

UNITED STATES COMMISSION OF FISH AND FISHERIES.

PART I.

REPORT

ON THE

CONDITION OF THE SEA FISHERIES

OF THE

SOUTH COAST OF NEW ENGLAND

IN

1871 AND 1872.

BY

SPENCER F. BAIRD,

COMMISSIONER.

WITH SUPPLEMENTARY PAPERS.

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scarcely longer than the segment itself. In these appendages the spiniform process from the base is long and simple, not biramous, as in the adult, and the lamellæ are small, much shorter than this process, and the outer one has no articulated terminal portion. The terminal segment is as long as the four preceding segments, about as broad as long, the lateral margins slightly convex in outline, and each armed with two sharp teeth, while the posterior margin is concave in outline, with the lateral angles projecting into sharp teeth, between which the edge is armed with about twenty small and equal slender spines.

D.—CATALOGUE OF THE MARINE INVETEBRATE ANIMALS OF THE SOUTHERN COAST OF NEW ENGLAND, AND ADJACENT WATERS.—BY A. E. VERRILL, S. I. SMITH, AND OSCAR HARGER.

In the following catalogue nearly all the marine invertebrates which are known to inhabit the coast between Cape Cod and New York are included, except those belonging to certain groups which have not yet been studied by any one, sufficiently for their identification. Such are chiefly minute or microscopic species, belonging to the Eutomostraca, Foraminifera, Ciliated Infusoria, &c., together with the intestinal worms of fishes and other animals. Our sponges, also, have hitherto received very little attention, and it has not yet been possible to identify but a small number of the species. It is not to be supposed, however, that the list is complete in any group, for every season in the past has served to greatly increase the number of species in almost every class and order, and this will doubtless be the case for many years to come. But as no attempt has hitherto been made to enumerate the marine animals of this region, excepting the shells and radiates, it is hoped that this catalogue will prove useful, both to show what is already known concerning this fauna, and to serve as a basis for future work in the same direction.

In some instances species that have not actually been found on the part of the coast mentioned, but which occur on the shores of Long Island and New Jersey, under such circumstances as to render it pretty certain that they will also be found farther north, have been included in the catalogue, but the special localities have always been given in such cases.

In order not to make the list too long, only those synonyms are given which are really necessary to make apparent the origin of the names, and to refer the student to some of the best descriptions and figures in the works that are generally most accessible, and in which more complete synonymy may be found.

For the same reason, in describing the new species, the descriptions have been made as brief as seemed consistent with the purpose in view, viz: to enable students and others who may not be experienced natu-

ralists to identify the species that they may meet with. To this end, the portions of the descriptions relating to strictly microscopic parts have frequently been omitted, when more obvious characters, sufficient to distinguish the species, could be found.

References to the plates at the end of this volume have been inserted, and also to the pages in the first part of the report where brief descriptions, remarks on the habits, or other information may be found.

The catalogue of the Crustacea was prepared by Mr. S. I. Smith and Mr. Oscar Harger. The rest of the catalogue is by Professor A. E. Verrill, with the exception of the descriptions of the insects, which have been furnished by Dr. A. S. Packard and Dr. G. H. Horn; the Pycnogonids, which have been determined by Mr. S. I. Smith; and a few of the Bryozoa, which were identified by Professor A. Hyatt, who also furnished most of the figures of the species belonging to that class.

Hitherto there has been no attempt to enumerate the marine invertebrates of the entire southern coast of New England. Several partial lists have been published, however, and these have been of considerable use in the preparation of the following catalogue.

In the Report on the Invertebrata of Massachusetts, by Dr. A. A. Gould, 1841, numerous localities for shells on the southern coast of Massachusetts are mentioned.

A catalogue of the shells of Connecticut, by James H. Linsley, was published in the *American Journal of Science*, vol. 48, 1845. In "Shells of New England," 1851, Dr. William Stimpson gave much accurate information concerning the distribution of our Mollusca. In 1869 Dr. G. H. Perkins published a very useful catalogue, in the *Proceedings of the Boston Society of Natural History*, vol. xiii, p. 109, entitled "Molluscan Fauna of New Haven."

The "Report on the Mollusca of Long Island, New York, and of its Dependencies," by Sanderson Smith and Temple Prime, in the *Annals of the Lyceum of Natural History*, vol. ix, p. 377, 1870, also contains much useful information.

A paper by Dr. Joseph Leidy, entitled "Contributions toward a Knowledge of the Marine Invertebrate Fauna of the Coasts of Rhode Island and New Jersey," in the *Journal of the Philadelphia Academy*, vol. iii, 1855, although very incomplete, contains the only published lists of the Annelids and Crustacea of this region. In his "Catalogue of North American Acalephæ," 1865, Mr. A. Agassiz has enumerated all the species discovered on this coast up to that time. Other papers will also be referred to in the synonymy.

ARTICULATA.

INSECTA.

The insects included in the following catalogue have mostly been determined by A. S. Packard, jr., M. D., and by George H. Horn, M. D., who have also kindly furnished descriptions of the new species. Our thanks are also due to Dr. H. A. Hagen, who has identified some of the species. The Pycnogonids have been determined by Mr. S. I. Smith.

DIPTERA.

CHIRONOMUS HALOPHILUS Packard, sp. nov. (p 415.)

Full-grown larvæ were dredged in 10 fathoms in Vineyard Sound, several miles from land, among compound Ascidians, (A. E. V.;) and several young larvæ were dredged in 8 to 10 fathoms in Wood's Hole Passage, September 10, (A. S. P.)

"This is a true *Chironomus*, the body being long and slender, with the usual respiratory filaments at the end of the body. Head red as usual, chitinous; antennæ slender, ending in two unequal spines; eyes black, forming conspicuous dots; mandibles acute, three-toothed.

From lower side of antepenultimate segment arise two pairs of long fleshy filaments, twice as long as the diameter of body, not containing tracheæ, so far as I can see; and from the end of penultimate segment a dorsal minute tubercle, forming a cylindrical papilla, giving rise to eight respiratory hairs about as long as the segment is thick; anal legs long and slender, with a crown of about twelve spines. Two prothoracic feet, as usual. In one larva the semi-pupa was forming; length, 11^{mm}, (.45 inch.)

This species belongs in the same section of the genus with *Chironomus plumosus*, figured by Reaumer, (vol. iv, Pl. 14, figs. 11 and 12; and vol. v.)"—A. S. P.

CHIRONOMUS OCEANICUS Packard. (p. 331.)

Proceedings of the Essex Institute, vol. vi, p. 42, figs. 1-4, 1869.

Specimens apparently belonging to this species have been obtained near New Haven, at low-water mark, among confervæ. It occurs at Salem, Massachusetts; Casco Bay; and the Bay of Fundy, from low-water mark to 20 fathoms.

CULEX, species undetermined. (p. 466.)

A species of mosquito is excessively abundant on the salt-marshes in autumn, and the larvæ inhabit the brackish waters of the ditches and pools.

MUSCIDÆ.—Larvæ of an undetermined fly. (p. 415).*

This larva was found living beneath the surface of the sand, at low-water mark, on the shore of Great Egg Harbor, at Beesley's Point, New Jersey, April 28, 1871. (A. E. V.) The same larva, or an allied species, was found May 5, under stones below high-water mark. "Specimens were brought to me from New Jersey, and kept living in sea-water for some time. The following description is from the living specimens: Body white, long, slender, cylindrical, tapering gradually from the penultimate segment toward the head; thirteen segments, counting the head as one. Segments smooth, thickened at the hinder edge, the sutures being distinct; tegument very thin and transparent, allowing the viscera to be easily distinguished. The terminal segment of the body is conical; seen from beneath it is nearly a fourth longer than broad, the end subacute and deeply cleft by a furrow which diminishes in size and depth to beyond the middle of the segment, where it fades out. This conical extension is flattened vertically above; from the middle of the same ring project the supra-anal, conical, fleshy tubercles, one-fourth the length of the entire ring, which give rise to two main tracheæ running to the head, and which separate and close together at the will of the animal. When extended the prothoracic ring is considerably longer than the others. Head one-third as large as prothorax, and a little more than half as wide. Length, 9^{mm}.

I cannot detect any spiracles on either of the thoracic rings. The tracheæ are not nearly so regular as in the larvæ of the *Anthomyia ceparum*, with living specimens of which I placed it side by side; head much the same, showing it may be of this family. Minute antennæ present; no traces of them in *Anthomyia*, and their presence throws a doubt whether it be a muscid."—A. S. P.

ERISTALIS, species undetermined.

One large-sized larva was found in Vineyard Sound among algæ in April, by Mr. Vinal N. Edwards.

EPHYDRA, species undetermined. (p. 466.)

Packard, Proceedings Essex Institute, vol. vi, p. 50.

Shores of Narragansett Bay, puparium found under sea-weeds by Dr. T. d'Orexiemul. According to Dr. Packard, "scarcely distinguishable from *E. halophila* Packard, which lives in salt brine at the salt-works in Gallatin County, Illinois."

COLEOPTERA.*

A number of species of tiger-beetles (*Cicindela*) are common on the sandy shores and beaches just above high-water mark, and some of them are seldom found away from the sea-shore, while others are also found far inland. The larvæ of some of these, and perhaps of all, live below high water, but this has not yet been observed in the case of several

* The Coleoptera were mostly determined by Dr. George H. Horn.

in the following list, which includes those most characteristic of the sea-shores.

CICINDELA GENEROSA Dejean. (p. 336.)

Spécies Général des Coléoptères, vol. v, p. 231, (teste Lec.); Gould. Boston Journal Nat. Hist., vol. i, p. 42. Pl. 3, fig. 2.

