

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

<i>Philoscia vittata</i> Say.	<i>Epelys montosus</i> Harger.
<i>Jara albifrons</i> Leach.	<i>Spharoma quadridentatum</i> Say.
<i>Chiridoteca caeca</i> Harger.	<i>Limnoria lignorum</i> White.
<i>Chiridoteca Tuftsii</i> Harger.	<i>Anthura polita</i> Stimpson.
<i>Idotea irrorata</i> Edwards.	<i>Paranthura brachiata</i> Harger.
<i>Idotea phosphorea</i> Harger.	<i>Ptilanthura tenuis</i> Harger.
<i>Idotea robusta</i> Kröyer.	<i>Leptochelia algicola</i> Harger.
<i>Epelys trilobus</i> Smith.	

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

<i>Gyge Hippolytes</i> Bate and Westwood.	<i>Astacilla granulata</i> Harger.
<i>Phryxus abdominalis</i> Lilljeborg.	<i>Limnoria lignorum</i> White.
<i>Jara albifrons</i> Leach.	<i>Ega psora</i> Kröyer.
<i>Munna Fabricii</i> Kröyer.	<i>Tanais vittatus</i> Lilljeborg.
<i>Munnopsis typica</i> M. Sars.	<i>Leptochelia algicola</i> Harger.
<i>Idotea irrorata</i> Edwards.	

**NOTICE OF RECENT ADDITIONS TO THE MARINE INVERTEBRATA, OF THE NORTHEASTERN COAST OF AMERICA, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES AND CRITICAL REMARKS ON OTHERS.**

**PART I—ANNELIDA, GEPHYREA, NEMERTINA, NEMATODA, POLYZOA, TUNICATA, MOLLUSCA, ANTHOZOA, ECHINODERMATA, PORIFERA.**

**By A. E. VERRILL.**

Among the very extensive collections made during the past eight years by the U. S. Commission of Fish and Fisheries, under the direction of Professor Baird, there are still many species not recorded as American in any of the reports hitherto published; most of these are well-known Arctic or Northern 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 several years past. See, also, an important paper on the Podophthalmous Crustacea, by Professor S. I. Smith, and one on the Pycnogonida, by E. B. Wilson, in the Trans. Conn. Academy, vol. v, 1879.

## ANNELIDA.

*Sthenelais 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.

*Sthenelais 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.

***Sthenelais 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* M'Intosh, 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.

*Lætmatonice armata*, sp. nov.

*Lætmatonice filicornis* 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. filicornis*, 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. filicornis*, 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. filicornis*, belong to this species, is uncertain.

***Eunoa 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 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. Fish Commission).

*Autclytus 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 28, 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 longiceps*, sp. nov.

A very slender species, allied to *P. dispar* Webster, but with 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. Setae of several kinds, the usual arrangement being as follows: one or two acicula shorter than the other setae, 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 setae, 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 algæ, and at low-water, among the débris 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 setae, 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. Antennae 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 antennae 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

length, the superior one somewhat gibbous and bearing the long, slender, dorsal cirrus beyond its middle; beyond the origin of the latter the lingula is lanceolate, subacute at the end; three conspicuous dark spots on the superior lingula, one terminal, one at the origin of the cirrus, the other midway between that and the body; another spot on the body, at base of the appendage. The inferior lingula is also lanceolate, a little shorter than the superior. More than half the length of the dorsal cirrus projects beyond the end of the lingula. The ventral lingula of the lower ramus is oblong-lanceolate, obtuse, considerably smaller than the dorsal one. Ventral cirrus small, slender, acute, not reaching to the end of the ventral lingula. Setæ in both the upper and lower rami of two kinds: in the superior fascicle of each they have slender, acute, terminal pieces; in the inferior fascicle the terminal piece is short and hooked at the tip. It is very active in all its motions, and swims rapidly. It constructs a tenacious tube, attached to algæ, and supported by divergent silken threads. Length, 2 to 3 inches.

Vineyard Sound, 8-10 fathoms, 1875. Described from life.

**Nereis megalops** Verrill.

*Nectonereis megalops* Verrill, Report on Invert. of Vineyard Sd., etc., p. 298, [592], pl. xii, figs. 62, 63, 1873.

The female of this form was taken in Vineyard Sound, at surface, in 1875. Although agreeing in general with the male, it departs less widely from the ordinary *Heteronereis* form, both in respect to its head, palpi, and the dorsal parapodial appendages. The male has a simple, median, tapering, caudal cirrus. There are two minute, dark spots on each segment, along the middle of the ventral surface, posteriorly.

It is so nearly related to the *Heteronereis* stage of *Nereis Dumerili*, and to the *Heteronereis Malmgreni* described by Claparède, and to other related forms discovered on our coast by Professor Webster, that it seems probable that its *Nereis* stage, when known, will be closely allied to *N. Dumerili*, and consequently should be referred to *Nereis*, or to *Leontis*, if the latter be regarded as a distinct genus.

**Ceratocephale Websteri**, sp. nov.

Head small, with the cephalic lobe emarginate in front, and with a median groove running back; sides slightly incurved; posterior margin slightly convex. No eyes. Antennæ small, slender, tapering, coalescent at base with the palpi. Palpi small, slender, bent somewhat downward, not much larger than the antennæ, the terminal joint small, subacute, about one-third the whole length. The four cephalic organs are similar in form, and all are directed forward. Tentacular cirri slender, acute; the dorsal ones of the two anterior pairs are longer than the others, being nearly twice as long as the diameter of the body; the ventral ones are bent downward and forward in life, and are less than half as long; of the two posterior pairs, the dorsal are somewhat longer than the ventral.

Buccal segment large, somewhat swollen. Jaws small, light brown, strongly curved, with slender, sharp tips, the edge moderately serrulate. Denticles (or paragnaths) not observed, the proboscis being retracted. Parapodia of anterior segments small, the two rami of nearly equal length, and with similar fascicles of setæ, the lower ones most numerous, the upper lingula small, subtriangular, terminated by the slender, tapering, dorsal cirrus, which, at about the fifth segment, is more than twice as long as the lingula and reaches about to the end of the setæ. Ventral cirrus short, tapering. Farther back, at the eleventh segment and beyond, the rami become more unequal, the upper lingula develops into a long, flat, narrow, tapering branchia, bearing the filiform dorsal cirrus at its tip. At the fifteenth segment and beyond the branchia is decidedly longer than the parapodia, curved directly upward, and about eight times as long as its width in the middle, and more than half the diameter of the body, rather abruptly narrowed at the tip, and terminated by the long, slender cirrus, which equals or exceeds the branchia. In the enlarged base of the branchiæ there is a circular, thickened, white, round spot, due to an internal organ. On the setigerous lobe of the upper ramus is a narrow-lanceolate, lingula-like process, extending from the setigerous lobe as far as the tips of the setæ. On the lower ramus there are two similar lingulæ, one of which is terminal, and the other is situated at about the distal third, on the lower side. Ventral cirrus small, slender, tapered, single on the first sixteen segments; on the seventeenth and subsequent segments there are two equal ventral cirri, arising close together. Setæ in this region form a large fascicle in each ramus, with a single aciculum dividing each fascicle into two groups. The setæ in the upper ramus have a very long, slender, smooth, nearly straight, terminal joint, flexible at tip, and not distinctly flattened, even toward the base. In the lower ramus, the terminal joint is not quite so long, slender, and narrow, but distinctly flattened, and with the edge very finely serrulate; these are very slightly curved, but not abruptly bent, near the base. Diameter of the anterior part of the body, 6<sup>mm</sup> to 7<sup>mm</sup>. Color of body pale brownish or pinkish; branchiæ and bases of parapodia bright red; setigerous lobes greenish, the setæ dark at base. Described from life.

