X.—THE ANNELIDA CHÆTOPODA FROM PROVINCETOWN AND WELLFLEET, MASS.

By Prof. H. E. Webster and James E. Benedict.

The annelids on which this paper is based were collected from June to September, 1879, by the Summer Zoological Expedition of Union College. Of the 90 species found, by far the greater number live between tides. Not much dredging was done, and none at a greater depth than thirty fathoms. Two visits to Wellfleet procured a number of forms not found at Provincetown. Three genera and sixteen species are described as new. Of the genera, *Thaumastoma* seems not to belong to any described family. Eighteen species have their northern limit extended, having been previously found only to the south of the Cape. *Nerilla antennata* Schmidt and *Trichobranchus glacialis* Malmgren are European forms not previously found on our coast. *Syllides* Œrsted is also new to our coast, and is represented by a new species. *Capitella capitata* has not previously been reported from the United States, though found further north. The figures, except figs. 95—97, were made by H. E. Webster.

Family APHRODITIDÆ.

APHRODITA (*Linn.*) *Kinberg.*

Aphrodita aculeata *Linn.*

Aphrodita aculeata Linn. Systema Naturæ, ed. xii, vol. i, p. 1084. 1767.
Kinberg. Eugenies Resa, p. 3, pl. i, fig. 2. 1857.
Selenka. Das Gefässsystem der Aphrodita aculeata, ex Niederländisches Archiv für Zoologie, pls. iii–iv. 1873.
Verrill. Invertebrate animals of Vineyard Sound, in Report of U. S. Commissioner of Fish and Fisheries, Part i, p. 580. 1874.

No large specimens were taken; 20 to 28 fathoms, sand and shells.

Family POLYNOIDÆ.

LEPIDONOTUS (*Leach*) *Kinberg.*

Lepidonotus squamatus *Kinberg.*

Lepidonote armadillo Leidy. Marine Invert. Fauna, R. I. and N. J., Ex. Jour. Phila. Acad., series ii, vol. iii, p. 16, pl. xi, fig. 54. 1855.
Lepidonotus squamatus Knbg. Fregatten Eugenies Resa. Zoologi, Annulata, p. 13, pl. xv, fig. 15. 1857.

Lepidonotus squamatus VERRILL. Invert. Animals of Vineyard Sound, etc., p. 581. 1874.
WEBSTER. Annelida Chætopoda of the Virginian Coast, in Trans. Albany Institute, vol. ix, p. 204, pl. i, figs. 1–5. 1879.
Annelida Chætopoda of New Jersey, in the Thirty-second report of the N. Y. State Museum, p. 101. 1880.

Specimens not large but abundant from low water to 29 fathoms.

NYCHIA *Malmgren.*

NYCHIA CIRROSA *Malmgren.*

Aphrodita cirrhosa PALLAS. Miscell. Zoöl., p. 95, pl. viii, figs. 3–6 (*teste Malmgren*). 1766.
Lepidonote assimilis ÖRSTED. Annulatorum Danicorum Conspectus, p. 13, figs. 3, 6, 14, 32, 33, 37, 38, 45, 46. 1843.
Nychia cirrosa MALMGREN. Nordiska Hafs-Annulater, p. 58, pl. viii, fig. 1. 1865.

The foot of this species is not correctly figured by Malmgren. The upper ramus is not shown in the figure (l. c. fig. 1 B), but the lower ramus is represented as bluntly rounded externally. In fact the outline of the foot is very nearly that of *Eunoë Örstedi* MGM. (l. c. pl. viii, fig. 3 B). The lower margin of the upper ramus and the upper margin of the lower ramus are drawn out into conical, finger-shaped projections.

Not common; 29 fathoms, sand and shells.

NYCHIA AMONDSENI *Malmgren.*

MALMGREN. *Annulata Polychæta*, p. 131, pl. ii, fig. 4. 1867.

The same defect exists in Malmgren's figure of the foot of this species (l. c. fig. 4 B) as in the previous species.

Only one specimen was taken. Sand and shells, 29 fathoms.

EUNOA *Malmgren.*

EUNOA NODOSA *Malmgren.*

Polynoë nodosa SARS. Christiana Vid. Selsk. Forh., p. 59, 1860.
Eunoë nodosa MALMGREN. Nord. Hafs-Anu., p. 64, pl. viii, fig. 4. 1865.
Eunoa nodosa MALMGREN. Annu. Polych., p. 132. 1867.

Only half-grown specimens of this species were found. They differ in some particulars from Malmgren's description. The elytra are less distinctly emarginate and not so nodose. However, there can be no doubt as to their specific identity.

Not common; 12 to 30 fathoms, sand and shells.

LAGISCA *Malmgren.*

LAGISCA RARISPINA *Malmgren.*

Nordiska Hafs-Annulater, p. 65, pl. viii, fig. 2. 1865.

Common; 12 to 30 fathoms, sand and shells.

HARMOTHOË (*Kinberg*) *Malmgren.*

HARMOTHOË IMBRICATA *Malmgren.*

MALMGREN. Nordiska Hafs-Annulater, p. 66, pl. ix, fig. 8. 1865. Annulata Polychæta, p. 134. 1867.
VERRILL. Invertebrate Animals of Vineyard Sound, etc., p. 582. 1874.

Common, from low water to 30 fathoms.

LEPIDAMETRIA *Webster.*

LEPIDAMETRIA COMMENSALIS *Webster.*

Annel. Chæt. of the Virginian Coast, p. 210, pl. iii, figs. 23–31. 1779.
Annel. Chæt. of New Jersey, etc., p. 103. 1879.

At Wellfleet we found *Amphitrite ornata* VERRILL quite common in coarse gravel and mud. As usual, *L. commensalis* occurred in the tubes of this species, but sparingly. Most of the specimens taken were young, from one-half inch to one inch in length. In these the stout, single-pointed setæ of the upper bundle, lower ramus, had not yet appeared; the attachments of the elytra were very prominent; otherwise they did not differ from the adult form.

Family SIGALIONIDÆ.

SIGALION *Aud. and M. Ed.*

SIGALION ARENICOLA *Verrill.*

Proceedings of the United States National Museum, p. 167. Nov., 1869.

This species has a close superficial resemblance to *Sthenelais picta* VERRILL, and occupies the same stations.

Not common. Sand; low water.

STHENELAIS *Kinberg.*

STHENELAIS PICTA *Verrill.*

VERRILL. Invert. Animal of Vin. Sud., etc., p. 582. 1874.
WEBSTER. Annel. Chæt. of the Virginia Coast, p. 213. 1879. Annel. Chæt. of New Jersey, p. 103. 1880.

Common at low water, in sand.

PHOLOË *Johnston.*

PHOLOË MINUTA *Malmgren.*

Aphrodita minuta O. FAB. Fauna Grönlandica, p. 314. 1780.
Pholoë minuta MALMGREN. Nordiska Hafs.—Annu., p. 89, pl. xi, fig. 13. 1865.
? *Pholoë tecta* STIMPSON. Marine Invertebrata of Grand Manan, p. 36. 1854.

Only young specimens were found. They agreed in all respects with *Pholoë minuta*, save that the elytra completely covered the dorsum.

This is also the case with Stimpson's *Pholoë tecta*. It is probable that *Pholoë tecta** is the young of *Pholoë minuta*.

Not common; low water; sand.

Family NEPHTHYDIDÆ.

NEPHTHYS *Cuvier*.

NEPHTHYS INCISA *Malmgren*.

Nephthys incisa MGRN. Nordiska Hafs.—Ann., p. 105, pl. xii, fig. 21. 1865.
Nephthys ingens VERRILL. Invert. Ann. of Vin. Snd., etc., pl. 583, pl. xii, figs. 59, 60. 1874.
Nephthys incisa VERRILL. Check-List. 1879.

Common; 12 to 20 fathoms; mud.

NEPHTHYS BUCERA *Ehlers*.

EHLERS. Die Borstenwürmer, p. 617, pl. xxiii, fig. 8. 1868.
VERRILL. Invert. Animals of Vin. Snd., p. 583, pl. xii, fig. 58. 1874.

Not common; found in sand at low water. Very fine specimens were taken at Race Run, near Provincetown.

Family PHYLLODOCIDÆ.

ANAITIS *Malmgren*.

ANAITIS SPECIOSA *Webster*.

Annel. Chæt. of New Jersey, p. 104, pl. i, figs. 8, 9. 1880.

When first examined we regarded the specimens collected at Wellfleet as distinct from *Anaitis speciosa*; subsequent comparison of specimens has shown that the former must be regarded as a variety of the latter. As compared with specimens from New Jersey, these have the head a little narrower; the anterior emargination of the buccal segment, with the corresponding backward curvature of the posterior margin of the head, not so well marked.

The color is variable. In front of the eighth segment the color is yellowish-white; a dark-brown band covers the eighth segment and the anterior half of the ninth; behind this band the color is yellow or brownish-yellow; the middle third of the anterior margin of each segment is brown, while on the posterior segments this brown band runs entirely across the segment; the branchiæ for their inner two-thirds are yellowish-brown, outer third white; the brown band of the eighth and ninth segments includes the branchiæ, and is faintly perceptible below; body and branchiæ with numerous flake-white specks; head white with brown specks; or the general color may be white, green replacing the

* Examination of many specimens at Eastport, Me., has fully established the identity of *P. tecta* with *P. minuta*.

brown everywhere; the general color of the ventrum is the same as on the dorsum, though the brown or green is not so distinct.

Wellfleet; low water; on tubes of *Diopatra cuprea* CLPD.

PHYLLODOCE (*Sav.*) *Malmgren.*

PHYLLODOCE GRŒNLANDICA *Örsted.*

No adult specimens of this remarkably fine species were collected. A number of half-grown specimens were taken.

A minute, nearly spherical median papilla was seen in fresh specimens on the anterior projecting margin of the buccal segment; not visible on alcoholic specimens.

The transverse ridge between the segments is densely ciliated, and a line of long cilia runs down the outer face of the branchiæ near the posterior margin.

General color, dark green, with irregular brown markings; branchiæ brown, with light-green margin.

The anal cirri are about the length of the last five segments.

Low water, sand, to 25 fathoms, sand and shells.

PHYLLODOCE ARENÆ *Webster.*

Annel. Chæt. of New Jersey, p. 105, pl. ii, figs. 10–12. 1880.

Low water, sand, to 25 fathoms, sand and shells.

EUMIDA *Malmgren.*

EUMIDA MACULOSA *Webster.*

Annel. Chæt. of the Virginian coast, p. 215, pl. iv, figs. 38, 41, 1879. Annel. Chæt. of New Jersey, p. 106, 1880.

In the original description the anal cirri are said to arise from "stout basal articles, constituting one-third their entire length." This is a mistake; they have no basal article. Only two specimens were taken in Virginia, and but one of these had anal cirri, and these seem not to have been normal. Near the front of the head there is a slight constriction.

Low water, sand, common.

EULALIA (*Sav.*) *Malmgren.*

EULALIA GRACILIS *Verrill.*

Invert. Animals of Vineyard Sound, etc., p. 586. 1874.

Probably *gracilis;* though, as no figures accompany the original description, one can hardly be certain without comparison with the typical examples.

Both males and females have very long and delicate capillary setæ developed in addition to the ordinary setæ, not, as in the SYLLIDÆ,

as a distinct bundle, but mixed with the ordinary setæ. They begin from the twenty-fifth to the thirtieth segment, short at first, but soon becoming as long or longer than the width of the body, while the ordinary setæ are quite short; they extend nearly to the posterior end. In the males the posterior two-thirds of the body is rounded, much swollen by the contained spermatozoa. After the twenty-fifth segment the body of the females is filled with numerous large eggs; these are very dark green, and determine the color of the body wherever they exist. The anterior part of the body has the same color as in the males and in asexual forms. This is gray, with lateral brown bands, one on each side, and with a darker brown spot at the base of each foot, both above and below.