Adult common on sandy beaches at high-water mark; larvæ burrowing in sand below high-water mark, in company with the species of *Talorchestia*.

CICINDELA DORSALIS Say. (p. 364.)

Journal Academy Nat. Sciences of Philadelphia, vol. i, p. 20; Gould, op. cit., p. 47.

Martha's Vineyard, on the sandy beaches.

CICINDELA MARGINATA Fabricius. (p. 470.)

Systema Eleutheratorum, vol. i, p. 241; Gould, op. cit., p. 48.

Barren spots in salt marshes that are occasionally covered by the tides.

CICINDELA REPANDA Dejean. (p. 364.)

Spécies Gén. des Coléoptères, vol. i, p. 74.

With the last, and on sandy beaches at Martha's Vineyard, &c.

CICINDELA HIRTICOLLIS Say. (p. 364.)

Trans. Amer. Phil. Society, new series, vol. i, p. 411, Pl. 13, fig. 2.

With last, also at a distance from the coast.

CICINDELA DUODECIMGUTTATA Dejean.

Spéc. Gén. des Coléop., vol. i, p. 73; Gould, op. cit., p. 51.

Sandy beaches near the salt water; appears both in spring and autumn.

GEOPINUS INCRASSATUS (Dej.) (p. 364.)

Spécies Gén. des Coléopères, vol. iv, p. 21.

Several specimens were found on the outer beach of Great Egg Harbor, New Jersey, burrowing in sand between tides. This species is not confined to the coast, but occurs even west of the Mississippi in sandy places, (Horn.)

BEMBIDIUM CONSTRICTUM Leconte. (p. 464.)

Annals Lyceum Nat. Hist., N. Y., vol. iv, p. 362.

Between tides at Great Egg Harbor, New Jersey.

B. CONTRACTUM Say. (p. 464.)

Trans. Amer. Phil. Soc., vol. ii, p. 85.

Between tides at Great Egg Harbor. This and the preceding occur also along the margins of streams emptying into the ocean. (Horn.)

HYDROPHILUS (TROPISTERNUS) QUADRISTRIATUS Horn. (p. 466.)

Trans. Amer. Entomol. Soc., 1871, p. 331.

In brackish pools, near Beesley's Point, New Jersey, associated with *Palæmonetes vulgaris* and other brackish-water species.

"Elongate oval, more attenuate in front, black, with slight olivaceous tinge; surface densely, finely, and equally punctured. Head with a sigmoid row of coarse punctures on each side, meeting at the vertex. Antennæ and palpi testaceous. Thorax with a small fovea on each side, near the anterior margin, behind and within the eyes, and an angulate row of punctures on each side near the middle, and a few coarse punctures very irregularly disposed. Elytra with four striæ of moderate punctures, the first two sutural and extending nearly from base to apex, inclosing at base a short scutellar row; the outer two rows subhumeral, obliterated at base, extending nearly to apex, and becoming confused, extending toward the inner rows. Body beneath black, opaque, and pubescent, abdomen with a row of brownish patches at the sides of each segment. Legs pale testaceous, femora at base and tarsi black. Length, .38 inch; (9.5^{mm}.)

Resembles *lateralis* in form, but more narrowed in front than behind. The elytra are evenly punctured, and the body along the median line moderately convex. It differs from all our species by the four distinct striæ of punctures on each elytron. The outer two correspond in position with the eighth and ninth, and traces of a third, fourth, and fifth are visible at base."—Horn.

PHILHYDRUS REFLEXIPENNIS Zimmermann.

Trans. Amer. Entomol. Soc., 1869, p. 250.

Great Egg Harbor, between tides.

This and the next occur also inland. (Horn.)

P. PERPLEXUS, Leconte.

Proc. Philad. Acad. Nat. Sci., 1855, p. 371.

Great Egg Harbor, between tides.

PHYTOSUS LITTORALIS Horn. (p. 464.)

Trans. Amer. Entomol. Soc., 1871, p. 331.

"Head brownish testaceous, moderately shining, sparsely clothed with yellowish hairs, front feebly concave; parts of mouth and antennæ testaceous, the latter darker at tip. Thorax paler than the head, as broad as long, disk depressed, sides strongly rounded in front, behind the middle sinuate; base truncate, feebly emarginate at middle, and but slightly broader than half the width of thorax at middle; surface sparsely punctured and pubescent. Elytra pale testaceous, sparsely punctured and pubescent, short, sides strongly divergent behind; body apterous. Abdomen elongate oval, broader behind the middle, piceous, shining, and very sparsely pubescent. Legs pale testaceous. Last segment of abdomen ♂ slightly prolonged at middle and sinuate on each side. Length, .08 inch, (2^{mm}.)

The male resembles in its several characters *P. Balticus* Kraatz, of Europe, but the median prolongation of the last abdominal segment is broader. The penultimate segment is subcarinate along the median line behind. The mandibles in the present species are much more exert than in the species from California.

This is an interesting addition to our insect fauna. Its occurrence has been looked for on the ground of the occurrence of a species on the Pacific Coast, for, as a rule, (rapidly losing its exceptions,) any genus represented in Europe and on the Pacific Coast will have a representation in the Atlantic faunal region."—Horn.

This species was found burrowing in sand, between tides, at Beesley's Point, New Jersey.

BLEDIUS CORDATUS (Say.) (p. 462.)

Trans. Amer. Phil. Soc., vol. iv, p. 461.

This small species occurred in considerable abundance near Beesley's Point. It forms its small burrows in the loose sand at and just below high-water mark, in company with *Talorchestia longicornis*, *Scyphaella arenicola* SMITH, &c. It throws up a small heap of sand around the opening of its burrows, which are much smaller than those of the following species.

"This species is somewhat variable in the form of the elytral dark spot. The elytra are pale testaceous or nearly white in color, and normally with a cordate space of brownish color, and with the apex in front. This spot may become a narrow median fusiform space, or be divided so that the suture is pale; the spot frequently becomes larger by the apex of the cordate spot, extending to the scutellum and along the basal margin."—Horn.

BLEDIUS PALLIPENNIS (Say.) (p. 462.)

Journal Acad. Nat. Sci., Philad., vol. iii, p. 155.

Shores of Great Egg Harbor, near Beesley's Point, common, burrowing perpendicularly in moist sand considerably below high-water mark. The holes are round, with a small heap of sand around the orifice. This species is also found far inland. (Horn.)

HETERO CERUS UN DATUS Melsheimer. (p. 464.)

Proc. Acad. Nat. Sci., Philad., vol. ii, p. 98.

Beesley's Point, burrowing in sand, between tides. This species occurs also on the margins of inland streams. (Horn.)

PHALERIA TESTACEA Say.

Leng's Expedition, vol. ii, p. 280.

Somer's Point, on the shore of Great Egg Harbor, between tides.

NEUROPTERA.

MOLANNA, species undetermined. (p. 379.)

This larva was found in a firm, straight, flattened, tapering tube, made of grains of sand, and attached to the piles of a wharf, below high-water mark, at Menemsha Bight, on Martha's Vineyard, October, 1871, by Dr. Edward Palmer.

ANURIDA MARITIMA (Guerin.) (p. 331.)

This Podurid is very abundant on the under surfaces of large stones from high-water mark to about half tide, New Haven, Wood's Hole, Nantucket; also on the coasts of Europe and Greenland. (Fabricius.)

ARACHNIDA.

CHERNES OBLONGUS Say. (p. 331.)

Hagen, Record of American Entomology for 1868, p. 51.

Under stones near low-water mark, at Wood's Hole, (S. I. S.,) several specimens were found together. This species is recorded from Florida and Georgia. I am not aware that it has been observed below high-water mark before. These specimens were identified by Dr. Hagen.

TROMBIDIUM, species. (p. 331.)

Several species of mites belonging to this or allied genera are found beneath stones near high-water mark, or even running over the *fuci* and rocks near low-water mark, but it is uncertain whether they become submerged by the rising tide or rise on its surface.

BDELLA MARINA Packard, sp. nov. (p. 331.)

Savin Rock, near New Haven, under stones between tides.

"Elongated pyriform, of the usual form of the genus, the body being thickest at the insertion of the third pair of legs. Body with a few scattered hairs, especially toward the end. Palpi twice as long as labium, hairy toward the tip, four-jointed, basal joint not so long as second, third, and fourth conjointly; second a third shorter than third. Mandibles very acutely conical, projecting one-fourth their length beyond the beak, with about four hairs on the outer side; tips very slender acute, corneous. Legs rather hairy; fourth pair but little longer than the others. Claws consisting of two portions, the basal much compressed, subovate, with about six hairs on the under edge, and carrying a stout curved claw. Beak half as long as the body is wide. Length 2.5^{mm}.

"It differs from Say's *Bdella oblonga* ('from Georgia, under bark of trees,' &c.) in its pyriform shape, the shorter first joint of the palpi, and much shorter beak."—A. S. P.

PYCNOGONIDEA.

PHOXICHILIDIUM MAXILLARE Stimpson. Plate VII, fig. 35. (p. 415.)

Marine Invertebrata of Grand Manan, p. 37, 1853.

Common in Vineyard Sound and the Bay of Fundy.

PALLENE, species. (p. 421.)

A small species, perhaps young, found upon piles of the wharf at Wood's Hole, and dredged in Vineyard Sound, in 14 fathoms, off Tar-paulin Cove on Ascidians, and off Holmes's Hole on Hydroids; also off Watch Hill, Rhode Island, and New Haven.

CRUSTACEA.

