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ART. X.—Brief Contributions to Zoology from the Museum of Yale Coll. College. No. XXVI. Results of recent Dredging Expeditions on the Coast of New England. No. 4; by A. E. VERRILL.

(Continued from vol. vi, page 435.)

VERY few localities of "hard" bottom were met with in more than an 25 fathoms of water; and consequently we could not obtain in so complete a knowledge of the fauna occupying such bottoms, at greater depths off that coast, as of that inhabiting the soft muddy bottoms. This has, however, been remedied to a considerable extent by some of the subsequent dredgings made by Dr. Packard, when on the Bache. Moreover, a considerable number of species belonging properly on rocky bottoms came up attached to the boulders, already referred to, which we frequently brought up even from the softest mud.

Other inhabitants of such bottoms were obtained from the stomachs of fishes, freshly caught. From these and other sources we could now compile a pretty full list of species belonging to the hard bottoms in depths between 50 and 125 fathoms, off the coast between Cape Cod and Mount Desert.

Two of our dredgings off Seguin Island, in 33 and 45 fathoms respectively, belong to the series of outer and deeper dredgings, rather than among those made in the bays. They are, however, somewhat intermediate in character.

The first named locality was unusually rich in species, and I therefore give the entire list obtained at that place, so far as they have been identified. The bottom was generally hard, and in places rocky, but some patches of mud were evidently encountered by the dredge, and consequently there is a considerable number of true mud-dwelling species in the list. Only one haul of the dredge was made at this locality, owing to unfavorable weather.

Contents of a single haul of the dredge made Aug. 13, 1873, on hard bottom, with some spots of mud, in 33 fathoms; locality, six miles east of Seguin Island.

ARTICULATA.

Arachnida.

Nymphon, sp.

Crustacea.

Hyas coarctatus. 18.  
Eupagurus Kroyeri.  
Pandalus annulicornis.  
Hippolyte pusiola.

Hippolyte spina.  
Unciola irrorata.  
Cerapus rubricornis.  
Monoculodes, sp.

Metopa, sp.  
Caprella, sp.  
Praniza cerina.

*Annelids.*

Harmothoë imbricata.	Amphitrite Grœnlandica.	Melinna cristata.
Nicomache lumbricalis.	Cistenides granulatus.	Thelepus cincinnatus.
Nothria couchilega.	Ampharete gracilis.	Scione lobata.
Phylodoce catenula V.	Ampharete, sp.	Chone, sp.
Lumbriconereis fragilis.	Vermilia serrula.	Potamilla oculifera.
Anthostoma acutum V.	Arenia, sp.	Sabella, sp.
Gattiola, sp.	Ninoë nigripes V.	Spirorbis lucidus.
Nereis pelagica.		

*Sipunculoids.*

Phascolosoma cœmentarium.	Phascolosoma tubicola V.
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*Nemerteans.*

Nemertes affinis.

MOLLUSCA.

*Gastropods.*

Admete viridula.	Astiris zonalis V.	Lepeta cœca.
Bela turricula.	Trichotropis borealis.	Calliostoma occidentale.
Bela harpularia.	Aporrhais occidentalis.	Margarita cinerea.
Bela violacea.	Velutina haliotoidea.	Diadora noachina.
Buccinum undatum.	Lamellaria perspicua.	Doris planulata.
Neptunea decemcostata.	Lunatia Grœnlandica.	Hanleia mendicaria Carp.
Neptunella pygmœa.	Turritella erosa.	Entalis striolata.

*Lamellibranchs.*

Saxicava arctica.	Astarte elliptica.	Modiolaria corrugata.
Macoma sabulosa.	Astarte lens.	Leda tenuisulcata.
Cardium Islandicum.	Cyclocardia borealis.	Pecten Islandicus.
Cardium pinnulatum.	Crenella glandula.	Nucula tenuis.
Cyprina Islandica.	Modiolaria discors.	Anomia aculeata.
Astarte undata.		

*Ascidians.*

Ascidopsis complanatus.	Leptoclinum luteolum.	Amarœcium glabrum.
Glandula arenicola.	Leptoclinum albidum.	Lissoclinum, sp.
Molgula paunosa.		

*Brachiopods.*

Terebratulina septentrionalis.

*Bryozoans.*

Tubulipora crates.	Caberea Ellisii.	Cellularia tenuata.
Idmonea pruinosa.	Gemellaria loricata.	Cellepora scabra.
Crisia eburnea.	Flustra solida.	Cellepora ramulosa.
Discofascigera lucernaria.		

RADIATA.

*Echinoderms.*

Lophothuria Fabricii.	Stephanasterias albula V.	Amphipholis elegans.
Strongylocentrotus Drö-	Leptasterias, sp.	Ophiopholis aculeata.
bachiensis.	Cribrella sanguinolenta.	Ophioglypha Sarsii.
Solaster endeca.	Ophiocnida hispida.	Ophioglypha robusta.
Asterias vulgaris.		

*Acalephs.*

Lafoëa fruticosa.	Grammaria robusta.	Sertularia polyzonias.
Lafoëa dumosa.	Sertularia argentea.	Eudendrium tenue.
Halecium, sp.	Sertularia latiuscula.	

*Polyps.*

Urticina crassicornis. | Cornulariella modesta V., new genus and sp.\*

PROTOZOA.

*Sponges.*

Tethya hispida. | Reniera, sp. | Grantia ciliata.  
Halichondria, several sp.

*Foraminifera.*

Numerous species.

ALGÆ.

Laminaria longicuris. | Agarum Turneri. | Desmarestia aculeata.

The 45 fathom locality was about five miles southwest from Seguin Island. At this place we dredged many of the species enumerated in the above list, together with a number of additional ones, among which were the following:

*Crustacea.*

Hippolyte aculeata. | Diastylis quadrispinosa. | Balanus porcatus.  
Ptilocheirus pinguis.

*Annelids.*

Nephtys, sp. | Trophonia aspera. | Terebellides Stroëmi.  
Rhynchobolus albus. | Ammochares, sp. | Myxicola Steenstrupii.

MOLLUSCA.

Bela decussata. | Margarita obscura. | Eugyra pilularis.  
Natica clausa. | Cylichna alba. | Arxarconis Swenstrupii.  
Scalaria Grœnlandica.

MOLLUSCA.

Bela decussata. | Margarita obscura. | Eugyra pilularis.  
Natica clausa. | Cylichna alba. | Amaroecium pallidum.  
Scalaria Grœnlandica. | Yoldia thraciformis.

RADIATA.

Cerianthus borealis V. | Eudendrium ramosum.

A number of dredgings were made on and near East and West Cod Ledges, several miles off Cape Elizabeth. The shallower parts of these in 10 to 15 fathoms, are very rough and rocky, so that in some places the dredge could not be used, and even the tangles suffered seriously by the iron frame becoming caught and jammed among the rocks so firmly that

\* *Cornulariella modesta* V.

Allied to *Cornularia* and *Telecto*. Polyps tubular, rising from creeping stolons; lower part of the polyp-bodies has the walls thickened and stiffened by numerous large fusiform spicula, with sharp conical projections, and is more or less eight-ribbed in contraction; upper part of body hour-glass shaped, flexible, translucent, whitish, with fewer white spicula, retractile into the lower part, the eight internal lamellæ showing through. Tentacles large, expanding about 6mm, lanceolate, gradually tapering to the acute tips, flat above, with the short thick pinnæ arranged along the upper edges on the distal half; the lower side of the tentacles is rounded and more or less swollen toward the base. Color of stolons and base of polyps dirty yellowish or brownish; flexible part of polyps and the tentacles translucent white; the latter with central rows of white spicula. Height of polyps, 6mm to 18mm; diameter, 3mm; distance between polyps, 6mm to 25mm; breadth of stolons, about 3mm.

Casco Bay; Bay of Fundy, 80 to 100 fathoms. Gulf of Saint Lawrence, in deep water (Whiteaves).

