin. Lateral and posterior margin densely fringed, with a longer tuft a little to one side of median plane of body on many of elytra. Elytra completely cover the body, and the tubercles and filaments give it an appearance of being covered with fine gray sand.

Parapodium with dorsal bundle of rather long setae, toothed on both edges, and a ventral bundle of very stout, dark-brown setae (see fig. 6). Each of the latter ends in a blunt point and carries at a little distance from its end a transverse row of sharp teeth. One or two of these are much stouter than the rest (fig. 7). Dorsally either an elytophore or a very long dorsal cirrus (fig. 6). Ven-

trally a long narrow cirrus. Between each pair of parapodia, fastened to anterior wall of parapodium, to body wall, and a few to posterior wall of anterior parapodium are a number (ten or more) of finger-shaped processes (gills). (See fig. 6, *br.*) These appear first between the third and fourth setigerous segments and are found throughout the greater part of body. Proboscis smooth with a row of dorsal and ventral papillae around distal opening.

Length, 25 mm.; width, 8 mm. Another specimen: Length, 20 mm.; width, 6 mm.

Collected from Boqueron Bay, Ponce, station 6065.



FIGS. 5-7.—*Polynoe branchiata*. Fig. 5, Head, $\times 9$. Fig. 6, Parapodium, $\times 16$; *br.*, branchiae. Fig. 7, Ventral seta, $\times 90$.

Polynoe nodosa, n. sp.

Body plump, with short parapodia. The specimens with elytra removed are coiled, and look not unlike the larva of a coleopterous insect. General body color gray, with dark longitudinal dorsal band. In one of the two specimens at my disposal this is due to color of body wall; in the other, to the color of minute tubercles which cover it. Whole dorsal surface, even of parapodium, studded with small round tubercles. No tubercles ventrally, but surface is studded with fine papillæ, giving it a villous appearance. Head with lateral edges rounded. Breadth about equal to distance from posterior margin to base of antennæ. Anterior eyes larger than posterior and situated more toward side of head. Antennæ longer than head, with terminal swelling and acute tip. Tip of terminal swelling and subterminal band white; the rest brown. Tentacles not half as long as antennæ, like the latter in form and color, but lacking subterminal band of white. Tentacular and dorsal cirri like antennæ. Palps nearly twice as long as tentacles, tapering slowly to near apex, ending abruptly in a sharp point. Basal half colorless, terminal half brown. Surface studded with very minute papillæ, visible only under high power. In a smaller specimen, about half the length of the above, the palps were uniformly brown and only a little longer than the antennæ.

Elytra on segments 2, 4, 5, 7, etc., 23. Whole number of pairs, 12. Body segments 27, including anal segment. Only the anterior pair of elytra present in either specimen. These were nearly square, the edge with a row of fine papillæ, surface studded with tubercles. (See fig. 8.)

Parapodium miramous, very thick, its dorsal surface covered with tubercles. (See fig. 9.) Toward the end, and ventrally, the tubercles are replaced by fine villous-like papillæ; dorsally, an elytophore or cirrus. Short, stout, ventral cirrus. A few (ten) very strong setæ, with blunt-pointed apex; a single large tooth some distance from apex. Basal part striated longitudinally. A single large aciculum.

Length 25 mm.; width 5 mm. Of another, length 15 mm., width 3.5 mm.
Collected from Fajardo and station 6079.

Polynoe, sp.

From Mayaguez was collected a fragment, probably a *Polynoe*, but owing to loss of the anterior segments this could not be determined with certainty. An elevated dorsal ridge marks off three distinct areas of the body—a median and two lateral. Surface irregularly marked with light brown and gray. Elytra transparent, not covering entire dorsal surface.

STHENELAIS Kinberg.*Sthenelais simplex* Ehlers.

Sthenelais simplex Ehlers, Annelids of the Blake, p. 60, pl. 13, figs. 2 and 3; pl. 14, figs. 1 to 6.

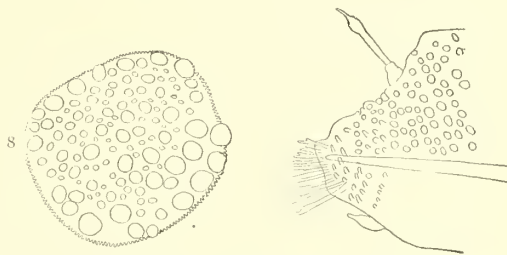
Ehlers says there are no eyes. These, which agree in all other respects with his diagnosis, show a pair of very small dark eyes, one on either side of the base of the antenna.

Collected from station 6066.

Sthenelais grubei, n. sp.

Grube, in his diagnosis of this genus (*Annulata Semperiana*, p. 54), says that the elytra are borne on segments 2, 4, 5, 7, etc., alternately to segment 23, and on every segment posterior to that. Schmarda (*Neue Wirbellose Thiere*, p. 146) states that the alternation ceases on the twenty-seventh segment. The specimens here described agree with Schmarda's description. The head (fig. 10) is rounded, with a rather broad median fissure into which the antenna fits. Base of antenna with broad lateral flap, narrower at base. Palps as long as first nine segments.

Elytra white, semitransparent. First pair broad kidney-shaped; others approximately oval, the outer posterior border fringed with a few delicate papillæ. As far as segment 27 there is a narrow dorsal area not covered by the elytra.



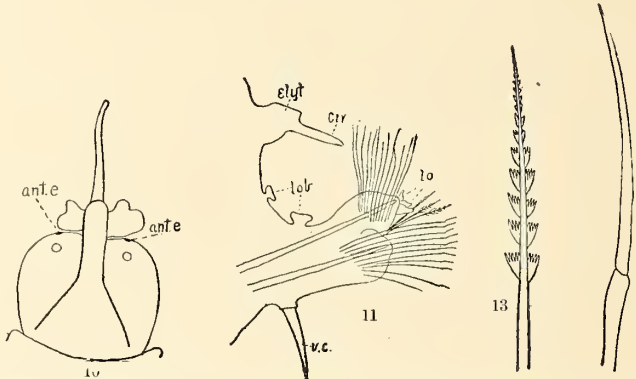
FIGS. 8, 9.—*Polynoe nodosa*. Fig. 8, Elytron, $\times 20$.
Fig. 9, Parapodium, $\times 15$.

First parapodium with a pair of long cirri and with long delicate setae minutely serrated along the edges. Other parapodia with a pointed ventral cirrus. (Fig. 11 *v. c.*) On segments without elytra a broad dorsal cirrus; on those with elytra the elythrophere carries a narrow cirrus on its outer surface (fig. 11 *cir.*). Lobes of parapodium thick, blunt. Setae on dorsal lobe arranged in a row; those on ventral lobe in a partial spiral. End of lobe prolonged into leaf-like processes. Similar processes may occur on dorsal surface of parapodium. (Fig. 11 *lob.*) In this figure of the parapodium no attempt has been made to represent the curved arrangement of the ventral setae. Dorsal setae long, capillary, with delicate serrations along their edges. Ventral setae of two kinds; first compound, with long, smooth, terminal joint (fig. 12); second, few in number, complexly fringed along their edges (fig. 13).

Pharynx, when everted, with an upper and lower "valve," each with eleven papillae. Two brown teeth above and below. There are two anal cirri. In some specimens many of the anterior elytra bear orange-colored pigment spots.

This is apparently closely related to *S. luxuriosa* of Grube (Annulata Semperiana, p. 54), but differs in fringing of elytra and in structure of setae. One specimen of 28 segments was 14 mm. long. None were complete, some bottles containing only anterior, others only posterior ends.

Collected from stations 6057, 6059, 6061, 6062, 6063, 6073; Puerto Rico, Boqueron Bay, and San Antonio Bridge, San Juan.



FIGS. 10-13.—*Sthenelais grubei*. Fig. 10, Head, $\times 21$; *ant. e.*, anterior eyes. Fig. 11, Parapodium, $\times 18$; *v. c.*, ventral cirrus; *cir.*, dorsal cirrus; *elyt.*, elythrophere; *lob.*, processes on parapodium. Fig. 12, Compound ventral seta, $\times 143$. Fig. 13, Complex ventral seta, $\times 143$.

PSAMMOLYCE Kinberg.

Psammolyce rigida Grube.

Psammolyce rigida Grube, Verhand. d. Zool.-Botan. Gesellschaft in Wien, 1868, p. 631, pl. 7, fig. 1. Quoted from Grube, Annulata Semperiana, p. 55, 1878.

Collected from station 6062.

PANTHALIS Kinberg.

Panthalis oculea, n. sp.

Head globular, prolonged anteriorly into two eye-stalks, which carry the enormous eyes (fig. 14). Three tentacles, the median on anterior margin of head, the paired beneath the eye-stalks and projecting beyond their ends. Apex abruptly narrowed, giving rise to moderately long filament, longer than terminal filament of unpaired. Palps long, tapering, surface covered with minute filiform processes.

First parapodium with two long cirri, ending like the unpaired antenna, and nearly as long as the palps, but more slender, and smooth. Palps and cirri with numerous brown dots. A tuft of setae on dorsal surface of first parapodium. A brown marking at base of unpaired antenna and a transverse brown band at posterior edge of head. Smaller pair of eyes near base of antenna.

Elytra on segments 2, 4, 5, 7, etc., through as much of the body as was preserved. Elytra nearly round, small, leaving the greater part of the body uncovered, their surface divided by fine lines into nearly equal, rectangular "cells." A brownish pigment in many of these spaces, with a tendency to accumulate in greater amount toward dorsal and posterior edges. Two specimens, otherwise indistinguishable from the others, showed no pigment on the dorsal surface of elytra and the posterior edges of the latter were black.

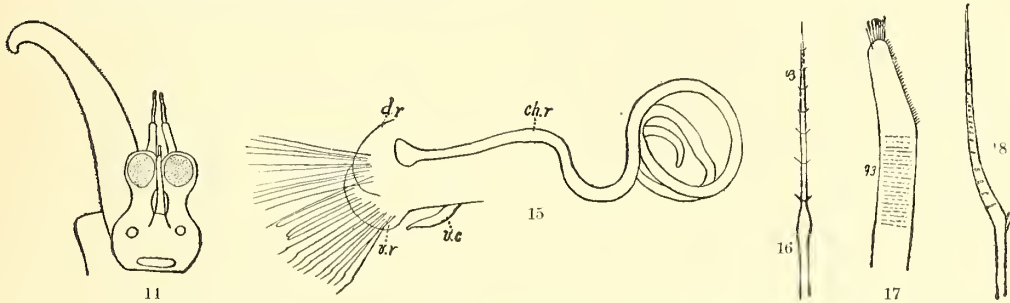
Pharynx, when extruded, as long as first 20 segments, with a smooth surface; at end with a dorsal and ventral "valve," each fringed with papillae, of which the dorsal and median ventral are much the largest. Two powerful teeth in each jaw, a row of smaller teeth running laterally on either side of each.

On ventral view of the entire animal a series of black coiled structures may be seen lying one on either side the median line in either segment. If the parapodium be cut off, these structures pull out of the body, remaining attached to tip of parapodium by a flat expansion. (Fig. 15, *ch. r.*) Each is a chitinous rod, which easily splits up into a number of fine threads. Dissection shows that the first septum appears between segments 21 and 22, the coelom in front of that being a continuous cavity. This cavity is nearly filled by these rods, which are shorter and much less coiled than they are farther back. They lie just above the nephridia, which can be seen below them as slender, short, white organs.

Rami of parapodium almost fused. Dorsal ramus (fig. 15, *d. r.*) rounded, thin, with a tuft of long setæ; a few larger than the others, lanceolate at end, with a number of pairs of lateral spines (fig. 16). Ventral setæ of two kinds; dorsal ones thick, brown, with end obliquely truncated, and covered with minute spines. (Fig. 17.) Ventral ones colorless, not more than one-fourth as thick as the dorsal, bent at some distance from end, with the transverse diameter somewhat greater at point of bending; from the bend to apex covered with transverse rows of minute spines. (Fig. 18.)

About 55 of anterior segments preserved in one specimen measured 17 mm. in length, 2 mm. broad without parapodia, 4 mm. with parapodia.