The following catalogue of the Crustacea has been prepared by Mr. S. I. Smith, excepting the portion relating to the Isopoda, which has been written by Mr. O. Harger.* The list is by no means complete, even for the higher groups which are treated, and no attempt has been made to enumerate the Ostracoids and free-swimming Copepods. Among the Amphipods, the difficult group of Lysianassinæ has not been studied, as the species require careful comparison with those of our northern coast and of Europe. The same is true of the species of *Ampelisca*, and partially of some other genera. In several cases species are omitted which are as yet only represented in our collections by imperfect, young, or too few specimens. The catalogue is intended, however, to include every species which has been mentioned, on good authority, in any published work as inhabiting the southern coast of New England.

BRACHYURA.

GELASIMUS MINAX Leconte. (p. 467.)

Proceedings Acad. Nat. Sci., Philadelphia, vol. vii, 1855, p. 403; Smith, Trans. Conn. Acad., vol. ii, p. 128, Pl. 2, fig. 4, Pl. 4, fig. 1, 1870.

Southern coast of New England to Florida. This species, the largest of our "fiddler-crabs," lives upon salt marshes, usually farther from the sea than the others, and frequently where the water is most of the time nearly fresh.

GELASIMUS PUGNAX Smith. (p. 466.)

Trans. Conn. Acad., vol. ii, p. 131, Pl. 2, fig. 1, Pl. 4, fig. 2. *G. vocans*, var. λ , De Kay, Nat. Hist. of New York, p. 14, Pl. 6, fig. 10, 1844, (not *Cancer vocans* Linné.) *G. pugilator* Leconte, loc. cit., p. 403, (not of Bosc.)

From Cape Cod to Florida, the Gulf of Mexico, and the West Indies. It makes its burrows only upon salt marshes, but is often seen in great companies wandering out upon muddy or sandy flats, or even upon the beaches of the bays and sounds.

GELASIMUS PUGILATOR Latreille. (p. 336.)

Nouveau Dictionnaire d'Hist. nat., 2^e édit., tome xii, p. 520, 1817; Smith, Trans. Conn. Acad., vol. ii, p. 136, Pl. 4, fig. 7, 1870. *Ocypode pugilator* Bosc, Hist. nat. des Crust., tome i, p. 167, 1820. *Gelasimus vocans* DeKay, op. cit., p. 14, Pl. 6, fig. 9.

Cape Cod to Florida, upon muddy and sandy flats and beaches.

OCYPODA ARENARIA Say. (pp. 337, 534.)

Journal Acad. Nat. Sci., Philadelphia, vol. i, p. 69, 1817; Edwards, Hist. nat. des Crust., tome ii, p. 44, Pl. 19, figs. 13, 14.

This species, which is common upon the sandy beaches from New Jersey southward, and which I have found upon Fire Island Beach, Long

* The description of *Seyphacella arenicola* and the reference of *Idotea triloba* to *Epelys* are taken from Mr. Smith's unpublished manuscript, and his name, therefore, appears as authority in these cases.

Island, will very likely be found rarely upon the beaches at Nantucket, and on the southern part of Cape Cod. It lives in deep burrows, above the reach of tides, upon sandy beaches. It is readily distinguished from the "fiddlers" by the nearly equal claws or hands, which are alike in both sexes, and by its color, which is almost exactly like the sand upon which it lives. It is carnivorous and very active, running with great rapidity when pursued.

The synonymy of this species is in much confusion, and I have not attempted to rectify it here, although there are apparently several names which antedate that of Say. The Brazilian species, usually called *rhombea* appears to be identical with ours, and if it is really the *rhombea* of Fabricius, his name should undoubtedly be retained.

SESARMA RETICULATA Say. (p. 467.)

Journal Acad. Nat. Sci., Philadelphia, vol. i, pp. 73, 76, Pl. 4, fig. 6, 1817; p. 442, 1818; Smith, Trans. Conn. Acad., vol. ii, p. 156.

From Long Island Sound to Florida, usually upon salt marshes and associated with *Gelasimus pugnax*.

PINNIXA CYLINDRICA Say. Plate I, fig. 1. (p. 367.)

Journal Acad. Nat. Sci., Philadelphia, vol. i, p. 452, 1818.

Vineyard Sound and Long Island Sound to South Carolina.

PINNOTHERES OSTREUM Say. Plate I, fig. 2, male. (p. 367.)

Loc. cit., p. 67, Pl. 4, fig. 5, 1817; DeKay, op. cit., p. 12, Pl. 7, fig. 16.

Massachusetts to South Carolina.

PINNOTHERES MACULATUS Say. (p. 434.)

Loc. cit. p. 450, 1818.

It lives in *Mytilus edulis* on the New England coast, and is found from Cape Cod to South Carolina.

CANCER IRRORATUS Say. (pp. 312, 530.)

Loc. cit., p. 59, Pl. 4, fig. 2, 1817; Stimpson, Annals Lyceum Nat. Hist., New York, vol. vii, p. 50, 1859. *Platycarcinus irroratus* Edwards, Hist. nat. des Crust., tome i, p. 414, 1834; DeKay, op. cit., Pl. 2, fig. 2. *Cancer Sayi* Gould, Report on the Invertebrata of Massachusetts, 1st edit., p. 323, 1841. *Platycarcinus Sayi* DeKay, op. cit., p. 7. *Cancer borealis* Packard, Memoirs Boston Nat. Hist. Soc., vol. i, p. 303, 1867.

Labrador to South Carolina.

CANCER BOREALIS Stimpson. (pp. 486, 493.)

Loc. cit., p. 50, 1859. *Cancer irroratus* Gould, op. cit., p. 322.

Nova Scotia to Vineyard Sound and No Man's Land. It very likely occurs both north and south of these limits, as it seems to be rare or local, and is often, perhaps, confounded with the far more common *C. irroratus*, although it is a perfectly distinct species.

PANOPEUS HERBSTII Edwards. (p. 472.)

Op. cit., vol. i, 403, 1834; Smith, Proceedings Boston Soc. Nat. Hist., vol. xii, p. 276, 1859.

Long Island Sound to Brazil, but not common north of New Jersey. It is readily distinguished from the following species, by the tubercle on the subhepatic region, just below the first lobe of the antero-lateral border of the carapax; by the postorbital tooth being separated from the second tooth of the antero-lateral margin by a rounded sinus; and by the dactylus of the larger cheliped having a stout tooth near the base within.

PANOPEUS DEPRESSUS Smith. Plate I, fig. 3. (p. 312.)

Loc. cit., p. 283, 1859.

From Cape Cod to Florida, and often carried with oysters much farther north. It is, perhaps, native in Massachusetts Bay.

PANOPIUS SAYI Smith. (p. 312.)

Loc. cit., p. 284, 1859.

Associated with the last, and having the same range. It is easily distinguished from the last species by its narrower, more convex, and swollen carapax, and by the more projecting and arcuate front. The terminal segment of the abdomen of the male is also quite different in the two species; in *P. Sayi* it is broader than the preceding segment, about two-thirds as long as broad, the edges slightly concave, and the tip abruptly triangular, while in *P. depressus* it is narrower than the preceding segment, about three-fourths as long as broad, the edges convex, and the tip broadly rounded.

PANOPEUS HARRISII Stimpson. (p. 313.)

Loc. cit., p. 55, 1859. *Pilumnus Harrisii* Gould, op. cit., p. 326, 1841.

Massachusetts Bay to Florida.

CARCINUS GRANULATUS (Say, sp.) (p. 312.)

Cancer granulatus Say, loc. cit., p. 61, 1817. *Carcinus manas* Gould, op. cit., p. 321; DeKay, op. cit., p. 8, Pl. 5, figs. 5, 6. (?) *Carcinus manas* Leach, Edwards, &c.

Cape Cod to New Jersey, and perhaps much farther south. Our species may, very likely, be the same as the *Carcinus manas* of Europe, but its not extending north on our own coast throws some doubt upon this until there has been a careful comparison of specimens from the two sides of the Atlantic.

PLATYONICHUS OCELLATUS Latreille. Plate I, fig. 4. (pp. 338, 533.)

Encyclopédie méthodique, tome xvi, p. 152; DeKay, op. cit., p. 9, Pl. 1, fig. 1, Pl. 5, fig. 7. *Cancer ocellatus* Herbst, Krabben und Krebse, Band iii, erstes Heft, p. 61, Pl. 49, fig. 4, 1799. *Portunus pictus* Say, loc. cit., p. 62, Pl. 4, fig. 4, 1817.

Cape Cod to Florida.

CALLINECTES HASTATUS Ordway. (pp. 367, 468.)

Boston Journal Nat. Hist., vol. vii, p. 563, 1863. *Lupa hastata* Say, loc. cit., p. 65, 1817. *Lupa diacantha* DeKay, op. cit., p. 10, Pl. 3, fig. 3.

Cape Cod to Florida, and occasionally in Massachusetts Bay.

LIBINIA CANALICULATA Say. (p. 368.)

Loc. cit., p. 77, Pl. 4, fig. 1, 1817; DeKay, op. cit., p. 2, Pl. 4, fig. 4; Streets, Proceedings Acad. Nat. Sci., Philadelphia, 1870, p. 105, 1871.

Found as far north as Casco Bay, on the coast of Maine, and common from Massachusetts Bay southward, at least as far as Florida.

LIBINIA DUBIA Edwards. (p. 368.)

Op. cit., tome i, p. 300, Pl. 14 bis, fig. 2, 1834; Streets, loc. cit., p. 104.

Cape Cod to Florida.

PELIA MUTICA Stimpson. (p. 415)

Annals Lyceum Nat. Hist., New York, vol. vii, p. 177, 1860. *Pisa mutica* Gibbes, Proceedings Amer. Association Adv. Sci., 3d meeting, p. 171, 1850.

Vineyard Sound to Florida.

HYAS COARCTATUS Leach. (p. 504.)