Dedicated to Professor H. E. Webster, who has largely contributed to the knowledge of American Annelids.

Twenty-four miles east of Cape Cod, 122 fathoms, soft mud (U. S. Fish Commission). Only one specimen, which lacks the posterior portion of the body. Closely related to *C. Loveni* Malmgren, but the latter has the branchial organs cirriform and slender, and the double ventral cirri are figured upon the tenth segment; the setæ of the lower ramus are also represented with the terminal joint abruptly bent at base, wider, and much more strongly serrulate than in our specimen. It is possible, however, that the two may be only sexual forms of one species.

**Lumbrinereis hebes** Verrill.

*Lumbriconereis obtusa* Verrill, Proc. Amer. Assoc. for 1873, p. 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, etc., p. 302, 1873, (vol. i, Rep. of U. S. Com. of Fish and Fisheries, p. 596).

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. Antennæ 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 papillæ, with capillary setæ; on the fifth there are fascicles of about six large special setæ, of which the posterior are shorter. On the sixth and following segments, there are, with the capillary setæ, three or four uncini in the dorsal fascicles. Branchiæ 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; antennæ 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. Antennæ 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 setæ, and a prominent, flat process, somewhat expanded and rounded at the end; on the first segment, these are smaller and less spatulate, and the setæ 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 setæ, differing in form; the upper and most anterior are fine, bent, capillary setæ, with acute tips, similar to, but much smaller than, those of the preceding segments; below these there is a group of small, slender setæ, 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 setæ and fine capillary ones. The upper fascicles, on the segments behind the fifth, consist of numerous, long, bent, very acute setæ, 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. Branchiæ appear in a rudimentary form as small papillæ on the sixth segment; on the seventh they are short conical papillæ; 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 branchiæ 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 branchiæ red. Length, 100<sup>mm</sup> to 140<sup>mm</sup>; breadth, 1<sup>mm</sup> to 1.5<sup>mm</sup>; length of antennæ, 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 branchiferous 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, fœtid 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 papillæ. 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.

clavate, unequal, branchial cirri, mostly less than four times as long as the diameter of the body. The two anterior segments have slender capillary setæ 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 setæ 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 unciform setæ with somewhat hooked but scarcely bidentate tips. Similar unciform setæ exist in some of the posterior dorsal fascicles. The setæ are silvery white. Body dark olive-green, with lighter dorsal line; branchiæ 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.

#### *Dodecaceria concharum* Ersted.

This species is nearly allied to the last, and occurred with it. It is very common, on our coast, in various shells. The genus *Dodecaceria* Ersted has not been distinctly distinguished from *Heteroeirrus* Grube, to which it is closely related. The number of branchial cirri is variable in both, but their arrangement is the same. The setæ, however, are different in their arrangement. In *D. concharum* the 1st segment bears no setæ; on the 2d to 7th there are short capillary setæ, above and below; on the 8th there is a solitary, long, unciform seta in the dorsal fascicle of capillary setæ, 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 setæ 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 setæ, 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 is usual in the *Maldanidae*. 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 rami, 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 rami, 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 filifera*, 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 unciniiform, 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*.

**Polycirrus phosphoreus**, 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** Mahgren.

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. Branchiæ slender, cirriform, in length about equalling the diameter of the body.

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

**Spirorbis Stimpsoni**, sp. nov.

*Spirorbis nautiloides?* Verrill, in former papers. See Trans. Conn. Acad., vol. iii, p. 45, pl. iv, fig. 4 (*non* Lamarek).

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

smoothish. Branchiæ 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 80 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 antennæ, 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, 29<sup>mm</sup>.

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

**GEPHYRÆA.**

*Priapulus pygmæus*, 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 papillæ, 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 papillæ on the annulations. Caudal appendage in length about equal to diameter of body, with a rather stout stem, bearing about twelve short, fusiform papillæ or branches, which are changeable in form, and covered with small conical papillæ. 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).

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

This species belongs to *Amphiporus*, as characterized by M'Intosh. 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 M'Intosh 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 anterior groups 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 groups 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 lactifloreus** 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.

**Tetrahymena 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 grayish or yellowish,

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.  
*Cosmocephala* (?) *cordiceps* (Sars, MSS.), Jensen, Turbellaria ad Litora Norvegiæ, 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.

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

*Lineus Gessercensis* McIntosh.—*Nemertes viridis* Verrill, Report on Invert. of Vineyard Id., etc., p. 334 [628].

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.

**Lineus 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.

**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 inornata**, 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

140 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, 2.5<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 ?

*Nectonema*, gen. nov.

Body long, slender, nearly round, smooth. Head without appendages, obtusely rounded or blunt-conical, apparently with the mouth on the under 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.

*Nectonema agilis*, sp. nov.

A long, slender, and exceedingly active, round worm, resembling a *Gordius*, 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 the 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 length, 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 a transverse whitish band 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 (ovaries?), with numerous transverse divisions, extending from near the head to the tail, could be indistinctly seen. Color, in life, grayish or yellowish white, with four narrow, double, longitudinal lines of dark slate-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.

#### PÓLYZOA.

*Alcyonidium rubrum*, sp. nov.

An encrusting species, forming broad, smooth colonies, covering stones and large shells. Zoëcia 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 zoëcia. 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. Zoëcia 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 zoëcia, situated rather in advance of the middle of the outer margin of the frontal area, the beak reaching beyond the distal end of the zoëcia; 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. Oëcia 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. Zoëcia 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 zoëcia, 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. Oœcia 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 turrata* (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 *Kinetoskias* Dub. and Koren. Both occur in deep water off Maine and Nova Scotia.

*Bugulella 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. Zoëcia 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 belong, 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.

- I. *Cellularia* Pallas, 1766, (restricted). Zoœcia unilateral, in two alternating rows, mostly protected by lateral spines, either simple or dilated. Vibracula and lateral and median avicularia present. Type *C. scruposa*.\*
- a. Subgenus *Cellularia* (= *Scrupocellaria, pars*, Gray, Busk). Lateral spines all simple.
- b. Subgenus *Cellarina* Van Ben. (incl. *Tricellularia* Flem., 1828). One of the lateral spines usually more or less dilated and often expanded in a shield-like form in front of the zoœcia. Two New England species: *C. scabra* Van Ben. and *C. ternata* (Sol.), with varieties *gracilis* and *duplex* (Smitt).
- The name *Tricellularia* (given to *ternata*) might have been adopted for this subgenus, but it is very inapplicable to the group, and even to the type-species, as now known.
- II. *Scruparia* Oken (restricted) (= *Scrupocellaria, pars*, Gray; *Canda* Busk, non Lamx.). Lateral avicularia and vibracula absent. A lateral spine develops into a protective (often frondose) shield. Type *S. reptans* (Linné), not yet found on the American coast.
- III. *Bugulopsis* Verrill (= *Cellularia, pars*, Busk, non Pallas). Characterized by the simple, unarmed zoœcia, arranged in alternating rows, and destitute of avicularia, vibracula, and shields. Type *C. Peachii* (Busk), Gulf of Maine and Bay of Fundy. European seas, north to Spitzbergen.