The following species have been found both north and south of Cape Cod:

- Urosia ornata* Say
- Urosia albipennis* Leach
- Urosia flavipes* Hagen
- Urosia fulva* Hagen
- Urosia fuscipes* Hagen
- Urosia rufipes* Kirby
- Urosia rubra* Smith
- Epidia acutipes* Hagen
- Sphaeroma quadridentatum* Say
- Limnoria tyronum* White
- Amphora gelida* Stimpson
- Parasabella brochida* Hagen
- Phidippus tenuis* Hagen
- Lophochela albigula* Hagen

The following eleven species occur also on the coast of Europe:

- Equie Hippodamia* Baird and Westwood
- Equie concolorata* Philpotts
- Equie albipennis* Leach
- Equie flavipes* Kirby
- Equie rufipes* Kirby
- Equie rubra* Smith
- Equie albipennis* Leach
- Equie rufipes* Kirby
- Equie rubra* Smith
- Equie albipennis* Leach
- Equie rufipes* Kirby
- Equie rubra* Smith
- Equie albipennis* Leach
- Equie rufipes* Kirby
- Equie rubra* Smith

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REPORT OF THE COMMISSIONERS OF THE MASSACHUSETTS DEPARTMENT OF AGRICULTURE AND FISHERIES, FOR THE YEAR 1879.

By A. S. FERRIS.

Among the very extensive collections made during the past eight years by the U. S. Commissioner of Fish and Fisheries, under the direction of Professor Baird, there are still many species not recorded in America, in any of the reports hitherto published, most of these are well known to the collectors of European species, but others are still undescribed. As the final reports on the different groups will require a long time for their completion, owing to the vast number of specimens to be examined from more than a thousand localities, it has been thought desirable to record some of the more important additions to the fauna without further delay. More detailed descriptions and numerous figures will be published in the final reports, together with the details of their geographical distribution. All the species included in the following list, unless otherwise stated, have been collected by the U. S. Fish Commission.

Many species have also been recorded in various articles in the American Journal of Science and Arts, during recent years past. See, also, an important paper on the Pteropodiforms (Gastropods), by Professor S. I. Smith, and one on the Pteropodiforms, by E. B. Wilson, in the Trans. Conn. Academy, vol. 7, 1872.

Proc. U. S. Nat. Mus., 79: 115-206

1879

## ANNELIDA.

*Ethenelais gracilis*, sp. nov.

A small, slender, delicate species. Scales white, smooth, outer edge with few (12-16) very small, unequal, tapering papillæ, which are not crowded, the longest about as long as the intervening spaces. Head short, broad, the posterior and lateral margins rounded, the front emarginate. Eyes black, conspicuous; the posterior pair on the dorsal surface in advance of the middle of the head; anterior pair nearer together, close to the anterior margin; median antenna long, stout at base, tapering to a slender tip; the palpi have about the same form and length as the median antenna. Dorsal setæ longer than the ventral, extremely slender, tapering gradually toward the very fine tips, and very minutely serrulate. Upper ventral setæ (2-4) simple, very slender, with the shaft smooth, the serrate portion broader, with rather long ascending spinules, the tips tapering to a long fine point; the median setæ, above the acicula, have longer, much stouter, smooth shafts, expanded distally, with the terminal portion long, curved, divided into eight to twelve imperfect joints, tapering to very slender capillary tips, which are mostly acute, sometimes faintly hooked. Below the acicula there are others, similar in structure, but with the shaft not so stout, and with the terminal piece shorter, with fewer joints; the lower portion of the fascicle consists of numerous, much more slender, capillary setæ, with smooth shafts and very long, slender, tapering terminal pieces, composed of ten to twelve or more imperfect joints.

Harbor of Gloucester, Mass., 7 to 10 fathoms, sand, 1879 (U. S. Fish Commission). Described from alcoholic specimens.

*Ethenelais Emertoni*, sp. nov.

A small, slender species, with white, translucent scales, their outer edge with very small, nearly equal, slender papillæ, often slightly clavate at tip, and rather near together, their interspaces being mostly less than their length; surface partially covered with minute rounded verrucæ.

Dorsal setæ very slender, capillary, very minutely transversely serrulate. Few (about 4) upper ventral setæ, simple, long, slender, with the terminal portion sharply serrulate, the tips fine and sharp; next to these are some slender compound setæ, the terminal piece slender, straight, of moderate length, acute, with six to eight imperfect joints; the median setæ have much stouter, smooth shafts, expanded distally, and a nearly straight, short, rapidly tapering, sharply pointed, terminal piece, of four to six joints; below these are some with similar though smaller shafts, and a short, stout, terminal piece, hooked at the tip, and with a sharp ascending spine at about the distal third; others of the same size have the terminal piece very acute, with six to eight or more joints; the lowest are very slender, with a longer, very fine, tapering, terminal piece, imperfectly divided into about four to six joints, at each of which there is a projecting acute angle like a tooth; the last of

these is not far from the minute curved tip, so that the tip often appears as if bifid. In this character it approaches the genus *Eusthenelais* of McIntosh, the validity of which may be doubtful.

Salem Harbor, Mass., on muddy bottoms (J. H. Emerton, 1879). Described from alcoholic specimens.

*Ethenelais picta* Verrill.

In this species, the scales are partially covered with very small, round, slightly prominent, obtuse verrucæ, and the free margin bears a row of small, simple, rather slender, tapering or fusiform, mostly acute papillæ, which are of unequal lengths, and placed at irregular distances, but sometimes in small clusters. The setæ of the dorsal ramus are numerous, long and slender, but varying in size and length, the median and lower ones being much the stoutest and rather strongly serrulate. In the superior group of the lower ramus are several very acute setæ, strongly spirally spinulate toward the end; next to these are two or three, or more, slightly longer, compound setæ, with slender shafts, serrulate near the joint, and bearing a long, slender, terminal piece, imperfectly jointed in the middle and slightly bifid at tip; below these are numerous, stout, compound setæ, mostly shorter, with stouter, smooth shafts, enlarged distally, and bearing a short, thick, terminal piece, which is decidedly hooked and bifid at the tip; some of the upper ones in this group have the terminal piece more than twice longer than broad, but most of them have it triangular and little longer than broad; the next series of setæ are slender, some with smooth shafts and a slender, tapering, terminal portion, composed of two or three indistinct joints, and bifid at tip; others, among the most inferior setæ, have a slender shaft, serrulate distally, with a simple, slender, terminal piece, bifid at tip, or more properly with a slender spine-like process arising near to, and nearly as long as the sharp, incurved tip, which is opposed to it. Grows to the length of 6 to 8 inches or more.

Barnstable and Provincetown, Mass., to Virginia, in sand, at low-water.

*Sigalion arenicola*, sp. nov.

An elongated, moderately stout, depressed species, narrowed and tapered posteriorly, and bearing very numerous, large, thin, white, translucent, smooth scales, which have large pinnate processes on their posterior edge.

Head small, shield-shaped, widest anteriorly, with a broad, slightly rounded lobe in front, and with the anterior angles rounded; ocelli small, but distinct, forming a quadrangle on the top of the head, the two pairs near together. A pair of minute, obtuse antennæ at the front edge; no trace of a median antenna. Scales, except the smaller, rounded, anterior ones, large and somewhat quadrangular, with three of the angles rounded; on the posterior border there are about eight to ten well-separated, large, deeply pinnate processes, borne on simple, slender

stems; the pinnate portion is broad-ovate, longer than the stems, with about four to six long, slender pinnæ on each side. The setæ are very numerous and complicated. Those of the dorsal fascicle are long, slender, capillary, mostly curved inward over the back. In the lower fascicles there are several kinds: the upper (a) are two to four simple ones, with long, tapering, strongly spinulated, very acute tips; the next (b) are several compound setæ, with the shaft stouter and strongly serrulated near the end, while the terminal piece, of variable length, is composed of many joints, and is minutely bifid at the tip; the next (c) are about six to eight stout, compound setæ, arising both above and below the supporting aciculæ, and having their shafts minutely and closely circularly serrulate toward the end, and with a short, stout, tapering, undivided, terminal piece, which has a hooked, claw-like tip, with a sharp secondary process opposed to it; below these are (d) numerous long, slender, compound setæ, with shafts scarcely or not at all serrulate, and with the subdivided terminal piece minutely bifid at the tip, varying in length and number of joints, the middle ones being comparatively stout, with the terminal piece tapering and not very slender, while the lower ones are very slender and capillary, with a very long, tapering, terminal piece, of many joints. Color nearly white or pale flesh-color. Length of largest, 80<sup>mm</sup> to 100<sup>mm</sup>.

Vineyard Sound and off Nantucket Island, Mass., 10 to 20 fathoms, clean silicious sand, 1875. Shores of Cape Cod Bay, in sand, at low-water, at Barnstable (A. E. V.), and Provincetown (H. E. Webster).

This elegant species is allied to *S. Buskii* McIntosh, and has similar appendages to the scales. In our species, however, the pinnate processes are less crowded and have longer stems and fewer and longer pinnæ.

*Latmatonice armata*, sp. nov.