There are three anal cirri on all forms, the odd one being median, ventral, and quite small.

Common on dredged shells, 20 to 30 fathoms; sand and shells.

EULALIA DUBIA *n. sp.*

(PL. VIII, FIGS. 101–105.)

This species we at first referred to *Eulalia annulata* VERRILL, but when the specimens were submitted to him he decided that they did not belong to his species.

The head (fig. 101) has the lateral margins evenly rounded, with a constriction just back of the origin of the antennæ. The inferior antennæ are concealed by the superior, but are similar to them in every respect. The median antenna is a trifle less stout than the anterior, otherwise the same. Eyes two, moderately large, circular, black.

Tentacular cirrus of the first segment and the lower cirrus of the second segment equal in length; about one-half as long as the other cirri; these reach about to the fourth setigerous segment.

The branchiæ are all acute, growing progressively longer and wider from the first segment (fig. 102) to the middle of the body (fig. 103), after which they continue to increase in length, but diminish in breadth, becoming very long and narrow on the posterior segments (fig. 104). The ventral cirri undergo similar changes, but not to the same extent. The segments of the posterior half of the body are crossed by a narrow raised band.

The setæ have very short terminal articles (fig. 105); the stem terminates in a series of minute teeth, with one much larger slightly curved tooth. The proboscis is long, cylindrical, densely covered with cylindrical papillæ. Segments, deeply incised.

Body, dark green; branchiæ, dark brown, with green margin; a dark brown spot at the base of the feet, both above and below.

The specimen from which the figure of the head was made had the head retracted, so that the first pair of tentacular cirri seem to originate beneath the head; in extended specimens the first segment is plainly

visible. Some specimens had four eyes; in this case they are all on the same straight line, the outer pair smaller than the inner.

The transverse band crossing the segments is densely ciliated, and there is a line of cilia on the posterior face of the branchiæ (after the first few segments), near the inner margin.

Common. Low water to 20 fathoms.

ETEONE (*Sav.*) *Örsted.*

ETEONE ALBA *Webster.*

Annelida Chætopoda of New Jersey, p. 106, pl. ii, figs. 13-16, 1880.

We found this species in New Jersey, associated with *Streblospio Benedicti* WEBSTER, for the most part in mussel beds, in about 15 feet of water. We found it at Wellfleet, associated with the same species, but near high-water mark, in firm mud.

Not common.

ETEONE CINEREA *n. sp.*

(PL. I, FIGS. 1-5.)

Head convex above, flattened below, constricted just back of the origin of the superior antennæ, sides and anterior and posterior margin convex. (fig. 4.)

Antennæ stout, conical, white, one-third as long as the head.

Eyes two, minute, black, hardly perceptible in alcoholic specimens.

Buccal segment a little more than half as long as the head; from the middle of its anterior margin a small rounded papilla projects.

Tentacular cirri short; the lower a little longer than the upper, and with a sudden falling off in diameter at the outer third; inner two-thirds fusiform.

The dorsal cirri (branchiæ) have nearly the same shape throughout. On the anterior segments (fig. 1) not quite so large as on the middle segments, and closer to the foot; on the middle segments (fig. 2) remote from the foot; on the posterior segments (fig. 3) smaller even than the anterior, but not in contact with the foot; they are all thick, flattened, with nearly straight sides and bluntly rounded end. The ventral cirri are like the dorsal, but smaller.

The setæ are numerous, quite short; the stem (fig. 5) terminates in two sharp, elongated points; the appendix, three times as long as the stem, is wide at base, but narrows rapidly to a minute capillary termination.

Anal segment smooth, cylindrical, as long as the four segments preceding it, without cirri, they having probably been lost.

The anterior and posterior segments are crossed by a distinct impressed line; the middle segments by two lines. Along the middle third the segments are longer and wider than elsewhere; the body tapering

a little forwards, rapidly along the posterior third; the posterior segments are about one-third the length and width of the median. The general color is light-gray, with a few scattered brown specks; anal segment, light-green; antennæ and tentacular cirri, white.

Greatest width, 2mm. Length, 28mm.

Single specimen, dredged; 20 fathoms; sand and shells.

Family HESIONIDÆ.

PODARKE *Ehlers.*

PODARKE OBSCURA *Verrill.*

VERRILL. Invert. Animals of Vin. Sound, etc., p. 589, pl. xii, fig. 61, 1874.
WEBSTER. Annel. Chæt. of the Virgn. Coast, p. 216, 1899. Annel. Chæt. of New Jersey, p. 107, 1879.

Provincetown and Wellfleet. Not common. Low water; sand and mud.

PODARKE CÆCA *n. sp.*

(PL. I, FIGS. 6-8.)

We found a few specimens of *Podarke* differing much from *Podarke obscura* VERRILL; it may be found to be the young of some species.

The head (fig. 6) was evenly rounded in front and at the sides; nearly straight behind; length to width as two to three; slightly convex; no eyes; antennæ arising from nearly cylindrical basal articles; posterior unpaired antenna, arising near the posterior margin, not quite so long or so stout as the others; upper (anterior) pair close to each other, near the anterior margin of the head; length (without basal articles) about equal to the length of the head; lower pair arise from the under surface of the head, just outside the upper pair; a trifle more delicate than the latter.

The first segment encroaches laterally on the head, reaching about to the middle line; it is nearly as long at the sides as the following segment, elsewhere about one-half as long.

The tentacular cirri are six on each side, not at all crowded, a single pair from each of the first three segments; they have stout and rather long cylindrical basal articles; are very variable in length; taper uniformly to a bluntly rounded apex. The feet (fig. 7) are quite large, pointed externally, much swollen at base, owing to the origin of the basal portion of the dorsal cirri.

The dorsal cirri do not extend beyond the feet, are delicate, conical; base a little swollen.

Ventral cirri given off at about the outer fourth of the foot; extend about to the end of the foot.

The segments are deeply incised, much wider than long, slightly convex, both from side to side and from before backwards.

On our specimens there were no setæ in the dorsal rami; as they were not in good condition, it seems probable that these setæ had been lost, as is often the case in *Podarke obscura*. The ventral setæ have the usual form; one in each bundle is very long, both in stem and appendix, those above and below it proportionately shorter as they are more remote; from 4 to 8 in each bundle.

The general color is yellowish white, crossed above and below by many transverse bands, made up of irregularly shaped, yellowish-brown spots and specks.

Width, without feet, at ninth segment, 2^{mm}.

Length of first 10 segments, 10^{mm}.

No entire specimen was found.

Low water; sand.

HESIONE (*Savigny*) *Quartrefages*.

HESIONE AGILIS *n. sp.*

(PL. I, FIGS. 9-11.)

The head of this species is very peculiar (fig. 6); anterior margin with a slight median convexity, otherwise straight; outer angles very broadly rounded; lateral margins concave; posterior margin very concave; posterior angles prolonged far backward, forming wide, obtusely rounded lappets.

The length of the head along the middle line is one-third the width of its anterior part, while the distance from the anterior to the posterior lateral angles is a little more than two-thirds the same length.

The posterior antennæ arise from rounded projections (basal articles), half way between the eyes and anterior margin of the head; they are conical, a little swollen at base, in length about double the length of the head along the line on which they stand; the anterior antennæ arise from the front margin of the head in front of and a trifle within the posterior antennæ; they have stout cylindrical basal articles, are conical, a little longer than the posterior pair.

There are two pairs of eyes, lateral; bright red; anterior pair oval, oblique, large; posterior pair a little within the anterior, in contact with them, more or less regularly crescentic.

The tentacular cirri have the form shown in the figure, but their length was not even approximately the same on any two specimens. The longest one figured would reach about to the fourth segment, but in some specimens one of the cirri reaches to the eighth or even to the tenth segment. Out of half a dozen specimens taken we could determine no law for the relative length of the cirri; nor could we even say whether, as a rule, the upper were longer or shorter than the lower.

It would seem that they are normally very long, from two to four times as long as figured, but readily lost and renewed. They have long

and stout cylindrical basal articles, and taper uniformly to a bluntly rounded apex. The feet, dorsal cirri, and setæ are all very long, and increase in length from the first segment to the middle of the body, and then as regularly decrease. The superior ramus (fig. 7) bears a dorsal cirrus, which is as long or even longer than its foot; and a bundle of very delicate capillary setæ, as long as the cirrus, and quite numerous; the ventral ramus is just below the dorsal and projects beyond it, forming nearly one-half of the foot; it ends in a minute conical cirrus, is obliquely truncated below, and bears on its lower posterior margin a conical ventral cirrus, which projects beyond the apex of the foot by about one-half its length. The ventral ramus has a fan of compound setæ (fig. 8) which decrease in length uniformly from the upper to the lower part of the fan; the appendix of these setæ is about one-third the length of the stem.

The anterior enlarged part of the digestive tract extends through the first four segments; it is nearly cylindrical, tapering somewhat along the posterior third; is finely but distinctly transversely striated; has a deep median dorsal longitudinal incision or depression of varying width. The transverse striæ can be seen passing to the bottom of this depression in front, but behind it seems to be carried completely through, giving two bluntly rounded posterior terminations to this organ. Back of this the intestine has a yellowish, granular appearance, and for six segments sends diverticula into the feet, one-third as long as the feet.

One, two, or three segments preceding the anal have rudimentary appendages. The anal segment is much like the others, bears two anal cirri, in all respects similar to the dorsal cirri. Body slightly convex above and below; colorless, except as colored by the contents of the digestive tract; tapering uniformly, but gradually, from the first segment to the last.

The largest specimen had 18 setigerous segments.

Length, 2.55^{mm}; width of middle segment, 0.25^{mm}; length of foot from middle segment, 0.36^{mm}.

Found near high-water mark in sandy-mud, Wellfleet, Mass.

The width was about the same in all the specimens, but in most a number of the posterior segments had been lost.

According to the diagnosis given by Ehlers (Borsten., p. 187), this species is a *Hesione*. Ehlers does not mention a definite number of tentacular cirri. Grube, in his Annulata Semperiana, speaking of *Fallacia* QUATREFAGES, which is established as a genus because it has four pairs of tentacular cirri on each side, says that this is also the case with *Hesione* SAVIGNY, as is plainly stated in the preliminary description of the genus, Système des Annelides, p. 9. Grube further claims that the figure of *Hesione splendida* (l. c., pl. iii, fig. 3) shows six tentacular cirri, and the basal joint of another, on each side, and remarks that the loss of tentacular cirri is common in this group.

Quatrefages has examined the specimen from which Savigny made

his description. He regards it as having but six pairs of tentacular cirri, and succeeds in complicating matters by saying that the cirri of the feet are retractile ("Pedes longiusculi, cirri retractiles"), whereas Savigny says that the tentacular cirri are retractile, a thing sufficiently hard to believe. Langerhans (Zeitschrift für Wissenschaftliche Zoölogie, p. 306, 1879) adopts Grube's view as to *Hesione* and *Fallacia*, and refers *Hesione Steenstrupii* QUATREFAGES to *Halimede* RATHKE; but *Halimede* is regarded by Malmgren as a synonym of *Castalia* (SAV.) SARS, though on what grounds, if Rathke's description is in any way valid, it is hard to understand. The genera of Hesionidæ seem to be badly confused. Our specimens differ from most of the described genera in having the feet distinctly biramous, with two entirely distinct bundles of setæ. However, this is also the case with *Podarke* EHLERS, though expressly placed by Quatrefages among the uniramous forms.