As no species of the last group was originally included in *Cellularia*, it is inadmissible to restrict that name to it. Either *reptans* or *scruposa* should be taken as the type of *Cellularia*, both having been originally included by Pallas, as well as by most subsequent authors. *Scruparia* † Oken (1815) originally included not only the group that had previously been named *Eueratea* by Lamouroux (1812), but also *S. reptans*. Therefore there seems to be no good reason why it should not be restricted, as above, rather than be displaced by the much later and more objectionable name, *Scrupocellaria*. *Menipea*, used by Busk and others for *Cellarina*, is inadmissible, in that sense, for the original group named *Menipea* by Lamouroux is a valid and very distinct genus. *Canda* (Lamx., 1816), adopted by some for *Cellularia reptans*, cannot properly be so used, for the original type is a distinct genus.

*Porellina stellata* Verrill, Amer. Jour. Sci., xviii, p. 53.

A large species, forming radiating patches on shells, etc. Zoœcia arranged in quincunx, large, broad, moderately convex, white, shining, mostly imperforate and smooth, the marginal ones more or less perforate in front. Apertures nearly semicircular, the proximal edge straight or nearly so, often with two spines on the distal border; median pore, a short distance from the aperture, large, nearly circular, provided with numerous, slender, convergent spinules, which nearly reach the center, giving the pore a stellate appearance. Avicularia near the lateral margin, about opposite the median pore, varying in size and form; in the same colony some are short triangular, others long triangular, while others with a long and acute erect tip show the transition toward vibra-

\*This species has been recorded from the Gulf of St. Lawrence by Packard and others, but I have myself seen no American examples.

†This name has recently been given to a new genus, in a new sense, by Hincks, in accordance with a practice that is nearly always unsafe, as well as confusing.

cula. Length of zoëcia,  $0.60^{\text{mm}}$  to  $0.70^{\text{mm}}$ ; breadth,  $0.50^{\text{mm}}$  to  $0.60^{\text{mm}}$ ; breadth of apertures,  $0.12^{\text{mm}}$  to  $0.15^{\text{mm}}$ ; of median pore,  $0.05^{\text{mm}}$  to  $0.06^{\text{mm}}$ . The zoëcia are about twice as large as those of *P. ciliata*.

Casco Bay, Maine (U. S. Fish Commission, 1873).

In the nearly circular form of the median pore this species approaches the genus *Porina*, as restricted by Smitt (Florida Bryozoa); but in all other respects, except size, it agrees so closely with *P. ciliata*, made the type of *Porellina* by Smitt, as to forbid a generic separation, although the latter has a crescent-shaped pore.

The genus *Porellina* was, however, originally established by D'Orbigny for erect fossil species, having the surface foveolated. In his system, the present species would belong to *Reptoporina*, based on the encrusting forms with aperture and special pore as in *Porina*. Perhaps it may be desirable to separate generically the species having the hemispherical apertures, median ciliated pore, and sublateral avicularium, as in this species and *P. ciliata*, whatever be their mode of growth.

Mr. Hincks has recently proposed a genus, *Microporella*, with *P. ciliata* as type, which might also, if adopted, include the present species. *Diporula* Hincks\* seems scarcely worthy of generic separation from the latter.

**Smittia** Hincks (= *Escharella* Smitt, non Gray).

The genus *Escharella*, as defined by Smitt, still included somewhat heterogeneous species. The form of the zoëcial aperture, chiefly relied upon by both Smitt and Hincks, proves to be a rather indefinite character, since it varies in the form and breadth of the sinus, in the several species now known, from an ill-defined, broad, shallow sinus, nearly as in *Lepralia*, to a deep and narrow one, like that of *Escharina* (*Hippothoa* Smitt). It would appear best, therefore, to combine, with the form of the aperture, the presence of a median avicularium in front of the sinus, or within its margin. The mere form of growth, presence or absence of pores in the zoëcia and oëcia, are of no importance generically, as Smitt has well shown. This restriction would exclude *E. sanguinea* Sm., *E. Jacotini* Sm., and some other species, most of which can be well referred to *Escharina* (*Schizoporella* Hincks), as here limited. The species first described in 1853, by Stimpson, as *Flustra solida* (= *Eschara palmata* Sars), and referred to *Escharella* by Smitt, seems, however, worthy of generic separation, on account of the chitinous fibres strengthening the zoarium. It appears to belong to the genus *Flustri-morpha* Gray, so far as can be determined by his description, in which the position of the avicularia is not mentioned, nor even the exact form of the zoëcial apertures.

As to the correct name for this natural and important genus, there is still room for diversity of opinion. *Escharella* Gray, 1848, (non D'Orbigny), certainly ought not to have been restricted to this division, for

\*Annals and Magazine of Natural History, vol. iii, p. 156, Feb., 1879.

it included only three species, neither of which belongs to the present group. Moreover, his first species (*immersa*) and third species (*variolosa*, in part) belong to the older genus *Escharoides*, as restricted and adopted by him in the same work. The second is a *Porina* or *Porellina*. Therefore it would be better to regard *Escharella* as a synonym of *Escharoides* Edw. (1835), in Gray's restricted sense. *Escharella* D'Orbigny (1852) was established wholly independently of Gray's genus, and is a group entirely distinct from Gray's, and if the name is to be used at all, it should be used only in D'Orbigny's sense. *Smittia*, recently proposed by Hincks (Ann. and Mag., Feb., 1879), may well be adopted, therefore, for the present group. The following species, from our coast, belong to this genus:

*Smittia porifera* (Smitt) Hincks. Massachusetts Bay to Labrador, common.

*Smittia candida* (Stimp.) Verrill. Gulf of Maine, Bay of Fundy, etc.

*Smittia globifera* (Packard) Verrill. Casco Bay to Labrador, common.

*Smittia auriculata* (Hassal?) Verrill. Gulf of Maine.

*Smittia Landsborovii* (Johnst.) Hincks. Massachusetts Bay, northward, common.

*Smittia bella* (Busk) Hincks. Gulf of St. Lawrence (Whiteaves).

The last species I have not seen from our coast; but I have at least two additional, undetermined species.

***Smittia candida* V. (= *Lepralia candida* Stimpson).**

This species has been entirely misunderstood by Smitt and others, owing doubtless to the imperfection of the original description. Stimpson's figure, however, represents very well the form of the aperture and of the zoëcia in young colonies, without oëcia and avicularia. The zoëcia are rather large, and conspicuously perforated over the front; the aperture has a distinct rounded sinus. The avicularia, which are usually absent on many or most of the zoëcia of a colony, are large, obtusely rounded at the end, commonly placed transversely just in front of the sinus, or sometimes partially within it, but on some crowded colonies varying much in direction, some being direct, others oblique, others transverse. Oëcia large, globose, usually perforate, but sometimes, when highly calcified, the pores mostly disappear, or become small, and the surface becomes rough and granulous. It is very closely related to *S. porifera*, but has larger zoëcia and avicularia, while the usual obliquity of the latter is generally distinctive.