*Latmatonice flicornis* Verrill, formerly, in Amer. Jour. Science (non Kinberg).

Body stout, depressed, broadest in the middle, tapered slightly toward both ends, the posterior most obtuse. Back covered with large, thin, white, smooth scales, usually more or less concealed by a felt-like coating, to which mud and dirt adhere. Lower surface granulous. Head small, but prominent, with two minute, rounded, tubercle-like antennæ in front and a median antenna arising between them, which has a stout, tapering base, but becomes very slender for most of its length; it is much shorter than in *L. flicornis*, its tip not reaching to the basal third of the palpi. The latter are large and long, regularly tapered to the end, three to four times as long as the median antenna and four or five times as thick. The first parapodia bear two slender cirri on the upper ramus, which are about as large as the median antenna. The scales are large, smooth, and translucent, without appendages, mostly broadly rounded on the inner and posterior edges, and deeply emarginate on the outer attached border. The upper rami of the parapodia bear, besides

several divergent clusters of capillary setæ, a group, sometimes of six to eight, long, stout, spine-like, dark brown, acute and barbed setæ, having several short recurved hooks on each edge of the flattened tips, near the end. The ventral rami of the parapodia are prominent and bear three, or more, stout, elongated, brown setæ, with sharp, somewhat recurved tips, which are covered along the convex side with slender, sharp spinules; at the end of the straight shaft, and separated by a naked space from the spinulated portion, there is a strong, sharp, divergent spine. Length of a medium-sized specimen, 32<sup>mm</sup>; breadth, exclusive of setæ, 13<sup>mm</sup>; length of palpi, 7<sup>mm</sup>.

Common on muddy bottoms in the Bay of Fundy and Gulf of Maine, in 50 to 150 fathoms. Collected first in 1864, 1865, and 1868, by the writer and Professor S. I. Smith, and subsequently by the U. S. Fish Commission, in many localities.

It differs from *L. flicornis*, with which it was formerly identified by me, not only in having a much smaller median antenna, but also in the character of the setæ, especially those of the ventral fascicle. Whether the Gulf of St. Lawrence specimens, recorded by McIntosh as *L. flicornis*, belong to this species, is uncertain.

*Bunco spinulosa*, sp. nov.

Body large, oblong, rather narrow, of nearly equal breadth through the greater part of its length. Head dark, deeply bilobed in front, the sides rounded; each lobe terminates in an anterior, acute, white point. Eyes large, lateral, the anterior farther apart than the posterior. Median antenna rather small, about twice as long as the head, tapering to a slender point; lateral antennæ smaller and about half as long as median; palpi moderate, smooth, much stouter and longer than the antennæ; tentacular and dorsal cirri long, slender, covered with numerous slender papillæ. Scales large, broad, rounded-oblong, the posterior part being produced and broadly rounded, the surface covered with minute, rounded grains and toward the border with very small, elongated, tapering, acute spinules; outer edge fringed with numerous small, slender papillæ. Setæ yellow, very abundant, forming large, dense tufts. Those of the upper parapodia are in part as long as those of the lower, and much stouter; the upper ones are shortest, unequal, stout, curved, spine-like, acute, finely and closely transversely serrulate throughout most of their length, only a very small tip being smooth; below these there is a group of longer and smoother spine-like setæ, the serrulation less distinct and not extending so far toward the base nor so near to the tip. The ventral parapodia have very numerous setæ, less than half as thick as the upper ones, but the longest about equal to or somewhat exceeding those of the upper fascicle; they are all of one general form, decreasing much in length toward the lower side; the shaft is long and smooth, the distal portion enlarged, somewhat curved, closely spinulated, ending in a short, smooth, slightly incurved, acute tip. Length (a few posterior segments

lacking), 35<sup>mm</sup>; breadth, including setæ, 16<sup>mm</sup>; breadth of body by alone, 6<sup>mm</sup>; length of largest scales, 8<sup>mm</sup>; breadth, 5.5<sup>mm</sup>.

One specimen, in alcohol. Sable Island Bank, off Nova Scotia, Captain McPhee, schooner "Carl Schurz," November, 1878 (U. S. S. Fish Commission).

*Autolytus ornatus*, sp. nov.

A small, slender species. The female form is easily distinguished by the bright red color of the ova and embryos, showing conspicuously through the pale yellowish integuments of the body, or incubatory sac. The head is short, broad, slightly emarginate in front; eyes conspicuous, lateral, rounded; antennæ nearly equal, the median one a little the longest; lateral ones about twice the length of the head. Dorsal cirri long, slender, about equal to the diameter of the body. The three anterior segments bear only short setæ, but fascicles of long setæ commence on the fourth; these are nearly as long as the breadth of the body. Length, about 5<sup>mm</sup>.

Vineyard Sound, at surface, July 13 and August 23, 1875.

Another form, possibly the male of this species, was taken July 21. This was bright green in color. The lateral antennæ were of moderate length, tapered, swollen at base; odd median antenna and upper tentacular cirri slender, very long, about equal to half the body. Dorsal cirri long, more than half the diameter of the body. Fascicles of long setæ commence on the fourth segment.

*Odontosyllis lucifera* Verrill.

*Eusyllis lucifera* Verrill, Amer. Jour. Science, vol. x, p. 39, 1875.

An examination of the armature of the œsophagus of this species shows that it belongs to the genus *Odontosyllis*. The chitinous rim is somewhat horseshoe-shaped, the extremities often angular or tooth-like, turning inward and downward, while the opposite side bears a row of about six small, sharp, incurved denticles. Anal cirri two, rather long and slender, transversely lined.

*Pedophylax longiopea*, sp. nov.

A very slender species, allied to *P. dispar* Webster, but with the much longer head and palpi, and longer and stouter caudal cirri. The head is nearly as long as broad, both the front and posterior edge a little produced in the middle; median antenna arising in advance of the center of the head, swollen toward the end, but with the tip acute, somewhat longer than the head, but scarcely reaching beyond the middle of the palpi; lateral antennæ very small, papilliform, nearly in line with the odd one. Ocelli four, the two pairs close together on the head, the anterior just outside of the lateral antennæ, the others just behind them. Palpi very long, more than twice as long as the head, at the base as broad as the head, slightly swollen, tapering gradually to the narrow end, the sides nearly straight or slightly incurved, slightly

emarginate at the tip, with a distinct sutural line along the middle above. Tentacular cirri small, papilliform. Parapodia small, each with a small dorsal and ventral cirrus and a large, obtuse, setigerous lobe. Setæ of several kinds, the usual arrangement being as follows: one or two acicula shorter than the other setæ, tapering, straight, spine-like, one usually acute and the other blunt at tip; one longer, slender, simple seta, curved and slightly enlarged toward the end, which suddenly narrows to a small acute tip; one, or sometimes two, of similar size and length, straight and abruptly expanded or spatulate near the end of the shaft, and bearing a long, very slender, acute, terminal piece; two or three unequal compound setæ, with the shaft spatulate at the end and bearing a short, acute-triangular, terminal piece. Posteriorly the lowest is a simple, curved seta, with a short, sharp tip, similar to the upper one, but shorter, more tapered, and less curved. The pharynx occupies about four segments; the median tooth is rather large. Stomach large, occupying two segments, oblong, with many circles of granules. Caudal cirri relatively large, elongated, enlarged in the middle, tapering to acute tips, their length greater than the diameter of the body, much longer than the median antenna. Color, pale salmon. Length, 5<sup>mm</sup> to 7<sup>mm</sup>.

Thimble Islands and Savin Rock, near New Haven, Conn., 2 fathoms, among algae, and at low-water, among the debris attached to tubes of *Diopatra*, October, 1873, and October 15, 1875 (A. E. Verrill).

A specimen, probably a sexual form of this species or *P. dispar*, was taken in Vineyard Sound, at surface, July 10, 1875. It was similar anteriorly, but on the segments behind the 11th there were fascicles of long, slender setæ, twice as long as the diameter of the body. Color, yellowish green.

*Nereis alacris*, sp. nov.

Body rather slender, slightly enlarged behind the buccal segment. Antennæ slender and pointed. First pair of superior tentacular cirri very long and slender, about equal to the first six segments; those of the second pair more than one-third longer, reaching about to the tenth segment; ventral cirri also long and slender, about one-third as long as the corresponding superior ones. Caudal cirri remarkably long and slender, longer and more slender than the longest tentacular cirri. General color of head and anterior segments bright olive-green; posterior segments and appendages tinged with orange-red; bases of antennæ and cirri tinged with purplish red; anterior eyes dark green with a red center, posterior pale red with a dark red center; middle of head pale green; a row of more or less connected and sometimes confluent light spots extends along the back, one to each segment; these spots are usually greenish white anteriorly, yellowish posteriorly. Smaller specimens are plainer colored, mostly greenish or brownish, often without dorsal spots.