Our specimens, though differing somewhat from the diagnoses, seem to belong to *Hesione* SAVIGNY as understood by Quatrefages; and to *Halimede* RATHKE as understood by Langerhans; while if regard be had strictly to the original descriptions of these genera, they could hardly be referred to either.

Örsted, in his diagnosis of *Castalia*, assigns to it maxillæ, and figures the maxillæ of *Castalia punctata* (Annulatorum Danicorum Conspectus, p. 23, fig. 65). It will be seen that similiar structures exist in our species, but they do not seem to be hard parts. We could spare only one specimen for this examination, but the parts in question appeared to be neither chitinous nor calcareous.

Family SYLLIDÆ.

SYLLIDES *Örsted.*

We accept the genus Syllides on the authority of Professor Langerhans, never having seen the original description. Marion-Bobretzky have described a species of the same genus, referring it to *Anoplosyllis* CLAPARÈDE. Before seeing Langerhans's work on the Syllidæ we proposed to refer our specimens to *Anoplosyllis*, though we were doubtful as to the propriety of so doing.

SYLLIDES CONVOLUTA, *n. sp.*

(PL. II, FIGS 12-16.)

Head (fig. 12) with anterior and posterior margins slightly convex; sides well rounded; length to breadth as three to two; eyes six, bright red; anterior pair very close to the anterior and lateral margins; of the posterior pairs, those in front are largest, and external, the eyes on either side being almost in contact.

The palpi are longer than the head; coalesce along their inner third; outer margin convex; inner margin concave; apex bluntly rounded.

A short conical cirrus, arising from the lower face of the palpi at about the middle point, extends directly downward. This is a peculiar feature, which seems not to have been previously described in any species of this family. The antennæ are claviform; the median longest, about twice the length of the head and palpi together, arising between the posterior eyes; the lateral antennæ arise very near the anterior margin of the head, just outside of the anterior eyes; they are about two-thirds as long as the median.

The tentacular cirri, in all respects similar to the lateral antennæ, arise very near the anterior margin of the segment; the lower cirrus is a little shorter than the upper.

The buccal segment is as long as the next segment.

The dorsal cirri of the first two setigerous segments are a little more slender than the tentacular cirri, but in other respects similar to them; those on the remaining segments are distinctly articulated; they vary in length from two to four times the width of the body. There are three anal cirri, two lateral articulated, a median not articulated. The pharynx reaches to the middle or to the posterior margin of the third segment; we did not make out clearly the structure of its anterior end. The stomach is a little longer than the pharynx, very large, nearly filling the segments, which it occupies; it has the structure common to this group, but in front shows a peculiar organ, as to the character of which we made no notes in the living specimens, having probably failed to observe it. This organ is transversely oval, convex in front, concave behind, and crossed by numerous waved lines, which radiate from the middle point behind. The feet are very long (fig. 16), and bear a long, conical, or finger-shaped ventral cirrus, which points either directly or obliquely backward.

The setæ are from five to seven in each foot, and of two kinds: one (fig. 14) compound, with the appendix delicate, elongated; the other, of which there is but one in each bundle, simple (fig. 15), with a small terminal button. The longest of the compound setæ are about as long as the foot, the others from one-half to two-thirds as long.

The body is much wider in the middle than at either extremity; segments deeply incised, especially along the middle third. Two of the median segments are shown in fig. 13; these are from the same specimen as fig. 12, and are magnified to the same extent.

Body slightly convex above, nearly flat below, colorless; intestine brown, yellowish brown, or reddish brown.

Dorsal cirri and antennæ readily lost. This species throws itself quickly into a coil, very much as is the habit of *Glycera* (*Rhynchobolus*).

Length, 25^{mm}.

Greatest width, 0.2^{mm} (about).

Number of segments, 45.

Number of segments varies from 35 to 50.

Low water, sand, Race Run, near Provincetown.

Marentzeller figures the setæ of *Syllis ochracea* as bidentate; Marion-Bobretzky represent the same setæ as ending in a single point, and both writers give additional simple setæ, which do not exist on our species, but which, as figured by these authors, do not agree with each other. The compound setæ on our species do not seem to be bidentate, but this may be owing to our object-glass not being sufficiently good. Marion-Bobretzky also show a peculiar destitution of the margin of the stem, near its end, not shown by Marentzeller, and not seen in our species.

STREPTOSYLLIS, *n. g.*

Antennæ, three; tentacular cirri, four; dorsal cirri, partly smooth, partly articulated; œsophagus unarmed, with a circle of papillæ at its anterior end; stomach passing directly into the intestines; setæ of two kinds, simple and compound, both kinds covered by a membrane externally;* palpi united for most of their length, turned downward so as not to be visible from above.

It will be seen that this genus agrees in some respects with *Amblyosyllis* GRUBE (*Pterosyllis* CLAPARÈDE), but the head is not "winged"; the setæ are very peculiar, and the dorsal cirri cannot be described either as smooth or moniliform, since both forms occur on the same specimen. It would, perhaps, be well to include the peculiar form of the setæ in the generic description. Unfortunately, we found but one species, and it seems better not to multiply characteristics on such a narrow basis.

STREPTOSYLLIS ARENÆ, *n. sp.*

(PL. II, III, FIGS. 17-23.)

Head convex, sides and front regularly rounded (fig. 17), posterior margin curved forward, posterior angles bluntly rounded. Eyes, six; anterior pair small, crescentic, just behind and outside the origin of the lateral antennæ; outer posterior pair largest, irregularly oval, in contact with the inner pair, or sometimes merged with them; inner posterior pairs small, circular.

The antennæ and tentacular cirri are never annulated, but are more or less regularly wrinkled. They vary much in form. They may taper quite regularly from base to apex, or only along their outer third or fourth, or they may be somewhat clavate. The lateral antennæ arise very close to the anterior margin of the head; they are from three to four times as long as the head. The median antenna, longer than the lateral, arises a little back of the eyes, near the posterior margin of the head.

The buccal segment in alcoholic specimens, or in living contracted specimens, is about one-half as long as the next segment, but in extension it may nearly equal the length of that segment. The upper tentacular cirrus is a little longer than the lower cirrus, a little shorter than the lateral antennæ.

* Stem of compound setæ terminating in four teeth or lobes.

The palpi are large, swollen at base, united along their inner two-thirds, then becoming somewhat flattened, and with their outer angle prolonged into a delicate conical cirrus (fig. 18). As noticed above, they cannot be seen in a dorsal view, being always turned directly downward.

The dorsal cirri are exceedingly variable in form, structure, and length. They may be conical or clavate; wrinkled irregularly (fig. 17); articulated with each article divided longitudinally (fig. 20); articulated without the longitudinal division; or nearly smooth (fig. 19). Their length may be less than the width of the body, or three times the width. All these variations occur on the same specimen, and without any apparent order.

The ventral cirri arise near the end of the foot (fig. 21), are short (relatively) on the first foot, but lengthen rapidly, becoming very long on the fourth segment. They are irregularly wrinkled, often with a deep constriction at the outer third or fourth. They are larger at base than the dorsal cirri of the same segment, and taper regularly to a bluntly rounded apex. They usually are directed backward, but often are coiled (fig. 20). They retain their length even on the posterior segments, and are there longer than the dorsal cirri. There are three anal cirri (fig. 19); a median, which may be as long as the ventral cirri, and two lateral, three to four times as long.

The anal segment is much narrower than the segment preceding it, convex above and below, margin regularly rounded.

The setæ are of two kinds. In every bundle there is one long simple seta (fig. 23), straight or slightly curved, bluntly rounded at its apex, where it is covered with a membrane, which is prolonged along the seta for nearly one-fourth of its length. This seta is always in the upper part of the bundle; in length it is about the same as the stem of the compound setæ.

The compound setæ are numerous, crowded, the terminal part of the stem divided into four distinct processes or lobes, between which the appendix is inserted (fig. 22). The length of the stem is always about equal to the length of the foot, and as the anterior feet are shortest, so also are the stem parts of the anterior setæ. The appendix on the anterior segments is very short, about one-half as long as the one figured, but not differing otherwise. In all the bundles a few of the short forms occur, but do not make up the bundle, as they do on the anterior segments. The appendix is covered with a membrane, which is prolonged down the sides. The œsophagus and stomach have about the same length and diameter, occupying together twelve segments. The œsophagus is strongly convoluted. The "glands" of the stomach are hexagonal, the rows very numerous; a small part of the anterior end of the stomach is without them. There are no special glands back of the stomach, but it is simply reduced in diameter, and prolonged into the intestine. The body is strongly convex above; less so below. The first segment is

about one-half the width of the 10th; from this segment the diameter is nearly uniform, save that the last few segments fall off somewhat rapidly. Body colorless in front; œsophagus light brown; stomach white; back of the stomach the body is yellowish, or light brownish-yellow, with numerous white specks.

Length of largest specimen, 8mm.

Greatest width, 0.5mm.

Number of segments, 55.

Low water; sand.

GRUBEA (*Quatrefages*) *Claparède.*

GRUBEA DOLICHOPODA *Marentzeller.*

Grubea dolichopoda MARENTZELLER. Zur Kentniss der Adriatischen Anneliden, p. 26, pl. iv, fig. 1, 1874.

Grubea tenuicirrata WEBSTER. Annelida Chæt. of New Jersey, p. 109 (corrected in foot-note, p. 110, to *G. dolichopoda*.)

Prof. Langerhans, in his monograph of the SYLLIDÆ (*Zeitschrift für Wissens. Zoöl.*, p. 564, 1879), identifies *G. dolichopoda* MARENTZ. with *G. clavata* CLPD., and regards *G. tenuicirrata* CLPD. as a distinct species. If this conclusion is based only on the descriptions and figures given by Claparède and Marentzeller, and not on examination of the type specimens, it would seem hardly tenable. On the other hand, the differences indicated by Marentzeller between *G. dolichopoda* and *G. tenuicirrata* are very slight; so slight that it seems probable that these forms are identical. There is nothing in the text to indicate that Langerhans examined specimens of *G. tenuicirrata* CLPD., and the differences between this species and *G. clavata*, as understood by him, refer mainly to the terminal points of the compound setæ and to the position of the pharyngeal tooth. As to the fine points of the setæ, Claparède's figures in the *Glanures* are certainly not reliable; and the position of the pharyngeal tooth was not regarded as of so much consequence when he wrote his description as at the present time, when it is regarded not only as a good, but as a sufficient, generic character, at least by Langerhans in his monograph (*l. c.*, p. 526, SYLLIS. —, p. 541, OPISTHOSYLLIS). It may be further noted that Langerhans gives *G. clavata* four anal cirri, while *G. dolichopoda* Marentz. has but three.

Common on stones, shells, &c., at low water.

SPHÆROSYLLIS *Claparède.*

Langerhans, in commenting on the genus SPHÆROSYLLIS, says that Claparède did not sufficiently insist on the coalescence of the buccal segment with the head. He therefore adds as one of the important generic characteristics this union of head and buccal segment. The species described below, from Provincetown, have the buccal segment quite distinct; this is also the case with *S. fortuita* Webster, from Vir-

ginia. Claparède regards the form of the cirri and antennæ, swollen, spherical at base, as a generic characteristic. That this is not valid is shown by *S. fortuita* and also by one of the new forms described below.