***Smittia globifera* V. (= *Lepralia globifera* Packard, Canadian Naturalist, vol. viii, p. 408).**

This species is very closely related to *S. auriculata*, with which I have, in former papers, united it. As compared with an authentic English specimen of *S. auriculata*, received from the Rev. A. M. Norman, the zoëcia and avicularia are about one-half larger, but of nearly the same form. The zoëcia are less regularly perforated. In our species, the

oœcia are prominent, but scarcely globose, the front surface being more or less flattened, and perforated with rather large pores, which are mostly confined to the flattened front surface. The median avicularium is well-rounded, direct, and just in front of the well-defined sinus. This species occurs in the encrusting (Lepralian) form, and also in the various foliaceous (Hemescharine) states, sometimes cup-shaped, saucer-shaped, and hat-shaped, according to place of growth. It is very common in the Bay of Fundy and on the Grand Banks.

*Escharina* Edw., 1835, = *Hippothoa* (*pars*) Smitt, = *Schizoporella* Hincks, 1879.

Edwards, in establishing this generic group, assigned a definite species as its type (*E. vulgaris* Moll); and although he afterwards united with it several incongruous species, the name ought to be retained for the group including his specified type. The earlier name, *Hippothoa* Lamouroux, adopted by Smitt for this group and the true *Hippothoa*, combined with it by him, should, of course, be retained for the group typified by *H. divaricata*, from which *H. hyalina* (type of *Celleporella* Gray) does not appear to me to be generically distinct. The name given by Edwards, being next in order,\* and definitely applied, should, therefore, be retained for the present group. Moreover, Gray, in 1848, when restricting the genus, retained the name for the typical group. The name *Herentia* Gray, as restricted by Smitt, would also be available for this group, if *Escharina* could properly be rejected. In any case, the new name proposed by Hincks seems wholly unnecessary.

*Escharina*, as understood by me, includes those species which have the primary zoœcial aperture more or less subcircular, with a distinct, often narrow, median sinus, and with the avicularia lateral, when developed. Mode of growth varies, but more generally encrusting in a single layer; sometimes, as in *E. Isabelliana*, forming thick masses, consisting of numerous layers of cells. Our species, so far as determined, are as follows:

*Escharina Isabelliana* D'Orb. = *E. variabilis* Leidy.

*Escharina reversa* Verrill. Perhaps a variety of the preceding.

*Escharina linearis* (Hassal).

*Escharina biaperta* (Mich.).

*Escharina secundaria* (Smitt).

*Escharina ansata* (Johnst.) Gray.

*Escharina porosa* Verrill, sp. nov.

One or two undetermined species are also in our collection.

*Escharina porosa* Verrill, sp. nov.

*Escharella pertusa* Verrill, Amer. Journ. Sci., vol. x, p. 41, 1875, (*non* Smitt).

Zoarium encrusting shells and stones. Zoœcia large, oblong, perforated by numerous, rather large, round pores; apertures large, roundish,

\*The name *Escharina* was used by Ehrenberg in 1834 as the name of the family, but in that sense it was a synonym of *Escharidæ* Fleming, 1828, and consequently might be used as a generic name in another sense.

with a broad, shallow, median sinus, and small, lateral, opercular denticles. Oœcia large, prominent, globose, the surface rough with sharp granules, and perforated by small, inconspicuous pores. Avicularia scarce, often absent, when present lateral, opposite the side of the aperture, broad, obtusely rounded, the point directed toward the zoœcial aperture. Color, when dry, reddish brown.

Vineyard Sound and Long Island Sound, 8 to 12 fathoms, common.

The species here described has a close resemblance to both *S. porifera* and *S. candida*, and when the avicularia and oœcia are wanting it will not be easy to distinguish them. The resemblance to *S. candida* is particularly close, and extends even to the oœcia, but these are rougher and less porous in *E. porosa*. The situation and form of the avicularium are, however, the best diagnostic characters.

This species is closely related to *E. sanguinea* (Norman) of Europe. It also has a general resemblance to *E. pertusa* (Esper), as described by Smitt; but there appears to be great confusion in regard to the identification of the latter, and doubtless several species have been confounded under that name. Hincks refers *pertusa* to *Lepralia*. American writers have referred several distinct species to *pertusa*, and I am not sure that the genuine *pertusa* inhabits our coast. The species thus named by Dawson, on examination of specimens kindly furnished by him, proves to be *Smittia porifera*. Probably *S. candida* has also been identified as *pertusa* by some writers.

The generic relations of the species, well described and figured by Smitt as *Escharella Jacotini* (Aud.), has been variously determined. In Gray's system, it appears to have been united with one of the forms of *Escharoides coccinea*, under the name of *variolosa*, and referred to *Escharella*. Smitt placed it under *Escharella* in a special subdivision. It seems to me, however, to have more definite relations to the genus *Discopora*, as defined by Smitt, and more particularly to that subdivision of *Discopora* which includes *D. pavonella*, *D. appensa*, etc., characterized by having lateral avicularia, and with a median denticle at the proximal edge of the primary zoœcial aperture, and to which the name *Mucronella*, given by Hincks to the group called *Discopora* by Smitt, may be properly restricted.

We may subdivide *Discopora* into three natural groups, easily defined, as follows:

**Discopora** Lamarek (*pars*), restricted by Edw. (*non* Fleming; *non* Gray).

*Discopora* (*pars*) Smitt, Skandnaviens Hafs-Bryozoer, p. 25, 1868. *Palmicellaria* (*pars*) Hincks.

The type of this genus, as restricted by Edwards, was *D. verrucosa* Lam. (*non* Esper). As shown by Edwards, this species is very distinct from Esper's species, and is closely allied to the well-known *D. Skenei* of the North Atlantic. Gray was, however, misled by the quotation of Esper's name in the synonymy, and erroneously took Esper's species as

the type of *Discopora*. Hincks attributed the name to Fleming, who used it in a different sense, and, apparently overlooking the fact that the name originated with Lamarek, rejected it for the original group.

*Discopora*, as I propose to restrict it, is characterized by having both median and lateral avicularia, with the former (or both) often raised on a prominence in front of the zoæcial aperture. *D. Skenei*, with its Lepralian form described as *L. crassispinia* by Stimpson, is the only known New England species.

**Escharoides** Edw., in Lam., 1835; Gray (restr.), 1848, (*non* Smitt).

*Mucronella* (*pars*) Hincks, 1879.

Type *E. coccinea* (Abildg.), as defined by Smitt, = *E. Peachii* (Johnston).

This group includes those species of *Discoporidae* having a prominent median denticle, but without avicularia. The zoæcial aperture is usually somewhat raised, and is often armed with marginal spines. As *E. coccinea* was one of the species originally included by Milne Edwards, Gray's restriction was correctly made, and should be adopted.

The typical species, with several varieties, abounds on our coast.

**Mucronella** Hincks (restricted), Ann. & Mag., iii, p. 162, 1879.

*Discopora* (*pars*) Smitt, Skandinaviens Hafs-Bryozoen, p. 25, 1868.

Characterized by having lateral avicularia on one or both sides of the zoæcial aperture, but without the median avicularium. Median denticle of various forms, often small. Apertures armed or unarmed with spines. Growth various, most often encrusting, foliaceous, or lichen-like, sometimes forming thick crusts composed of many layers. Our species are as follows:

*Mucronella appensa* (Hassal) Verrill.