Collected from stations 6059, 6063, and Porto Rico.



FIGS. 14-18.—*Panthalis oculca*. Fig. 14, Head, $\times 14$. Only the left palp is figured. Fig. 15, Parapodium, $\times 14$; *d. r.*, *v. r.*, dorsal and ventral rami; *v. c.*, ventral cirrus; *ch. r.*, chitinous rod. Fig. 16, Seta of dorsal ramus, $\times 143$. Figs. 17 and 18, Setae of ventral ramus, $\times 143$.

EULEPIS Grube.

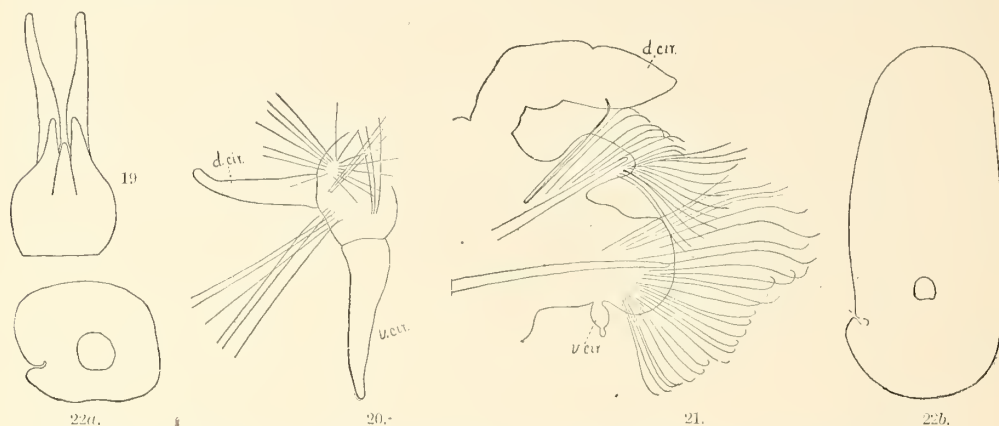
Eulepis splendida, n. sp.

Head rounded, incised in front, unpaired tentacle small, rising from dorsal surface of head, reaching scarcely to half the length of the paired; the latter arising from anterior lobe of head, about two-thirds as long as head (fig. 19). All antennæ conical, with distal two-thirds dark brown, the very tip white. Palps long, smooth, white, tapering gradually to the end (fig. 19). No eyes could be seen.

First parapodium with two cirri and two tufts of delicate setæ (fig. 20) arising from its surface. Parapodium twisted so that the two cirri come to lie very nearly in a horizontal plane. Setæ long, thread-like, a few with very minute serrations along one border. Other parapodia with very distinct rami. Dorsal ramus with about 15 stout, brown, chitinous setæ, curved at apex, the curved portion pointing backward. Below this is a tuft of fine thread-like setæ, some with fine serrations along their edges. These are very numerous and of a golden-red color. Ventral ramus broader than dorsal, with about 25 long setæ. Setæ about half the diameter of coarse dorsal setæ, curved at apex, the curved portion pointing backward. General color of these setæ yellowish brown, with tips, as seen in reflected light, noticeably lighter. Ventral cirrus ovate with base slightly narrowed, its apex drawn out into a terminal joint having much the form of the basal, but very much smaller. Dorsal ramus with either a cirrus or an elyptrophore (fig. 21).

Elytra borne on segments 2, 4, 5, 7, etc., 21, 24. Grube, in his diagnosis of this genus (*Annulata Semperiana*, p. 51), says that elytra alternate anteriorly, after the manner of the *Polynoidæ*, but posteriorly are borne on all segments. In his description of *E. hæmifera* (loc. cit., p. 52), he notes that the elytra are found on segments 2, 4, 5, 7, etc., up to 21; that then they skip first two, then three,

and from the twenty-eighth segment are found on all segments. He notes further that the elytra increase in size up to the twelfth pair, and then become smaller. In *E. splendida* there are twelve pairs of elytra, the last much the largest, borne on segment 24, but extending back so as to cover as far as greater part of segment 31, and the above generic description—that all of the posterior segments bear elytra—applies only if we regard the broad, flat expansion of the dorsal cirrus as an elytron (fig.



FIGS. 19-22b.—*Eulepis splendida*. Fig. 19, Head, $\times 17$. Fig. 20, First parapodium, $\times 23$; *d. cir.* and *v. cir.*, dorsal and ventral cirri. Fig. 21, Posterior parapodium, $\times 17$. Figs. 22a, 22b, Seventh and twelfth elytra, $\times 8$.

21). This can hardly be the case, since it is found on all the cirrus-bearing segments, except the most anterior ones. In this respect these specimens do not agree with Grabe's diagnosis. They agree in so many other respects, however, that I have no hesitation in assigning them to this genus. Probably the loss of posterior elytra is correlated with the enormous development of the twelfth pair.

Parapodia around head very much crowded together; the second and third segments fused dorsally, so that the second elytriphore apparently arises from anterior end of third segment. The first elytra completely cover the head.

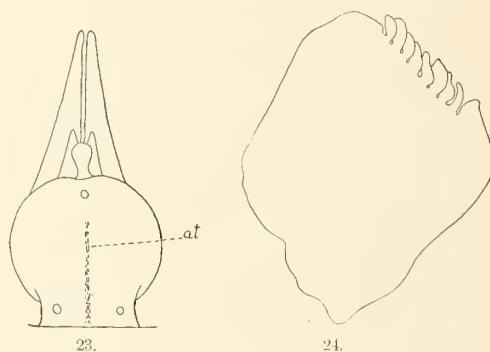
The first elytra were removed in order to draw the head, and were unfortunately lost before they could be drawn. A drawing of the seventh is given in fig. 22a and of the twelfth in fig. 22b. These are drawn to the same scale, to show the increase in size from before backward. Except a small notch on outer border, the edge is entire. Their color is white, and they show, under the microscope, a finely granular texture. At anterior edge of ventral ramus of parapodium is a dark spot.

Body of 37 segments. Length, 37 mm. Width without parapodia, 3 mm.; with parapodia, 5 mm. The single entire specimen had one anal cirrus.

Collected from stations 6062 and 6065.

Eulepis fimbriata, n. sp.

Head rounded (fig. 23). Antenna small, globular, on a short stalk. Tentacles reaching a little beyond tip of antenna, rising from under surface of head. Palps long, smooth, closely appressed in middle line. Head thickly marked with yellowish brown. Two dark spots (eyes?) near base and one toward apex just behind base of antenna. All appendages around the head very much crowded together. The anterior elytra completely cover the head, their elytriphores touching on median line. An anterior process from base of elytriphore



FIGS. 23, 24.—*Eulepis fimbriata*. Fig. 23, Head, $\times 18$; *at*, line along which process from anterior elytriphore fuses with head. Fig. 24, Elytron, $\times 22$.

fuses with dorsal surface of head. (See its line of attachment *at*, in fig. 23.) Parapodia and setae like those of *E. splendida*, except that setae of dorsal ramus are possibly not so numerous and lack the brilliant color characteristic of the latter. Second and third segments more or less fused above. Arrangement of elytra as in *E. splendida*, the twelfth pair much the largest, borne on segment 24 and covering nearly all the rest of body.

Elytra white, granular, like those of *E. splendida*, but prolonged on lateral border into broad leaf-like processes (fig. 24). One anal cirrus. Number of body segments, 37.

Length, 24 mm.; width, without parapodia, 4 mm.

Collected from station 6061.

Family PHYLLODOCIDÆ.

PHYLLODOCE Sav.

Phyllodoce oculata Ehlers.

Phyllodoce oculata Ehlers, Annelids of the Blake, p. 135, pl. 40, figs. 4, 5, 6.

According to Ehlers, the ventral cirrus in each segment is fused along its whole dorsal edge to ventral face of parapodium. In the specimen from Porto Rico, although the cirrus is closely apposed to the parapodium, it is actually fused only at its base. Ehlers describes, further, the parapodium as uniramous, with an anterior and a posterior lip, the latter being the larger and bifid at end. In these it is the anterior lip which is larger and bifid.

Through the courtesy of Dr. W. M. Woodworth, I have had an opportunity of examining the type specimen from the Museum of Comparative Zoology at Cambridge, Mass., and I find that Ehlers was certainly wrong in both the above points. The ventral cirrus in the type specimen is attached only at its base, and the anterior lip is larger and bifid. In all other respects the Porto Rico specimens agree with Ehlers's diagnosis of the species.

Collected from station 6065.

Phyllodoce magna-oculata, n. sp.

Head rounded, broader than long (fig. 25). Eyes very large (*e*, fig. 25). Dorsal antennae lanceolate, nearly twice as long as head (*d. ant.*, fig. 25). Ventral antennae on lower face of head, equal in size to dorsal. Four pairs of tentacular cirri, the largest 3.5 times as long as the antennae, thick, with acute termination. The other cirri smaller, equal.

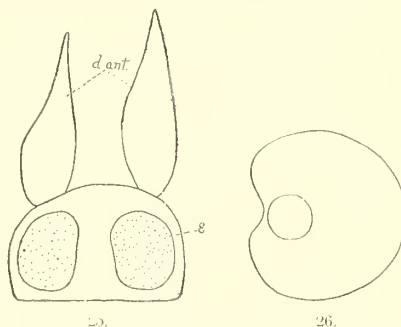
The gills had all been removed from the anterior segments of the body. Those which remained were covered with a slimy deposit, containing numerous foreign particles. The gills are especially liable to be broken away in attempting to remove this deposit. Gills broadly reniform (fig. 26), with entire margin and with point of attachment near the base of the hilus. Color at point of attachment, light brown. Each gill contains numerous anastomosing blood vessels and numerous small, round, light and dark brown pigment granules.

Parapodium a single conical lobe, slightly bifid at the end, with a large aciculum. About nine compound setae on either side of the aciculum. Basal joint of setae long, most extending nearly or quite the length of parapodium beyond tip of latter. At end the basal portion has a club-shaped enlargement, marked by very fine longitudinal lines. Terminal portion rather more than half as long as basal, at base as broad as basal portion, tapering gradually to a fine point.

Collected from station 6067.

Phyllodoce, sp.

From Boqueron Bay was obtained a fragment of a specimen of this genus too much injured for identification, head and tail lacking. The fragment was 25 mm. long, 5 mm. wide, and contained over 50 segments. Body black, with a dorsal longitudinal band, and edges of gills and cirri fringed with white.



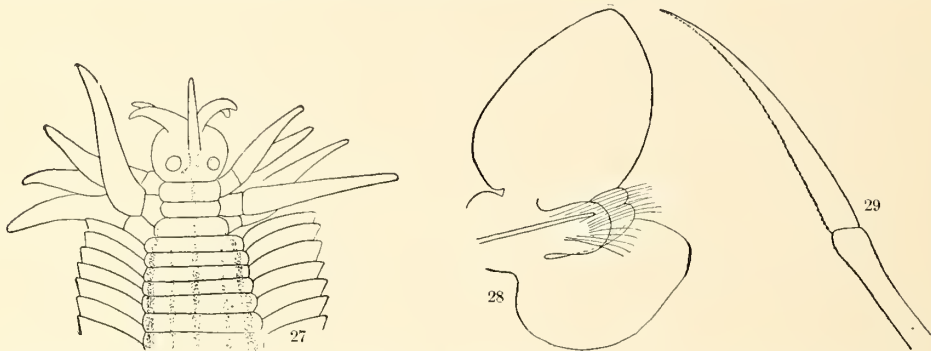
FIGS. 25, 26.—*Phyllodoce magna-oculata*. Fig. 25, Head, $\times 70$; *d. ant.*, dorsal antennae; *e*, eye. Fig. 26, Gill, $\times 70$.

EULALIA (Sav.) Malmgren.*Eulalia quinquelineata*, n. sp.

Head oval, broadest just in front of eyes, with a slight constriction at base of tentacles (fig. 27). Tentacles four, equal, three-fourths as long as head, stout, with acute points. Median unpaired tentacle arising about half way from eyes to the anterior margin of head, much more slender than paired and reaching beyond their ends. Two rows of small pigment spots begin at base of unpaired tentacle and extend back between eyes, forming an) (shaped marking.