SPHÆROSYLLIS BREVIFRONS, *n. sp.*

(PL. III, FIGS. 24-30.)

This species belongs to the typical SPHÆROSYLLIS in the form of the dorsal appendages, in the presence of numerous papillæ, and in general structure, but differs from any heretofore described in the shortness of the palpi, and from all save *S. fortuita* in the presence of a well-marked buccal segment, visible from above.

The head (fig. 24) is short, very wide, almost completely fused with the palpi in front, sides rounded; middle third of the posterior margin convex, encroaching on the buccal segment; the margin, external to the middle third, slightly concave. Eyes, six; the posterior pairs widely separated; those on each side close together; the external pair sometimes crescentic, sometimes oval; the internal small, circular; the anterior pair minute, situated just external to the bases of the lateral antennæ.

The palpi are short, coalesced, slightly emarginate in front.

The antennæ have a swollen, globular base, and a short cylindrical outer part.

The tentacular cirri are like the antennæ, but a little longer.

The buccal segment, according to the state of contraction, may be from one-third to three-fourths as long as the next segment.

The dorsal cirri have also a swollen base, which forms about one-half the entire length. Sometimes the base passes gradually into the outer part; in this case there is usually a single constriction (fig. 26); or the base may be separated by a well-defined constriction from the outer part, in which case the appendix may usually be regarded as composed of two articles (fig. 27).

The anal cirri (fig. 25) are stouter than the dorsal, much swollen at base, without constriction.

The ventral cirri (fig. 26) are slightly flattened, sides nearly straight, apex bluntly rounded, about one-half as long as the dorsal cirri.

In each bundle of setæ is one simple, straight, or slightly curved, seta (figs. 29, 30); the others are compound, and practically all of one kind (fig. 28), differing only in length of stem and appendix.

Pharynx occupying about three segments; stomach a little shorter than the pharynx.

Body, colorless; eyes, red.

Length, 1^{mm}.

Width, 0.17^{mm}.

Number of segments, 22.

Other specimens were larger and with more segments; in no case did the length exceed 1.5mm.

Low water; sand.

A number of specimens, which we are quite unable to separate from this species, were collected by Mr. Benedict at South Norwalk, Conn. They differ only in the length of the buccal segment, which is hardly visible dorsally. This is probably due to different states of contraction, though it seems curious that all of the Provincetown specimens should show the buccal segment plainly, and that none of the specimens from South Norwalk should show it.

SPHÆROSYLLIS LONGICIRRATA, *n. sp.*

(PL. VIII, FIGS. 95–100.)

Head with the anterior and lateral margins (fig. 95) regularly rounded, posterior margin very slightly convex, nearly straight. The posterior part of the head, bounded in front by a curved line drawn through the bases of the antennæ, is elevated, convex, the part of the head in front of this line being thin, depressed; sometimes the depression is prolonged backward between the eyes for a varying width, giving lateral elevations, on which the four posterior eyes are found.

Eyes, six; the two posterior pairs large, circular, nearly on the same straight line; the anterior pair very small, just in front of the origin of the lateral antennæ.

The antennæ are somewhat fusiform, irregularly constricted, bluntly rounded at apex; median antenna one-third longer than the head and palpi; lateral a little shorter.

The tentacular cirri, dorsal, and anal cirri have the same structure as the antennæ. The dorsal cirri originate some distance within the foot, and are very long for the genus; there is usually a deep constriction at the outer third or fourth, setting off a fusiform appendix. The anal cirri may be double the length of the dorsal.

The buccal segment, in extension, is as long as the second segment.

The palpi are large, convex externally, concave internally, apex bluntly rounded, anterior third free, connected by a thick membrane along their posterior two-thirds; this membrane emarginate in front, and divided into lateral halves by an impressed line, which runs back to the head.

The pharynx occupies four segments, the stomach two.

The feet (fig. 97) are stout, nearly cylindrical, truncated externally. The ventral cirri, bluntly conical, are about one-half the length of the foot in front; behind, as long as the foot.

In each foot is a fan of compound setæ and one simple seta (fig. 100). The compound setæ are very delicate, differing from each other only in length (figs. 98, 99).

Body, colorless; stomach, white; intestines, brown or yellow.

Length, 4–5mm.

Number of segments, 33.

Sexual (capillary) setæ on the male appear at the twelfth segment, and exist on all save the last 3–5 segments.

Common at low water on shells, &c.

PÆDOPHYLAX *Claparède.*

PÆDOPHYLAX HEBES, *n. sp.*

(PL. III, FIGS. 31–36.)

In this species the head (fig. 31) is very short, the width being more than double the length; the anterior angles are very broadly rounded; the anterior and posterior margins but slightly curved. Eyes, six; the anterior pair mere specks; the posterior pairs on each side very close to each other, sometimes in contact; large, circular.

Palpi very large, without indication of division above; below, a narrow sulcus; their length is more than double the length of the head.

The median antenna arises close to the posterior margin of the head, and reaches to the middle, or a little beyond the middle, of the palpi. Its form seems to be variable, but in general the inner third is narrow; the middle third somewhat enlarged; the outer part narrowed, but not so much as the basal part. The lateral antennæ are mere buds, about the size of the tentacular cirri.

The buccal segment is about one-half as long as the second segment; its cirri very short.

The pharynx, in one specimen, occupied the first five segments; the stomach three to four. In another the stomach occupied the eighth and ninth segments.

The dorsal cirri are a trifle larger than the tentacular cirri, but very small; and although the posterior cirri are a little larger than the anterior, they are always smaller than the ventral cirri. These last are conical, minute, arising from the body, within the foot, and reaching about to the apex of the foot. The feet are short, stout, fleshy.

There are two kinds of setæ, simple and compound, with certain slight form variations in each series. On the anterior segments the setæ are all compound (figs. 33, 34), short, with short appendix. At about the beginning of the middle third the simple setæ appear. These are, at first, straight, single pointed setæ (fig. 35), placed dorsally, one to each bundle. On a few of the posterior segments these are replaced by shorter setæ, which have a second sharp point developed below the terminal point (fig. 36).

The anal segment is a little longer than the segment preceding it; it bears three anal cirri—a short median and two lateral—which are double the length of the median antenna. They are more or less fusiform.

The body is widest in the middle; the length and width of the median segments are about equal; length of the anterior segments much less than the width.

Body gray or flesh color: According to the notes made on the living forms, one specimen had dark red eyes; another black eyes.

Length of largest specimen, 7mm.

Number of segments, 44.

In confinement very sluggish, not at all inclined to move about.

From low water to 25 fathoms; sand and shells.

AUTOLYTUS (*Grube*) *Marenzeller.*

AUTOLYTUS CORNUTUS *A. Agassiz.*

A. AGASSIZ. Journal Boston Society Nat. Hist., vol. vii, p. 392, plates 9–11. **1863.**
VERRILL. Invert. Animals of Vin. Snd., etc., p. 590, pl. xii, figs. 65, 66. **1874.**

Wellfleet, low water, in sand.

Provincetown, 25 fathoms, sand and shells.

Not common.

NERILLA *Schmidt.*

(Family not determined.)

NERILLA ANTENNATA *Schmidt.*

Nerilla antennata SCHMIDT. Reise nach der Färör, p. 38, pl. iii, figs. 8, 8a. **1848.**
GRUBE. Fam. der Ann., p. 62. 1856.
CLAPARÈDE. Beobachtungen, etc., p. 48, pl. xii, figs. 16–20. **1863.**
Dujardinia antennata QUATREFAGES. Hist. Nat. des Annelés, vol. iii, p. 69. **1865.**

We found this species quite abundant in sand at low water. It is unquestionably Schmidt's species.

Family NEREIDÆ.

NEREIS (*L.*) *Cuvier.*

NEREIS VIRENS *Sars.*

Nereis virens SARS. Beskrivelser og Jagttagelser, p. 58, pl. 10, fig. 27. 1835.
Nereis grandis STIMPSON. Marine Invertebrata of Grand Manan, p. 34, fig. 24. 1853.
Nereis Yankiana QUATREFAGES. Histoire des Annelés, vol. i, p. 153, pl. 17, figs. 7–8. 1865.
Atitta virens KINBERG. Annulata Nova, p. 172. 1865.
MALMGREN. Nordiska Hafs-Annulater, p. 183, et Annulata Polychæta, p. 56, pl. iii, fig. 19. 1867.
Nereis virens EHLERS. Borstenwürmer, p. 559, pl. xxii, figs. 29–32. 1868.
VERRILL. Invert. Animals of Vineyard Sound, p. 590, pl. xi, figs. 47–50. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 235. 1879.
TURNBULL. Anatomy and Habits of. Trans. Connecticut Academy, vol. iii. 1865.

This species we found, both abundant and large, between tides, ranging nearly to the top of high water.

At Provincetown it was the only shore Nereis, the *N. limbata*, so common everywhere south of the Cape, not being found at Provincetown at all, though found at Wellfleet.

NEREIS LIMBATA *Ehlers.*

EHLERS. Die Borstenwürmer, p. 567. 1868.
VERRILL. Invert. Animals of Vineyard Sound, etc., pp. 318, 590, pl. xi, fig. 51. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 235, pl. vi, figs. 70, 75. 1879.
Annel. Chæt. of New Jersey, p. 111, pl. iii, figs. 21, 22. 1880.

We found a number of specimens of this species at Wellfleet in sand and mud. All small. Not found at Provincetown at all, though carefully looked for. At Wellfleet, on some oysters lately brought from Chesapeake Bay, we found a living specimen of *N. limbata.*

NEREIS PELAGICA *Linn.*

This widely distributed species was common at all depths below fifteen fathoms. For synonomy up to 1868, see Ehler's Borstenwürmer, p. 511.

Nereis pelagica LINN. Syst. Nat., ed. x, p. 654; ed. xii, p. 1086.
VERRILL. Invert. Animals of Vineyard Sound, etc., p. 591, pl. xi, figs. 52–55. 1874.
MARENTZELLER. Südjapanische Anneliden, part i, p. 14. 1879.

NEREIS TENUIS *n. sp.*

(PL. III, IV, FIGS. 37–43.)

The width of the head (fig. 37), in its widest part, nearly equal to the length; posterior two-thirds convex, with convex sides; anterior third much narrowed and flattened, and with a median depression running back to the convex part of the head.

Eyes lateral, not quite so regular in outline as shown in the figure; posterior pair a trifle larger than the anterior.

Palpi long, and with long terminal articles, the basal part being a little longer than the head.

Antennæ conical, delicate, close to each other at base, half as long as the head.

The proboscis (fig. 38) has the basal and maxillary rings of about the same length. Paragnathi small, conical, black, arranged as follows: I, wanting; II, single curved series; III, a transverse series, near the posterior margin of the ring; IV, curved line; V, three at the angles of a triangle; VI, wanting; VII and VIII, merged, forming a series, in part single, in part double.

The jaws were not completely exposed; on the part seen there were five stout, rectangular teeth.

Buccal segment a little longer than the second segment.

Tentacular cirri with long cylindrical basal articles, the posterior superior cirrus reaching about to the fourth segment, the others shorter, as shown in the figure.

The dorsal cirri arise from the base of the lingula. On the anterior segments this cirrus is as long as its lingula; it grows progressively shorter to the tenth segment (fig. 39), after which it again lengthens, becoming longer than the lingula on the middle and posterior segments.

The superior lingula and single lip of the dorsal ramus are alike in all respects; stout, conical, close together on the anterior segments, shorter and more divergent behind.

The ventral ramus has but one lip, is shorter and wider than the dorsal, somewhat flattened in front, with the lower margin concave near the apex, but further back tapering regularly.