*Mucronella paronella* (Alder) Hincks.

*Mucronella nitida* Verrill = *Discopora nitida* V., 1875.

*Mucronella Jacotini* (Aud.) V. = *Escharella Jacotini* Smitt.

*Mucronella scabra* (Fabr.) V. = *Discopora scabra* Smitt.

*M. scabra*, var. *labiata* (Stimp.) = *Lepralia labiata* Stimp.

*Mucronella orata* (Smitt) V. = *D. scabra*, var. *orata* Smitt.

**Mucronella nitida** Verrill.

*Discopora nitida* Verrill, Amer. Journ. Sci., ix, p. 415, pl. vii, fig. 3, 1875.

This species is very abundant in Vineyard Sound and Long Island Sound. Although it is an encrusting species, when young often forming small, thin, radiating patches, when old it forms thick, irregular, cellular crusts, composed of numerous layers of cells. Some of these finally become large, subglobular masses, with an uneven surface, sometimes two inches or more in diameter. The color, when recently dried, is usually bright greenish yellow, sometimes brownish. The younger cells have the walls of both oëcia and zoëcia uniformly perforated; when older, the bounding walls become raised; a marginal row of conspicuous pores remains, while those over the front mostly disappear, or are obscured by granules; the pores of the globose oëcia also mostly dis-

appear and their surface becomes roughly granulous. The lateral avicularia are generally abundant, very few cells being without one or both; they vary somewhat in size, form, and position, but are usually small and near the aperture. The zoœcial aperture is small, always with a small, squarish mnero in front, and with a slender lateral process on each side for the articulation of the operculum. In the secondary stages of calcification, a strong, prominent, flat process often rises up on each side of the aperture.

*Mucronella scabra* Verrill.

The relationship of *M. scabra* is not always obvious, owing to the fact that usually only one large lateral avicularium is developed, and this is crowded so far in front of the zoœcial aperture as to appear like a large, rostriform, median avicularium, facing sidewise. A careful examination of the young cells will, however, usually show some cells with two lateral avicularia, with the small median denticle of the aperture between them.

*Escharopsis* Verrill = *Escharoides* Smitt (*non* Edw.).

Bulletin National Museum, No. 15, p. 149, 1879.

I proposed this name for a group, including two of our larger, northern, *Eschara*-like species. The zoœcial aperture has a narrow median sinus, which in the later stages of growth includes within it a small laterally placed avicularium, facing sidewise. The genus is otherwise apparently closely related to *Escharina*, *Celleporaria*, and *Retepora*.\* Smitt, in his Florida Bryozoa, even referred one of the species to *Retepora* (*R. rosacea*). The growth of both our species is often Lepralian and foliaceous as well as *Escharine*.

*Escharopsis lobata* (Lamx.) Verrill = *Escharoides Sarsii* Smitt = *Lepralia producta* Packard.

*Escharopsis rosacea* (Sars) Verrill = *Escharoides rosacea* Smitt.

#### TUNICATA.

*Ascidia inornata*, sp. nov.

In expansion the body is upright cylindro-conical, about twice as high as broad; the base is about the same in diameter as the middle portion, and but very little expanded. The oral tube is much longer than the other, subterminal, swollen at base, tapering, the upper part cylindrical, the opening surrounded by seven low, rounded, thin lobes or crenulations, between which are seven orange-colored ocelli; corresponding with the ocelli there are seven thickened, pointed lobes or folds of the test, which run down from them along the tube as slightly prominent costæ, with transverse wrinkles between them. The anal tube is subterminal, shorter and smaller, situated to one side, and only about half

\* In a paper received from Dr. Smitt, since the above was written, he has enlarged his genus *Discopora*, so as to include the northern species of *Retepora* (*R. cellulosa* and *R. elongata*), and also the species here called *Escharopsis rosacea*. (Öfversigt af Kongl. Vet.-Akad. Förh., 1878, p. 30.)

as long as the oral. Its orifice is surrounded by six lobes and ocelli, like those of the other. Test moderately thick and firm, somewhat wrinkled, nearly glabrous, translucent, dull yellowish, blotched more or less with russet-brown. The internal organs show through faintly as yellow and dark markings. Height, in expansion, 32<sup>mm</sup>; greatest diameter, 17<sup>mm</sup>; length of oral tube, 12<sup>mm</sup>; of anal, 4<sup>mm</sup> to 5<sup>mm</sup>.

Johnson's Bay, near Eastport, Me., 12 fathoms, stony, August 8, 1872.

**Halocynthia** Verrill = *Cynthia* Savigny (*non* Fabr., 1808).

Bulletin National Museum, No. 15, p. 147, 1879.

This name was proposed for the restricted genus *Cynthia* of Savigny, characterized by having both apertures quadrangular, and ovaries developed on both sides. The species now known from our northeast coast are as follows:

*Halocynthia pyriformis* (Rathke) = *Cynthia pyriformis* authors.

*Halocynthia rustica* (Linné) = *Ascidia monoceros* Möller.

*Halocynthia tuberculum* (Fabr.) = *Cynthia carnea* (Ag.) Verrill.

*Halocynthia pulchella* Verrill = *Cynthia pulchella* Verrill.

*Halocynthia echinata* (Linné) = *Cynthia echinata* authors.

*Halocynthia partita* (Stimp.) = *Cynthia partita* Stimpson.

#### MOLLUSCA.

**Xylophaga dorsalis** (Turton).

Many living specimens of this species have been found in bits of old wood, dredged in Casco Bay; in 100 to 110 fathoms, about thirty miles off Cape Ann; and in various parts of Massachusetts Bay and Cape Cod Bay. It has previously been recorded by Mr. J. F. Whiteaves from Gaspé Bay. Found on the European coast south to the Adriatic.

**Lunatia nana** (Möller) G. O. Sars, Moll. Reg. Arct. Norveg., p. 159, pl. 21, fig. 16.

*Natica nana* Möller, Kroyer's Tidss., vol. iv, p. 80, 1843.

Three living specimens of this species were dredged on Stellwagen's Bank, north of Cape Cod, in 26 to 32 fathoms, sand, by the U. S. Fish Commission, 1879. It has not previously been recorded from the American coast; but it was dredged in 1872 by Messrs. Smith and Harger, in 45 fathoms, on Le Have Bank. It is easily distinguished from all our other species of the group by its horny operculum and closed umbilicus. Except in the last character, it resembles *L. immaculata*. Its color is ivory-white, shining.

**Dendronotus robustus** Verrill, Amer. Journ. Science, vol. 1, p. 405, fig. 1, 1870.

*Dendronotus velifer* G. O. Sars, Mollusca Reg. Arcticæ Norvegiæ, p. 315, tab. 28, fig. 2, tab. xv, fig. 4 (dentition), 1878.

The species well-described and figured in the excellent work of Sars is identical with the American form. Our *D. robustus* was described from a specimen not fully grown; but we have since dredged it of larger size, agreeing with *D. velifer*, in numerous localities, from off Cape Cod

to Nova Scotia, in 20 to 100 fathoms. The dentition of our original specimen is like that figured by Sars for *D. velifer*.