On first segment, one tentacular cirrus; on second, two (a dorsal and a ventral); on third, a long dorsal, tentacular cirrus, and a thick, flat, ventral cirrus, the latter like the ventral cirri of succeeding segments. Tentacular cirri composed of a basal portion and a stout terminal portion pointed at end. Dorsal cirrus of second and that of third segments about equal in size and slightly larger than other two. First and second segments about two-thirds the diameter of the fourth and succeeding segments.

Body 450 mm. long; without the parapodia 2 mm. wide at anterior end. It retains this width until near posterior end, where it narrows gradually. No anal cirrus present in the single specimen in this collection. Segments at anterior end six times wider than long; toward posterior end this proportion is diminished and the parapodia of successive segments are more widely separated than anteriorly. In the preserved specimen, which is doubtless more or less contracted, the gills of each segment overlap those of segment in front. On account of the great length of the body and the extent to which it was coiled I was unable to determine the precise number of the segments. Since the length of the anterior segments is only about 0.33 mm., increasing slightly toward posterior end, it follows that there must be at least 1,300 segments in the whole body.



FIGS. 27-29.—*Eulalia quinquelineata*. Fig. 27, Head, $\times 7$. Fig. 28, Parapodium, $\times 72$. Fig. 29, Compound seta, $\times 257$.

Parapodium a single ramus with anterior bilobed lip and posterior shorter, rounded, one. Dorsal cirrus nearly a regular ovate, attached by ventral joint (fig. 28). Ventral cirrus comparatively large, ovate, hollowed out on side next parapodium. Both cirri show numerous ramifications of blood vessels in their interior. Toward posterior end the cirri become a trifle more acute at ends and the whole appendage is much smaller, but their relative proportions are about the same. Setae compound, the basal joint long, swollen at end. Terminal joint broad at base, bent slightly and tapering gradually to an acute point, with row of minute teeth on concave edge (fig. 29).

Color of body yellowish brown, with a faint greenish tinge. Dorsal surface with five longitudinal black bands—a median, two admedian, and two lateral, the latter just at base of parapodia. Median narrow on first five segments, becoming broader farther back. Lateral narrower than median, beginning on third segment. Admedian about half way between the other two, a little nearer the lateral; narrower and lighter colored than either. They begin on posterior edge of fourth segment as small spots, which are repeated on fifth and sixth segments, becoming continuous lines on seventh (fig. 27). Toward posterior end this line becomes much less conspicuous. On ventral surface a median and two lateral bands, similar in size and position to corresponding dorsal ones, but with no admedian bands.

Collected from Hucares.

Family NEREIDÆ.

NEREIS Cuvier.

Nereis bairdii Webster.

Nereis bairdii Webster, Annelids from Bermuda, Bull. No. 25, U. S. Nat. Mus., p. 312, pl. 8, figs. 22-28.

There are apparently two well marked varieties in this species, differing in color and in form of parapodia. One with outer portion of head and dorsal surface of anterior segments brown. A row of colorless spots in this band on head and across anterior end of first six or seven segments. Parapodia, especially the posterior ones, with excessive development of dorsal ramus, as described by Webster. A rectangular white patch on dorsal surface of each pair of segments, overlapping the line between the two, though lying mainly in posterior one. The second variety has a band of brown around the head, much narrower than the first and with no white spots. A transverse brown band on each segment, much darker near posterior edge. Lobes of parapodium much blunter and more rounded than in first variety and posterior parapodia not with excessive development of dorsal ramus. Dorsal cirri much longer than in first variety. Webster figures long compound setæ with smooth terminal joint. In the Porto Rico specimens this terminal joint is finely toothed. These specimens agree so closely with one another, and with Webster's description of the species, in so many anatomical features, that I have thought it best to regard them as color varieties of the same species.

Collected from Puerto Real, Arroyo, Boqueron Bay, Mayaguez, Porto Rico, stations 6065, 6091, 6092, 6062, and 6063; Ensenada Honda, Culebra.

Nereis mirabilis Kinberg.

Nereis mirabilis Kinberg, Annulata Nova, Öfvers. af. K. Vet. Akad. Förh. 1864, No. 16, page 571. Quoted from Ehlers, Annelids of the Blake, p. 117, pl. 37, figs. 1-6.

Nereis gracilis Webster, Annelids from Bermuda, p. 313.

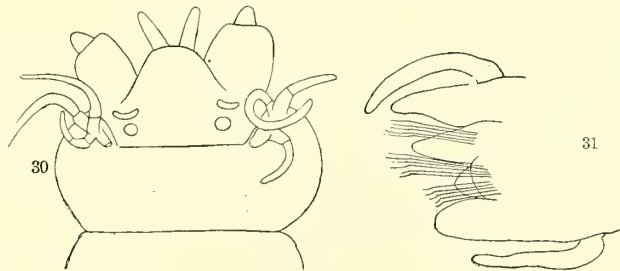
From a careful comparison of Ehlers's with Webster's description I conclude that these are identical species. Ehlers figures the antennæ as entire, while Webster figures them with rather long basal joints. The single specimen at my disposal (from Boqueron Bay) has a short basal joint, easily overlooked in preserved material.

Nereis arroyensis, n. sp.

Head broader than long, the dorsal surface shading off gradually into the palps, with no sharp line between the two. Anterior edge rounded, with two thick antennæ. Eyes four, anterior pair semilunar in form (with transparent "lens"?) (fig. 30). The posterior dorsal tentacular cirri had been lost; the other cirri short (fig. 30). In other specimens than the one figured these cirri were longer. Body colorless, broadest in front, tapering gradually to posterior end. Body of 73 segments. Two very long anal cirri. 45 mm. long, 2.5 mm. wide.

Parapodium with dorsal cirrus longer than ramus (fig. 31). Ramus of two lingule, the dorsal a little longer than the ventral. Setæ of dorsal ramus compound, with long basal joint with prominent transverse striations. Terminal joint long, nearly straight, finely toothed. Dorsal setæ of ventral ramus like setæ of dorsal ramus. Ventral setæ with basal joint like dorsal, terminal joint short, hooked at end and with a row of long delicate spines on side. Dorsal lingula of ventral ramus with anterior and posterior lobe ("lip"), the anterior a little the larger. Ventral cirrus not quite so long as dorsal. Toward posterior end, parapodia much as anteriorly, except that lobes become a little more pointed, and the setæ with long terminal joint become relatively much more numerous in the ventral ramus. The number of setæ in the dorsal ramus becomes very small.

Collected from Arroyo and station 6052.



FIGS. 30, 31.—*Nereis arroyensis*. Fig. 30, Head, $\times 17$. Fig. 31, Parapodium, $\times 18$.

A single much mutilated specimen from Mayaguez I have placed in this species, though it is possibly distinct. The form of the head and palps was like that of *N. arroyensis*, as also was that of the posterior parapodia. The anterior 8 to 10 parapodia had very thick rounded lobes, showing only a division into the two rami.

Family NEPHTHYDIDÆ.

NEPHTHYS Cuv.

Nephtys squamosa Ehlers.

Nephtys squamosa Ehlers, Annelids of the Blake, p. 128, pl. 37, figs. 7-10.

Collected from stations 6084, 6085, 6091, 6092, 6093.

Family AMPHINOMIDÆ.

HERMODICE Kinberg.

Hermodice carunculata (Pall.) Kinberg.

Hermodice carunculata Webster, Annelids from Bermuda, Bull. U. S. Nat. Mus. 1884, p. 307. (See this paper for reference to earlier literature.) Ehlers, Annelids of the Blake, p. 27.

The color varies from brown to a decided blue. Ehlers says the young are a light brown with a black mark across the back. Only one specimen of this collection (18 cm. long) showed this marking.

Collected from Guanica Bay, Fajardo, Arroyo, Ponce, San Antonio Bridge, San Juan, Boqueron Bay, Mayaguez, Playa de Ponce Reef, Ensenada Honda (Culebra), stations 6092, 6088.

NOTOPYGOS Kinberg.

Notopygos crinita Grube.

Notopygos crinita Grube, Beschreibung neuer oder wenig bekannter Anneliden, Archiv. f. Natur. Jhr., 21, Bd. 1, 1885. Grube, Annulata Semperiana, 1878, p. 7. Ehlers, Annelids of the Blake, p. 24, pl. 1, fig. 3; pl. 3, figs. 5, 6, 7.

A very full description is given by Ehlers; he does not figure nor describe a row of small, bead-like elevations on the dorsal surface of the median fold of the caruncle; these are about 15 in number, very prominent in front, and gradually fading out behind; they are relatively more prominent in the large than in the small specimens. In a specimen 42 mm. long the first ten of these beads were dark brown. In smaller specimens only one or two show any color.

Collected from station 6079. From a second specimen the locality label was unfortunately lost in transferring.

EURYTHOE Kinberg.

Eurythoe complanata Pall.

Eurythoe complanata Pallas, Miscellanea Zoologica, Hagae-Comitum, p. 109, pl. 8, figs. 19-26. Quoted from Ehlers, Annelids of the Blake, p. 29.

Body light gray, with marked iridescence. Setae white. Ehlers describes the eyes as black; these were a light reddish brown.

Collected from Arroyo, Hucars, Puerto Real, Ensenada Honda (Culebra). In one other specimen the locality label was lost.

EUPHROSYNE Sav.

Euphrosyne triloba Ehlers.

Euphrosyne triloba Ehlers, Annelids of the Blake, p. 31, pl. 4.

Collected from station 6098.

CHLOEIA Sav.

Chloeia euglochis Ehlers.

Chloeia euglochis Ehlers, Annelids of the Blake, p. 18, pl. 1, figs. 1-8; pl. 3, figs. 1-4.

Two specimens are in this collection. Eyes not so nearly fused as in Ehlers's description. Median and paired antennae and most of the dorsal cirri are of a brilliant violet color.

AMPHINOME Brug.

Amphinome microcarunculata, n. sp.

Body of single specimen incomplete, only anterior 36 segments preserved. Length of these, 38 mm. Breadth of head, 0.75 mm. Body rapidly widens to twentieth segment, where its breadth is 10 mm.;

from here it narrows again rapidly; thirty-second segment, 5 mm. wide. Color above, seal-brown, shading into ashy gray anteriorly; ventrally, ashy gray. Setæ long, very fine, white. Caruncle small, smooth, not extending beyond limits of head lobe. Dorsal setæ shorter than ventral. Dorsal cirrus arising at base of tuft of setæ, a little behind and ventral to them. Cirrus about three-fourths as long as setæ. Ventral ramus with a thick fleshy lip, from the dorsal edge of which the setæ arise. Ventral cirrus slender, shorter than lip of ramus. Two tentacles and two subtentacles present, the median tentacle having been lost. (See fig. 32.) No eyes could be seen. Mouth surrounded by two segments, the posterior lip lying in the interruption of median line of third segment. Gills appear first on eighth segment, as a single filament, attaining their full size about segment 12. They are very inconspicuous, lying behind the dorsal cirrus, and in preserved material almost completely hidden in the constriction between the segments. In its fully developed form each gill is composed of a tuft of thick, short filaments.

In the generic description of *Amphinome* (Kinberg; Svenska. Vetensk. Akad. Öfversigt, vol. 14, pp. 11 to 14, 1858) it is stated that the gills begin on segment 3. In the absence of a median tentacle and in the fact that the gills appear first on the ninth segment, this specimen differs from the generic diagnosis. I have regarded the former as an accident, and the latter as not of sufficient importance on which to form a new genus.

Collected from station 6070.

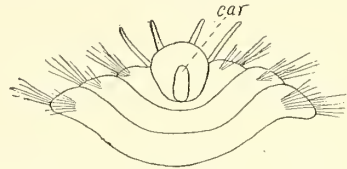


FIG. 32.—Head of *Amphinome microcarunculata*, $\times 8$; car., caruncle.

Family CHRYSOPETALIDÆ.

BHAWANIA Schmarda.

Bhawania goodei Webster.