The ventral lingula is a little shorter than the upper lingula, in all other respects similar to it; on the posterior segments (fig. 40) turned downwards.

The ventral cirrus arises from a small elevation at the base of the ventral lingula; on the anterior segments fusiform (fig. 39), further back (fig. 40) more regularly conical.

The setæ are of three kinds (figs. 41, 42, 43). Those of the upper ramus are short, hardly reaching beyond the ramus, appendix very delicate, terminal points of stem of same length (fig. 41). Those of the lower ramus in two bundles; in the upper part of the upper bundle the setæ are the same as those described above (fig. 41); in the lower part of the same bundle a few with short appendix (falcate), curved near the end, apex bluntly rounded (fig. 43); in the lower bundle, anterior segments, many like fig. 43, a few like fig. 42; further back the falcate setæ become less numerous. In the single specimen found the setæ of the dorsal rami, after the first few segments, had all been lost. At first there is a single black acicula in each ramus; further back a second acicula, slender, uncolored, appears in the dorsal ramus.

The body was colorless except as colored by the blood, which showed through very plainly; bases of feet opaque white, this color being due to glands within them.

Length, 45^{mm}.

Width, 1.2^{mm}.

Posterior third tapering a trifle. This is the most delicate *Nereis* described from our coast. It is easily recognized by its extreme narrowness as compared with its length.

But one specimen was taken, off Race Run, near Provincetown; 20 to 25 fathoms, mud and sand.

Family EUNICIDÆ.

DIOPATRA *Quatrefages.*

DIOPATRA CUPREA *Claparède.*

Nereis cuprea, BOSC. Hist. Nat. des Vers., Vol. i, p. 143 (*teste* Claparède). 1802.
Eunice cuprea QUATREFAGES. Hist. Nat. des Annèles, vol. i, p. 331. 1865.
Diopatra cuprea CLAPARÈDE. Annel. Chét. du Golfe de Naples, p. 432. 1868.
VERRILL. Invert. Animals of Vin. Sound, p. 593, pl. xiii, figs. 67, 68. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 236. 1879. Annel. Chæt. of New Jersey, p. 115.

Found sparingly at Provincetown; very common at Wellfleet, in the harbor, at low water; sand and sandy mud.

NINOE Kinberg.

NINOE NIGRIPES *Verrill.*

Invertebrate Animals of Vineyard Sound, p. 595. 1874.

Dredged in from 12 to 20 fathoms; sand, shells.

LUMBRINEREIS (*Blainville*) *Ehlers.*

LUMBRINEREIS FRAGILIS *Audouin and M. Edwards.*

Lumbricus fragilis MÜLLER. Prodr. Zool. Dan. p. 216, n. 2611 (*teste* Malmgren). Zool. Dan. vol. 1, p. 22, pl. xxii, figs. 1–3. 1788.
Scoletoma fragilis BLAINVILLE. Dict. des Sci. Nat., Article *Vers*, p. 492 (*teste Aud. and M. Ed.*).
Lumbrinereis fragilis AUDOUIN and M. EDWARDS. Littoral de la France, vol. i, p. 170. 1834.
QUATREFAGES. Hist. Nat. des *Annèles*, vol. i, p. 365. 1865.
Lumbriconereis fragilis ÖRSTED. Consp. Ann. Dan. p. 15, figs. 1, 2. 1843. Danielssen, Reise, p. 50. 1857. Reise, p. 116. 1858. (*teste* Malmgren).
MALMGREN. Annulata Polychæta, p 177, pl. xv, figs. 83–83 D. 1867.
EHLERS. Die Borstenwürmur, p. 395. 1868.
VERRILL. Invert. Animals of Vineyard Sound, p. 594. 1874.
LANGERHANS. Zeitschrift für wissenschaftliche Zoölogie, p. 297. 1879.
Lumbriconereis borealis KINBERG. Annulata Nova Öfvers af K. Vet.-Akad Förh, No. 10, p. 568. 1864.
Lumbriconereis madeirensis. KINBERG. l. c., p. 559 (*teste* Langerhans).

Very fine large specimens were dredged. Its resemblance to *Ninoe nigripes* Verrill is very striking.

Twenty to thirty fathoms; sand and shells.

LUMBRINEREIS TENUIS *Verrill.*

Invert. Animals of Vin. Sound, etc., p. 594. 1874.

This species was not often taken. Sand, low water.

DRILONEREIS *Claparède.*

DRILONEREIS LONGA *Webster.*

Annel. Chæt. of the Virginian Coast, etc., p. 240, pl. vii, figs. 84–88. 1879. Annel. Chæt. of New Jersey, p. 116. 1880.

Quite abundant in sand at low water.

ARABELLA (*Grube*) *Ehlers.*

ARABELLA OPALINA *Verrill.*

Lumbriconereis splendida LEIDY. Marine Invert. Fauna of R. I. and N. J., p. 10. 1855.
Lumbriconereis opalina VERRILL. Invert. An. of Vin. Sound, p. 594, pl. xiii, figs. 69, 70. 1874.
Arabella opalina VERRILL. Proc. Acad. Nat. Sciences, Philadelphia, for 1878, p. 299.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 242. 1879. Annel. Chæt. of New Jersey, p. 116. 1880.

Very common at low water in sand.

STAUROCEPHALUS (*Grube*) *Ehlers.*

STAUROCEPHALUS PALLIDUS *Verrill.*

VERRILL. Invert. Animals of Vineyard Sound, p. 595. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 242. 1879. Annel. Chæt. of New Jersey, p. 116. 1880.

Very rare. Only two specimens were taken. Sand; low water.

STAUROCEPHALUS CÆCUS *n. sp.*

(PL. IV, FIGS. 44, 44*a*–48.)

The head of this species is constricted just in front of the origin of the antennæ, the widest part being back of the antennæ, where the width exceeds the length; the anterior part is regularly curved, obtuse (fig. 44). There are no eyes.

The antennæ are quite long, composed of about fifteen articles; increasing slightly in diameter from origin along the inner third, then tapering gradually to the end; the last three or four articles elongated.

The palpi are stout, transversely wrinkled, canaliculate; terminal article fusiform, bluntly rounded at apex, forming nearly one-third the entire length.

The first two segments are about equal in length, a little longer than those following them.

The dorsal cirri (fig. 45) have a terminal article shaped like the corresponding part of the palpi; they are nearly cylindrical, reach just beyond the foot.

The ventral cirri are short, fusiform, arising near the apex of the foot and reaching a little beyond it.

The foot ends in three rounded lobes, of which the upper (fig. 45) is very large, the two lower small and projecting beyond the upper, divergent. The anterior feet are in length about one-half the width of the body, growing progressively longer along the anterior third, from which point their length equals the width of the segments to which they are attached.

The anal segment is about double the length of the segment preceding it. There are three anal cirri; the lateral cirri are made up of from three to five nearly cylindrical articles, each one slightly less in diameter than the one preceding it, and in length equal to the anal segment; the median cirrus is in all respects similar to the basal article of the lateral.

There are two kinds of setæ in the upper bundle; in the upper part one to three very delicate capillary setæ (fig. 46) minutely denticulated along one edge for some distance; below these, two or three having a very peculiar form (fig. 47); these are about two-thirds as long as the first form, inner three-fourths of uniform diameter, near the end denticulated, external tooth sharp pointed, prolonged nearly in the line of the main part of the seta; external to the base of this tooth the seta becomes suddenly very delicate, capillary. These setæ may be curved, as in the figure, or straight. In the lower bundle only compound setæ (fig. 48) are found. These are arranged in a fan, growing progressively shorter from the upper to the lower part of the fan, the shortening, for the most part, affecting the appendix. With such magnifying power as we had the appendix of these setæ seemed to have the apex bluntly rounded, without tooth.

The body was convex above and at the sides, flattened below; the segments distinctly separated from each other by well-impressed lines of segmentation.

The general color was white.

Length of largest specimen, 8^{mm}.

Width, 0.5^{mm}.

Number of segments, 51.

In young specimens the antennæ and palpi appear as mere buds. The head is larger relatively than in adults. The dorsal cirri have no basal articles, but arise, like the ventral cirri in mature forms, from the side of the foot, near the end. They moved with a perfectly uniform gliding motion, due, no doubt, to the action of cilia, without any apparent effort of the body or feet. In a more advanced stage the palpi were club-shaped, lacking the terminal article.

Very common in sand at low water. The young forms were especially numerous.

Family GLYCERIDÆ.

RHYNCHOBOLUS *Claparède.*

RHYNCHOBOLUS DIBRANCHIATUS *Verrill.*

Glycera dibranchiata EHLERS. Borstenwürmer, p. 670, pl. xxiv, figs. 1, 10–28. 1868.
GRUBE. Jahres-Bericht der Schles. Gesell. für vater län Cultur, p. 64. 1869.
Rhynchobolus dibranchiatus VERRILL. Invert. An. of Vin. Sound, etc., p. 596, pl. x, figs. 43, 44. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, etc., p. 245. 1879. Annel. Chæt. of New Jersey, p. 117. 1880.

Very common in sand at low water.

GONIADA *Audouin and M. Edwards.*

GONIADA GRACILIS *Verrill.*

(PL. V, FIGS. 49–52.)

Eone gracilis VERRILL. Invert. An. of Vin Sound, etc., p. 596. 1874.
Goniada gracilis VERRILL. Proceedings U. S. National Museum, p. 174. 1879.

We found in the fine sand of the harbor, at about half-tide, a number of specimens evidently referable to *Goniada*, and which we regarded as undescribed. Professor Verrill, however, regarded them as belonging to the species described by him as *Eone gracilis*, since changed to *Goniada gracilis*, as above.

The apex of the head (fig. 49) is nearly hexagonal.

The antennæ are composed of three articles, of which the inner forms over half the entire length; the outer articles are about equal in length; the diameter decreases progressively; external article very delicate.

The first and sixth segments of the head bear each a pair of minute eyes; those on the sixth segment not always demonstrable in alcoholic specimens.

The dorsal cirri on a few of the anterior segments and the ventral cirri back of the middle of the body are rounded; elsewhere they are somewhat flattened, as is, also, the lower lip of the lower ramus.

The dorsal ramus appears at the 27th segment.

The setæ of this ramus are short, simple, a little curved at the apex.

From the 26th–30th segment the long compound setæ of the ventral ramus become much elongated, the appendix, especially, being very long and delicate. (Compare fig. 50 with fig. 52.)

This may be a sexual peculiarity; but, as all the specimens taken were sexually mature, we had no means of determining this point.

The normal color would seem to be yellowish-white; this changes to pure white in the males after the 30th, and to flesh-color, varying from light to dark, in the females, after the 20th segment. The eggs are

large, crowded, flesh-colored, determining the color of the body, in the females, given above.

In confinement they were very active, moving about rapidly, and throwing themselves into coils, after the manner of *Rhynchobolus*.

Length in contraction, 35—50^{mm}.

Greatest diameter—1^{mm}.

They taper rapidly along a few of the anterior and posterior segments; otherwise the diameter is uniform.

Found sparingly, burrowing in the finest sand of the harbor; half-tide to low water.

Family ARICIIDÆ.

ARICIA (*Savigny*) *Audouin and M. Edwards.*

ARICIA ORNATA *Verrill.*

Invert. An. of Vin. Sound, etc., p. 596. 1874.

Not common. A few very fine large specimens were taken at extreme low water, in sandy mud.

SCOLOPLOS *Örsted.*

SCOLOPLOS ROBUSTA.