Trans. Linn. Soc., London, vol. xi, p. 329, 1815. Règne animal de Cuvier, 3^{me} édit., Pl. 32, fig. 3. *Lissa fissirostra* Say, loc. cit., p. 79, 1817.

Leidy mentions this species as having been found on the coast of New Jersey, and Say mentions it from the coast of Long Island, but it seems to be rare south of Cape Cod. It lives in deep water from Cape Cod northward, and on the European coast, and is frequently found in the stomachs of the cod-fish.

HETEROCRYPTA GRANULATA Stimpson. (p. 315.)

Annals Lyceum Nat. Hist., New York, vol. x, p. 102, 1871. *Cryptopodia granulata* Gibbes, loc. cit., p. 173; and Proceedings Elliott Soc., Charleston, vol. i, p. 35, wood cut.

This species, dredged several times in Vineyard Sound, was before known only from North Carolina to Florida and the West Indies.

ANOMOURA.

HIPPA TALPOIDA Say. Plate II, fig. 5. (pp. 338, 530.)

Loc. cit., p. 160, 1817.

Cape Cod to Florida.

EUPAGURUS POLLICARS Stimpson. (p. 313.)

Annals Lyceum Nat. Hist., New York, vol. vii, p. 92, 1859. *Pagurus pollicaris* Say, loc. cit., p. 162, 1817; Gould, op. cit., p. 329; DeKay, op. cit., p. 19, Pl. 8, fig. 21.

Massachusetts to Florida.

EUPAGURUS BERNHARDUS Stimpson. (p. 501.)

Loc. cit., p. 89, 1859. *Pagurus Bernhardus* (Linné sp.), Fabricius, Entomologia systematica, vol. ii, p. 469, 1793; Gould, op. cit., p. 329; DeKay, op. cit., p. 20.

Vineyard Sound, &c., in deep water, more abundant north of Cape Cod, and extending to Northern Europe on one side, and to Puget Sound on the other.

EUPAGURUS PUBESCENS Stimpson.

Loc. cit., p. 89, 1859; and Proceedings Acad. Nat. Sci., Philadelphia, 1858, p. 237, 1859. *Pagurus pubescens* Kroyer, Naturh. Tidsskrift, Bind ii, p. 251, 1838.

This species has been taken in deep water off the coast of New Jersey, and will, doubtless, be found off Long Island and Vineyard Sounds. It extends northward to Greenland and Northern Europe.

EUPAGURUS LONGICARPUS Stimpson. (p. 339.)

Proceedings Acad. Nat. Sci., Philadelphia, 1858, p. 237, 1859. *Pagurus longicarpus* Say, loc. cit., p. 163, 1817; Gould, op. cit., p. 330; DeKay, op. cit., p. 20, Pl. 8, fig. 22.

Massachusetts Bay to South Carolina.

MACROURA.

GEBIA AFFINIS Say. Plate II, fig. 7. (pp. 367, 530.)

Loc. cit., p. 195; 1817.

Long Island Sound to South Carolina.

CALLIANASSA STIMPSONI Smith, sp. nov. Plate II, fig. 8. (p. 369.)

Carapax smooth and shining. Greater cheliped (fig. 8) about three times as long as the carapax; carpus and hand convex on both sides; carpus sometimes considerably longer, sometimes not at all longer than broad; both fingers of the same length, and about as long as the basal portion of the dactylus; the prehensile edge of the dactylus without a strong tooth or tubercle at base. Smaller cheliped about half as long as the greater; carpus and hand about equal in length; fingers equal, slender, as long as the basal portion of the propodus. Abdomen smooth and shining above, gradually increasing in breadth to the fifth segment; second segment longest, much longer than broad; third and fifth equal in length; fourth shorter, and sixth a little longer than third or fifth; telson much broader than long, shorter than the fourth segment.

Length of a large specimen, 61^{mm}; length of carapax, 15; length of larger cheliped, 44.

In the character of the chelipeds this species seems to be closely allied to *C. longimana* Stimpson, from Puget Sound.

Our species ranges from the coast of the Southern States north to Long Island Sound.

HOMARUS AMERICANUS Edwards. (pp. 395, 492, 522.)

Hist. nat. des. Crust., tome ii, p. 334, 1837. *Astacus marinus* Say, loc. cit., p. 165, 1817, (not of Fabricius.)

New Jersey to Labrador.

CRANGON VULGARIS Fabricius. Plate III, fig. 10. (pp. 339, 529.)

Supplementum Entomologiæ system., p. 410, 1798. *Crangon septemspinosus* Say, loc. cit., p. 246, 1818.

North Carolina to Labrador and Europe. In depth it extends from low water to 60 or 70 fathoms, and probably much deeper.

HIPPOLYTE PUSIOLA Kroyer. (p. 395.)

Monografisk Fremstilling Hippol., p. 319, Pl. 3, figs. 69-73, 1842.

Vineyard Sound and northward to Greenland and Europe.

VIRBIUS ZOSTERICOLA Smith, sp. nov. Plate III, fig. 11. (p. 369.)

Female: Short and stout. Rostrum about as long as the carapax, and reaching nearly, or quite, to the tip of the antennal scale; the upper edge nearly straight and unarmed, except by two, or rarely three, teeth at the base; under edge with three (sometimes two or four) teeth on the anterior half. Carapax smooth and armed with a stout (supra-orbital) spine on each side at the base of the rostrum and above and a little behind the base of the ocular peduncle, a small (antennal) spine on the anterior margin beneath the ocular peduncle, and a stout (hepatic) spine behind the base of the antennæ. Inner flagellum of the antennula extending very slightly beyond the tip of the antennal scale; outer flagellum considerably shorter. Abdomen geniculated at the third segment; the posterior margin of the third segment prominent above, but not acute.

The males differ from the females in being smaller, much more slender, and in having the rostrum narrower vertically.

The color in life is very variable. Most frequently the entire animal is bright green, sometimes pale, or even translucent, tinged with green. Others were translucent, specked with reddish brown, and with a broad median band of dark brown extending the whole length of the body.

Length of female, 20-26^{mm}; male 15-20.

It is at once distinguished from *V. pleuracanthus* Stimpson, to which, in many characters, it is closely allied, by its very much longer rostrum.

Among eel-grass about Vineyard Sound, and probably common at other points on the coast.

Virbius pleuracanthus Stimpson, (Annals Lyceum Nat. Hist., New York, vol. x, p. 127, 1871,) abundant upon the coast of New Jersey, will very likely be found farther north. In habit it is similar to the species just described.

PANDALUS ANNULICORNIS Leach. Plate II, fig. 6. (p. 493.)

Malacostraca Podophthalmata Britannicæ, Pl. 40, 1815.

Deep water in Vineyard Sound, off Newport, &c.

North of Cape Cod it is common, and extends to Greenland and Europe. In depth it extends down to 430 fathoms at least.

PALÆMONETES VULGARIS Stimpson. Plate II, fig. 9. (pp. 479, 529.)

Annals Lyceum Nat. Hist., New York, vol. x, p. 129, 1871. *Palaemon vulgaris* Say, Journal Acad. Nat. Sci., Philadelphia, vol. i, p. 224, 1818.

Massachusetts to South Carolina.

PENÆUS BRASILIENSIS Latreille.

Edwards, Hist. nat. des Crust., tome ii, p. 414; Gibbes, loc. cit., p. 198; Stimpson, Annals Lyceum Nat. Hist., New York, vol. x, p. 132.

According to Stimpson, this species has been found in the Croton River at Sing Sing, New York, by Professor Baird. It will therefore be very likely to occur in the rivers of Southern New England. It is common on the coast of the Southern States, and extends to Brazil.

SQUILLOIDEA.

SQUILLA EMPUSA Say. (pp. 369, 536.)

Loc. cit., p. 250, 1818; Dekay, op. cit., p. 32, Pl. 13, fig. 54; Gibbes, Proceedings Amer. Assoc., 3d meeting, p. 199.

Florida to Cape Cod.

The young of this species is figured on Plate VIII, fig. 36.

MYSIDEA.

MYSIS STENOLEPIS Smith, sp. nov. Plate III, fig. 12. (p. 370.)

Male: Anterior margin of the carapax produced into a very short, broad, and obtusely rounded rostrum, and each side at the inferior angle into a prominent, acutely triangular tooth, between which and the base of the ocular peduncle there is a broad and deeply rounded sinus. Peduncle of the antennula about a third as long as the carapax along the dorsal line; the sexual appendage slender, tapering, nearly as long as the peduncle; inner flagellum half as long as the outer. Antennal scale rather longer than the carapax along the dorsal line, narrow, about ten times as long as broad, tapering to a slender and acute point, both edges ciliated and nearly straight; flagellum about as long as the rest of the animal. Abdomen somewhat geniculated between the first and second segments; sixth segment about twice as long as the fifth. Appendages of the fourth segment reaching nearly to the distal extremity of the sixth segment; inner ramus slender, slightly longer than the base; outer ramus naked, composed of six segments; the first, third, and fourth subequal in length, and together equaling about three-fourths of the entire length; the second, fifth, and sixth subequal; penultimate segment armed with a stout spine on the outside at the distal extremity, and the last segment terminated by a similar spine. Inner lamella of the appendages of the sixth segment extending slightly beyond the telson, narrow and tapering to an obtuse tip; outer lamella narrow, linear, about seven times as long as broad, nearly a third longer than the inner, both edges ciliated and nearly straight, and the tip narrow and somewhat truncated. Telson considerably longer than the sixth segment, tapering slightly, the sides nearly straight, and each armed with about twenty-four spines; the extremity cleft by a deep sinus rounded at bottom, and its margins convex posteriorly and armed with very numerous slender spines.