Bhawania goodei Webster, Annelida from Bermuda, p. 308.

A number of fragments, lacking both head and tail, seem undoubtedly to belong to this species, though the remaining parts differ somewhat from Webster's description. Dorsal and ventral rami of parapodia separated rather more widely than in Webster's description. Terminal portion of ventral ramus expanded at base and narrowing rapidly toward apex. Webster figures it as slender and conical. Dorsal ramus as in Webster's description. Dorsal paleæ in a row extending across back, the median ones bending inward, so that those of opposite sides overlap. Setæ of two kinds. Those of dorsal ramus constricted at base, like dorsal paleæ, and for inner two-thirds of their length marked with the longitudinal and transverse striations characteristic of latter. These are figured by Webster as smooth, with sharp point and broad base.

The setæ of the dorsal ramus are regarded by Johnson (Proc. Calif. Acad. Sci., vol. 1, No. 5, p. 162) as a second form of paleæ, and are one of the characters of his new genus *Heteropale*. The data in my possession are few, but from what I have I am inclined to believe that Johnson's *Heteropale* should be discarded in favor of Schmarda's *Bhawania*. In the shape and position of the other setæ, these specimens agree with *B. goodei*.

Ehlers (Annelids of the Blake, p. 34) describes fragments of a Chrysapetalid in which the paleæ cover the back. He does not describe any other details.

Collected from Arroyo.

Family EUNICIDÆ.

EUNICE Cuvier.

Eunice ornata Andrews.

Eunice ornata Andrews, Annelida Polychæta of Beaufort, N. C., Proc. U. S. Nat. Mus., vol. 14, p. 284, 1891.

Collected from stations 6080, 6079, 6073, 6092; Mayaguez; Ponce; stations 6086, 6091; and a female with eggs from Arroyo. In the specimen from station 6092 the gills began on the sixth segment, instead of the fifth, which, according to Andrews, is the normal.

***Eunice denticulata* Webster.**

Eunice denticulata Webster, Annelida from Bermuda, Bull. U. S. Nat. Mus. 1884.

Webster's specimens, preserved in alcohol, were of a yellowish white color. One in this collection, preserved in formalin, was a dirty white through most of the body, dorsal surface of head and anterior segments irregularly marked with dark green blotches. Gills appear as single filaments on the twenty-eighth setigerous segment. Head deeply bilobed. Tentacles smooth, equal, about twice as long as the head. The dorsal ramus of the parapodium contains comb-shaped setæ, which are not described by Webster. The head of one large specimen was mottled with brown.

Collected from stations 6065, 6079, on corals at Mayaguez, and from Ensenada Honda (Culebra).

***Eunice violacea-maculata* Ehlers.**

Eunice violacea-maculata Ehlers, Annelids of the Blake, p. 86, pl. 24, 1, figs. 11, 12; pl. 25, figs. 1-7.

Two long transversely banded anal cirri. Collected from Ensenada Honda (Culebra), and from station 6079.

***Eunice articulata* Ehlers.**

Eunice articula Ehlers, Annelids of the Blake, p. 83, pl. 24, figs. 8, 9, 10.

Gills begin on the third setigerous segment. Ehlers says there are two anal cirri. These have four, two long, articulated, and two very short ones.

From Playa de Ponce reef was collected a specimen superficially very unlike Ehlers's description of this species, but agreeing so closely in most characters of importance that I have included it here. The differences are possibly sexual. The body is much larger and broader. General color, light brown. Segments 3, 7, 8, and 9 white. A narrow brown band at the base of each segment of antennæ and cirri. A smaller specimen from station 137 shows these same color markings.

Collected from stations 6065, 6098, 6096, and Playa de Ponce reef.

***Eunice siliensis* Grube.**

Eunice siliensis Ehlers, Die Borstenwürmer, p. 353, pl. 16. (See Ehlers's paper for references to previous literature.)

In an animal of 350 segments the gills appear first as a simple fold on segment 145. Ehlers says that the distinction in length between the two pairs of anal cirri is not great. In the single perfect specimen in this collection two of these are much longer than the other two.

Collected from station 6064, Caballo Blanco reef, and Arroyo.

***Eunice fucata* Ehlers.**

Eunice fucata Ehlers, Annelids of the Blake, p. 91, pl. 25, figs. 8-20.

Ehlers does not mention the presence of anal cirri. In one of these there are two long, rather fleshy cirri. Collected from Arroyo, Caballo Blanco reefs, and Boqueron Bay.

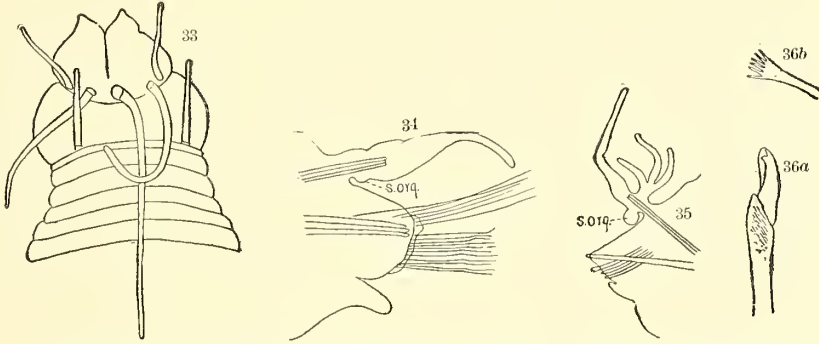
***Eunice auriculata*, n. sp.**

Prostomium bilobed, each lobe triangular, with apex pointing forward. (See fig. 33.) This lobing is much more prominent on the ventral face. Tentacles composed of a short articulated basal portion and a long, smooth, terminal portion, the latter tapering gradually to the end. Median antenna very long, reaching back to the eighteenth segment. Median paired antennæ half as long as unpaired. Outer paired antennæ about half as long as median. Peristomium long at sides, deeply hollowed in front, so that median length is scarcely two-thirds that of side. Median length about equal to three succeeding segments. Third segment about equal in width to succeeding. Nuchal cirri smooth, tapering gradually from a rather thick base to a sharply-pointed apex. Apex reaching a little beyond front border of peristomium. The body gradually narrows to the fourth segment, and from here gradually increases in width to about the tenth. From there a gradual decrease again as far as thirtieth. Thirtieth segment a trifle narrower than the first. Dorsal cirri very large. Branchiæ begin on nineteenth segment as a single filament. On the twenty-first this has divided into two, and at about the twenty-seventh it divides again. They never become very complex.

Anterior parapodia blunt, with anterior and posterior lips, the former a little the longer and with a rounded lobe at its apex. (See fig. 34.) About 12 acicular setæ in the dorsal bundle and over 20 setæ in lower bundle. The latter with long, acute, terminal joint. Ventral cirrus short and fleshy;

farther back the parapodium becomes more pointed, and the division into anterior and posterior lips is not evident. (See fig. 35 of forty-fifth parapodium.) A stout dorsal aciculum and three smaller ventral ones bent and toothed at end. Aciculæ extend into the dorsal cirrus in all parapodia. Ventral cirrus stout and short on anterior segments (fig. 34); very small on posterior ones (fig. 35).

Setæ of posterior segments of three kinds. Some like those of anterior segments. In addition, comb-shaped setæ and compound setæ, with short toothed terminal joint. (See figs. 36a and 36b.) On the ventral surface of the dorsal cirrus is a peculiar rounded lobe, which I suppose must be a sense



Figs. 33-36b.—*Eunice auriculata*. Fig. 33, Head, $\times 12$. Fig. 34, Anterior parapodium, $\times 19$; s. org., sense organ. Fig. 35, Forty-fifth parapodium, $\times 19$. Figs. 36a, 36b, Setæ, $\times 143$.

organ, though I have not yet had opportunity for a careful study of it. It is present, though very small, on the first segment, and becomes very prominent farther back. (See figs. 34 and 35, s. org.) It contains no pigment, so can hardly be optical in function. A more complete account is reserved for a later paper.¹ No eyes could be discovered on the alcoholic material. Jaws: 1, long, pointed; 2, right 4 to 5, left 6; 3, right 5, left 5. Dark brown spot on outer ventral side of 4.

Color light brown. The posterior segments had been lost in all the specimens. The animals live in tubes of mud with thick (2 mm.) walls. Collected from stations 6066 and 6067.

Eunice culebra, n. sp.

The collection includes one small specimen which I at first took for a species of *Nicidion*. Only about 50 of the most anterior segments were preserved; the most posterior show a short outgrowth on each dorsal cirrus, representing a gill; it is evidently an immature *Eunice*. Head deeply bilobed, with a pair of eyes near bases of the inner paired tentacles. Tentacles slender, unpaired, three times as long as head. Median paired three-fourths as long as head. Outer paired a little shorter than median. Tentacular cirri slender, a little over half as long as buccal cirrus. Parapodium (see fig. 37) with a single stout aciculum. Dorsal cirrus long, ventral cirrus short, blunt, with a swollen base. Ventral setæ compound, terminal joint with a stout tooth behind apex. Dorsal setæ long, curved, pointed, slightly enlarged near the end.

I have been unable to identify this species, and have given it, provisionally, the above name. Collected from Ensenada Honda, Culebra.

Eunice rubra Grube.

Eunice rubra Grube, *Annulata Oerstediana*, 1856-57, p. 59. Quoted from Ehlers, *Annel. of Blake*, p. 87, pl. 26, figs. 1-11.

Specimens very immature, but agreeing so closely with this species in structure of tentacles, setæ, and acicula that I have placed them here. From Arroyo, Puerto Real, and station 6085.

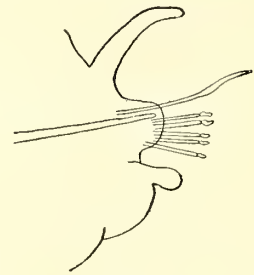


FIG. 37.—Parapodium of *Eunice culebra*, $\times 46$.

¹ Later study shows that this organ is essentially identical in structure with the lateral line organs described by Eisig in the *Capitellidae*. (*Fauna u. Flora Golf v. Neapel*, xvi, p. 76.)

Eunice, sp.

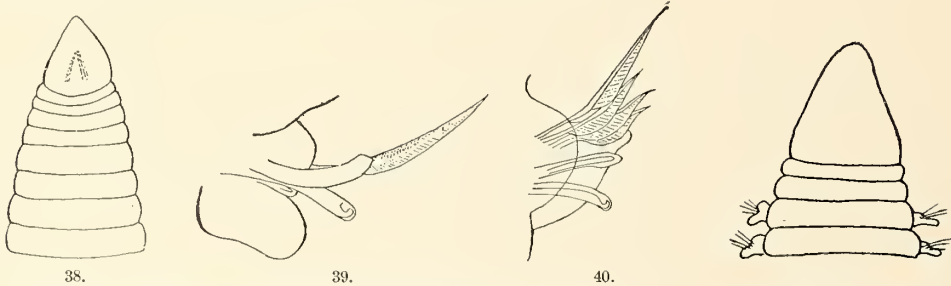
Fragments of *Eunice*, too much injured for identification, were collected from Arroyo; stations 6086, 6062, and 6663.

DIOPATRA Quatrefages.

Fragments of tubes, evidently belonging to this genus, were collected from station 6062.

LUMBRICONEREIS (Blainville) Ehlers.***Lumbriconereis parva-pedata***, n. sp.

Head acute, about as broad as long. Dorsal surface marked by median longitudinal ridge. No eyes. (Fig. 38.) First two segments short and nearly fused, the line between them more apparent on the side than elsewhere; the two together only a little longer than the third. Junctions between anterior segments as far as ninth not marked by any prominent constrictions. From the ninth onward these intersegmental constrictions become very deep and the segments are much shorter, not more than half as long as broad. Width of body increases up to segment 10; then decreases slowly to segment 25; from here the diameter is nearly uniform, tapering gradually toward posterior end. Segments behind twenty-fifth a little longer than those in front.



FIGS. 38-40.—*Lumbriconereis parva-pedata*. Fig. 38, Head, $\times 8.5$. Fig. 39, Parapodium, $\times 143$. Fig. 40, Posterior parapodium, $\times 57$.