Anthostoma robustum VERRILL. Op. cit., p. 597, pl. xiv, fig. 76. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 258. 1879.

All the specimens taken were small. Sand; low water.

SCOLOPLOS FRAGILIS.

Anthostoma fragile VERRILL. Op. cit., p. 598. 1874.
WEBSTER. Annel. Chæt. of Virginian Coast, p. 258. 1879. Of New Jersey, p. 121. 1880.

Common, especially at Wellfleet. Sand; low water.

Family OPHELIIDÆ.

OPLILIA (*Savigny*) *M. Edwards.*

OPHELIA LIMACINA *Sars.*

Ammotrypane limacina H. RATHKE. Nov. Act. Nat. Cur., vol. xxi, p. 190, pl. x, figs. 4–8. 1840.
GRUBE. Fam. der Ann., p. 70. 1851.
KOREN. Nyt. Mag., vol. ix, p. 94 (*teste* Malmgren).
JOHNSTON. Cat. Brit. Mus., p. 217. 1865.
QUATREFAGES. Hist. Nat. des Ann., vol. ii, p. 279. 1865.

Ophelia bicornis ÖRSTED. Grönlands Annulata Dorsibranchiata, p. 32, figs. 104, 105, 115, 116, 121. 1843.

Ophelia bicornis SARS. Nyt. Mag., vol. vi, p. 207.
Ophelia limacina SARS. Nyt. Mag., vol. vii, p. 381 (*teste* Malmgren).
Ophelia borealis QUATREFAGES. Hist. Nat, des. Ann., vol. ii, p. 273. **1865.**

Quite common in the sand, at low water.

AMMOTRYPANE *H. Rathke.*

AMMOTRYPANE FIMBRIATA *Verrill.*

Invert. An. of Vin. Sound, etc., p. 604, pl. xv., fig. 79. 1874.

Only one specimen was taken. Sand; low water. **Wellfleet.**

Family THELETHUSIDÆ.

ARENICOLA *Lamarck.*

ARENICOLA MARINA *Malmgren.*

Lumbricus marinus LINN. Syst. Nat., ed. xii, vol. i, p. 1077.
Lumbricus papillosus O. FABRICIUS. Fauna Grönlandica, p. 283. **1780.**
Arenicola piscatorum LAMARCK. Syst. d. An. sans. Vert., p. 324. **Hist. Nat. An. sans.** Vert., 2d ed., vol. v, p. 580 (t. Malmgren).
AUD. AND M. EDWARDS. Littoral de la France, vol. ii, p. 285, pl. 8, figs. 8–12. 1834.
JOHNSTON. Cat. Brit. Mus., p. 287. 1865.
Arenicola marina malmgren Annulata Polychæta, p. 188. 1867.

The specimens of this species were all collected in one locality, at Race Run, in coarse sand. We did not find it in Provincetown harbor or at Wellfleet, though the conditions seemed to be favorable, and we looked for it with care. At Race Run were obtained numerous specimens, but they were all small.

Family CHLORÆMIDÆ.

TROPHONIA *M. Edwards.*

TROPHONIA AFFINIS *Verrill.*

Siphonostomum affine LEIDY. Marine Invert. Fauna of R. I. and N. J., p. 16, **1855.**
Trophonia affinis VERRILL. Op. cit., p. 605, pl. xiv, fig. 75. 1874.

Only two specimens were collected. Low water; sand.

Family STERNASPIDÆ.

STERNASPIS *Otto.*

STERNASPIS FOSSOR *Stimpson.*

STIMPSON. Marine Invert. of Grand Menan, p. 29, fig. 19. **1854.**
VERRILL. Invert. An. of Vin. Sound, p. 606, pl. xiv, fig. 74.

Abundant; dredged; 20–30 fathoms.

Family CHÆTOPTERIDÆ.

SPIOCHÆTOPTERUS *Sars.*

SPIOCHÆTOPTERUS OCULATUS *Webster.*

Annel. Chæt. of the Virginian Coast, etc., p. 247, pl. viii, figs. 98–102. 1879.—Annel. Chæt. of New Jersey, p. 118. 1880.

We found this species in great numbers at Wellfleet. Here a great area of sand-flat is exposed at low water, drained by swiftly running streams. It is along the borders of these streams that this species is most abundant. Often 6 or 8 could be obtained from a single "dig" of the spade. It occured under the same conditions in Virginia and New Jersey, but much more sparingly. These three localities are the only ones reported up to this time.

Family SPIONIDÆ.

SCOLECOLEPIS *Blainville.*

SCOLECOLEPIS VIRIDIS *Verrill.*

VERRILL. Invert. Animals of Vin. Sound, etc., p. 600. 1874.
WEBSTER. Annel. Chæt. of New Jersey, p. 118. 1880.

Wellfleet. Rare, only one specimen taken. Sand, low water.

SCOLECOLEPIS CIRRATA *Malmgren.*

Nerine cirrata SARS. Nyt. Mag., vol. vi, p. 207 (*teste* Malmgren).
Scolecolepis cirrata MALMGREN. Annulata Polychæta, p. 199, pl. x, fig. 54. 1867.
VERRILL. Invert. An. of Vin. Sound, p. 602. 1874.

Not common. Dredged in from 20–30 fathoms; sand.

SPIO (*O. Fabr.*) *Örsted.*

SPIO SETOSA *Verrill.*

VERRILL. Op. cit., p. 602, pl. xiv, fig. 71. 1874.
WEBSTER. Annel. Chæt. of N. J., p. 119. 1880.

Provincetown; low water to 25 fathoms.
Wellfleet; low water, sand.
Common.

(SPIO RATHBUNI, *n. sp.*

(PL. V, FIGS. 53–59.)

Head oval (fig. 53), length about double the width, sides very slightly convex; anterior end divided into two rounded lobes; posterior end a little narrower than the anterior; the anterior third of the head, together

with a narrow lateral space, depressed, flattened; the remaining part of the head somewhat elevated.

Eyes small, black; variable both in number, position, and form; not the same in any of these respects on any two specimens.

Tentacles of the form usual in this group, rather stout, reaching back to the eighth segment, tapering slightly, the diameter at the apex being about one-half that at the base.

The buccal segment is very large, reaching in front to the anterior margin of the head; at the sides and behind extending far beyond the head; it has both dorsal and ventral rami, of the same form as those of the next segment, but not quite so large.

The dorsal rami of the non-branchiated segments consist of an anterior, low, rounded, lobe; and a posterior, somewhat elongated and flattened, cirrus.

The ventral rami of the first ten segments do not differ materially from the dorsal rami; after the tenth segment the ventral cirri grow progressively smaller and disappear; the anterior lobe, now become lateral and transverse, is lengthened and depressed (fig. 55).

On the branchiated segments nothing remains of the dorsal ramus but a conical elevation from which the setæ arise.

The branchiæ begin on the thirteenth segment (fig. 55). They are slightly wider at either extremity than in the middle, apex very widely rounded; outer margin with a wide membrane reaching from base to apex; inner margin, as well as an elevated membranous ridge uniting the bases of the opposite branchiæ, with very long, densely crowded cilia; on the largest specimen taken there were 23 pair of branchiæ followed by 15 non-branchiated segments.

The setæ of the first eight segments are all capillary, mostly long and delicate; those of the dorsal rami longer than the ventral. In both rami are a few shorter setæ, somewhat wider along their inner two-thirds (fig. 56).

The dorsal setæ of the branchiated region are a little shortened, but back of the branchiæ grow long again, and are even more delicate than in front.

On the 9th segment the ventral setæ are changed to hooks (fig. 58), of which there are from 4 to 7 in each rami; they project but slightly beyond the setigerous lobe, and are covered by a delicate membrane.

The anal segment ends in four short, stout, bluntly conical lobes (fig. 59). The body is flattened above, convex laterally and below. Impressed lines, running along the ventral surface, include the middle half of this surface; these, being crossed by the lines of segmentation, furnish median ventral plates.

The extended proboscis was not seen.

The posterior margin of the mouth is crenulated; the anterior margin of the buccal segment is divided by a longitudinal median incision into two rounded lobes, which may be widely separated or closely approximated.

Largest specimen.

Length, 10mm.
Width, 0.5mm.
Number of segments, 49.
This species lives in delicate sand tubes; low water.

PRIONOSPIO (*Malmgren*) *Sars.*

PRIONOSPIO (species not determined).

A single specimen, too much injured for identification, was dredged in the harbor. Bottom muddy, covered with dead eel-grass.

STREBLOSPIO *Webster.*

STREBLOSPIO BENEDICTI *Webster.*

(PL. V, FIGS. 60–64.)

Annel. Chæt. of New Jersey, p. 120, pl. v, figs. 48–50. 1880.

The head (fig. 6) is emarginate in front. The lobes of the dorsal and ventral rami do not disappear as stated in the original description, but become much smaller; the error arose from not studying transverse sections.

We found this species in great numbers at Wellfleet, above the harbor, living in soft, black mud, which formed a layer, two or three inches thick, over compact sand. The tubes were placed vertically in the mud, very close together. They were not as large as the specimens found in New Jersey.

The anal segment has a shallow sucker (fig. 64), with thick, rounded margin.

SPIOPHANES *Grube.*

SPIOPHANES VERRILLI *n. sp.*

(PL. VI, FIGS. 65–72.)

Head (fig. 66) resting on the buccal segment; posterior half raised, presenting somewhat the appearance of a carina; anterior half rapidly widening, thin, depressed, with anterior angles much prolonged. Eyes four, small, black, lateral; anterior pair about on the middle line; posterior pair half way between the anterior pair and the posterior margin of the head.

We were unable to find the minute posterior antenna represented as belonging to this genus.

Tentacles (fig. 65) reaching back to the eighth segment; canaliculate, margins of canal rounded and scolloped.

The dorsal cirri on the anterior segments are wide at base, narrowed at about the middle, with their outer half conical (fig 67); the base gradually becomes more swollen, the apex more attenuated, until the middle

line is reached, when the basal part becomes smaller, the outer part longer, with a slight increase in its diameter. Back of the dorsal cirri of the anterior segments is a thin plate, with convex margin, in front of which the setæ arise. This plate exists on all segments, but after a few of the anterior becomes narrower, longer, conical (fig. 69).

The ventral cirri of the first four segments are a little smaller than the dorsal cirri; they have a straight upper, a convex lower, margin; behind them is a plate or lobe similar to the dorsal ramus; back of the fourth segment the cirrus disappears, and the ventral ramus moves gradually towards the ventral margin (fig. 69). After the fourth segment a projecting, arched plate, similar to the ventral ramus, is found about half way between the two rami.

From the sixth segment a membranous densely ciliated ridge (fig. 68) connects the bases of the opposite dorsal cirri. At first this ridge is quite low, but afterwards becomes well marked.

The dorsal setæ of the anterior segments are very long (fig. 70), delicate, margined on one edge; they shorten a little backwards, but behind the middle again increase in length.

The ventral setæ (fig. 71) are shorter, more curved, and a little wider; in other respects similar to the dorsal setæ. On the sixth segment the ventral setæ change to uncini (fig. 72). These project very slightly. There are a few capillary setæ at the lower end of each series of uncini. The anal segment is bluntly rounded, with two delicate filiform cirri.

On the anterior segments the dorsum is flat; the sides and ventral surface convex; further back the dorsum becomes convex; the sides nearly straight; the ventral surface flat, or slightly convex.

General color of the body red; head, sides of body, and feet, white. Only two specimens were found.

Length of largest specimen, 21^{mm}.

Width, 1^{mm}.

Number of segments, 82.

Found at Wellfleet, in sand, at low water.