Length of a male from tip of rostrum to extremity of telson, 23.2^{mm}; length of carapax along the dorsal line, 6.5; length of antennal scale, 6.7; length of telson, 3.8. Length of female, 30^{mm}.

The females differ but little from the males except in the usual sexual characters. The figure, (Plate III, fig. 12,) made from a small female specimen, does not properly represent the anterior margin of the carapax.

In life the young females are semi-translucent, a spot on each ocular peduncle, the peduncles and inner flagella of the antennulæ, the antennal scale, the telson and caudal lamellæ more or less blackish from deposits of black pigment, while each segment of the abdomen is marked with a rudely stellate spot of black.

Large males of this species were found in the autumn among eel-grass, at New Haven, Connecticut, and the young abundantly in the same situation in May. Young females were collected in abundance during June and July, among the eel-grass in the shallow bays and coves about Vineyard Sound, while adult females, with the marsupial pouches filled with young, were collected, at Wood's Hole, in abundance, April 1, by Mr. V. N. Edwards.

MYSIS AMERICANA. Smith, sp. nov. (p. 396.)

Anterior margin distinctly rostrated, but only slightly projecting; evenly rounded, the inferior angle projecting into a sharp tooth. Antennulæ, in the male, with the densely ciliated sexual appendage similar to that in *M. vulgaris* of Europe; the outer flagellum nearly as long as the body, the inner slightly shorter. Antennal scale about three-fourths as long as the carapax, about nine times as long as broad, tapering regularly from the base to a very long and acute tip; both margins ciliated. Appendages of the fourth segment of the abdomen in the male similar to those in *M. vulgaris*. The outer ramus is slender and naked, and its pair of terminal stylets are equal in length, slender, curved toward the tip, and the distal half armed with numerous short setæ; the ultimate segment of the ramus itself is little more than half as long as the stylets, the penultimate segment four or five times as long as the terminal. Inner lamella of the appendages of the sixth segment about as long as the telson, narrow, slightly broadened at the base, and tapering to a slender but obtuse point; outer lamella once and a half as long as the inner, and eight times as long as broad, slightly tapering, the extremity subtruncate. Telson triangular, broadened at base, the lateral margins slightly convex posteriorly, and armed with stout spines alternating with intervals of several smaller ones; the tip very narrow, truncate, armed with a stout spine each side, and two small ones filling the space between their bases. Length 10 to 12^{mm}.

This species was found, in April, at Beesley's Point, New Jersey, in pools, upon salt-marshes, and at the same locality the stomachs of the spotted flounder were found filled with them. Professor D. C. Eaton found it in great abundance among sea-weeds, &c., just below low-water mark, at New Haven, Connecticut, May 5, 1873. It was also taken in the dredge, in 4 to 6 fathoms, at New Haven, Connecticut, and in 25

fathoms off Vineyard Sound, and has been found in the stomachs of the shad, mackerel, &c.

HETEROMYSIS FORMOSA Smith, gen. et sp. nov. (p. 396.)

Body rather short and stout. Carapax broad behind and tapering anteriorly; the anterior margin produced into an obtusely triangular rostrum. Ocular peduncles short and thickened nearly to the base. Peduncle of the antennula stout, extending to the tip of the antennal scale; the terminal segment in the male wanting the usual elongated sexual process, but having in its place a very dense tuft of long hairs; inner flagellum nearly as long as the carapax; outer flagellum stout at base and more than twice as long as the inner. Antennal scale about three and a half times as long as broad, not quite reaching to the extremity of the peduncle of the antennula, ovate, obtuse at the tip, external margin without a spine and ciliated like the inner; peduncle elongated, penultimate segment considerably longer than the ultimate; flagellum nearly as long as the entire body. Mandibles, maxillæ, first and second maxillipeds, as in *Mysis*. The first pair of legs (second pair of gnathopoda) differ remarkably from those in all the described genera of Mysidæ. The whole leg is stouter than in the succeeding pairs, and the terminal portion, corresponding to the multiarticulate portion of the inner branch (endopodus) in *Mysis*, &c., consists of only three segments including the terminal claw; the first of these segments is stout, slightly shorter than the preceding (meral) segment, and armed with stout spines along the distal portion of the inner margin; the second segment is very short, not longer than broad, and closely articulated to the preceding segment so as to admit of very little motion; the ultimate article is a long, slightly curved claw, freely articulated to the preceding segment. In the five posterior pairs of legs the terminal portion of the inner branch is multiarticulate as in *Mysis*, in the first composed of five segments, besides a stout terminal claw like that in the preceding pair, and in the four remaining pairs of six segments and a slender terminal claw. The exopodal branches of all the legs are well developed.

Abdomen a little more than twice as long as the carapax, the sixth segment a little longer than the fifth. The appendages of the first five segments alike in both sexes; short, rudimentary, and like the same appendages in the female *Mysis*. Inner lamella of the sixth segment projecting very slightly beyond the extremity of the telson, broad, ovate; outer lamella only a little longer than the inner, about two-sevenths as long as broad, inner margin quite convex, outer very slightly, tip rounded. Telson short, broad at base, and narrowed rapidly toward the extremity, the width at base about two-thirds the length, at the extremity only a third as wide as at base; the lateral margins each armed with twelve to fourteen spines, which increase in size distally, and a very long terminal spine; the posterior margins cleft by a sinus deeper than broad, and armed with numerous small spines.

In life the males are semitranslucent and nearly colorless, while in the females the antennulæ, the flagella of the antennæ, the ocular peduncles, the thorax with the marsupial pouch, and the articulations of the caudal appendages are beautiful rose color.

Length of a male, 6.0^{mm}; carapax along the dorsal line, 1.8; antennal scale, 0.70; telson, 0.90. Length of a female, 8.5^{mm}; carapax, 2.5; antennal scale, 0.88; telson, 1.16.

The absence of the sexual appendages from the antennulæ of the male, the peculiar structure of the anterior legs, and the similarity of the abdominal appendages in the two sexes, at once separate the genus *Heteromysis* from all known allied genera.

THYSANOPODA, species. (452.)

A great number of small specimens were taken from the stomach of mackerel caught twenty miles off No Man's Land, July 18, 1871.

Several were also caught swimming at the surface in Vineyard Sound, April 30, 1873, by V. N. Edwards.

A single specimen of a species apparently the same as this was taken at New Haven, Connecticut, May 5, 1873, by Professor D. C. Eaton.

CUMACEA.

DIASTYLIS QUADRISPINOSA, G. O. Sars. Plate III, fig. 13. (p. 507.)

Öfversigt af Kongl. Vet.-Akad. Förh., 1871, Stockholm, p. 72.

Dredged in 23 fathoms of Martha's Vineyard and in 29 fathoms of Buzzard's Bay. It is also found in the Bay of Fundy. Sars's specimens were dredged by the Josephine expedition in 18 fathoms off Skinnecock Bay, Long Island, and in 30 to 35 fathoms, latitude 39° 54' north, longitude 73° 15' west, off the coast of New Jersey.

Our specimens agree well with Sars's description, except that the second segment of the inner ramus of the lateral caudal appendages has but three, or rarely four, spines upon the inner margin, while in Sars's specimens there were five.

DIASTYLIS SCULPTA Sars.

Loc. cit., p. 71.

With the last species, in 18 fathoms, off Skinnecock Bay, according to Sars.

DIASTYLIS ABBREVIATA Sars.

Loc. cit., p. 74.

Rare in 30 to 35 fathoms, off the coast of New Jersey, with the first species, (Sars.)

EUDORELLA PUSILLA Sars.

Loc. cit., p. 79.

Not infrequent in 18 fathoms, off Skinnecock Bay, (Sars.)

EUDORELLA HISPIDA Sars.

Loc. cit., p. 80.

Rare in 30 to 35 fathoms, with the other species mentioned, off the coast of New Jersey, (Sars.)

AMPHIPODA.

ORCHESTIA AGILIS Smith, sp. nov. Plate IV, fig. 14. (p. 314.)

Male: Antennula not quite reaching the distal extremity of the penultimate segment of the antenna; second and third segments of the peduncle about equal in length, and each slightly longer than the first; flagellum about as long as the two last segments of the peduncle. Antenna less than half as long as the body; segments of the peduncle stout and swollen, the ultimate longer than the penultimate; flagellum stout, compressed vertically, much shorter than the peduncle, composed of twelve to fifteen segments. Propodus in the second pair of legs short and thickened laterally, the palmary margin with a small prominence on the outer edge of the posterior angle, behind which the tip of the dactylus closes, and along the inner edge, inside the dactylus, with a thin ridge, which is broken by a small notch near the posterior angle, so that the margin when viewed laterally shows a broad lobe next the base of the dactylus and two small, rounded lobes next the posterior angle, the tip of the dactylus resting between the small lobes; dactylus slender, curved so as to fit closely the palmary margin, and furnished with very minute setæ along the prehensile margin. Posterior thoracic legs slightly longer than the preceding; carpus in full-grown specimens short, much swollen, and thickened so as to be nearly cylindrical.

Female: Carpus and hand in the second pair of legs unarmed; propodus short, slightly spatulate in outline, with a pair of minute setæ at the base of the dactylus, which is very short, not reaching the extremity of the propodus.

Length: male, 10-15^{mm}; female, 10-14.

Bay of Fundy to New Jersey.

ORCHESTIA PALUSTRIS Smith, sp. nov. (p. 463.)