FIG. 41.—Head of *Lumbriconereis floridana*, $\times 15$.

Parapodium of first segment very small, forming a mere knob on side of segment. Second parapodium a little longer, containing two or three stout, hooked setae (see fig. 39), and two (only one shown in fig. 39) long, capillary setae with broad, striated apex. Parapodia of anterior segments too short to be visible from a dorsal view. They gradually elongate toward posterior end, coming into view from above on the eighteenth segment. Parapodium of nineteenth segment (see fig. 40) has rounded anterior and more pointed posterior lips. Four dorsal broad capillary setae and two ventral stout hooked setae. The setae of most of posterior segments had been lost, so that no data can be given concerning any variations that may occur among them.

Length, 200 mm. Width at anterior end, 2 mm.

Color in alcohol, light yellow, with yellowish brown bands crossing many of the segments. These bands are very irregularly distributed and may be portions of the color of the living animal which had not been entirely extracted by the alcohol.

Collected from Ensenada Honda, Culebra.

Lumbriconereis floridana Ehlers.

Lumbriconereis floridana Ehlers, *Annelids of the Blake*, p. 103, pl. 30, figs. 10 to 15.

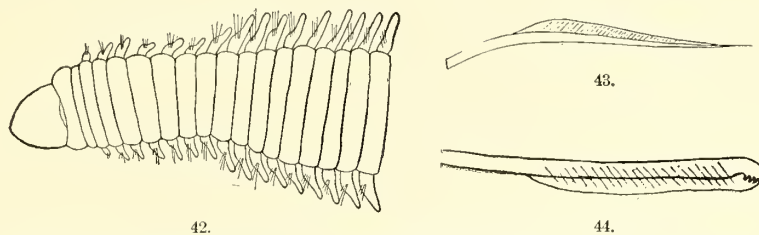
Collected from Boqueron Bay and station 6065. From the latter locality was collected the anterior portion of another specimen, differing from Ehlers's diagnosis in the more pointed head lobe. (See fig. 41.) Since it agrees in other respects, I have included it in this same species.

Lumbriconereis maculata, n. sp.

Head rounded, a trifle longer than broad, as long as following three segments. Surface uniformly convex, with abrupt depression at posterior margin. No eyes. (Fig. 42.) First segment twice as long as second. First nine segments about five times as broad as long. Beginning with the tenth there is

a marked increase in width up to the sixteenth. (See fig. 42.) Sixteenth and later segments about eight times broader than long. At about the ninetieth each segment becomes longer and narrower. Middle of each segment marked by a transverse sharp ridge. Intersegmental constrictions much deeper in posterior than in anterior segments.

Anterior parapodia rather short. Beginning with the second, each has a noticeable posterior lip. Farther back, the parapodia are nearly twice as long as anteriorly, but with essentially similar form. The change is rather abrupt, occurring, in one specimen on the sixth, in the other on seventh segment. Distal portion of setae white, as seen with low power, in sharp contrast to darker proximal portion.



FIGS. 42-44.—*Lumbriconereis maculata*. Fig. 42, Anterior portion, $\times 9.5$. Fig. 43, Capillary seta, $\times 55$. Fig. 44, Uncinate seta, $\times 110$.

Setae of two kinds. Capillary (see fig. 43) long, curved, with marginal expansion, the whole delicately striated. Setae of other kind with stout, terminal hook (see fig. 44). The hook with four small teeth and with broad lateral expansion, involving the entire seta. Both forms are present in the anterior segments. At about segment 35 the second form becomes more prominent, and at segment 42 the capillary setae disappear. The others, as seen under low power, have club-shaped ends.

Color varies from chestnut brown on the posterior segments to light yellow on the anterior. Surface of body, especially on head and anterior segments, marked with irregular spots of dark brown.

Neither specimen was complete. The larger, of 112 segments, was 29 mm. long. The head was 1 mm. wide. Body, without the parapodia, 2 mm. at the widest part.

Collected from Puerto Real.

Lumbriconereis bilabiata, n. sp.

Head elongated, like that of *L. floridana*. (See fig. 45.) First segment longer than second. Succeeding segments of uniform breadth, about eight times broader than long. Anterior parapodia with rather prominent but very narrow posterior lip. Farther back a thicker anterior lip, nearly as long as the posterior, makes its appearance. (See fig. 46 of thirty-sixth parapodium.) The aciculum very strong, black. Setae had nearly all been lost. Those of thirty-sixth segment were as figured. Specimen incomplete, of only 57 anterior segments.

Length, 13 mm. Greatest breadth, 1 mm.

Color, a uniform gray brown. Collected from station 6061.

ARABELLA (Grube) Ehlers.

Arabella opalina Verrill.

Lumbriconereis splendida Leidy, Marine Invert. Fauna of R. I. and N. J., p. 5, 1855.

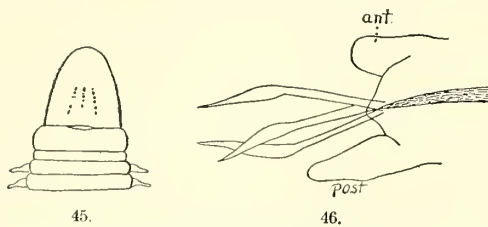
Lumbriconereis opalina Verrill, Invert. of Vineyard Sound, Rept. U. S. F. C. for 1872, p. 594, pl. 13, figs. 69, 70, 1874.

Arabella opalina Verrill, Proc. Ac. Nat. Sci. Phila., p. 299, 1878. Webster Annelida Chatopoda of Virginia Coast, p. 242.

1879: Annelida Chatopoda of New Jersey, p. 116, 1880; Annelids of Provincetown, Rept. U. S. F. C. 1884, p. 721.

Annelids from Bermuda, Bull. U. S. Nat. Mus. 1884, p. 321. Andrews, Annelida Polychaeta of Beaufort, Proc. U. S. Nat. Mus., vol. 14, p. 288, 1891.

Collected from Puerto Real and Arroyo. The specimen from Arroyo had a transverse row of brown spots across each segment of the posterior end of body.



FIGS. 45, 46.—*Lumbriconereis bilabiata*. Fig. 45, Head, $\times 13$. Fig. 46, Thirty-sixth parapodium; ant., anterior lip; post., posterior lip.

NICIDIION Kinberg.

Nicidion brevis Ehlers.

Nicidion brevis Ehlers, Annelids of the Blake, p. 98, pl. 28, figs. 9-14; pl. 29, figs. 1 and 2.

Collected from station 6085, Mayaguez, Puerto Real, Caballo Blanco reefs, and Ensenada Honda, Culebra.

LYSIDICE Sav.

Lysidice sulcata, n. sp.¹

Head deeply bilobed (fig. 47). (*L. notata* Ehlers, Annelids of Blake, p. 100, to which it seems to be closely related, shows no trace of this lobing.) Tentacles three, middle one the longest. Eyes dark brown, just outside of outer antennæ. Roughly crescent-shaped, posterior end of crescent the larger. Peristomium about four times wider than long. Second segment about half as long as buccal and slightly wider. Successive segments widening gradually to the sixth, which is as wide as greatest width of body. Parapodia first appear on third segment. Anterior parapodium uniramous, with dorsal capillary and ventral jointed setæ. The terminal joint short and toothed (fig. 47a). A single aciculum. Posterior parapodium with two aciculæ and comb-shaped setæ (fig. 48). In other respects like anterior ones.

The specimen was incomplete, having lost the posterior end; 102 segments present. At the head the animal was 2 mm. in diameter; length 23 mm.

This differs from *L. notata* in the cleft condition of the cephalic lobe and in the presence of comb-shaped setæ on posterior parapodium. Anterior end deep reddish brown (in formalin). Cephalic lobe and tentacles very light brown.

Collected from reefs at Ponce and stations 6065 and 6079.

Family GLYCERIDÆ.

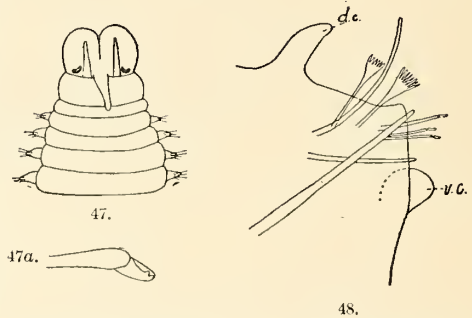
GLYCERA Sav.

Glycera abranchiata, n. sp.

Head of usual form, narrow, not noticeably segmented, about one-third as long as extended proboscis. Four delicate tentacles. Proboscis smooth at base, but for greater part of its course covered with minute papillæ; at end, with a row of much larger papillæ. Four strong, black teeth. Segments biannulate, increasing gradually in width up to about the twenty-fifth, which is five times broader than long. From here the body gradually decreases in width, that of posterior segments equaling their length. Two anal cirri. The parapodium of the twenty-fifth segment is equal in length to about one-fifth of the diameter of the body. Those of the posterior end of the body equal in length to whole width of body. The anterior end of body cream color, posterior end much thinner and transparent. Parapodium of first segment very small, others increasing in length up to the twenty-seventh. Each (fig. 49) with two rounded posterior, and two much longer, pointed, anterior, lips. The ventral cirrus is broad with an acute apex; dorsal cirrus small, rounded, situated on the body wall. A dorsal and a ventral aciculum.



FIG. 49.—Parapodium of *Glycera abranchiata*. d. c. and v. c., dorsal and ventral cirri.



FIGS. 47, 47a, 48.—*Lysidice sulcata*. Fig. 47, Head, $\times 12$. Fig. 47a, Ventral seta, $\times 163$. Fig. 48, Posterior parapodium, $\times 46$.

¹Since the manuscript for this paper was sent to the printer, I have received from Professor Verrill his paper on Additions to the Turbellaria, Nemertinea, and Annelida of the Bermudas, Trans. Conn. Acad. Sci., vol. x, pt. 2, Nov., 1900. This paper is not accompanied by figures, but from the descriptions I am inclined to believe that this species may possibly be identical with Verrill's *Lysidice bilobata*.

Setæ of two kinds. Dorsal ones simple, long, smooth, curving gradually to an acute point. Ventral ones compound, the terminal articulations long, tapering, slightly curved, with minute denticulations on their concave edge. There are no gills.

Collected from Arroyo.

Glycera tessellata Grube.

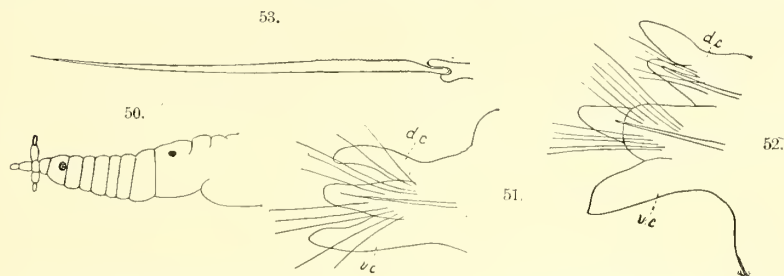
Glycera tessellata Grube, Archiv. f. Naturgesch. Jhrg. 29, 1863. Quoted from Ehlers, Die Borstenwürmer, p. 655, pl. 24, figs. 2, 9, 33, and 34.

Collected from stations 6055, 6066, Ensenada Honda (Culebra), Puerto Real.

GONIADA Aud. et Milne-Ed.

Goniada oculata, n. sp.

Head of ten segments. A pair of eyes in first and in anterior portion of eighth. Tenth segment carrying four tentacles. (Fig. 50.) Basal joint of tentacle longer than tenth segment and nearly as great in diameter. Terminal joint of tentacle small, rounded. Length of 60 segments, 15 mm.; width, 1 mm. Anterior parapodia uniramous, with rounded-flat dorsal and ventral cirri. Dorsal cirrus a little shorter than the parapodium; ventral cirrus somewhat longer (fig. 51). At about the thirty-sixth segment the dorsal ramus appears (fig. 52). This is small, with a very few stout setæ. Setæ of ventral ramus compound (fig. 53, of a lateral seta). Terminal joint of medium ones much shorter than those of the lateral. Color, light brown. On ventral surface a red spot in center of each segment.