Parapodia, in the middle region, of moderate size; upper rami longest, having an inferior and superior branchial lobe, or lingula, of about equal

*Lumbrineris hebes* Verrill.

*Lumbrineris obtusa* Verrill, Proc. Amer. Assoc. for 1873, p. 383, 383, 1874.

The name *obtusa* having been preoccupied in this genus, the above name is proposed as a substitute.

*Goniada gracilis* Verrill.

*Eone gracilis* Verrill, Report on Invert. of Vineyard Sound, ad, etc., p. 302, 1873, (vol. 4, Rep. of U. S. Com. of Fish and Fisheries, p. 596). 6).

This species has upon its proboscis the two rows of V-shaped denticles (in chevron) and also the jaws as in *Goniada*, to which genus it should, therefore, be referred.

*Polydora gracilis*, sp. nov.

Small, 3<sup>mm</sup> to 4<sup>mm</sup> long, very slender. Antennae stout, blunt, very long, six times as long as breadth of body, or even more, transversely wrinkled.

Head with a long, narrow, oblong, central portion, acute behind, notched or bilobed in front, with the two anterior corners rounded and a little prominent; side lobes of the head not broad, gradually narrowed toward the front; eyes four, the front pair conspicuous, decidedly larger and but little wider apart than the others, which are small and but little farther back.

The four anterior segments have small, rounded, dorsal papillae, with capillary setae; on the fifth there are fascicles of about six large special setae, of which the posterior are shorter. On the sixth and following segments, there are, with the capillary setae, three or four uncini in the dorsal fascicles. Branchiae elongated, commencing on the seventh segment, absent on the twelve posterior segments. Caudal appendage sucker-like, with a smooth margin, surrounded by a marginal circle of dark specks. Color pale salmon or light flesh-color; antennae and head with dark specks.

Off Block Island, 1873, gregarious in galleries in *Pecten tenuicostatus*, and having slender sand-tubes projecting from the orifices in the shell.

*Polydora concharum*, sp. nov.

A very long, slender species, having more than 200 segments, and often becoming four or five inches long.

Head, or cephalic lobe, narrow in front, projecting considerably beyond the wide lateral lobes (formed by the buccal segment), and deeply divided at the end into two lanceolate, acute, divergent lobes. Eyes four, small, but conspicuous, black, the anterior ones much wider apart than the posterior, and but little farther forward. In some specimens, the eyes are absent. Antennae very long and slender, fifteen to twenty times as long as the diameter of the body, or more, whitish or pale flesh-color, with a central red vessel, and usually with a fine dark line on each side. Buccal segment large and swollen below, with longitudinal sulci extending back from the mouth. On the four anterior segments, the

parapodia, above and below, bear slender, very acute, bent setae, and a prominent, flat process, somewhat expanded and rounded at the end; on the first segment, these are smaller and less spatulate, and the setae are fewer and shorter. The fifth segment is about as long as the three preceding ones, not much swollen, and it bears three distinct groups of setae, differing in form; the upper and most anterior are fine, bent, capillary setae, with acute tips, similar to, but much smaller than, those of the preceding segments; below these there is a group of small, slender setae, abruptly bent backward and with blunt tips; then there is a row of five or six large, strong, dark-colored, nearly straight, blunt spines, which are nearly equal in diameter, the anterior and upper ones longer, and, when projected at right angles to the body, forming an oblique, somewhat curved, transverse row; finally, in a row below the last of these, are two or three lighter-colored and more slender, straight spines, with abruptly tapered, acute tips. On the succeeding segments, the lower fascicles consist of strong, elongated uncini, in rows of six or seven, with the tip bidentate, strongly curved, beak-like, and with a thin, spatulate border; near the posterior end, they are replaced by acute setae and fine capillary ones. The upper fascicles, on the segments behind the fifth, consist of numerous, long, bent, very acute setae, like those of the anterior segments, the upper one in each fascicle with longer and more slender tips than the lower; toward the posterior end they become longer and fewer, with straighter tips, equalling or exceeding the diameter of the segments. Branchiae appear in a rudimentary form as small papillae on the sixth segment; on the seventh they are short conical papillae; on the eighth they become longer and more distinctly ligulate, and increase in length on the following segments, soon becoming long and slender, recurved, and meeting across the back. They exist on one hundred or more of the succeeding segments. After the branchiae cease the succeeding segments are very numerous, smaller, and rounder, so that the body is more slender and attenuated posteriorly, and somewhat broader and a little flattened on the branchiferous portion. Anal segment small, terminating in four small, roundish, equal, flattened lobes.

Color somewhat variable, usually pale flesh-color, or grayish or yellowish white anteriorly, and more or less tinged with dull greenish or brownish posteriorly, the red dorsal vessel showing plainly, and the branchiae red. Length, 100<sup>mm</sup> to 140<sup>mm</sup>; breadth, 1<sup>mm</sup> to 1.5<sup>mm</sup>; length of antennae, 20<sup>mm</sup> to 30<sup>mm</sup>. Described from life.

Very common all along the coast, from Cape Cod to Nova Scotia, in 10 to 100 fathoms, in tortuous, narrow galleries excavated in shells, especially of *Cyprina Islandica*; also in decayed wood dredged in 32 fathoms off Cape Cod. Collected by the writer in the Bay of Fundy in 1863, 1864, 1868, 1870, and subsequently at various localities while dredging for the U. S. Fish Commission in 1872, 1873, 1877, 1878, and 1879.



A new genus, related to *Spio*, but with a pair of branchial appendages behind the long antennæ, and with a distinct collar on the front edge of the second setigerous segment, was discovered near New Haven, Conn., at low-water, in 1877, and had been briefly described in this article. But learning that Professor H. E. Webster had also discovered the same genus, and had described it in a forthcoming paper on the Annelids of New Jersey, with an abundance of good specimens, my description has been withdrawn.

*Spio limicola*, sp. nov.

A small, slender species, with branchiæ on all the segments, and usually characterized by blackish, transverse lines and spots on the head and anterior segments. Body thickest anteriorly, tapering gradually to the end, somewhat depressed. Head flattened, obtusely rounded in front. Eyes four, small, nearly in a square. The anterior a little wider apart. Antennæ rather stout at base, tapered, blunt, about four or five times as long as breadth of body, whitish, with red vessels, and sometimes with thin, dark lines along the edges. Branchiæ flat, shorter, broader, and blunt anteriorly; narrower, longer, and more tapering farther back, where they meet across the back; posteriorly they become small and papilliform. The parapodia have anteriorly, in the upper ramus, two broad lingulæ, of which the posterior is the longer and more acute; the capillary setæ, arising between them, form large fascicles anteriorly; posteriorly they become longer, exceeding the diameter of the body, and form small fascicles. In the posterior region, the upper lingulæ become more unequal, the posterior one becoming elongated and the anterior one reduced to a mere papilla. The lower ramus is nearly the same on all the segments, consisting of a broadly rounded, flat, thick lobe, bearing a group of numerous uncini. Anal segment small, bearing four moderately long, blunt cirri, their length about twice the diameter of the anal segment.

Color, pale reddish white or light flesh-color, with bright red vessels and branchiæ, and showing the greenish intestine posteriorly; head with two blackish spots in front and others on the sides and beneath; anterior segments with blackish, transverse spots or interrupted lines of blackish between the segments on the ventral side and laterally; branchiæ and both upper and lower lingulæ usually with flake-white specks or a white line along their margins; anal segment and cirri greenish yellow.

Length, 25<sup>mm</sup> to 35<sup>mm</sup>; breadth, 1<sup>mm</sup> to 1.5<sup>mm</sup>. Described from life. Cape Cod Bay, 16 to 25 fathoms, soft, fetid, sandy mud (U. S. Fish Commission, 1879). Some of the specimens were filled with pink eggs, August 29.

*Spiophanes tenuis*, sp. nov.