Male: Antennulæ reaching slightly beyond the distal extremity of the penultimate segment of the peduncle of the antennæ. Antennæ less than half as long as the body; peduncle slender; flagellum slender, longer than the peduncle, composed of eighteen to twenty-six segments. Propodus in the second pair of legs nearly oval in outline, the palmary margin spinous, regularly curved to the posterior angle, which projects on the outer edge in a slight, rounded prominence, within which the tip of the dactylus closes; dactylus slender, curved so as to nearly fit the palmary margin, and furnished with minute setæ along the prehensile margin. Posterior thoracic legs slightly longer than the preceding; carpus and propodus both long and slender.

The female differs from the male as in the last species.

Length, male, 15-22^{mm}; female, 12-18^{mm}.

Cape Cod to New Jersey, and very likely farther north and south.

TALORCHESTIA LONGICORNIS Smith. (p. 336.)

Talitrus longicornis Say, loc. cit., p. 384, 1818. *Orchestia longicornis* Edwards, His. nat. des. Crust., tome iii, p. 18, 1840; De Kay, op. cit., p. 36, Pl. 7, fig. 19. Cape Cod to New Jersey, and probably farther south.

TALORCHESTIA MEGALOPHTHALMA Smith. (p. 336.)

Orchestia megalophthalma Bate, Catalogue Amphip. Crust., British Museum, p. 22, 1862.

Cape Cod to New Jersey, and probably farther south.

Talitrus quadrifidus, De Kay, (op. cit., p. 36, Pl. 14, fig. 27,) may be based on the female of one of the preceding species, but it so is badly described and figured as to be indeterminate.

HYALE LITTORALIS Smith. (p. 315.)

Allochrestes littoralis Stimpson, Marine Invertebrata of Grand Manan, p. 49, Pl. 3, fig. 36, 1853; Bate, Catalogue Amphip. Crust., British Museum, p. 48, Pl. 8, fig. 2, 1862.

This species was found at New Haven, Connecticut, by Professor Verrill, May 5, 1873, and is one of the inhabitants of rocky shores, piles of wharves, &c. I have found it at Provincetown, Massachusetts, and it is abundant in the Bay of Fundy. It is undoubtedly abundant on the whole New England coast, but its station upon the shore is so high up on the beach that it is likely to be overlooked.

LYSIANASSA, species. (p. 431.)

A species of this genus, as restricted by Boeck, was several times dredged in Vineyard Sound and Buzzard's Bay.

Several other species of *Lysianassinae* were taken in Vineyard Sound and the neighboring region, but they have not yet been sufficiently studied to be enumerated. The species of this group are much less common and the individuals smaller on the coast of Southern New England than they are upon the coast of Maine and farther north.

LEPIDACTYLIS DYTISCUS Say. (p. 339.)

Loc. cit., p. 380, 1818.

Georgia to Cape Cod.

PHOXUS KROYERI Stimpson. (p. 501.)

Marine Invertebrata of Grand Manan, p. 58, 1853.

Rare in Vineyard Sound and usually in deep water. Common in the Bay of Fundy.

UROTHOË, species. (p. 452.)

A species with long, slender antennæ and very large black eyes, and apparently belonging to this genus, was taken in great numbers at the surface at Wood's Hole, on the evening of July 3, and on one or two other occasions. In life it was whitish, slightly tinged with orange-yellow.

MONOCULODES, species. (p. 452.)

A single specimen taken at the surface in Vineyard Sound, December 21, by Mr. V. N. Edwards.

LAPHYSTIUS STURIONIS Kroyer. (p. 457.)

Nat. Tidsskrift, vol. iv, p. 157, 1842. *Darwinia compressa* Bate, Report Brit. Assoc., 1855, p. 58; Catalogue Amphip. Crust., Brit. Mus., p. 108, Pl. 17, fig. 7; Bate and Westwood, Brit. Sessile-eyed Crust. vol. i, p. 184, wood cut.

A parasitic amphipod, apparently quite identical with this species of Europe, was found in the mouth of a goose-fish (*Lophius Americanus*) taken in Vineyard Sound. A species, apparently the same, was also taken from the back of a skate (*Raia levis*) in the Bay of Fundy the past summer. It is readily distinguished by its broad depressed form, and by having the third to fifth pairs of legs very stout and their distal segments forming powerful talon-like claws, while the first and second pairs are small and slender.

CALLIOPIUS LÆVIUSCULUS Boeck. (p. 315.)

Crust. Amphipoda borealia et arctica, p. 117, 1870. *Amphithoë lævinscula* Kroyer Grönlands Amphipoder, p. 53, Pl. 3, fig. 13, 1838. *Calliope lævinscula* Bate, Catalogue Amphip. Crust. Brit. Mus., p. 148, Pl. 28, fig. 2, 1862; Bate and Westwood, op. cit., vol. i, p. 156, wood cut.

Vineyard Sound and northward to Greenland, Northern Europe, and Spitzbergen.

PONTOGENEIA INERMIS Boeck. (p. 452.)

Op. cit., p. 114, 1870. *Amphithoë inermis* and *crenulata*, Kroyer, Grönlands Amphipoder, pp. 47, 50, Pl. 3, figs. 11, 12, 1838. *Iphimedia vulgaris* Stimpson, Marine Invertebrata of Grand Manan, p. 53, 1853. *Atylus inermis*, *crenulatus*, and *vulgaris* Bate, Catalogue Amphip. Crust. Brit. Mus., pp. 138, 139, 142, Pl. 27, figs. 5, 6, 1862. *Atylus vulgaris* Packard, Memoirs Boston Soc. Nat. Hist., vol. i, p. 298, 1867. (Not *Atylus (Paramphitoë) inermis* Packard, loc. cit., p. 298, Pl. 8, fig. 3.)

Taken at the surface in Vineyard Sound, in March, by Mr. V. N. Edwards. It is abundant, in company with *Calliopius læviusculus*, about the Bay of Fundy in pools left by the tide, and ranges north to Labrador and Greenland.

GAMMARUS ORNATUS Edwards. Plate IV, fig. 15. (p. 314.)

Annales des Sci. nat., tome xx, 1830, p. 367, Pl. 10, figs. 1-10; Hist. nat. des Crust., tome iii, p. 47; Bate, op. cit., p. 212, Pl. 37, fig. 8. *Gammarus locusta* Gould, op. cit., p. 334. *Gammarus pulex* Stimpson, Marine Invert. Grand Manan, p. 55.

New Jersey to Greenland.

GAMMARUS ANNULATUS Smith, sp. nov. (p. 314.)

Anterior margin of the head produced each side beneath the antennulæ into a truncated lobe, which extends farther forward than in *G. ornatus*; eyes scarcely reniform, less elongated than in *G. ornatus*, and their lower margins not reaching, by considerable, the anterior border of the truncated lobe. Antennæ longer than the antennulæ; the ultimate segment of the peduncle longer than the penultimate; the flagellum much more slender, the segments more elongated and with fewer hairs, than in *G. ornatus*. Hands of the first pair of legs more elongated than in *G. ornatus*, and the palmary margins very oblique. Propodus in

the second pair very narrow and elongated, subcylindrical, slightly flattened on the inner side, the palmary margin longitudinal, and scarcely distinct from the posterior margin. Fourth segment of the abdomen with a median fascicle of two large and two small spines, but no lateral fascicles. Fifth and sixth segments with both median and lateral fascicles of spines.

Color in life grayish white, the posterior margins of the segments bordered with brown, giving the body an annulated appearance.

Length, 12-18^{mm}.

New Haven, Connecticut, and Eastport, Maine, and doubtless abundant at other points on the coast.

This species closely resembles the fresh-water *G. fasciatus*, but is distinguished from it by the proportions of the segments of the peduncles of the antennæ, and by wanting the lateral fascicles of spines upon the fourth segment of the abdomen.

GAMMARUS NATATOR Smith, sp. nov. (p. 439.)

Male: Eyes large, elongated, but only slightly reniform. Antennula short and stout, about three-sevenths as long as the body; flagellum but little longer than the peduncle; secondary flagellum nearly half as long as the primary. Antenna considerably longer than the antennula; penultimate segment of the peduncle reaching to the extremity of the peduncle of the antennula; ultimate segment of the peduncle longer than the penultimate; flagellum about two-thirds as long as the peduncle. Both antennulæ and antennæ are furnished with very long hairs, of which many on the antennulæ are plumose. First, second, and third epimera margined on the inferior edges with long cilia. First pair of legs more slender than the second; propodus oval, twice as long as broad, palmary margin continuous with the inferior, with a very narrow lamellar edge, a stout obtuse spine in the middle, and two smaller ones at the inferior angle; dactylus strongly curved. In the second pair the propodus is more than half as broad as long, and somewhat rectangular in outline, except that the palmary margin is slightly oblique; the palmary margin has a narrow lamellar edge, with a slight emargination in the middle, from which a stout obtuse spine arises, and at the inferior angle there are two or three smaller spines, as in the first pair. The inferior edges of the carpi and propodi of both pairs of legs are thickly clothed with long hairs. Natatory legs reaching to the tips of the telson. Second and third segments of the abdomen with the sides produced backward, and the postero-inferior angle acute. Fourth segment with only a median fascicle of spines; fifth and sixth segments with median and lateral fascicles. Rami of the posterior caudal stylets lanceolate, five or six times as long as broad, the outer extending beyond the inner by the length of its terminal article, which is very slender, almost spiniform, the edges of both rami clothed with long plumose hairs. Each division of the telson nearly three times as long as broad.

In the female the hands of the first and second pairs of legs are smaller and slenderer, and the propodi somewhat oval and nearly alike in both pairs; otherwise the females do not differ from the males, except that the rami of the posterior caudal stylets are, perhaps, a very little shorter and broader in proportion.

Length, 10-12^{mm}.

Vineyard Sound, in vast numbers at the surface of the water, usually among floating sea-weeds and eel-grass. Also from stomach of mackerel, May 20.