FIGS. 50-53.—*Goniada oculata*. Fig. 50, Head, $\times 26$. Fig. 51, Parapodium, $\times 100$. Fig. 52, Posterior parapodium, $\times 87$. Fig. 53, Seta, $\times 163$.

This seems closely related to *G. gracilis* (Webster, Annelids of Provincetown, U. S. F. C. Rept. 1881, p. 723. *Eone gracilis* Verrill, Invert. of Vineyard Sound, p. 596), but differs in having antennæ with two instead of three articles, in greater number of segments in the head, and in the larger size of the eyes.

Collected from station 6064.

Family ARICHDÆ.

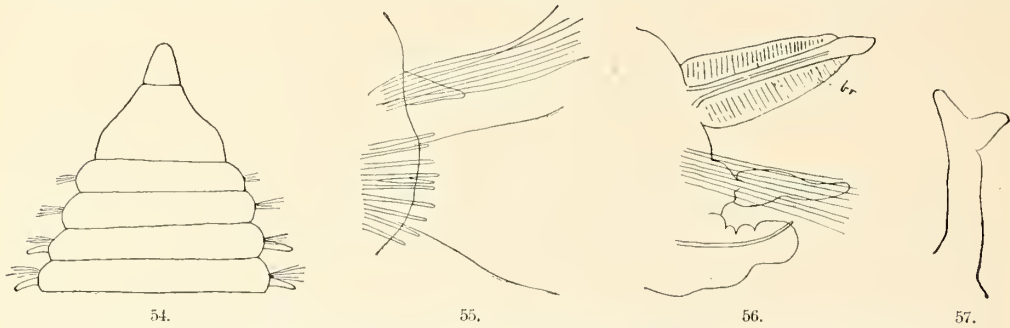
ARICIA Sav.

Aricia cirrata, n. sp.

Head acute, without eyes (fig. 54). Buccal segment as long as first two segments. Body narrow anteriorly, rapidly widening so that posterior end is nearly four times breadth of anterior. Flat dorsally, rounded ventrally. Dorsal portion of first sixteen segments with very broad space between parapodia of the two sides. At about the sixteenth segment this space becomes very much narrower.

Anterior parapodia small, with dorsal bundle of long, delicate, toothed setæ and a ventral vertical row of very stout, brown, slightly curved setæ. A few capillary, like the dorsal setæ, are found among these (fig. 55). Farther back this ventral row is replaced by a prominent, cylindrical, ventral ramus (fig. 56). In one specimen this change occurred on the seventeenth, in another on the fourteenth, and in another on the twentieth setigerous segment. Both rami carry long, delicate, capillary setæ, though they may be absent from the ventral ramus. I believe that they are normally present, but

easily break away. Farther back the setae in each ramus become very much stouter, not so long, have a brown color and smooth edges. Dorsal cirri appear first on third setigerous segment, at first rather short and cylindrical, increasing rapidly in length to about segment 16. A curious abnormality is the bifid or trifid end of many of these cirri on the specimen from station 139 (fig. 57). Branchia appear first in one specimen on sixteenth setigerous segment; in another on twelfth setigerous segment; they



FIGS. 54-57.—*Aricida cirrata*. Fig. 54, Head, $\times 12$. Fig. 55, Anterior parapodium, $\times 23$. Fig. 56, Posterior parapodium, $\times 26$; *br.*, branchia. Fig. 57, Bifid dorsal cirrus from one specimen of *A. cirrata*, $\times 40$.

are small at first, gradually increasing in size up to the twelfth, which is full size; very prominent, flat, with acute tips (fig. 56, *br.*).

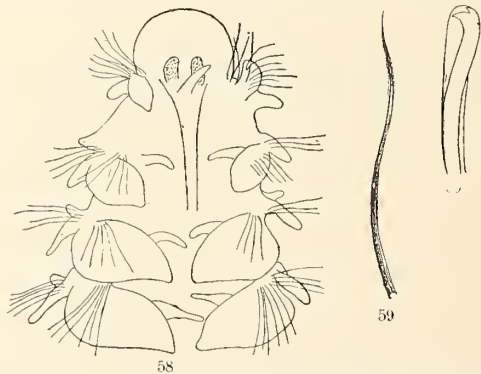
Color in places bright reddish brown; elsewhere, yellowish brown.

Specimens incomplete. One of 75 segments; length, 50 mm.; width, 3 mm.; at narrowest point, 2.5 mm. Collected from stations 6061, 6066, and 6067.

ARICIDEA Webster.

Aricidea alata, n. sp.

Head rounded, smooth; two very large, irregularly shaped eyes. Median tentacle straight, conical, reaching to anterior border of eye. First segment with parapodium. On the second the broad, flat, dorsal cirrus ("second gill") becomes prominent, and from the third on these are very large, covering a large part of the back (fig. 58). They do not lie flat on the dorsal surface, but are elevated a little above it. Beginning with the second and ending with the thirty-first, the long, conical, dorsal gills arise from the dorsal edge just to the median edge of the dorsal cirrus. The latter spread out like broad wings on either side of the segment. In front of each is a row of stout, golden yellow setae (fig. 58). These are curved, tapering gradually to a sharp apex, and marked by longitudinal striations (fig. 59). Ventral ramus with broad, flat posterior lip ("third gill"), with setae like dorsal. Toward posterior end both second and third gills become much less prominent, and the setae are fewer in number. Large hooked setae appear in the ventral ramus (fig. 60). Throughout greater part of body a delicate longitudinal band of tissue runs along the side, uniting the parapodia of successive fragments. Color white.



FIGS. 58-60.—*Aricidea alata*. Fig. 58, Anterior end, $\times 28$. Fig. 59, Capillary seta from anterior segment, $\times 124$. Fig. 60, Uncinate seta from posterior segment, $\times 143$.

A single incomplete specimen of 54 segments. Length, 24 mm.; breadth, 1 mm.; from Arroyo.

ANTHOSTOMA Schmarda.

Anthostoma ramosum Schmarda.

Anthostoma ramosum Schmarda, Neue Wirbellose Thiere, p. 62. Webster, Annelids from Bermuda, p. 321.

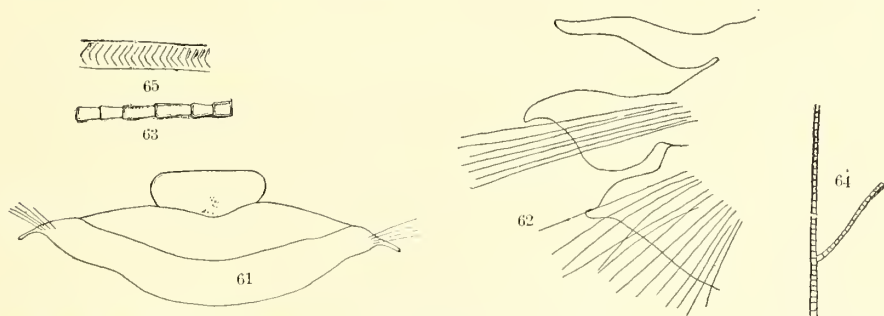
So far as I can tell from Schmarda's brief description, these belong to his species. Head rounded, almost semicircular in form. Proboscis in form of three broad plates, one much larger than the other two. Each much subdivided, colorless at base, dark-brown at apex. Body very much flattened and broad back to segment 34, with very short gills, leaving more than half the dorsal surface exposed. At about thirty-fourth segment it becomes narrower, looking as if dorsal surface of parapodium had rolled upward, and the gills elongate so as to cover whole of dorsal surface. The gills begin on the fourth setigerous segment.

If I have correctly identified this specimen, Schmarda's description and figure of the parapodium applies only to the posterior segments, and here the dorsal gill is relatively too small in his figure. Anteriorly the parapodia contain from 9 to 13 stout setae. Only at the posterior end is the number as low as 4, as Schmarda has described.

Collected from Arroyo and Boqueron Bay.

Anthostoma latacapitata, n. sp.

Head nearly four times broader than long, anterior edge nearly straight, angles rounded. No eyes. (Fig. 61). First segment twice as wide as head, second segment (first setigerous) a little wider than first, and succeeding segments of equal width with this, back to segment 25. Here the body narrows very slightly and remains of a uniform width throughout. Setigerous segments as far as twenty-third (fig. 62), with a broad dorsal cirrus ("second gill") and dorsal bundle of long, delicate



Figs. 61-65.—*Anthostoma latacapitata*. Fig. 61, Anterior end, $\times 18$. Fig. 62, Parapodium, $\times 18$. Fig. 63, Dorsal seta, $\times 330$. Fig. 64, Bifurcated seta, $\times 520$. Fig. 65, Ventral seta, $\times 390$.

setae, each with numerous fine parallel transverse markings (fig. 63). A single one of these was bifurcated at end (fig. 64). On ventral ramus a prominent posterior lip, its dorsal angle prolonged into a conical point (fig. 62). This lip is marked off posteriorly by a short constriction from the parapodium. Ventral setae very numerous, forming a dense comb-shaped row. Setae stout, narrowing rapidly to an acute point, which may be bent, or completely curved on itself, the stem marked with numerous transverse lines (fig. 65). In figure of parapodium only a few of these are represented.

Dorsal gills begin on sixth segment. They are linear, with acute apex. Behind twenty-third segment the ventral row of setae becomes much shorter, and throughout the greater part of the body the posterior lip of ventral ramus is ovate with acute tip. Anterior lip more prominent than anteriorly. Setae of ventral ramus of two kinds. A few (two) blunt, rounded, hardly reaching beyond apex of anterior lip, and ten to twelve delicate, long, finely toothed, with transverse lines like those of anterior dorsal setae. Dorsal cirrus shaped like anterior ones, but much smaller, and dorsal gill proportionately much larger than anteriorly. Very thick at base, tapering rapidly to apex, and extending for one-quarter of its length beyond dorsal cirrus. In the preserved specimen these dorsal gills are bent backward and slightly outward, leaving dorsal surface of body uncovered. Proboscis only slightly protruded, edges of protruded portion ramose.

Color, light brown to gray, with darker spots dorsally. A large dark spot in front of dorsal gill on either side.

The collection contained 3 fragments from Hucares. Two, apparently from the same specimen, were 50 and 44 mm. in length. Posterior end not preserved. Greatest breadth 4 mm.

Family CIRRATULIDÆ.

CIRRATULUS Lam.

Cirratulus melacanthus Grube.

Cirratulus melacanthus Grube, Die Familie der Cirratuliden; Bericht über die Thätigkeit der Naturw. Sect. der schlesischen Gesellschaft im Jahre 1872, p. 31. Quoted from Ehlers, Annelids of the Blake, p. 155.

Head segment too badly mutilated for identification. I have identified the specimen from the structure of the parapodium. Collected from Guanica Bay.

Cirratulus nigromaculata, n. sp.

Body short, 10 mm. in length, rather less than 2 mm. broad in widest portion; tapering gradually toward either end, anterior end much more blunt than posterior. Head rather thick, rounded, much narrower than segments immediately behind it (fig. 66). Segments very short, their limits difficult to make out in contracted alcoholic material. Setæ in two bundles, the dorsal rather longer than ventral, all very delicate, capillary, and difficult to see. From the fifth or sixth, or possibly both, the dorsal gills arise on either side (fig. 66). These are long and thick, nearly half the length of body. There are at least four on a side, more or less united at their bases (only three shown in the figure). At intervals along the back appear the much more delicate lateral gills. These break away so easily that it is impossible to say how many are normally present. In one of the two specimens in this collection there are five, the last arising three-fourths of the distance from head to tail.

Color, ventrally white, with a decided brownish tinge dorsally. Whole body spotted with irregular black marks, especially numerous along the mid-dorsal line. The dorsal gills are white, with numerous black bands (fig. 66). The lateral gills are covered with minute brown spots, except for a colorless band near the apex. Extreme tip of gill brown. Collected from Ensenada Honda, Culebra.