A very delicate and slender species, thickest anteriorly at the branchial segments, gradually attenuated posteriorly. Head changeable,

depressed, narrow in middle, expanding laterally at the front, with prominent, blunt, lateral angles, and with a broadly rounded or sometimes slightly emarginate front margin; posteriorly the narrow head-lobe extends back to the second setigerous segment. Eyes four, minute, in a quadrangle, the anterior pair wider apart. Antennæ slender, not very long, about three times as long as diameter of body. Buccal segment swollen, forming short, convex, lateral lobes along the posterior half of the head; below the mouth is a prominent, strongly ciliated lobe. Branchiæ in four pairs, on the 2d, 3d, 4th, and 5th setigerous segments; the anterior pair branched, the others apparently foliaceous and shorter.\* The first setigerous segment has a small, prominent, rounded, upper ramus, with few short setæ. The 2d to 5th have a broad linguliform, or leaf-like, upper ramus, with the inner distal edge prolonged into an angle over the back, and a very broad, fan-shaped fascicle of long acute setæ set transversely and protecting the gills; a smaller lobe also exists in front of the setæ; lower ramus composed of a small, rounded lobe with a fascicle of slender setæ, and with uncini in the fascicles beyond the 15th segment, and a cluster of acute setæ. The parapodia increase rapidly in size from the 1st to the 6th, and then gradually decrease to the 17th segment, beyond which they are rudimentary; on the 5th to 8th the upper lingula is about half as long as the breadth of the body; beyond the 5th they are more or less expanded distally, or wide, spatulate, bluntly terminated; beyond the 10th small, not very prominent, rounded; on 5th to 10th segments the upper setæ are slender, acute, longer than the lingula, and in large fascicles, though in much smaller ones than those of the branchial segments; on the posterior segments the uncini become longer, and the capillary setæ mostly disappear in the lower fascicles. Color yellowish or greenish white, often decidedly greenish posteriorly, and with a dark greenish-yellow intestine. Some were filled with pale pink eggs, August 29.

Cape Cod Bay, 16 to 21 fathoms, soft, fetid mud (U. S. Fish Commission, 1879).

*Heterocirrus fimbriatus*, sp. nov.

A delicate species, remarkable for the great length and slenderness of its setæ, which form a wide fringe along the sides of the body. Head small, about twice as long as broad, not half as broad as the body, obtusely rounded in front, with a pair of sublateral ocelli at about the anterior third. Tentacular cirri short, usually absent in preserved specimens. The three to six anterior segments bear each a pair of slightly

\* A larger specimen was taken in 31 fathoms, off Cape Cod, which may be a distinct species. In this the branchiæ are long, lanceolate, acute, and all are pectinately divided along the posterior margin, with slender papilla. The eyes are red. Proboscis urceolate, with the extended margin scolloped. The first eleven segments bear capillary setæ, above and below, in large fascicles; on the 12th to 16th there are also stouter acute spinules in the lower fascicles; beyond the 16th segment there are uncini mingled with the capillary setæ.

*Lineus dubius*, sp. nov.

Similar to the last in form and habits. Body very slender in extension, and attenuated posteriorly. Head elongated, narrow. Ocelli white, inconspicuous, forming a simple lateral row of about twelve, extending back on each side of the head, beyond the lateral (nasal) fossæ. Color light green to dark olive-green. Length of largest observed, 50<sup>mm</sup> to 75<sup>mm</sup>.

Gloucester, Mass., under stones, between tides, 1878.

*Lineus pallidus*, sp. nov.

Long and very slender in extension, subterete, attenuated posteriorly. Lateral (nasal) fossæ long and deep. Mouth situated far back. Head elongated, usually obtuse and wider than the body, but very changeable. Ocelli absent. Color usually whitish or pale ochre-yellow, becoming reddish toward the head, and with a rather indistinct paler dorsal line; anteriorly there are usually two pale dorsal spots, in front of which the head is yellowish. Length, in extension, 100<sup>mm</sup>; breadth, 0.5<sup>mm</sup> to 0.75<sup>mm</sup>.

Off Cape Ann, Mass., 45 fathoms, mud, 1878.

*Micrura affinis* V. (= *Polia affinis* Girard, in Stimpson).

This species is very common from Massachusetts Bay to the Bay of Fundy, in 10 to 100 fathoms, on hard bottom. It is usually bright clear red or reddish brown above, rarely varying toward dark olive-green; beneath, pinkish white; front of head with a white margin running back in a short median point. Ocelli black, several in a single row on each margin of the head, the front one largest, variable in number. Caudal filament slender, acute, white. Length, often 125<sup>mm</sup> to 150<sup>mm</sup>; breadth, 2<sup>mm</sup> to 4<sup>mm</sup>.

*Micrura incornata*, sp. nov.

Body subterete, moderately elongated, thickest anteriorly, gradually tapered to the somewhat flattened tail; caudal filament white, very slender and acute, sometimes as long as the diameter of the body, but usually less. Head obtuse, often as wide as the body or wider. Lateral fossæ deep, extending to opposite the mouth, the latter not being very far back. No ocelli. Color bright cherry-red, varying to dark red, the middle of the head brightest; tail pale. Length of largest specimens observed, about 75<sup>mm</sup>; breadth, 0.10<sup>mm</sup> to 0.12<sup>mm</sup>.

Massachusetts Bay and Gulf of Maine, 45 to 110 fathoms, mud. Resembles the young of *Cerebratulus luridus* V., which occur with it.

*Micrura albida*, sp. nov.

Body thickest and nearly round anteriorly, tapered and somewhat flattened posteriorly, with a small, slender, caudal filament. Head obtuse, narrower than the body. No ocelli. Lateral fossæ short, not conspicuous. Color whitish or pale yellowish, often becoming light red toward the head; posteriorly often with grayish or clay-colored internal mottlings along the sides. Very sluggish in its motions. Two specimens from

10 fathoms, apparently of the same species, had a narrow ring of blue around the body, behind the head. Length, 50<sup>mm</sup> to 100<sup>mm</sup>; diameter, 1<sup>mm</sup> to 3<sup>mm</sup>.

Common in the Gulf of Maine and Massachusetts Bay, on muddy bottoms, in from 30 to 140 fathoms.

## NEMATODA?

*Octonema*, gen. nov.

Body long, slender, nearly round, smooth. Head without appendages, obtusely rounded or blunt-conical, apparently with the mouth on the wider side. Along each side of a considerable part of the length of the body, posteriorly, there is a delicate fin, composed of very numerous, slender, hair-like processes, apparently in two close alternating rows (perhaps in life connected together by a delicate web). In the supposed male, the tail is more or less incurved, tapered to a small papilliform tip. No external sexual organ visible. In the larger form, regarded as female, the posterior end is subtruncate, with a small terminal papilla.

*Octonema agilis*, sp. nov.

A long, slender, and exceedingly active, round worm, resembling a *Parvidius*, found swimming at the surface with a rapid, eel-like, undulatory motion. Integument firm, opaque, generally smooth, but with minute, oblong, brown verrucae posteriorly. Body, in life, nearly round, slightly flattened on two sides, of nearly uniform size throughout, but slightly tapered close to the somewhat smaller, depressed, obtusely conical head, and somewhat more gradually tapered to the posterior end in male. The peculiar fins are generally more or less injured, even in life, so that their real length is difficult to determine; but they appear to occupy half the length of the body, and perhaps more. In life they appear to have a continuous web, binding the hair-like rays together, but whether it was anything more than mucus is uncertain. The fin-rays, in life, are more than half the diameter of the body. Owing to the opacity of the integument, little could be seen of the internal structure without dissection or the preparation of transverse sections, for which no suitable opportunity occurred. In the head, which is more translucent, there appeared to be four roundish bodies, visible by transmitted light, while transverse whitish bands behind these seemed to indicate the position of the mouth. At the posterior end there seemed to be an anal opening, and a straight intestine leading to it. In some female specimens, a central whitish line, due to an internal organ (intestine?), could be traced from the head to the extreme posterior end, and a yellowish white organ (varies?), with numerous transverse divisions, extending from near the head to the tail, could be indistinctly seen. Color, in life, grayish or bluish white, with four narrow, double, longitudinal lines of dark teal-color. Length, 80<sup>mm</sup> to 200<sup>mm</sup>; diameter, 0.5<sup>mm</sup> to 1<sup>mm</sup>.

Vineyard Sound, Mass., swimming actively at the surface in the

evening. June and July, 1871, and July, 1875. First observed by Professor S. I. Smith.

This species was referred to as an "Undetermined Genus" in my Report on the Invertebrata of Vineyard Sound, etc., p. 632, 1873.

## POLYZOA.

*Aloyonidium rubrum*, sp. nov.