GAMMARUS MARINUS Leach. (p. 486.)

Trans. Linnæan Soc., London, vol. xi, p. 359, 1815; Bate, Catalogue Amphip.

Crust., Brit. Mus., p. 215, Pl. 38, fig. 4; Bate and Westwood, Brit. Sessile-eyed

Crust., vol. i, p. 370, wood-cut.

A species which I cannot distinguish, by the published figures and descriptions, from this common species of Europe, was not uncommon, associated with *Amphithoë maculata*, under stones at the Wepecket Islands, Gull Island, Cuttyhunk Island, and at other places on Vineyard Sound and Buzzard's Bay. It has also been found at Watch Hill, Rhode Island, and at New Haven, Connecticut, by Professor Verrill. It is at once distinguished from all the other species of our coast by its slender form, slender antennæ, by having the sides of the second and third segments of the abdomen narrow and not produced or acute at the postero-inferior angle, and by having the outer rami of the posterior caudal stylets four or five times as long as the inner.

GAMMARUS MUCRONATUS Say. (p. 479.)

Loc. cit., p. 376, 1818; De Kay, op. cit., p. 37. *Gammaracanthus mucronatus* Bate, op. cit., p. 203.

Readily distinguished from the other species of the coast by having the posterior margin of each of the anterior segments of the abdomen produced into a slender, spiniform, dorsal tooth. In life, it is translucent, tinged with green, or yellowish green, minutely specked with brown or black; these black or brown markings and the green color being frequently so arranged as to give the antennæ and legs a banded appearance. Our species cannot be referred to Bate's genus *Gammaracanthus*, for the dorsal margin is not distinctly carinated, and the third, fourth, and fifth segments of the abdomen are furnished with fascicles of spines.

Usually in brackish water, North Carolina to Cape Cod, and, according to Say, from Florida also.

MGERA LEVIS Smith, sp. nov. (p. 315.)

Eyes nearly round; black in alcoholic specimens. Antennula two-thirds as long as the body; first and second segments of the peduncle equal in length, third about two-thirds as long as the second; flagellum about as long as the peduncle. Antenna about as long as the peduncle of the antennula; ultimate and penultimate segments equal in length, antepenultimate very short; flagellum much shorter than the peduncle. Legs of the first pair small; carpus as broad as the propodus, but little

longer than broad, the posterior margin straight and furnished with fascicles of stout hairs; palmary margin nearly transverse, slightly arcuate, and armed with short setæ; dactylus slender and fitting closely the palmary margin. Legs of the second pair larger; carpus short, as broad as the base of the propodus, the posterior angle thickly clothed with stout hairs; propodus in the male stout, broadest distally, the palmary margin expanded toward the inferior angle and excavated on the inner side to receive the long and strongly curved dactylus; in the female, elongated, slightly narrowed distally, the posterior margin continuous and nearly parallel with the palmary, and furnished with fascicles of stout hairs. Fifth pair of legs but little longer than the third or fourth; sixth and seventh much longer than the fifth, subequal, stout, their meral and carpal segments considerably expanded, especially in the male. Ultimate caudal stylets projecting a little beyond the preceding pairs; rami short, broad, and with spinous tips; the outer ramus slightly longer and broader than the inner, and its outer margin armed with a very few fascicles of spinules. Telson reaching to the bases of the rami of the posterior caudal stylets, nearly as broad as long, and cleft two-thirds of the way to the base.

Length, 5-7^{mm}.

New Jersey, Long Island Sound, Vineyard Sound.

MELITA NITIDA Smith, sp. nov. (p. 314.)

Eyes small, round, black. Antennula about two-thirds as long as the body; first segment of the peduncle slightly shorter than the second, which is nearly twice as long as the last; flagellum longer than the peduncle. Antenna shorter than the antennula, but the peduncle considerably longer than the peduncle of the antennula, the penultimate segment being scarcely shorter than the penultimate segment of the antennula, while the ultimate segment is subequal with it. First pair of legs with the carpus longer and broader than the propodus; propodus oblong, slightly curved; dactylus very small but stout, curved, and attached in a notch in the middle of the extremity of the propodus, not closing upon the extremity of the propodus but projecting inward. Second pair of legs stout; carpus short, triangular; propodus somewhat oval, the palmary margin oblique, arcuate, continuous with the posterior margin, and armed with a series of minute spines and with numerous stiff hairs, the clothing of hairs continuing round upon the posterior margin to the carpus; dactylus curved, tip resting within the palmary margin. Third pair of legs slightly longer than the fourth. Three posterior pairs slender, the fifth somewhat shorter than the sixth and seventh, which are subequal, and have the anterior margins of the bases armed with small spines and the posterior margins minutely serrate. None of the dorsal margins of the segments of the abdomen serrate or emarginate, but the margin of the fifth segment armed with several slender spines on each side near the median line of the dorsum. Penultimate caudal stylets not quite reaching the tip of the preceding

pair. The ultimate pair very long and armed with fascicles of spines along the margins. Divisions of the telson slender, spinous at the tips.

In life dark greenish slate-color, changing in alcohol to dark slate. Length, 7-9^{mm}.

New Jersey to Cape Cod.

AMPELISCA. Plate IV, fig. 17. (pp. 431, 507.)

The species of this genus found upon our coast have not yet been carefully studied. At least two species were taken in Vineyard Sound and Buzzard's Bay. The genus is readily recognized, but the species are difficult to distinguish.

BYBLIS SERRATA Smith, sp. nov. (p. 501.)

Female: Dorsum rounded above, with no trace of a longitudinal carina upon the abdomen; third segment of the abdomen broadly rounded at the postero-lateral angle. Antennula about as long as the peduncle of the antenna; fourth segment of the peduncle of the antenna longer than the fifth. Inferior margins of the epimera of the first and second pairs of legs serrate, with slender and acute teeth alternating with the marginal cilia; carpus in the first pair scarcely if any longer than the propodus; carpus in the second pair very much longer than the propodus. In the third and fourth pairs of legs the dactylus as long as the propodus. Basal segment in the seventh pair of legs expanding distally, the posterior margin nearly straight, the anterior and inferior margins evenly arcuated, and reaching as far as the distal end of the carpus; carpus about as long as the ischium and merus together, a little less than twice as long as broad, and armed with long spines upon the anterior and distal margins, but the posterior margin wholly unarmed; propodus almost as long as the carpus, and nearly four times as long as broad, anterior margin unarmed, the posterior armed upon the outside with two transverse rows of three or four spines, decreasing in size as they recede from the margin, the distal end with a spine each side the slender dactylus. Rami of the first pair of caudal stylets equal, as long as the base; outer rami of the second pair shorter than the inner; rami of the posterior pair equal, longer than the bases, reaching to the tips of the rami of the first pair. Telson as long as the breadth at base, cleft rather more than half its length, the lateral margins arcuate, and rapidly converging toward the evenly rounded extremity.

Alcoholic specimens are pale yellowish, the epimera, bases of the posterior legs, and the sides of the abdomen specked and mottled with numerous points of dark pigment crowded irregularly together.

Length, 10-12^{mm}.

Deep water off Vineyard Sound and Buzzard's Bay.

PTILOCHEIRUS PINGUIS Stimpson. (p. 431.)

Marine Invertebrata of Grand Manan, p. 56, 1853. *Protomeia pinguis* Bate, Catalogue Amphip. Crust. Brit. Mus., p. 170, Pl. 31, fig. 2, 1862.

Common on the whole coast of New England upon muddy bottoms

and north to Labrador. In depth it extends down to 150 fathoms, and probably much farther.

MICRODEUTOPUS MINAX Smith, sp. nov. (p. 479.)

Antennula about two-thirds as long as the body; first segment of the peduncle stout, about as long as the head; second segment a little longer and much more slender; third segment nearly half as long as the first; flagellum slender, about a third longer than the peduncle; secondary flagellum very small, consisting usually of but one segment. Antenna about two-thirds as long as the antennula; ultimate and penultimate segments of the peduncle equal in length, and each fully twice as long as the antepenultimate; flagellum scarcely as long as the last segment of the peduncle. Hands of the first pair of legs in the male greatly developed; carpus very large, scarcely longer than the breadth in the middle; superior margin strongly arcuate, the inferior angle produced into a stout process opposed to the propodus, and the inferior margin arcuate and armed distally with two teeth, a large and prominent one at the base of the terminal process, the other small, obtuse, or even obsolete; propodus not more than half as long as the carpus, much longer than broad, the inferior margin with two broad obtuse teeth; dactylus stout, a little shorter than the propodus. Legs of the second pair with the basal segment broad and squamiform; carpus elongated; propodus as long as the carpus and as broad as its distal portion, rectangular; about two and a half times as long as broad; dactylus short and hooked at the tip. In the female the hands of the first pair of legs are only moderately developed; carpus broad; propodus scarcely as broad as the carpus, rectangular, the palmary margin somewhat oblique, and the inferior margin armed with a spine at the obtusely rounded inferior angle. In the second pair the basal segment is not expanded but narrow; the carpus and propodus much as in the male, except that they are clothed with numerous long, plumose hairs. The bases of the first and second pairs of caudal stylets are armed with a long, slender, spiniform process, arising from the distal end just below the bases of the rami. The outer rami of the posterior stylets are a little longer than the inner. All the stylets extend to the same point.

Length, about 4^{mm}.

Long Island Sound and Vineyard Sound.

Another species of *Microdeutopus* was collected in Vineyard Sound, but it was not abundant.

AUTONOE, species. (p. 415.)