POLYDORA *Bosc.*

POLYDORA LIGNI *Webster.*

Annel. Chæt. of New Jersey, etc., p. 119, pl. v, figs. 45–47. 1880.

Our specimens were found living on the valves of *Pecten irradians*, their tubes occupying the spaces between the ribs.

Low water; not common.

POLYDORA CONCHARUM *Verrill.*

Proceedings of the United States National Museum, p. 174. November, 1879.

This large and peculiar species was very common, from near high water mark to 30 fathoms.

Family CIRRATULIDÆ.

CIRRATULUS *Lamarck.*

CIRRATULUS GRANDIS *Verrill.*

VERRILL. Invert. Animals of Vineyard Sound, etc., p. 606, pl. xv, figs. 80, 81. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, etc., p. 258. 1879. Annel. Chæt. of New Jersey, p. 122. 1880.

Specimens rare, not large. Found under stones, at low water.

DODECACERIA *Örsted.*

DODECACERIA CONCHARUM *Örsted.*

ÖRSTED. Ann. Dan. Consp., p. 44, fig. 99. 1843.
JOHNSTON. Catl. Brit. Museum, p. 212. 1865.
QUATREFAGES. Hist. Nat. des Ann., vol. i,, p. 464. 1865.
MALMGREN. Annulata Polychæta, p. 206. 1867.
VERRILL. Proceedings United States National Museum, p. 178. 1879.

One specimen only. Twenty to twenty-five fathoms; sand and shells.

Family CAPITELLIDÆ.

NOTOMASTUS *Sars.*

NOTOMASTUS FILIFORMIS *Verrill.*

VERRILL. Invert. An. of Vin. Sound, etc., p. 611. 1874.
WEBSTER. Annel. Chæt. of New Jersey, p. 123, pl. v, figs. 51-54. 1880.

Very abundant at low water, in the sand.

NOTOMASTUS LURIDUS *Verrill.*

VERRILL. Op. cit., p. 610. 1874.
WEBSTER. Op. cit., p. 123. 1880.

Quite common at low water; sand.

CAPITELLA *Blainville.*

CAPITELLA CAPITATA *Van Beneden.*

Lumbricus capitatus FABRICIUS. Fauna Grön., p. 279. 1780.
Capitella Fabricii BLAINVILLE. Dict. des Sc. Nat., vol. 57, p. 443. 1828 (*teste* Clpd.).
Lumbriconais capitata FREY and LEUCK. Beiträge z. Kenntn. wirbelloser Thiere, p. 141. 1847.
Capitella capitata VAN BENEDEN. Bull. Acad. de Belg., vol. iii, 1857, *teste* Claparède CLAPARÈDE, Rech. Anat. Annélides des Hébrides, p. 42, pl. i, figs 9–14. 1861. Annel. Chæt. du G. de N., part ii, p. 10, pl. xxvii fig. 1. 1868.
Capitella capitata MALMGREN. Annulata Polychæta, p. 207. 1867.
McINTOSH. Annelida of the cruise of the Valorous to Davis Strait, p. 507. 1877.
Valla ciliata JOHNSTON. Cat. British Worms, p. 67. 1865.

We found a few specimens of *Capitella*, which we are not able to separate from *C. capitata*. Sexual setæ on the eighth and ninth segments; all segments before the eighth with capillary setæ only; after the ninth, with uncini only. On one young specimen capillary setæ were found only on three segments. Another had five segments with capillary setæ; still another had capillary setæ on seven segments, but there were a few uncini in the seventh ventral ramus.

Near high water mark, in sand.

Family MALDANIDÆ.

NICOMACHE *Malmgren.*

NICOMACHE LUMBRICALIS *Malmgren.*

Sabella lumbricalis O. FABRICIUS. Fauna Grön., p. 374. 1780.
Clymene lumbricalis SARS. Fauna littoralis norvegiæ, vol. ii, p. 16, pl. ii, figs. 23–26. 1856.
Nicomache lumbricalis MALMGREN. Nordiska Hafs-Annulater, p. 190. 1865. Annulata Polychæta, p. 209, pl. xi, fig. 60. 1867.

Dredged, 12 to 28 fathoms.

PRAXILLA *Malmgren.*

PRAXILLA ELONGATA *Webster.*

Annel. Chæt. of New Jersey, p. 124, pl. vi, figs. 55–59. 1880.

We found this species quite common both at Provincetown and Wellfleet, living in sand and gravel. At Wellfleet associated with *Amphitrite ornata* VERRILL.

CLYMENELLA *Verrill.*

CLYMENELLA TORQUATA *Verrill.*

Clymene torquatus LEIDY. Marine Invert. Fauna of Rhode Island and New Jersey, p. 14. 1855.
Clymenella torquata. VERRILL. Invert. An. of Vin. Sound, p. 608, pl. xiv, figs. 71–73. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 258. 1879. Of New Jersey, p. 123. 1880.

Very abundant, low water, sand and gravel.

Family AMPHICTENIDÆ.

CISTENIDES *Malmgren.*

CISTENIDES GOULDII *Verrill.*

Pectinaria Belgica GOULD. Invertebrata of Mass., ed. i, p. 7, pl. i, fig. 1. 1841.
Pectinaria auricoma LEIDY. Marine Invert. Fauna of Rhode Island and New Jersey, p. 14. 1855.
Cistenides Gouldii VERRILL. Op. cit., p. 612, pl. xvii, figs. 87, 87 a. 1874.
WEBSTER. Op. cit. (N. J.), p. 127. 1880.

Common and very large. Low water. Wellfleet and Provincetown.

AMPHARETIDÆ.

MELINNA *Malmgren.*

MELINNA CRISTATA *Malmgren.*

Sabella cristata SARS. Fauna littoralis Norvegiæ, vol. ii, p. 19, pl. ii, figs. 1–7. 1856.
Melinna cristata MALMGREN. Nordiska Hafs-Annulater, p. 371, pl. xx, fig. 50. 1865.
Ann. Polych., p. 215. 1867.
VERRILL. Op. cit., p. 613. 1874.
Phenacia cristata QUATREFAGES. Hist. Nat. des Ann., vol. ii, p. 377. 1865.

Single much injured specimen. Dredged; 25 fathoms.

Family TEREBELLIDÆ.

AMPHITRITE (*Müller*) *Malmgren.*

AMPHITRITE ORNATA *Verrill.*

Terebella ornata LEIDY.—Marine Invert. Fauna of R. I. and N. J., p. 14, pl. xi, figs. 44, 45. 1855.
Amphitrite ornata VERRILL.—Invert. An. of Vineyard Sound, etc., p. 613, pl. xvi, fig. 82. 1874.
Amphitrite ornata WEBSTER.—Annel. Chæt. of the Virginian Coast, p. 262. 1879. Annel. Chæt. of N. J., p. 127. 1880.

This species was very rare at Provincetown, but we found it in great numbers at Wellfleet, in coarse sand and mud, very near high water mark.

AMPHITRITE BRUNNEA *Verrill.*

Terebella brunnea STIMPSON.—Marine Invert. of Grand Manan, p. 31. 1854.
Amphitrite Johnstoni MALMGREN.—Nord. Hafs-Annulater, p. 377, pl. xxi, fig. 51. 1865. Annulata Polychæta, p. 216. 1867.
Amphitrite brunnea VERRILL.—Check-list.

Professor Verrill regards *A. Johnstoni* MALMGREN as a synonym of *T. brunnea* STIMPSON. Stimpson's description, however, is very imperfect. We found two specimens which agree in most particulars, though not in all, with Malmgren's figures of *A. Johnstoni*. They have twenty-four segments with capillary setæ. A very fine large species, dredged in deep water by the Fish Commission, and regarded at first by Professor Verrill as *A. brunnea*, has twenty-five segments with capillary setæ. Our specimens of *A. brunnea* were found under stones, at low-water.

NICOLEA *Malmgren.*

NICOLEA VIRIDIS *n. sp.*

(PL. VI, FIGS. 73, 74.)

The frontal membrane is very large; the tentacles numerous and long, some of them as long as the body.

The branchiæ are divided from near the base, flattened, ending in short blunt subdivisions (fig. 73). The anterior branchiæ are much larger than the posterior.

The uncigerous tori on the segments bearing capillary setæ are large, projecting, convex externally; then follow eight segments, on which the tori are much smaller, and square; then three segments, apparently without setæ; then a short anal segment, with crenulated margin.

No lines of segmentation can be made out in living specimens on the dorsum and sides as far back as the last segment with capillary setæ; on alcoholic specimens they are faintly perceptible.

The cirri of the third and fourth setigerous segments of the male form are small, flattened, quadrangular.

The uncinate setæ have one very large tooth at the apex (fig. 74).

The body tapers very gradually, the diameter of the last segment being about one-half that of the anterior segments.

The general color is green; anterior two-thirds with numerous irregular black specks on the dorsum and sides; these become larger and confluent on the posterior segments, forming spots or blotches. First segment crossed by a band of dark reddish-brown specks (? eye specks), closely crowded; tentacles light flesh-color; branchiæ with dark-brown center.

A single specimen, a male, was taken in sand, at low water.

Length, 9mm.

Greatest width, 1mm.

PISTA *Malmgren.*

In the Invertebrate Animals of Vineyard Sound, etc., Professor Verrill has described a new genus, *Scionopsis*, which he says is closely related to *Pista*, differing from that genus in the extent of the membrane on the third segment, and in the structure of the branchiæ. We found at Wellfleet a form which seems to be intermediate between *Pista* and *Scionopsis*. In the form of the uncinate setæ and in the lateral membrane on the second and third segments it agrees with *Pista;* until closely examined the branchiæ seem also to agree with *Pista*, since, owing to the arrangement on the stem, they present the same peculiar form. However, in the method of branching they agree with *Scionopsis*. It seems best, for the present at least, to refer both this new form and *Scionopsis* VERRILL to *Pista*.

PISTA INTERMEDIA *n. sp.*

(PL. VI, FIGS. 75–78.)

The branchiæ in this species arise from an elongated central stalk, the basal portion of which is naked (without branches) for a variable length, depending upon the size of the branchiæ. The branches are given off from the stem very close to each other, and appear to be ar-

ranged in a very slowly ascending spiral. Each main branch subdivides close to its origin, and again divides; there is a strong tendency to terminate in a short bifurcation, one branch of which is a little longer than the other (fig. 75). The lowest main branches are the largest. They are convex externally, concave internally, directed upward and a little outward. The main branches grow rapidly shorter from base to summit, and tend more directly outward. The result of this arrangement is an egg-shaped branchia, the small end outward. There would appear to be normally four branchiæ, but none of our specimens show more than three.

The tentacular cirri are short, numerous.

The lateral membrane of the second segment is short but high; outer margin convex; the corresponding membrane of the third segment is lower, but extends from the dorsal to the ventral surface.

The anterior ventral shields are very short; the others are variable in form; they may be square, or their length may be more or less than their width.

There are two series of capillary setæ (figs. 76, 77), the setæ not differing much from each other except in length.

The uncini of the anterior segments (fig. 78) do not differ much from those further back, and will be seen to closely resemble those of *Pista cristata*, as figured by Malmgren. The elongated inferior process, said by Malmgren to exist on the uncini of the first six uncigerous segments in this species, we found on all uncini. It does not seem, however, to be a process of the uncini, but a tendon or cord, derived from a membrane, which, in part at least, covers each uncinus. We were able to trace this membrane to the extent shown in fig. 78. On all the species of this family which we have had an opportunity to examine we have found a similar membrane and similar cords, when sufficient care has been taken with the preparation of the uncini for examination. It may further be noted, both as regards this species and *Pista palmata*, that the uncini are not simply flattened with a single series of terminal points, but that the apex is much widened, with transverse series of points, each series composed of from three to five points, corresponding to the single series seen when the uncinus is viewed from the side.