An encrusting species, forming broad, smooth colonies, covering stones and large shells. Zoecia rather large, mostly hexagonal, but often pentagonal, with their boundaries well-marked in alcoholic specimens by a distinct line. The retracted zooids in preserved specimens usually form a small papilla in the middle of the zoecia. Color, in life, bright brick-red, or sometimes orange-red.

Common all along the coast, from Long Island Sound to Nova Scotia, mostly in 10 to 50 fathoms, and especially on *Pecten tenuicostatus*.

*Bugula cucullata* Verrill, Amer. Jour. Sci., xviii, p. 52, July, 1879.

Zoarium much branched, branches slender, dichotomously divided, the branchlets diverging but little. Zoecia in two alternating rows, rather large, elongated, narrow, with the long, narrow, frontal area occupying most of the length. At the distal angles there are usually two rather long slender spines on each side, but often three on the outer angle. The spines are unequal, divergent, more or less curved and directed upward; the one farthest in front is usually longest, curved forward and upward at base. Avicularia large, elongated, the length greater than the width of the zoecia, situated rather in advance of the middle of the outer margin of the frontal area, the beak reaching beyond the distal end of the zoecia; the head is compressed, broad-oval, and tapers below at the posterior end into the pedicel, which is thick at first, but narrows to a slender base; the beak is long, concave above, but strongly incurved or hooked at the tip. Oecia short, but wide, nearly hemispherical, the front edge turned upward, showing a large opening in a front view, and giving them a hood-like appearance; surface more or less areolated, glistening.

Jeffrey's Ledge, off Maine, 51 fathoms, taken by Dr. A. S. Packard and Mr. C. Cooke, while dredging on the "Bache," in 1874, for the Fish Commission. A second specimen of this fine species was dredged this season, off Cape Cod, in 75 fathoms, mud. When placed in alcohol, it quickly became bright rose-red; but the alcohol soon dissolved the color, becoming light pink, while the specimen became white.

*Bugula decorata* Verrill, Amer. Jour. Sci., xviii, p. 52.

Zoarium rather large, with thick, much branched stems, producing densely branched, somewhat plumose tufts, two inches or more high. Branches unequally dichotomous, often somewhat spirally arranged. Zoecia in two alternating rows, large, broad, prolonged proximally. Frontal area large, elongated, sunken and wrinkled in the dry state

the distal angles are prolonged into a single, stout, often short spine on each side, frequently absent on the inner angle. Avicularia on the middle of the front side of the zoecia, toward the base; they have a short, broad, swollen head, with a short, strongly curved beak; the pedicels are short and thick, rapidly enlarged from the base upward. Oecia large, globose, brilliantly iridescent, elegantly sculptured, with a series of raised curved lines passing up over each side and converging to the middle of the front side, while their concave interspaces are covered with microscopic transverse lines. Dredged at Eastport, Me., by the writer, and also in the Gulf of Maine, 110 fathoms, near George's Bank, by Dr. A. S. Packard and Mr. C. Cooke, in 1872 (U. S. Fish Commission). The other species of *Bugula* found on the New England coast are as follows:

*Bugula turrita* (Desor) Verrill. Florida to Casco Bay.

*Bugula avicularia* (L.) Oken. Long Island Sound to Spitzbergen; Europe.

*Bugula flustroides* (Lamx.) (= *B. flabellata* Gray). Long Island Sound to Maine; Europe.

*Bugula fastigiata* (L.) Alder (= *B. plumosa* Busk). Massachusetts Bay to Labrador; Europe.

*Bugula Murrayana* Busk. Long Island Sound to Spitzbergen; Europe.

*B. Murrayana*, var. *fruticosa* (Packard). Massachusetts Bay to Spitzbergen.

*Bugula flexilis* Verrill\* and *Bugula umbella* Smitt belong to the genus *Actoskias* Dub. and Koren. Both occur in deep water off Maine and Nova Scotia.

*Acanellella fragilis* Verrill (Amer. Jour. Sci., xvii, p. 472, June, 1879).

A peculiar genus, in which the branches are composed of a single series of cells, connected together by small and short joints. Zoecia with an oval frontal area, surrounded by spines.

Off George's Bank, 220 fathoms, on *Acanella*.

## CELLULARIDÆ.

Notwithstanding the very numerous restrictions which the ancient genus *Cellularia* has undergone, it is still made to include heterogeneous species by several recent writers, while others restrict it to groups not originally included by Pallas. In the excellent memoirs of Smitt on the Arctic Bryozoa, five species still remain in the genus *Cellularia*. These, however, to three well-marked groups, some of which have received several generic names, so that their synonymy is very complicated. Having had occasion to revise this family, I offer the following summary, so far as it concerns the New England species:

\*See American Jour. Science, ix, p. 415, pl. 7, fig. 1, 2, 1875; and vol. xvii, p. 259, 1879.

clavate, unequal, branchial cirri, mostly less than four times as long as the diameter of the body. The two anterior segments have slender capillary setae in the upper fascicles, less long than the diameter of the body; they increase in length and numbers farther back, and on the seventh and forty to fifty succeeding segments they become very numerous and remarkably long, being from two to three times as long as the breadth of the body; toward the posterior end of the body they again diminish in length, becoming comparatively short on the last twenty segments. The ventral setae are all capillary and fine-pointed on the anterior and median segments; they somewhat exceed the diameter of the body in the middle segments, but are shorter toward both ends. On the last twenty segments there are, in each ventral fascicle, one or two short unciniform setae with somewhat hooked but scarcely bidentate tips. Similar unciniform setae exist in some of the posterior dorsal fascicles. The setae are silvery white. Body dark olive-green, with lighter dorsal line; branchiae with dark tips. Length, about 25<sup>mm</sup>; diameter, without appendages, 1<sup>mm</sup> to 1.75<sup>mm</sup>.

Off Campo Bello Island, Bay of Fundy, 60 fathoms, burrowing in dead shells of *Pecten tenuicostatus*, 1872.

*Dodecaoceria concharum* CErsted.

This species is nearly allied to the last, and occurred with it. It is very common, on our coast, in various shells. The genus *Dodecaoceria* CErsted has not been distinctly distinguished from *Heterocirrus* Grube, to which it is closely related. The number of branchial cirri is variable in both, but their arrangement is the same. The setae, however, are different in their arrangement. In *D. concharum* the 1st segment bears no setae; on the 2d to 7th there are short capillary setae, above and below; on the 8th there is a solitary, long, unciniform seta in the dorsal fascicle of capillary setae, and four or five stouter ones, with bidentate tips in the ventral fascicles, and no capillary ones; on the 9th and succeeding segments, the ventral setae continue as on the 8th, and the dorsal fascicles usually contain four or five elongated, simple, hooked uncini, together with more or less numerous fine, acute, capillary setae which are often absent, but they occur on some of the segments even to the posterior end, where they are often about one-third as long as the diameter of the body. Behind the middle of the body the uncini become smaller, shorter, and fewer, only two or three to a fascicle, but near the posterior end, on four or five segments, they become stouter, more hooked and distinctly bidentate, especially on the ventral side.

The color is usually dark green or greenish black, and no distinct ocelli were detected, but some obscure dark specks may represent them.

*Praxillura*, gen. nov.

Body very long and composed of a larger number of segments than usual in the *Maldanida*. Posterior segments very numerous, short, becoming indistinct posteriorly. Caudal segment subacute, destitute of

a funnel, and, in our specimens, of any other appendage. Anterior segments numerous and short, eight or more (in the type), bearing, in the lower ramus, one or two simple, acute spines; in the middle and posterior regions bearing a row of uncini. Head gibbous posteriorly, without any well-marked lateral fold.

*Praxillura ornata*, sp. nov.

Body very long, slender, of nearly uniform diameter, composed of about forty setigerous segments; the eight anterior bear only one or two spines in the ventral ramus, uncini appearing on the 9th. Head swollen and gibbous above, posteriorly, abruptly flattened in front, with the anterior edge bluntly rounded; two rounded, lateral lobes beneath; front concave beneath; no distinct lateral lobes above; numerous small, red ocelli in several rows around the front margin. Buccal segment thick, coalescent with the head, long, biannulate, the head and buccal segment together about equal in length to the first two setigerous ones. The eight anterior, setigerous segments are short, scarcely longer than broad, with a well-marked suture between, and biannulate, the posterior half smaller, the anterior swollen in the middle, where the setae arise, and with a red band behind the setae. In the middle region, the segments are long and narrow. The seven or eight anterior segments have a small upper fascicle of slender acute setae, and one stout acute spine below (sometimes two). On the ninth segment there are two uncini and a spine below them, and on the tenth to the twelfth and several following there are four to eight uncini, and the number increases farther back. The last seventeen setigerous segments are very short. These are followed by several scarcely distinct segments at the posterior end, which is tapered and simple. Color pinkish white, with a bright red band on each segment anteriorly, a dark red spot on each side of the head, and two bands of red on the buccal segment. Ocelli red. On the middle region, the bands are less distinct, and the surface is covered with dark brown specks. Length, 125<sup>mm</sup> to 150<sup>mm</sup>. Diameter, 1<sup>mm</sup> to 1.5<sup>mm</sup>. Described from life.