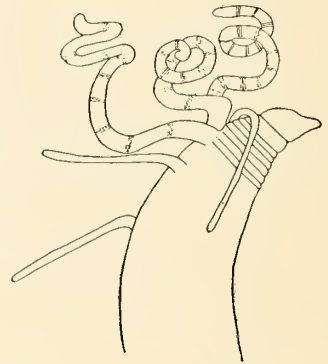


FIG. 66.—Anterior portion of *Cirratulus nigromaculata*, $\times 5$.

Cirratulus elongatus, n. sp.

Head short, conical (fig. 67). The three following segments smooth, rather long, limits between them not sharply marked off; without appendages. Setæ begin on fourth segment; from here segments increase rapidly in width up to tenth, and from there decrease in width for a short distance, then remaining of uniform breadth to posterior end. No eyes. Lateral gills as long delicate cirri, easily broken away; only a very few remained attached in the single specimen at my disposal. After about the fiftieth segment the body becomes very thin-walled, and is much coiled. Setæ in two rows, long, delicate, capillary (fig. 67). Color, yellowish brown. Gills a darker brown. Length 60 mm. Breadth at widest portion, 2 mm.; at narrowest, 1 mm.

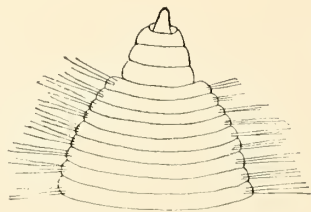


FIG. 67.—Anterior end of *Cirratulus elongatus*, $\times 23$.



FIGS. 68, a, b, c.—Setæ from *Phylloctenopterus claperedii*, $\times 143$.

From the structure of the gills and arrangement of the setæ, I have included this specimen provisionally in this genus. Too many of the gills had been lost to make the identification positive.

Collected from Ensenada Honda, Culebra.

Family CHÆTOPTERIDÆ.

PHYLLOCHÆTOPTERUS Grube.

Phyllochætopterus claperedii (?) McIntosh.

Phyllochætopterus claperedii McIntosh, Challenger Reports, vol. XII, p. 374; pl. 45, figs. 9, 10, 10a, 11; pl. 46, fig. 1; pl. 24a, figs. 1-5.

Tubes of this genus were included in this collection, and a few of these contained fragments of the animals. A single specimen retained enough of the anterior segments for comparison with McIntosh's description of this species, and the points of agreement were so many that I have placed them here, though it is not impossible that specific differences would be found if complete specimens were available for comparison. Figs. 68a, 68b, 68c show characteristic setæ, fig. 68a showing the dorsal, and fig. 68c the ventral one, fig. 68b being intermediate in position between the other two. The "tooth-like" brown spines were also present.

Collected from stations 6055 and 6075.

Family TERESELLIDÆ.

TEREBELLA Malmgren.

Terebella annulifilis Grube.

Terebella annulifilis Grube, Jahresbericht der Schles. Gesellsch. Natur., Sect. für 1871, p. 49. Quoted from Grube, Annulata Sempertiana, p. 225, pl. 13, fig. 2, 1878.

Collected from Ensenada Honda, Culebra; Arroyo; Ponce; Mayaguez.

Terebella variegata Grube.

Terebella variegata Grube, Monatsb. d. Berl. Akad., 1869. Quoted from Grube, Ann. Semp. p. 227, pl. 13, fig. 3, 1878.

The original description of this species was inaccessible to me. It apparently conforms to the diagnosis given by Grube, loc. cit., second reference. Collected from Guanica Bay and reef at Ponce.

Terebella turgidula Ehlers.

Terebella turgidula Ehlers, Annelids of the Blake, p. 241, pl. 52, figs. 1-8.

According to Ehlers, this differs from the generic description in having 18 bunches of capillary setæ. All of the Porto Rico specimens, which agree very closely in other respects with his description, have 17. Gills with very thick stem, branches very arborescent; anterior gill largest, the next three-fourths size of first, the third very small. In Ehlers's type specimen the third left gill was not present. In a specimen from Playa de Ponce the first right gill had been lost, not even a scar showing the point of attachment remaining. It either had not developed or had broken away so long before the animal was killed that the wound had entirely healed. I would suggest that the loss of the third gill in Ehlers's type specimen is a similar individual variation.

Collected from Playa de Ponce and from Ensenada Honda, Culebra.

Terebella sp.

From Mayaguez Harbor was collected the posterior portion of a Terebellid, which, on account of the loss of the head, could not be identified. Posterior segments thin-walled, much swollen. Color in formalin, a dark purplish brown.

PHENACIA Grube.

Phenacia robusta Grube.

Phenacia robusta Grube, Annulata Sempertiana, p. 235, pl. 12, fig. 8.

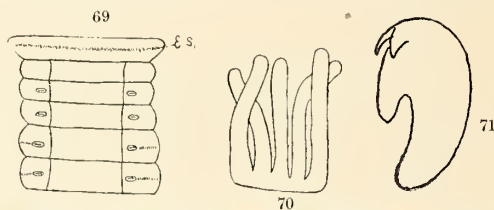
Grube's description says that only a very narrow space separates the gill filaments of the two sides. His figure, however, shows a considerable space between the bases of these filaments. The Porto Rico specimens agree in this respect more closely with his figure than with his description. Shell covered with numerous flat calcareous plates. (Bryozoa skeletons.)

Collected from Puerto Real; station 6065, Boqueron Bay. From another bottle the locality label was lost in transferring.

THELEPUS Malmgren.

Thelepus crassibranchiatus, n. sp.

Head not especially prominent, with row of very numerous eye-spots just under the lobe of its disk (fig. 69). Tentacles very thick, about as long as first ten body segments. Four on a side. Branchiæ in two transverse rows on second and third segments (counting the head as first). Those of second segment five straight thick filaments in a transverse row on either side, more or less fused at their bases (fig. 70). Branchiæ of third segment similar to those of second, but each composed of only three filaments on a side, filaments more delicate and not more than three-fourths as long as anterior gills. Capillary setæ begin on third, uncinæ on fifth segment. Posterior portion of body broken, but apparently both kinds of setæ are present on all segments. Uncinæ setæ with one strong terminal tooth and two laterally placed smaller teeth (fig. 71). On the thorax each segment is marked with parallel lines, forming a rectangular plate (fig. 69).



Figs. 69-71.—*Thelepus crassibranchiatus*. Fig. 69, Anterior portion, $\times 20$; e. s., eye spots. Fig. 70, Branchia of second segment, $\times 13$. Fig. 71, Uncinæ seta, $\times 428$.

Family AMPHARETIDÆ.

AMPHICTEIS Grube.

Amphicteis nasuta Ehlers.

Amphicteis nasuta Ehlers, Annelids of the Blake, p. 232, pl. 49, figs. 1-6. (Ehlers's plate is labeled "Ampharete." From the context, this is evidently a misprint.)

A single specimen, labeled "Sta. 6055, Aguadilla," evidently of this species, though the characteristic paleæ of the second segment had been lost. Only the 14 anterior segments were preserved.

Family AMPHICTENIDÆ.

PECTINARIA Lam.

Pectinaria gouldii Verrill.

Cistenides gouldii Verrill, Invert. of Vineyard Sound, p. 612, pl. 17, figs. 87, 87a.

Pectinaria belgica Gould, Invert. of Mass., 1841, p. 7.

P. auricomma (Grube) Leidy, Invert. Fauna of Coasts of R. I. and N. J., 1855.

P. groenlandica (Grube) Stimpson, Marine Invert. Fauna of Grand Manan, Smithsonian Contributions, vol. 6, 1854.

Cistenides gouldii Webster, Annelida Chaetopoda from Provincetown.

Pectinaria gouldii Verrill, New England Annelida, pt. 1, p. 257, U. S. F. C. Rept. for 1880, p. 731. Andrews, Annelids from Beaufort, N. C., p. 297.

These are larger than the specimens described by Verrill, reaching a length of 64 mm. From Ensenada Honda, Culebra, and station 6055.

Family CAPITELLIDÆ.

DASYBRANCHUS Grube.

Dasybranchus umbrinus Grube.

Dasybranchus umbrinus Grube, Annulata Semperviana, p. 189.

Collected from stations 6061, 6062, 6066, and Boqueron Bay.

Dasybranchus lunulatus Ehlers.

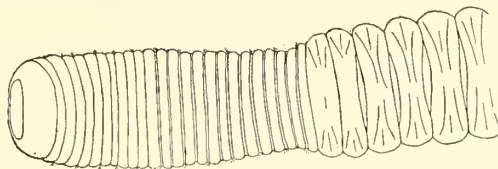
Dasybranchus lunulatus Ehlers, Annelids of the Blake, p. 174, pl. 45, figs. 5 to 9.

Collected from Puerto Real and Arroyo.

With these I have included, rather doubtfully, two small specimens from station 6061 and one from station 6055, which seem to me to be probably the young of this species. They differ from Ehlers' diagnosis in that 16 segments bear capillary setæ, the last three, however, being very delicate.

Dasybranchus rectus, n. sp.

Anterior portion of 13 segments, the first entire; the second biannulated below, the rest distinctly biannulated above and below (fig. 72). Cephalic lobe triangular (not shown in figure), with blunt point, and on either side a dark patch composed, as seen, under high power, of a great many irregularly shaped pigment spots. (Eyes.) Second segment about six times broader than long. Beginning with the second and extending to and including the thirteenth, each segment has four bundles of setae. Seta bundle very short, white, arising from the groove which divides the segment into annuli, and with a dark pigment patch at base. Setae extremely delicate, needle-shaped. Anterior segments increase in size up to the fifth and then slowly decrease in diameter to the fourteenth. Dorsal surface of first five segments divided by anastomosing lines into numerous small, hexagonal or pentagonal areas. Pharynx thin-walled, with numerous delicate papillae. Second portion of body slightly wider than segments 11-13 (fig. 72). Tori rather prominent, meeting ventrally, but with a considerable space between their dorsal ends. Dorsal wall of segment between tori rather thin and protruding. This becomes more noticeable farther back, where the whole wall is very transparent and thin, and the intestinal contents are easily seen through it. Anterior portion of body is much straighter than in other species, and there are not so great differences in the diameter of different segments. Uncini awl-shaped, slightly curved at end and sharp. Not toothed.

FIG. 72.—Anterior portion of *Dasybranchus rectus*, $\times 4$.

Collected from stations 6055, 6061, and Ensenada Honda, Culebra.

Family OPHELIIDÆ.

AMMOTRYPANE Rathke.

Ammotrypane fimbriata Verrill.

Ammotrypane fimbriata Verrill, Invertebrates of Vineyard Sound, p. 604, pl. 15, fig. 79.

The eyes described by Verrill were not to be seen in these specimens, but in other respects they agreed with his description. Collected from Ensenada Honda, Culebra, and from stations 6093, 6092, 6096, and 6098.

Family MALDANIDÆ.

CLYMENELLA Verrill.

Clymenella torquata Verrill.

Clymene torquatus Leidy, Marine Invert. Fauna of R. I. and N. J., p. 14; Jour. Acad. Nat. Sci. Phila., 2d ser., vol. 3, p. 146.

Clymenella torquata Verrill, Invert. of Vineyard Sound, p. 608, pl. 14, figs. 71-73. Webster, Annel. Chæet. Virginia Coast, p. 28.

Annelida Chæet. Provincetown, U. S. F. C. Rept. 1881, p. 731. Andrews, Annelida Polychæta of Beaufort, p. 294.

An incomplete specimen, lacking the anterior end, from Playa de Ponce Reef, and an anal funnel from station 6055.

CLYMENE Sav.

Clymene cirrata Ehlers.

Clymene cirrata Ehlers, Annelids of the Blake, p. 182, pl. 46, figs. 10 to 13.

Four incomplete specimens, all with the posterior ends lost, were collected from station 6055

Clymene cingulata Ehlers.

Clymene cingulata Ehlers, Annelids of the Blake, p. 85, pl. 47, figs. 2 to 5.

Collected from station 6069. Another from station 6068, marked "water haul, dredge fouled," very poorly preserved and lacking both head and tail segments, is probably of this species.

Two small specimens, marked "Aguadilla, 6055," agree with the above in the shape of the head, but lack the collar on the fourth segment, and the teeth of the uncinata setae are much less developed. From their small size I have considered them immature specimens of *C. cingulata*.