The notes on color were made by Professor Verrill. Anterior region dull olive-green dorsally, sometimes tinged with reddish, and usually with more or less distinct transverse lines of reddish between the segments, these lines less marked in front. On the sides each torus is surrounded by a broad band of dark blood-red, and above each setigerous fascicle, except in front, there is a red spot. On the sides, between the segments, are narrow pale-olive sutural bands. Ventral surface pale-olive or yellowish-green. Each ventral shield with a conspicuous red spot on the lateral borders, those on the posterior shields being connected with the lateral bands. Feet, pale greenish. Posterior portion

of body plain yellowish-green or olive green. Branchiæ greenish, or yellowish, or flesh-color with bright red blood vessels showing through.

Length of largest specimen, 75mm.

Tube formed of coarse sand.

Found at Wellfleet in sand at low water.

Not common.

PISTA PALMATA.

(PL. VII, FIG. 79.)

Scionopsis palmata VERRILL. Invert. Animals of Vin. Sound, p. 614. 1874.
Scionopsis palmata WEBSTER. Annel. Chæt. of the Virginia Coast, p. 262, 1879. Of New Jersey, p. 128. 1880.

Found sparingly at low water.

The considerations that lead us to unite this form to *Pista* have been stated above.

TRICHOBRANCHUS *Malmgren.*

TRICHOBRANCHUS ? GLACIALIS *Malmgren.*

Nord. Hafs-Ann., p. 395, pl. xxiv, fig. 65. 1865.—Ann. Polycht., p. 220. 1867.

We found but one specimen of this genus, and that without branchiæ, and otherwise much injured. Depending mainly on the setæ, we refer it with some doubt to Malmgren's species.

Sand; low water.

POLYCIRRUS *Grube.*

POLYCIRRUS EXIMIUS *Verrill.*

Torquea eximea LEIDY. Marine Invert. Fauna of R. I. and N. J., p. 14, pl. xi, 51, 52. 1855.
Polycirrus eximius VERRILL. Invert. An. Vin. Sound, etc., p. 616, pl. xvi, *f.* 85, 1879.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 263, 1879. Of New Jersey, p. 128. 1880.

ENOPLOBRANCHUS *Verrill.*

ENOPLOBRANCHUS SANGUINEUS *Verrill.*

Chætobranchus sanguineus VERRILL. Op. cit., p. 616, 1874.
Enoplobranchus sanguineus VERRILL. Check-list (advance sheets).
WEBSTER. Annel. Chæt. of the Virginia Coast, p. 263. 1879.

Found only at Wellfleet. Sandy mud; low water; abundant.

Family SABELLIDÆ.

SABELLA (*L.*) *Malmgren.*

SABELLA MICROPHTHALMA *Verrill.*

VERRILL. Invert. Animals of Vin. Sound, p. 618. 1874.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 275. 1879. Of New Jersey, p. 128. 1880.

Not common. Found at low water.

POTAMILLA *Malmgren.*

POTAMILLA NEGLECTA *Malmgren.*

(PL. VII, FIGS. 80–84.)

Nordiska Hafs-Annulater, p. 401, pl. xxvii, fig. 84. 1865. Annulata Polychæta p. 222. 1867.

The specimens, which we refer, without much doubt, to this species, were pure white, very beautiful. The ventral sulcus, contrary to the generic diagnosis, was continued on the dorsum, although seen with difficulty in alcoholic specimens. The branchial cirri were readily lost.

Length, 60mm.

Diameter, 3mm.

Length of branchiæ, 9–13mm.

Length of first eight segments, 9mm.

Dredged in 25 fathoms; sand and shells.

POTAMILLA RENIFORMIS *Malmgren.*

Sabella reniformis LEUCKART. Archiv. f. Naturg., p. 183, pl. 3, fig. 8. 1849 (*teste* Malmgren).

Sabella oculifera LEIDY. Marine Invert. Fauna of R. I. and N. J., p. 13, pl. xi., figs. 55–61. 1855.

QUATREFAGES. Hist. Nat. des Annélés, vol. ii, p. 461. 1865.

Sabella aspersa KRÖYER. Bidrag till Sabellerne, p. 19. 1856.

Sabella oculata KRÖYER. Bidrag till Sabellerne, p. 22. 1856.

Sabella reniformis SARS. Christ. vid. Selsk. Forh., p. 123. 1861.

Sabella (Potamilla) reniformis MARION-BOBRETZSKY. Annales des Sci. Nat., vol. ii, p. 91, pl. xi, fig. 22. 1875.

Potamilla reniformis MALMGREN. Annulata Polych., p. 222, pl. xiv, fig. 77. 1867.

Potamilla oculifera VERRILL. Invert An. of Vin. Sound, p. 617, pl. xvii, fig. 86. 1874.

Potamilla reniformis VERRILL. Check-list.

We collected but one specimen of this species. Dredged in 25 fathoms; sand and shells.

OTHONIA *Johnston.*

OTHONIA FABRICII *Johnston.*

Othonia Fabricii, JOHNSTON. Lond. Mag. Nat. Hist., vol. viii, 181, fig. 19 (*teste* Malmgren and Claparède).

Fabricia Leidyi VERRILL. Op. cit., p. 619. 1874.

For the remaining synonomy of the species see Malmgren, Annulata Polychæta, p. 225. Also Claparède, Annel. Chet. du Golfe de Naples, p. 151. Malmgren's rejection of Fabricia seems to be valid, and Claparède's claim for *Othonia*, as opposed to *Amphicora*, seems equally sound; but his retention of *Fabricia* is not desirable. On decaying wood, near high water mark.

MYXICOLA (*Koch*) *Malmgren.*

MYXICOLA STEENSTRUPI *Kröyer.*

Myxicola Steenstrupi KRÖYER. Bidrag til Kunds., om Sabellerne, p. 35. 1856.
MALMGREN. Nord. Hafs-Ann., p. 408. 1865. Pl. xix, fig. 90.
Annulata Polychæta, p. 227. 1867.
Myxicola Sarsi KRÖYER. Op. cit., p. 9. 1856.
SARS. Christ. Vid. Selsk. Forh., p. 130. 1861.

Body white or yellowish white. The anterior segments, 3–6, may be brown, or white, or mottled. After the fourth segment there may be one, two, or three circular brown specks on the sides of each segment. These spots fail on a few of the posterior segments, but on the sides of the anal segment they are numerous, from four to twelve on each side, according to the size of the specimen. The branchiæ are greenish yellow at base, with their outer two-thirds reddish brown, or they may be greenish white throughhout; branchial cirri of the same color as the branchiæ.

Dredged in 25 fathoms; sand and shells.

Family SERPULIDÆ.

HYDROIDES *Gunnerus.*

HYDROIDES DIANTHUS *Verrill.*

Serpula dianthus VERRILL. Invert. An. of Vin. Sound, p. 620. 1874.
Hydroides dianthus VERRILL. Proc. Acad. Nat. Sci., p. 300. 1878.
WEBSTER. Annel. Chæt. of the Virginian Coast, p. 266. 1879.—Of New Jersey, p. 128. 1880.

Not common. Low water, on shells, etc.

SPIRORBIS *Daudin.*

SPIRORBIS BOREALIS *Daudin.*

Very common at low water, on sea weed, etc.

Genus incertæ sedis.

We collected a single injured specimen, which we have so far been unable to refer to any described family. It presents, however, so many peculiarities that it seems desirable to describe it as far as possible.

THAUMASTOMA *n. g.*

Head rounded behind, flattened and elongated in front; without appendages. Proboscis protrusible, digitate at extremity. No jaws. First segment with median cirrus. Dorsal setæ of first segment much elongated, directed forward. Ventral setæ of first two segment in two series;

one capillary; the other stout, spinous; all other setæ capillary. Each ramus, after the first segment, furnished with a transverse plate, thin, lateral, projecting, outer margin lobed. All segments biramous.

THAUMASTOMA SINGULARE *n. sp.*

(PL. VII, FIGS. 85–94.)

Head composed of two parts; anterior two-thirds flattened (fig. 85), nearly quadrangular, slightly emarginate in front; posterior third rounded, convex, bearing two pairs of minute black eyes; destitute of appendages.

The proboscis was seen extended to a length about equal to that of the head; the incisions dividing it into lobes were observed to run back about one-half this length. In alcohol the proboscis was nearly withdrawn, showing only its anterior end (fig. 86); its inner surface was densely ciliated.

The dorsal ramus of the first segment is composed (fig. 85) of two stout, conical cirri, longer than the head; the upper of these points forward; the lower forward and outward; between their bases rise two distinct bundles of capillary setæ, which are directed forward, and reach beyond the head. The lower ramus of the first segment consists of a transverse, convex, fleshy lobe, terminating above in a short, stout, blunt, rounded process; in front of this plate are two rows of setæ; those forming the anterior series (fig. 93) similar to the posterior (fig. 92), only longer and more delicate, but still having rather the form of spines than of capillary setæ, these anterior setæ are very light colored, nearly white; the posterior series is composed of 6–8 stout yellow spines (fig. 92).

The second segment has its dorsal ramus composed of a depressed fleshy lobe (not seen in the figure, which is a front view), from which arises a fan of capillary setæ (figs. 87, 94), while in front of this lobe is a thin, projecting plate, divided along its outer margin (fig. 87) into six unequal, bluntly rounded lobes.

This lower ramus is much like the corresponding ramus of the first segment, but lacks the superior process. In this ramus is a posterior row of black spines, similar to those of the first segment, except in color, and an anterior series of very fine capillary setæ, much shorter and more delicate than the capillary setæ of the segments behind, shorter even than the spines of the same ramus. Behind the second segment all the setæ are capillary and arise from more or less well-marked rounded lobes.

On the third segment a digitated plate runs down the side of the body, in front of both rami. It has twenty-one lobes (fig. 88) along its outer margin, and runs from above the dorsal ramus to below the ventral. On the fourth segment there are two such lobes (fig. 89). After the fourth segment the dorsal lobe steadily shortens, till on the seven-

teenth segment (fig. 91) it is reduced to a single, flattened, tapering projection. Meanwhile the ventral lobe retains about the same size on all segments, but shows great irregularities in the number and depth of the incisions forming its lateral lobes. From the eighth segment the dorsal rami and setæ have an upward direction; on the eighth they are even directed inward, but as this does not occur on the segments behind the eighth, it may be due to accidental distortion; in like manner the ventral rami of the eighth segment are turned (displaced?) upward; on all segments behind the eighth the ventral setæ point directly outward, instead of obliquely downward, as on the preceding segments.

After the first two segments the setæ of both rami are much alike, but those of the dorsal rami, after the fourth segment, are much more numerous, forming a stout, closely crowded bundle.

The general outline of the body is shown in figs. 87–91, which are half segments; it is depressed with slightly convex dorsal and median fields as far back as the sixteenth segment; here the dorsum becomes more convex (fig. 91). It is possible that this change may take place somewhat more gradually than this statement would indicate, as the dorsum is somewhat injured for a few segments anterior to the sixteenth.

No color notes were made, but as we remember it the general color was dirty white.

Length of 22 segments, 15mm.

Greatest width (at twelfth segment), 5mm. This width diminishes a little forwards, the width of the first segment being 3mm.

Dredged on a sandy bottom in about 20 fathoms.