Off Race Point, Cape Cod, 25 fathoms, sandy mud, in long, round, rigid tubes, made of fine sand (U. S. Fish Commission, 1879). Casco Bay (U. S. Fish Commission, 1873).

*Maldane nitida*, sp. nov.

Very slender, elongated, with twenty-one setigerous segments, of which fifteen elongated ones are included in the middle region, three short ones are anterior, and three short ones posterior. The head is swollen, convex and gibbous at the posterior part, abruptly flattened in front, with the front edge bluntly rounded; a low lateral fold; buccal segment coalescent with the head. The three anterior setigerous segments are short, about as long as broad, with a fascicle of long, acute

\*In one specimen there are four, somewhat unciniform, ventral spinules, in a row, on the eighth segment, and more on the ninth, without the acute spinule below.

setæ above, and a row of about three spines below; on the fourth and fifth segments there are six to nine uncini in the row, and more farther back, where they become prominent, strongly hooked, or claw-like uncini. The fourth and several succeeding segments are usually more than twice as long as broad, with an annulation in front of the middle; farther back, in the middle region, the segments are six to eight times as long as broad, very slender, swollen near the posterior end, where the setæ arise. The last three setigerous segments are about as long as broad, swollen in the middle, and bear slender setæ about one-half as long as the breadth of the body, and a row of uncini. Anal segment consolidated with the preceding, apparently single, non-setigerous one, very obliquely truncated at the end, and surrounded by a well-developed, smooth border, interrupted dorsally, so that when expanded it has a spatulate form. The anal opening appears to be nearly central, within the border. The caudal membrane is filled with blood-vessels. In the middle region of the body, on the ninth to eighteenth segments, in the upper fascicles of acute setæ, are two very long, slender, flexible, thread-like setæ, usually unequal, the longer six to eight times as long as the diameter of the segments; they are covered with sharp spinules, alternating on the two sides. Color of middle segments salmon, thickly specked with orange-brown and reticulated with red blood-vessels; anterior and posterior segments greenish or yellowish white.

Off Cape Cod, 20 to 50 fathoms, in hard sand; tubes attached to valves of dead bivalves (U. S. Fish Commission, 1879).

*Notomastus gracilis*, sp. nov.

Very small and slender. Head moderately acute in extension. Six anterior segments bear fascicles of capillary setæ above and below; the seventh and succeeding segments bear uncini above and below, but in the lower fascicles of the seventh segment there are often some capillary setæ also. The fascicles are all small. The uncini are elongated, distinctly constricted toward the end, and expanded in a blade-like form beyond, with the tip only slightly hooked. Color red. Length, 40<sup>mm</sup> or more; diameter, 0.05<sup>mm</sup>.

Noank, Conn., 4 to 5 fathoms, mud (U. S. Fish Commission, 1874).

This species resembles *N. filiformis* Verrill, but differs in the form and arrangement of the setæ. In the latter, the five anterior segments bear large groups of long, capillary, acute setæ; but on the fifth there are sometimes a few uncini mingled with the capillary ones in the lower fascicles. The uncini are numerous on the following segments, and are long and somewhat bent, but show no constriction, the distal portion being regularly narrow, spatulate, or paddle-shaped, with the central shaft curved, blunt, and slightly hooked at the tip. In some specimens there are two well-marked black eyes. The tip of the head is elongated and acute.

The genus *Ancistria* Quatrefages would include both the above species, but it seems to be impossible to distinguish that genus by any defi-

nite structural characters from *Notomastus* Sars. Therefore, the two species formerly described by me from Casco Bay as *Ancistria capillaris* and *A. acuta* should be named *Notomastus capillaris* and *N. acutus*.

*Polychirus phosphoreta*, sp. nov.

A large, handsome, bright red species, remarkable for its brilliant violet-blue phosphorescence when disturbed.

Body very changeable in form, soft and flaccid, usually swollen anteriorly, narrowing somewhat near the head, and more attenuated posteriorly. Tentacles very numerous, originating from an elongated and somewhat spatuliform cephalic process. Fascicles of acute, capillary setæ exist on twenty-four segments. The uncini commence on the tenth setigerous segment. They are minute, strongly hooked, and form a linear row, consisting of about twenty on the tenth segment, and of thirty to forty on the succeeding ones. The posterior region not having capillary setæ consists of thirty or more segments, toward the end becoming very short and indistinct. Anal segment small, simple, with a minute papilla. Ventral glandular shields conspicuous on the nine anterior segments, covering the whole ventral surface, becoming narrower backward, and bilobed; beyond the ninth segment the ventral shields are smaller and more distant, squarish, bilobed, and separated by a median furrow. On the nine anterior segments there is also a thickened, annular, light-colored, glandular area, just below the fascicles of setæ; farther back these become rudimentary. Color bright red or blood-red. In August, females were filled with large quantities of light red ova. Length, up to 75<sup>mm</sup> to 80<sup>mm</sup>; greatest diameter, 4<sup>mm</sup> to 5<sup>mm</sup>. Described from living examples.

From off Stonington, Conn., to the Bay of Fundy, in 10 to 50 fathoms. Common in the Bay of Fundy, where it was collected by the writer in 1863, 1864, 1868, 1870, 1872. Casco Bay and Massachusetts Bay (U. S. Fish Commission).

*Trichobranchus glacialis* Malmgren.

In life, the anterior part of the body is swollen, bright red, brightest near the head on the dorsal side. Posterior portion of body slender, yellowish or greenish. Lip and cephalic lobe bright blood-red anteriorly. Below the mouth is a turgid fold, which is light red, crossed by longitudinal lines of bright red. Tentacles whitish, those in front clavate or spatulate, the posterior ones very numerous, slender, filiform. Branchia slender, cirriform, in length about equalling the diameter of the body.

Off Cape Cod, 122 fathoms, soft mud (U. S. Fish Commission, 1879).

*Spirobrachia Stimpsoni*, sp. nov.

*Spirobrachia Stimpsoni*? Verrill, in former papers. See Trans. Conn. Acad., vol. III, p. 45, pl. IV, fig. 4 (non Lamarck).

Tubes dull white, opaque, terete, rather closely coiled, the aperture not raised; surface somewhat rough with the lines of growth, often

smoothish. Branchiae nine, rather long, lanceolate, with slender, naked tips and numerous lateral processes. Operculum elongated obconic, hollow, containing the eggs; pedicel slender at base, enlarging gradually to the operculum.

Massachusetts Bay to Nova Scotia, common, in 10 to 880 fathoms, on shells and stones.

*Tomopteris Smithii*, sp. nov.

A large and very elegant species, remarkably transparent and exceedingly active in its motions. Outline, including lateral appendages, elongated oval or lanceolate, the length being about three and one-half times the breadth. Head with two small eyes, near together; two short, tapering, acute antennae, and two very long and slender cirriform processes, nearly half as long as the body; these originate from broad subconical bases. The lateral appendages of the body commence close to the head; the first are about equal to the diameter of the body, but those at about the anterior third are twice as long, while the posterior ones become very small and more distant; the tail ends in a narrow, naked portion, of considerable length. The lateral appendages taper from the base to the fork, where they divide into two lobes, each consisting of a broad, elliptical, and very thin membrane, supported by an acute central branch of the main stem. The naked caudal portion in one specimen had about six faint bands of reddish, not seen in the other; all other parts are so limpid as to be nearly invisible in clear water. The interior of the body and appendages contained numerous eggs. Length, 63<sup>mm</sup> and 70<sup>mm</sup>; breadth across appendages, 18<sup>mm</sup>; length of middle appendages, 7<sup>mm</sup>; of long cephalic appendages, 299<sup>mm</sup>.

Eastport, Me., August, 1872, two specimens, at surface. Named in honor of Professor S. I. Smith, who first discovered it.

**GEPHYRÆA**

*Priapulid pygmaeus*, sp. nov.