***Idalia pulchella*** Alder and Hancock.

*Idalia pulchella* G. O. Sars, op. cit., p. 313, tab. 23, fig. 1, a-c, tab. xiv, fig. 8 (dentition), 1878.

This species has been found, for the first time, upon the American coast, by Mr. J. H. Emerton, who discovered it at Salem, Mass., this season. He has kindly sent me a specimen and a colored drawing of the species, which he had already determined. The specimen agrees very closely with Sars's description and figures, both in external characters and in dentition, but not so well with those of Alder and Hancock.

#### ANTHOZOA.

***Bolocera multicornis***, sp. nov.

A large, handsome species, broad and low, with a multitude of moderate-sized tentacles, crowded in many rows, and covering the greater part of the disk. Column smooth, very short; in our specimen the disk was so expanded that the margin was on a level with the base; a smooth rim below the bases of the tentacles. Tentacles very numerous (several hundred), crowded in twenty or more indistinct, close, concentric rows, which entirely cover and conceal the disk, except a narrow, naked zone around the mouth; they are changeable in form, often cylindrical and blunt at tip, at other times fusiform, clavate, or swollen in any part, their length nearly equal in extension, and mostly less than a fifth of the diameter of the disk, or 14<sup>mm</sup> to 18<sup>mm</sup>. The disk, as expanded, is regularly convex, and the specimen showed no inclination to contract or withdraw its tentacles. Mouth with a distinct, gonidial groove at each end, bordered by a large fold or lobe on each side; sides of mouth with numerous irregular lobes or folds and wrinkles. Color of body and tentacles nearly uniform bright red-lead color or orange-scarlet; mouth-folds a deeper tint of the same color.

Diameter of expanded disk, about 3.75 inches, or 194<sup>mm</sup>; height at center, 30<sup>mm</sup> to 33<sup>mm</sup>.

One specimen only, dredged off Cape Cod, in 45 fathoms, shelly bottom, 1879 (U. S. Fish Commission).

***Edwardsia pallida***, sp. nov.

A long, slender, soft, flaccid, whitish species. Column smooth, destitute of any investment, but sometimes with grains of sand, slightly adherent; surface faintly longitudinally sulcated, and sometimes finely wrinkled transversely. The form is somewhat changeable, usually much elongated, nearly cylindrical, but often tapered at the posterior end. Tentacles about twenty-four, slender, the length about twice the diameter of the body, of nearly uniform diameter to near the tip, translucent whitish, often with a pale olive-green central line, interrupted by a line of opaque white spots, often ten to twelve on a tentacle, or sometimes

by transverse lines of white; the central dark line is sometimes absent; column translucent, dull gray or grayish white, striped with narrow flake-white lines, between which the dark internal organs show through; a circle of lunate spots of opaque yellowish white is situated just below the tentacles, corresponding with the broad longitudinal stripes. Disk often much protruded, yellowish white, radiated with opaque white.

Provincetown, Mass., in sand, at low-water (U. S. Fish Commission, 1879).

**Anthothela**, gen. nov.

This generic division is proposed for the *Briareum grandiflorum* (Sars) and allied species. It is related to *Briareum* and *Paragorgia* in having a soft spiculose axis, but its polyp-cells are prominent and permanently exsert, and the polyps themselves are not entirely retractile. The cœnenchyma is thin, and often spreads out irregularly over foreign bodies or around the base, as an encrustation.

**Anthothela grandiflora** (Sars) Verrill.

*Briareum grandiflorum* Sars, Fauna Litt. Norvegiæ, p. 63, pl. 10, fig. 10-12.

This species has been obtained in several instances by the Gloucester halibut fishermen in deep water, off Nova Scotia, and presented to the U. S. Fish Commission. It was first obtained by Capt. N. McPhee and crew, of the schooner "Carl Schurz," off Sable Island.

**Halipterus Christii** (Koren and Dan.) Kölliker.

A single specimen of a species of *Halipterus*, which is, perhaps, identical with the above species, although differing somewhat from the descriptions and figures of the Norwegian form, has been presented to the U. S. Fish Commission by Capt. Thos. F. Hodgdon and crew, of the schooner "Bessie W. Somes," from the Grand Bank.

**Alcyonium digitatum** Linné (?).

Two specimens, which I refer very doubtfully to this species, were taken by Captain Greenwood and crew, of the schooner "Sultana," in 80 fathoms, on Clark's Bank, east of Cape Cod.

They form low, thick, lobular masses, with the polyps scattered over the entire surface, except at the very base, and everywhere showing the cœnenchyma between them. The base is somewhat spreading, and there is no main trunk, for the division into rounded or flattened lobes takes place close to the base, and they again subdivide, so that a group of short, thick, obtuse lobes, partly rounded and partly flat, results. The polyps are rather larger than in *A. carneum*, and some are retracted into the cells that are scattered over the cœnenchyma, and others more or less expanded; toward the summits of the lobes they are more numerous, but not crowded. The surface of the cœnenchyma, under a lens, shows a granular appearance, due to the small white spicula.

If not identical with *A. digitatum* of Europe, it is at least very closely

related, and belongs to the same section of the genus. A comparative study of the spicula has not yet been made.

*Alcyonium multiflorum*, sp. nov.

A large, upright species, with a tall bare trunk, which divides near the top into numerous divergent cylindrical branches, which are naked, except near the ends, where they again subdivide in the same way into secondary branches, which in turn divide again into a cluster of short, terminal branchlets. The ultimate branchlets bear at their ends an umbel-like cluster of crowded polyps, which in contraction form rounded groups. The whole forms a panicle-like structure, not unlike a cauliflower—a resemblance noticed by the fishermen. The minute polyp-cells are closely crowded at the ends of the branchlets, so as to leave no naked cœnenchyma visible between them. They are apparently not retractile, but the tentacles are often contracted into eight rounded, minute, rather rigid lobes at the summit of the polyps, which, in contraction, have small, short bodies. The branches, branchlets, and trunk are usually sulcated in alcoholic specimens, and have a smooth, scarcely granular surface. The surface is smoother than in *A. carneum*, though the structure of the cœnenchyma and interior is firmer and less flexible. Height, about 4 to 5 inches; breadth, about 3 inches, in contraction. Some specimens are considerably larger. Color, in alcohol, yellowish white; in recently preserved specimens, bright red, stained with purple.

Received from Daniel McKinnon and crew, of the schooner "Mary F. Chisholm," N. lat.  $44^{\circ} 06'$ , W. long.  $52^{\circ} 54'$ , 220 fathoms. Taken also by Captain John E. Wilson and crew, of the schooner "Polar Wave," in 200 fathoms, N. lat.  $44^{\circ} 30'$ , W. long.  $57^{\circ} 08'$ , and in various other localities, in deep water, by the fishermen. Called sea-cauliflower by the fishermen. Closely related to *A. carneum*, but differs in having smaller polyps, which are so crowded as to show no bare cœnenchyma between their bases. The naked branches are longer and more paniced. It resembles in general appearance the *Gorgonia florida* Müller (Zool. Danica); but the latter appears not to be known to modern Scandinavian writers, and its affinities are doubtful.

*Alcyonium Lütkeni*, sp. nov.

*Alcyonium glomeratum* Lütken, MSS. (non Johnston).