Clymene sp.

Fragments of a specimen of this genus, of a different species from the above, but too much injured for identification, were collected from Ensenada Honda, Culebra.

Family CHLORÆMIDÆ.

STYLAROIDES Claparède.

Stylaroides glabra, n. sp.

A single specimen, to which I have given the above specific name, was collected at station 6066. The head had been more or less mutilated. An outline drawing of its present appearance is given in fig. 73. The proboscis had been broken away before the drawing could be made, and is drawn to twice the same scale as the rest in fig. 74. It is thick, with sides much wrinkled and folded over. Setae of first three segments long, reaching beyond head. Apparently a greater number of setae on first than on succeeding segments, but so many of the latter were broken that this is difficult to determine. On second and succeeding segments dorsal and ventral setae bundles are separated by a considerable space. Dorsal setae much smaller than ventral. All setae marked with transverse lines. (See fig. 75.) Body covered, except toward the posterior end, with a thin, transparent shell, in which are embedded numerous fine grains of sand. Anteriorly the surface of body is smooth, light brown in color. Posteriorly the portion not covered by the shell is rougher and marked by brownish lines, but no papillae. Dorsal cirrus of anterior parapodia short, acute; of posterior ones, long, club-shaped.

Length, 28 mm. Width in widest part, 2 mm, tapering slightly toward head and tail.

SIPHONOSTOMUM Otto.

Siphonostomum cariboum Grube.

Siphonostomum cariboum Grube, *Annulata Oerstediana*, 1858, p. 108. Quoted from Ehlers, *Annelids of the Blake*, p. 158, pl. 42, figs. 6-9.

Collected from Ensenada Honda (Culebra), and from stations 6062 and 6063.

Family SABELLIDÆ.

SABELLA (L.) Malmgren.

Sabella spectabilis Grube.

Sabella spectabilis Grube, *Annulata Semperiana*, p. 253, pl. 14, fig. 4.

In the main features of size, structure, and color, these agree with Grube's description. Minor differences are these: Grube says that the first shield has an incision on its anterior edge, that the capillary setae are shorter toward posterior end, and that gill filaments are present as far as the extreme end of the gill. Grube gives no figures of the tip of the gills, and I am not certain from his description whether in the last point his specimens really differ from those I have. In the other features they do not agree. The tentacles are relatively longer, also, than in Grube's specimens. Since, however, they agree in other respects, I have assigned them to Grube's species. Tube of parchment-like material, the upper end covered with fine mud.

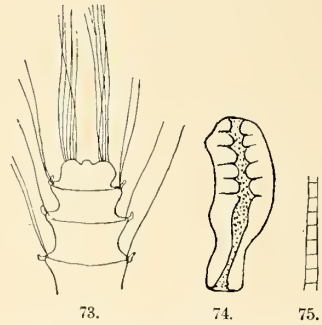
Collected from Ponce, Boqueron Bay, reef at Ponce, Mayaguez, Guanica Bay, and Hucars.

Sabella melanostigma Schmarda.

Sabella melanostigma Schmarda, *Neue Wirbellose Thiere*, p. 36, pl. 32, fig. 190; Ehlers, *Annelids of the Blake*, p. 263.

Specimens of this species very numerous in this collection. The thoracic segments number from 12 to 15. Ehlers says there are always 15. This variation does not seem to be due to age differences, as the largest do not always have the most segments. Two to five pairs of eyes on tentacles.

Collected from Ponce, Guanica Bay, reef at Ponce, Boqueron Bay, and Ensenada Honda, Culebra. A tube from station 6051.



FIGS. 73-75. *Stylaroides glabra*.—Fig. 73, Anterior portion, $\times 12$. Fig. 74, Proboscis. Fig. 75, Seta very highly magnified.

PROTULIDES Webster.

Protulides elegans Webster.

Protulides elegans Webster, Annelida from Bermuda, p. 325; Andrews, Annelida from Beaufort, p. 299.

These agree with Webster's description in every respect except color. The basal portion of the branchiæ is purple to beyond their uniting membrane. The dorsal surface of each filament is light purple. An occasional pinna deep purple. About 25 eye-spots on either side of each filament, extending over half of their free extremity. General body color light brown. A ventral dark band, about one-fourth of the whole width of body, extends from extreme posterior end to about the fifth or sixth thoracic segment.

From Guanica Bay, Ensenada Honda (Culebra), Mayaguez, station 6085, reef at Ponce, Caballo Blanco Reef.

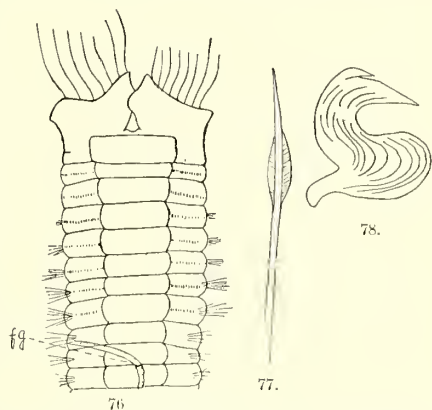
DASYCHONE Sars.

Dasychone ponce, n. sp.

This is apparently closely related to *D. conspersa* (Ehlers, Annelids of the Blake, p. 266, pl. 54, figs. 1-6), but differs from it in the greater number of branchiæ, the lack of regularity in shape and distribution of color spots, and in absence of a ventral compressed area. Gills very much coiled, the most ventrally placed filament very short, scarcely 1 mm. long; following filaments increase gradually in length up to the tenth, which is as long as the rest of the filaments, approximately 13 mm. long; 42 filaments on a side. Inclosed by the branchiæ are the two tentacles, about 5 mm. long. Branchiæ united by a basal membrane for 2 mm. of their length. Basal portion of branchia where united by the membrane, brown; membrane itself, white. Free portion of branchia white, crossed by dark bands; 13 to 15 eye-spots on each filament; a variable number of dorsal appendices on each filament. Some individuals have two pairs of these dorsal appendices much larger than the rest. This does not appear in all specimens. Terminal portion of filament smooth. Collar with two triangular lobes projecting anteriorly on ventral surface (fig. 76). Inner surface of these lobes marked with irregular blotches of brown. The general color of collar brown, with white border. Collar incomplete dorsally, ending by rounded lobe just above dorsal seta bundle. Body rounded dorsally, flattened ventrally. General color light brown, with numerous irregularly arranged dark-brown blotches. A dark-brown patch along the ventral surface of the abdomen, in the center of which the light fecal groove is prominent. (Fig. 76 *fg*.)

Thorax with ventral shields (fig. 76). First the widest and narrowing gradually to third; from here, of uniform width backward. First segment with setæ placed far dorsally. Uncinate setæ appear first on second segment, where the row of these is longest, and gradually narrowing to eighth. Uncinate setæ become dorsally placed on ninth segment and continue to posterior end of body. A large irregularly shaped brown spot between the uncinæ and the capillary setæ on each segment. Capillary setæ long, with expansion near end (fig. 77). Uncini stout, with large terminal and smaller dorsal tooth (fig. 78). Length of body, 30 mm. Width of thorax, 5 mm. Body nearly of uniform width throughout, tapering rapidly at posterior end. Tube very thin, delicate, paper-like in texture; color, light brown. At upper end covered with fine gray mud.

Collected from Ponce, Boqueron Bay, Arroyo, Playa de Ponce Reef, Mayaguez, reef near Ponce.



FIGS. 76-78. *Dasychone ponce*.—Fig. 76. Anterior portion, $\times 5$; *fg*, fecal groove. Fig. 77. Capillary seta, $\times 50$. Fig. 78. Uncinæ seta, $\times 143$.

Family SERPULIDÆ.

EUPOMATUS Phil.

Eupomatus parvus, n. sp.

In this species I have placed provisionally a few small specimens found on Bryozoa skeletons from Boqueron Bay and station 6062. It is not improbable that they are immature specimens of some species already described. They are very small. Length of body, 6 mm. Branchiæ, 2 mm. Operculum and stalk, 3 mm. Eight branchiæ on a side, with a rudimentary pseudoperculum opposite functional one. Branchiæ colorless, without pinnæ at tip. Stalk of operculum smooth. About 30 spines around edge of operculum. From upper surface of latter arise 8 long spines. These are enlarged at the base, curved and sharp at the end. At end each has sharp spines. (Figs. 79 from the side, 80 from rear.) Dorsal setæ of thorax like *E. uncinatus*. (Ehlers, Annelids of the Blake, p. 285.)

Both Ehlers and Schmarda (Neue Wirbellose Thiere, p. 29) describe in *Eupomatus* abdominal setæ with comb-shaped expanded ends. There are none of these in *E. parvus*. Abdominal setæ very long, acicular; 7 thoracic segments; about 45 abdominal segments. Tori of anterior segments long, of posterior ones shorter. Uncini like those of *E. uncinatus*.

This species differs from *E. uncinatus* in the structure of its operculum, in number of branchiæ (*E. uncinatus*, according to Ehlers, has 18 on a side), and in absence of comb-shaped abdominal setæ.

VERMILIA (Lam.) Phil.

Vermilia annulata Schmarda.

Vermilia annulata Schmarda, Neue Wirbellose Thiere, p. 28, pl. 21, fig. 176. Ehlers, Annelids of the Blake, p. 308, pl. 58, figs. 12-16; pl. 59, figs. 1-3.

An empty shell; collected from station 6064.

POMATOSTEGUS Schm.

Pomatostegus stellatus Abildgaard.

Terebella stellatus Abildgaard, Schriften der Gesellschaft Naturforsch. Freunde zu Berlin, Bd. 9, 1789, p. 142.

Pomatostegus stellatus Mörch, Revisio critica a. a. o., p. 50.

Above references quoted from Ehlers, Annelids of the Blake, p. 296.

Ehlers says the operculum consists of four circular plates, while the end of the stalk which projects above the last plate bears a crown of little hook-shaped teeth. As Grube has pointed out (Annulata Semperiiana, p. 272), each of these opercular plates is situated on a basal star-shaped plate, the attachment being so close that the basal piece is difficult to see. If, however, the terminal plate be pulled off, its stalk of attachment will show, on its end, this smaller star-shaped piece. The specimens from Porto Rico had one, three, and five of these plates on the operculum. Evidently the reduced number is due simply to the loss of plates originally present, and the star-shaped termination is merely the basal piece of a plate that has pulled off.

Collected from station 6076, Caballo Blanco Reef, Guanica Bay, Ensenada Honda (Culebra).

Family HERMELLIDÆ.

Hermella varians, n. sp.

Apparently very closely related to *H. bicornis* (Schmarda, Neue Wirbellose Thiere, p. 24, pl. 20, figs. 173a, 173, 173b), with which it agrees in the shape of the head, in the number and arrangement of the outer palæe (about thirty on a side), in the possession of twelve lappets on either side, just below the circle of outer palæe, and in the pair of jaw-like spines on the dorsal surface of the head. These spines are dark brown, stouter, and more jaw-like than in *H. bicornis*, and the inner palæe are much less numerous, only four on a side. The outer palæe are not toothed, but are broad flat plates showing longitudinal striations under high power. Palæe of body segments with broad, flat end, with entire margin and end irregularly serrated. Setae of ventral bundle of two kinds, one long, entire, very delicate, the other with toothed edges (fig. 81). Tentacles not very numerous; one on either side very much larger and longer than the rest. The specimen was badly preserved, only the head and a few anterior segments remaining. The color had all been lost (formalin) except a small purple brown spot on the ventral surface of one of the anterior segments.

Collected from station 6067.

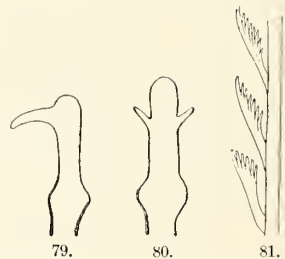


FIG. 79.—Spine from operculum of *Eupomatus parvus*, seen from side, $\times 30$.
FIG. 80.—Same, seen from rear, $\times 30$.
FIG. 81.—Seta of *Hermella varians*, $\times 60$.