A small yellowish white or flesh-colored species. In extension the proboscis is usually slightly clavate, nearly as long as the body, and often somewhat greater in diameter. The proboscis is distinctly longitudinally marked with about twenty-five white, muscular lines, between which there are as many rows of small, prominent, conical papillae, largest toward the mouth and disappearing on the posterior third. Body usually cylindrical, changeable, abruptly tapered or subtruncate at the posterior end, distinctly annulated, with fine circular and longitudinal lines on the annulations; at the posterior end having very small conical papillae on the annulations. Caudal appendage in length about equal to diameter of body, with a rather stout stem, bearing about twelve short, fusiform papillae or branches, which are changeable in form, and covered with small conical papillae. The integument is so translucent that the corpusculated circulating fluid can be easily seen circulating in the hollow stem and tubercles. The corpuscles are minute and round.

Pharynx provided with numerous teeth in longitudinal rows, each with a whitish, slightly curved, acute, central denticle. Intestine brown, scarcely longer than the body. Proboscis whitish or pale flesh-color; body and caudal appendage yellowish. Largest seen were about 15<sup>mm</sup> long and 2<sup>mm</sup> in diameter. Described from life. The form of the body and proboscis continually changes.

Massachusetts Bay, off Plymouth, 27 fathoms, soft mud; Harbor de Luth, Campo Bello Island, Bay of Fundy, 4 to 5 fathoms, soft mud (U. S. Fish Commission, July 30, 1872).

*Thalassoma viridis*, sp. nov.

A small bright green species with swollen body and long slender proboscis, somewhat spoon-shaped at the end. Body round, thick, about twice as long as broad, largest and obtusely rounded posteriorly; the surface is minutely granulous in appearance, the granules in circular lines; anteriorly the body rapidly narrows to the base of the proboscis, where there are two small spines at the mouth. The proboscis is so infolded at the edge as to form a groove, like a spout, which expands near the end; it is longer than the body. Color bright grass-green. Length of body about 6<sup>mm</sup>. Described from life.

Off Head Harbor, Campo Bello Island, 77 fathoms, mud, 1872. Found in holes in hard nodules of blue clay.

**NEMERTINA.**

*Amphiporus virescens*, sp. nov.

Body long, slender, tapering gradually to the tail, widest anteriorly in extension. Active in its movements. Head ordinarily obtusely rounded in front. Ocelli numerous, forming a very long lateral cluster on each side of the head; anteriorly each cluster consists of several rows, but it narrows backward to a single row, which extends back beyond the head and neck. Color clear pale green, varying in tint. Length of largest specimens seen, about 40<sup>mm</sup>.

New Haven and Noank, Conn.; Wood's Holl, Mass., etc. Common among hydroids on the piles of wharves.

*Amphiporus agilis* Verrill (= *Optonemertes agilis* Verrill, Am. Jour. Science, vii, p. 45, pl. 7, fig. 1).

This species belongs to *Amphiporus*, as characterized by McIntosh. It has only been taken in 20 to 90 fathoms, off the coast of Maine.

*Amphiporus roseus* Verrill (= *Planaria rosea* Müller).

The species which I thus identify is common in Massachusetts Bay and the Gulf of Maine, on muddy bottoms, in 20 to 100 fathoms. It agrees well with the original figures and descriptions, but does not agree with *A. pulcher*, to which McIntosh refers Müller's species, erroneously it seems to me. The color above is usually deep cherry-red to reddish brown, varying toward orange and chocolate-brown; beneath, flesh-color.

Ocelli in two large clusters on each side of the head, the anteterior group largest, somewhat triangular, covering the antero-lateral margins and extending upward and backward on the head, where they terminate on each side in a small subdorsal group of ocelli, more distinct than the rest; just back of these are two distinct clusters of ocelli. Transverse fossæ run up on each side, in line with the posterior group of ocelli. Proboscis large, finely papillose, reddish. Length, 50<sup>mm</sup> or more.

I have also met with another species, which agrees nearly with *A. pulcher*, as described by M'Intosh, and with which it is probably identical.

*Amphiporus Stimpsoni* Verrill (= *Ommatoplea Stimpsoni* Girard, in Stimpson).

This is very common in Massachusetts Bay and northward to the Bay of Fundy and Labrador, from low-water mark, under stones, to 100 fathoms. It is easily recognized by its clear, dark purplish or chocolate-brown color above, with pale margins and a squarish or triangular white spot on each side of the head, and usually with a narrow white band across the neck; beneath, pinkish or flesh-color. Ocelli in two or more rows in an elongated group on each antero-lateral margin of the head, and a pair of small subdorsal clusters on the transverse white nuchal band. Often 150<sup>mm</sup> long and 8<sup>mm</sup> to 10<sup>mm</sup> broad.

The *Planaria angulata* of Otho Fabricius was probably based on this species; but his description is insufficient to determine this with certainty.

*Amphiporus lactiflorens* M'Intosh.

Common at Eastport, Me., under stones, at low-water mark. Its color there is usually pale flesh-color, or dull whitish or grayish. Length, 50<sup>mm</sup> to 100<sup>mm</sup>.

*Amphiporus cruentatus*, sp. nov.

A species peculiarly characterized by having red blood, so that the vessels appear distinctly red through the translucent integument. Body flaccid, versatile, slender, tapering to both ends; head not very distinct; snout strongly ciliated. Ocelli about 12 on each side of the head, in an interrupted longitudinal row, the most anterior one considerably larger. Two slight transverse grooves on each side of the head, apparently not extending across the dorsal side, but the anterior ones curve forward in front of the ganglia, and the posterior ones behind the ganglia. Proboscis long, densely covered with elongated, conical papillæ. A simple central stylet and two small lateral ones on each side. Color light reddish salmon, with conspicuous bright red median and lateral blood-vessels, containing a corpusculated red fluid.

Vineyard Sound, 4 to 5 fathoms, July 21, 1875.

*Tetrastemma vermiculus* Ehr. (?); M'Intosh.

This species, as determined by M'Intosh, was common on the piles of wharves at Gloucester, Mass., in 1878. Color pale, usually whitish,

usually with more or less distinct brownish mottlings along the sides, due to internal organs. The two pairs of ocelli are rather distant, and usually there is a dusky line extending between the two eyes of the same side. On the head, in front of the eyes, there are often flake-white specks; and frequently others occur along the middle of the back. Not before recorded from the American coast.

*Tetrastemma vittata* Verrill.

American Journal of Science, vol. vii, p. 45, pl. 7, figs. 3, a, b, 1874; Proc. Amer. Assoc. for Adv. of Science for 1873, p. 389, pl. 2, figs. 7, 8, 1874.

*Cosmophaea (?) corallops* (Sars, MSS.), Jensen, Turbellaria ad Litora Norvegia, p. 82, tab. viii, figs. 13-16, 1879.

The species described by Jensen from the coast of Norway agrees so well, in form and color, with our *T. vittata*, as to render its identity highly probable. The eyes were not observed by Sars in the Norwegian specimens, but they are often so obscured by the very dark color of the head, in our darkest examples, as to be almost invisible.

This species was dredged in considerable numbers this season in Cape Cod Bay, 16 to 22 fathoms, mud, by the U. S. Fish Commission. Some of the specimens were 3 inches long.

*Lincus viridis* Verrill (= *Planaria viridis* Fabr.).

*Lincus Gosseanus* M'Intosh.—*Nemertes viridis* Verrill, Report on Invert. of Vineyard Sound, p. 334 [1878].

This species is exceedingly abundant on our coast, from the Arctic Ocean to Long Island Sound. It occurs gregariously under stones, between tides, and also at the depth of several fathoms. The most abundant variety is green, varying from dull olive-green to greenish black, the anterior end usually darkest, and the ventral surface paler than the back. The transverse light lines are usually indistinct. Length, often 150<sup>mm</sup> or more.

Var. *fusca* (= *Planaria fusca* Fabr.).

This variety occurs like the last, and is usually associated with it. The color varies from pale reddish brown to dark brown and greenish brown.

*Lincus communis* Van Beneden.

This species, accurately described and figured by Van Beneden, is very common, often occurring in large groups under stones and among muscels, on muddy shores, between tides (Eastport, Me., to Long Island Sound). It much resembles the preceding species in form and color, but is more slender, with a more elongated head, the mouth being farther back. The color is usually dark olive-green to greenish black, but varies to brownish and dull reddish. Ocelli black, often rather indistinct in dark specimens, forming a single lateral row on each side of the head. It is probable that *L. socialis* (Leidy sp.) is not distinct from this.