Several specimens of a species agreeing perfectly with Greenland specimens sent to me several years ago, under the above MSS. name, by Dr. Chr. Lütken, were dredged in 52 fathoms, off Halifax, N. S., by the U. S. Fish Commission, in 1877.

It may be distinguished by having the integument, especially of the polyp-bodies and bases of the tentacles, filled and covered with spicula, so as to render them decidedly rigid and incapable of complete contraction. The main stem is upright, without polyps, giving off cylindrical branches along the sides; from these small lateral branchlets arise all along their sides as well as at their ends, each bearing a cluster of

three to five, or more, polyp-cells, which are larger than in *A. carneum*, and, when contracted, are obovate, incurved, and show the bases of the eight tentacles as small terminal lobes. The spicula are larger and rougher than in *A. carneum* and the two preceding species. Height, 3 inches, or more.

#### ECHINODERMATA.

*Tremaster*, gen. nov.

Body thin, pentagonal, the rays united by a thin interradial web extending to their tips. Five interradial openings, situated toward the center of the disk, pass directly through to the lower side, where they open at the aboral side of the jaw-plates. Ambulacral grooves wide toward the mouth. Suckers in four rows. Upper surface covered with imbricated flat plates, which may bear granules and marginal spinules. Lower surface with small imbedded plates, bearing spines.

*Tremaster mirabilis*, sp. nov.

Body thick in the central region, very thin at the margin, the ends of the rays extending but little beyond the interradial margin, while the interradial web extends in a rounded lobe a little beyond the proper end of the rays, so that there is at the tip a slight but evident emargination. In all the specimens, the body is bent upward in a very convex form, with the rays and margin bent abruptly downward, so that the edges are in contact with the ground, or nearly so, all around, leaving a large concavity underneath. The margin is thrown into a broad fold or undulation between the rays. On the dorsal surface, the imbricated plates of the radial regions are more prominent, thicker, and with a broader free portion than those of the interradial regions, and they bear a row, sometimes of eight to ten small, acute, appressed spines (often but one or two in the young) along the free edge; these plates form, therefore, a regular rosette or star on the dorsal surface, its rays broad at the base and rapidly narrowed toward the margin, where the plates become very small and lack the spinules; all the dorsal plates are covered with small scattered granules, often with one or several larger central ones. In the interradial areas, the plates are thin, flat, the inner or free ends are oval and destitute of spines, and each plate is usually overlapped by only two, laterally placed, and not by the one directly behind it, as in the radial areas; these plates are large and somewhat rhomboidal toward the central area of the disk, but become very small and rounded toward and at the margin; each minute lower marginal plate bears a small ovate spinule, which form a close row or fringe around the margin. The central area of the disk is covered by large granulated plates; four or five, somewhat irregular in form, surround the central opening, which is protected by a circle of about twelve to eighteen small, obtuse spines. Madreporic plate prominent, close to the central opening, surrounded by small spinules. The five disk-perforations are large and conspicuous, when distended elliptical in form, and bordered by a row of small spines, which often converge above it. The interradial areas of the lower surface are formed

by small, more or less oblong plates, which become very small toward the margin; each bears a spine, which toward the mouth are rather long and acute, gradually becoming shorter, flatter, and blunter toward the margin, near which they are spatulate, but close to the margin they become very small and slender. The adambulacral plates are transversely elongated; each usually bears four spines, the two inner small, slender, acute, the innermost the smaller, and two outer much larger and stouter ones, the outermost usually the largest, flattened and often slit or channeled at the end. The disk-perforations are large, rounded, with a smooth rim, and not surrounded by special spines. Jaw-plates prominent, each bearing at the oral end two or three long, acute spines, and others on the upper surface, while on the lateral margin a row of six or eight smaller, slender spinules, usually with a second row behind them, of fewer spines. Ambulacral suckers and pores large, arranged in two alternating rows on each side of the median line; the grooves are broad and deep.

Color of specimens recently preserved in alcohol, deep orange-red above, yellowish-white beneath. The surface is covered with a soft, thin, mucous layer. Greatest diameter of the largest specimen, 112<sup>mm</sup>; lesser or interradial diameter, 100<sup>mm</sup>; breadth of larger dorsal plates, 9<sup>mm</sup> to 11<sup>mm</sup>; length of longest adambulacral spines, 8<sup>mm</sup> to 9<sup>mm</sup>. A smaller one has the greater radius 63<sup>mm</sup>; lesser, 55<sup>mm</sup>; breadth of larger dorsal plates, 6<sup>mm</sup>; length of largest adambulacral spines, 4<sup>mm</sup> to 5<sup>mm</sup>; of inner ones, 1<sup>mm</sup>.

This remarkable new starfish has hitherto been obtained only by the Gloucester halibut fishermen, who have presented three specimens to the U. S. Fish Commission. The first specimen was taken by Capt. Charles Anderson and crew, of the schooner "Alice G. Wunson," in 250 fathoms, off George's Bank, N. lat. 42° 08', W. long. 65° 31', April 28, 1879. The largest specimen was taken by Capt. Thomas Olson and crew, of the schooner "Epes Tarr," in 150 fathoms, N. lat. 47° 06', W. long. 58° 15'. Another specimen was taken in 220 fathoms, by Captain Kilpatrick and crew, of the schooner "Polar Wave," in N. lat. 44° 32', W. long. 57° 09'.

*Porania spinulosa*, sp. nov.

Greater radius, 40<sup>mm</sup>; lesser radius, 23<sup>mm</sup>. Whole upper surface covered with fine, sharp spinules. Pores on the dorsal surface very numerous, arranged in irregular groups of 6 to 15 or more, over the whole upper surface of the disk and rays, and in a marginal series between the upper and lower marginal plates. Lower marginal plates with a group of ten to twelve sharp spinules, in two or more rows on each plate. Lower surface with large, oblong, flat plates, separated by radial grooves, and bearing at their outer ends a row of two or three small, appressed spines; their surface bearing scattered, small, sharp granules. Adambulacral spines sharp, in several rows; two inner ones

side by side on each plate; one, somewhat stouter, farther out, alternating with them; outside of these are usually two, obliquely placed, divergent and usually pointing toward the end of the rays; jaw-plates bearing somewhat larger acute spines.

Color, in life, orange-red, mottled with brighter red on the dorsal side; beneath, light yellow.

Two characteristic specimens of this species have been dredged by the U. S. Fish Commission, off Cape Cod, in 80 fathoms, mud, 15 miles N. 65° E. from Race Point; the other in 130 fathoms, mud, 26 miles E. by N. from Race Point Light. Another specimen was taken by Capt. Thomas Goodwin and crew, of the schooner "Howard," in 170 fathoms, N. lat. 45° 25', W. long. 57° 10'.

This species differs so much from typical *Porania* that it might well form a new generic type. It has not the smooth, naked skin of typical *Porania*.

#### *Archaster tenuispinus* Duben and Koren.

Several specimens of this species have been recently presented to the U. S. Fish Commission by the Gloucester halibut fishermen, from deep water, off the Nova Scotia coast. It is a new addition to the American fauna. They vary in size from about 35<sup>mm</sup> in diameter up to 250<sup>mm</sup>.

The largest specimen was presented by Capt. Daniel McKinnon and crew, of the schooner "Mary F. Chisholm." It was from 130 to 160 fathoms, N. lat. 45° 02', W. long. 56° 11 $\frac{3}{4}$ '. Two smaller ones, one from 128 fathoms, N. lat. 40° 28', W. long. 55° 25', February, 1879, the other from 250 fathoms, N. lat. 42° 40', W. long. 63° 06', were presented by Capt. Daniel McEachern and crew, of the schooner "Guy Cunningham." With the latter were fine specimens of the rare simple-armed Ophiuran, *Astrochele Lymani* V., much larger than the original type.

#### *Astrophyton Lamarckii* Müller and Troschel.

Numerous specimens of this species have been obtained in deep water off George's Bank and off the Nova Scotia coast by the Gloucester fishermen, and presented to the U. S. Fish Commission. They are found clinging to *Paragorgia arborea*, *Primnoa reseda*, *Aleyonium carneum*, and other Aleyonaria.

Easily distinguished from *A. Agassizii* and *A. eucnemis*, both of which also occur in the same region, by the granulation of the disk, which is entirely covered, both over the ribs and interradial spaces, by coarse granules.

#### *Ophiacantha millespina*, sp. nov.

A five-rayed species, allied to *O. bidentata* Ljung. (= *O. spinulosa* M. & Tr.), but distinguished readily by the very numerous and minute three-pronged and four-pronged, slender spines which thickly cover the disk. The mouth-plates are four-lobed or somewhat cross-shaped, the outer lobe narrow and long, extending into the interbrachial spaces; the inner lobe is nearly triangular; the side-lobes are nearly as long as the outer

lobe, but narrower. Mouth-papillæ large, stout, subacute, usually three on each side of the jaw, the outermost thicker than the others, which are compressed. Arm-spines numerous, long, slender, tapered, subacute, translucent, rough with small acute spinules; the upper spines on the two or three joints just beyond the margin of the disk are longer than the rest, being considerably longer than the diameter of the arm; on the second joint beyond the disk the two rows nearly meet on the dorsal side, there being ten in each row; farther out the number is soon reduced to seven or eight, the upper ones longest, the lower ones short. Under arm-plates, near the base of the arms, short and broad, with a small central angle on the proximal edge; the distal edge curved. Farther out they rapidly become narrower and longer, the proximal angle becoming more prominent and the lateral edges being incurved, while the distal edge is convex. The ventral plates are separated by the side arm-plates. Diameter of disk, 11<sup>mm</sup>; length of arms, 45<sup>mm</sup> to 50<sup>mm</sup>; of longest arm-spines, 4<sup>mm</sup>. Color, in alcohol, yellowish white.

Taken on the eastern slope of George's Bank, in 220 fathoms, and presented by Captain Anderson and crew, of the schooner "Alice G. Wunson."

#### PORIFERA.

*Cladorhiza grandis*, sp. nov.

A large and remarkable species, with a strong, branched root, a long, stout, round, unbranched stem, and a very thick, elongated, club-shaped, compact body, from which a large number of lateral processes diverge, on all sides, nearly at right angles, so as to resemble somewhat an Indian war-club. The lateral processes are long, round, enlarged at base, and swollen or clavate toward the end, which terminates in a fascicle of slender setæ; other clusters of setæ project from and roughen the surface of the swollen end. These lateral processes are arranged irregularly, but rather uniformly, and often appear to form eight to ten or more irregular rows, but are more commonly without order, and about half an inch apart at base, diverging on all sides, more or less curved to one side or downward, the lowest and the uppermost somewhat shorter; their number, on the largest specimens, amounts to a hundred or more, while in the smallest observed there are about twenty; they are tubular, the small central tube connecting with larger cavities in the body of the sponge, at their bases; the internal cavity is lined with long, slender, longitudinal spicula, and their external surface is roughened with small projecting spicula, while the surface of the sponge-body is comparatively smooth. A large central bundle of long spicula runs through the whole length of the stem and body, and subdivides so as to go into all the branches of the root, which subdivides irregularly into numerous branches, differing in the different specimens. Color, in alcohol, yellowish white or clear white.

Height of largest examples, about 18 inches; diameter of the stem, 0.5 inch; of body, 1.5 inches; length of lateral processes, 1.5 to 2 inches; their diameter in middle, about 0.15 to 0.20 inch.

A moderate-sized specimen is 220<sup>mm</sup> high; the root (imperfect) is about

40<sup>mm</sup>; the stem, 70<sup>mm</sup>; the body, 110<sup>mm</sup>; diameter of the stem, 10<sup>mm</sup>; of the body, 20<sup>mm</sup>; length of lateral processes, 25<sup>mm</sup>; their diameter in middle, 3<sup>mm</sup> to 4<sup>mm</sup>. The smallest specimen seen has the stem 40<sup>mm</sup> long; the body, 30<sup>mm</sup> long; diameter of the stem, 5<sup>mm</sup>; of the body, 15<sup>mm</sup>; length of lateral processes, up to 20<sup>mm</sup>.

Numerous specimens of this very remarkable sponge have been brought in by the halibut fishermen from the deep-water fishing grounds off Nova Scotia, during the past year, and presented to the U. S. Fish Commission. Two of the best were taken by Captain McCormick and crew, of the schooner "Wachusett," in 180 fathoms, N. lat. 43° 17', W. long. 60° 58'. Several specimens have been presented by Capt. J. W. Collins and crew, of the schooner "Marion," from Banquereau.

NEW HAVEN, CONN., October, 1879.

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**DESCRIPTION OF A NEW GENUS AND SPECIES OF FISH, *LOPHOLATILUS CHAMÆLEONTICEPS*, FROM THE SOUTH COAST OF NEW ENGLAND.**

**By G. BROWN GOODE and TABLETON H. BEAN.**

A few days ago Captain William H. Kirby, of Gloucester, Massachusetts, took 500 pounds of a remarkable new fish on a cod-fish trawl in lat. 40° N., lon. 70° W., at a depth of 84 fathoms, 80 miles south by east of Noman's Land. One of these was forwarded by him to the United States National Museum, and forms the type of a new genus and species. The single individual secured (No. 22899, Earl 342) is 33 inches long. The largest one taken, according to Captain Kirby, weighed 50 pounds.

The species appears to be generically distinct from the already described species of the family *Latilidae* Gill. It is related by its few-rayed vertical fins and other characters to the genus *Latilus* as restricted by Gill, but is distinguished by the presence of a large adipose appendage upon the nape, resembling the adipose fin of the *Salmonidae*, and by a fleshy prolongation upon each side of the labial fold extending backward beyond the angle of the mouth. For this genus we propose the name *Lopholatilus*.

*Lopholatilus chamæleonticeps* sp. nov.

**DESCRIPTION.**—The greatest height of the body (.306), which is at the ventrals, is contained about 3½ times in the length to the origin of the middle caudal rays, and 4 times in the extreme length. Its greatest width (.144) equals the length of the caudal peduncle (.144); this latter being measured from the end of the soft dorsal to the origin of the middle caudal rays. The least height of the tail (.0867) is contained 4 times in the distance of the spinous dorsal from the snout.

The greatest length of the head (.33) is contained 3 times in the length to the origin of the middle caudal rays. Its greatest width (.165) is slightly more than twice the width of the interorbital area (.08). The length of the snout (.122) is contained twice in the length of the pectoral of the right side (.244). The length of the operculum to end of flap