A species belonging apparently in this genus, as defined by Boeck, was common in Vineyard Sound, living in tubes in masses of a compound Ascidian (*Amouroeium pellucidum* Verrill) in 3 to 8 fathoms. It is 6 or 7^{mm} in length, and in life the antennulæ and antennæ are obscurely banded and specked with pink; the body above, except upon the fifth segment and the posterior part of the abdomen, is almost black, the

color extending down upon the epimera, while the legs and caudal appendages are semi-translucent. The eyes are large and black.

AMPHITHOË MACULATA Stimpson. Plate IV, fig. 16. (p. 315.)

Marine Invertebrata of Grand Manan, p. 53, 1853:

Vineyard Sound to the Bay of Fundy and Labrador.

AMPHITHOË VALIDA Smith, sp. nov. (p. 315.)

Male: Eyes round, black in alcoholic specimens. Antennulæ and antennæ subequal in length. Peduncle of the antennula extending scarcely beyond the distal extremity of penultimate segment of the peduncle of the antenna; the second segment but little longer than the first; ultimate segment short and slender. Ultimate and penultimate segments of the peduncle of the antenna subequal in length. First pair of legs short, compressed; carpus as broad as the propodus; propodus broad, oval in outline, the posterior and palmary margins forming a continuous, nearly semicircular curve; dactylus fitting closely the palmary margin. Second pair of legs very large; carpus small; propodus oblong, broadest at the distal extremity, very large and thickened, the outer surface convex, the inner flattened, palmary margin transverse, with a broad, low, median tooth, and a rounded prominence at the inferior angle, within which the tip of the very stout and strongly curved dactylus closes.

The female differs in having the hands of the first pair of legs slightly more elongated, and those of the second pair smaller than in the male, and the palmary margin slightly oblique.

Color in life, bright green.

Length, 10-13^{mm}.

New Jersey and Long Island Sound.

AMPHITHOË LONGIMANA Smith, sp. nov. (p. 370.)

Male: Eyes round, and, in specimens preserved in alcohol, black. Antennula slender and as long as the body; second segment of the peduncle a little longer than the first; third segment about half as long as the second; flagellum about twice as long as the peduncle. Antenna considerably stouter and slightly shorter than the antennula, the peduncle about twice as long as the flagellum; third segment of the peduncle a little more than half as long as the first segment of the peduncle of the antennula; fourth segment nearly three times as long as the third; fifth considerably longer than the fourth; flagellum a little longer, or sometimes only as long, as the fifth segment of the peduncle. Hands of the first and second pairs of legs stout and much elongated. Carpus in the first pair nearly as long as the first segment of the peduncle of the antennula, narrow; propodus much more than twice as long as broad, as wide and long as the carpus, of the same width throughout, slightly curved, and the very short palmary margin transverse; dactylus stout, very little curved, more than half as long as the propodus, and projecting far beyond its inferior edge; the posterior margins of

both propodus and carpus densely clothed with long, stiff hairs. Carpus in the second pair of legs short, with an angular prominence upon the posterior side; propodus as long as in the first pair, and much broader, the palmary margin oblique, projecting at the inferior angle, just inside of which there is a deep sinus in the margin. Posterior edges of the bases of the sixth and seventh pairs of legs unarmed.

In the female the antennæ are shorter and not quite as stout, and the hands of the first and second pairs of legs are very much shorter, smaller, and much less hairy; in the first pair the carpus and propodus are very much shorter and proportionally broader, and the palmary margin of the propodus more oblique; in the second pair the propodus is short and somewhat oval, with a slight prominence at the inferior angle of the palmary margin.

Length, 6-9^{mm}.

New Jersey; Great South Bay, Long Island; Vineyard Sound. Common among eel-grass in sheltered situations. The young, even 5 or 6^{mm} long, were taken at the surface in Vineyard Sound several times.

AMPHITHOË COMPTA Smith, sp. nov. (p. 370.)

Eyes small, round, red in life, but fading in alcohol to whitish. Antennula slender, as long as the body; first segment of the peduncle as long as the head; second slightly longer than the first; last a third as long as the second; flagellum very slender, nearly three times as long as the peduncle. There is a rudimentary secondary flagellum, not longer than the first two segments of the primary flagellum and very slender. Antenna a little shorter than the antennula; the peduncle very little shorter than that of the antennula; last two segments about equal in length, the penultimate reaching as far as the same segments of the antennula; flagellum about as long as the peduncle. First and second pairs of legs, in the male, about equal in size, as long as the head and thorax together, and clothed on both margins with long, plumose hairs. Carpus in the first pair longer than, and as broad as, the propodus, the distal extremity truncate and right-angled at the inferior margin; the propodus much longer than broad, the palmary margin oblique, very nearly straight, and armed at the inferior angle upon the inner side with a stout spine. Carpus in the second pair narrower than in the first, the distal extremity obliquely rounded at the inferior angle; propodus as long as the carpus and no broader, the palmary margin less oblique than in the first pair, without any spine, and the inferior angle slightly projecting; dactylus, strongly curved and closing by the margin of the propodus. In the female the legs of the first and second pairs are nearly alike in form, very much smaller and weaker than in the male, and only sparsely clothed with mostly simple hairs, except upon the inferior margin of the carpus in the second pair. In both pairs the carpus is about as long and broad as the propodus; the propodus is short, narrowed toward the carpus, the palmary margin oblique, convex in outline, with the inferior angle rounded and armed with a stout spine on the inside. Second

and third segments of the abdomen produced into a slight angular prominence at the postero-inferior angle. The posterior edges of the bases of the sixth and seventh pairs of legs not serrated but armed with two to four small spines. First and second pairs of caudal stylets extending scarcely beyond the posterior pair. In the first pair there is a long, slender spine projecting from the distal extremity of the base beneath the rami.

Length of largest specimen examined, 13^{mm}.

North Carolina to Cape Cod. Common among eel-grass. Taken at surface in Vineyard Sound.

PODOCERUS FUCICOLA Smith. (p. 493.)

Cerapus fucicola Stimpson, Marine Invertebrata of Grand Manan, p. 48, Pl. 3, fig. 34, 1853.

This species was dredged by Professor Verrill, in 4 to 5 fathoms, off Watch Hill, Rhode Island, in April, 1873. It is common in the Bay of Fundy.

PODOCERUS, species. (p. 494.)

Another species of the same genus was taken in abundance with the last. It is a large and dark-colored species.

CERAPUS RUBRICORNIS Stimpson. Plate IV, fig. 18.

Marine Invertebrata of Grand Manan, p. 46, Pl. 3, fig. 33, 1853; Bate, Catalogue Amphip. Crust. Brit. Mus., p. 256, Pl. 45, fig. 4.

Not common south of Cape Cod, but very abundant in the Bay of Fundy and north to the coast of Labrador. In depth it extends down to 100 fathoms at least.

CERAPUS MINAX Smith, sp. nov.

Antennulæ and antennæ about equal in length, rather more than half as long as the body. Second pair of legs greatly developed in the male, the hand nearly half as long as the body; carpus elongated, narrow, nearly three times as long as the breadth in the middle, the posterior angle projecting into a broad process about as long as the dactylus, and armed on the inside with a tooth nearly as stout as the distal part of the process itself, but projecting only about half as far; propodus about half as long as the carpus, twice as long as broad; dactylus considerably shorter than the propodus, the tip in most of the larger specimens furnished with a pencil of long hairs. In the female the hand in the second pair of legs is small; the carpus produced into a long process on the inferior edge of the propodus to the palmary margin; propodus short, broad, somewhat oval, the palmary margin arcuate and armed with several short spines on the portion next the carpal process.

Length, about 4^{mm}.

Long Island Sound, Vineyard Sound.

? **CERAPUS TUBULARIS** Say. (p. 396.)

Loc. cit., p. 49, Pl. 4, fig. 7-11, 1817.

Several specimens of a small amphipod, dredged, June 27, in Vineyard

Sound, among masses of a large compound Ascidian, (*Amouroucium pelucidum*), in eight to ten fathoms, off Nobska Point, are probably this species, but unfortunately females only were obtained, while Say describes and figures the male alone. In our specimens, the antennulæ and antennæ are spotted with very dark purplish-brown, the anterior part of the body almost black, the middle and posterior portions spotted with black, or very dark purplish brown. They are between 4 and 5^{mm} long and inhabit unattached tubes as described by Say. The tubes are regularly cylindrical, quite thin and delicate, black, about 5^{mm} long, and 0.4^{mm} in diameter, and are carried about by the animal very much as the larvæ of some of the Phryganeidæ carry about their tubes in fresh water. In the structure of the caudal appendages, our specimens are quite different from the species usually referred to *Cerapus*, but I have not thought best to make any changes in nomenclature until the discovery of the male shall make it certain whether our specimens belong to the species described by Say.

COROPHIUM CYLINDRICUM Smith. (p. 370.)

Podocerus cylindricus, Say loc. cit., p. 387, 1818, (not of Bate, Catalogue Amphip. Crust. Brit. Mus., p. 256.)

New Jersey to Vineyard Sound. Very abundant among weeds and hydroids about piles of wharves, and almost everywhere in shallow water.

Length, about 4^{mm}.

SIPHONÆCETES CUSPIDATUS Smith, sp. nov. (p. 501.)

Male: Head produced into a long, slender, acute rostrum, and each side between the antennula and antenna into a long lobe rounded at the end where the eye is situated, and contracted toward the base. Antennula reaching about to the middle of the fourth segment of the peduncle of the antenna; segments of the peduncle equal in length; flagellum scarcely longer than a segment of the peduncle, and composed usually of five segments. Antenna a little longer than the body; third segment of the peduncle a little longer than any segment of the peduncle of the antennula; fourth segment nearly twice as long as the third; last segment nearly one-half longer than the third; flagellum a little shorter than the last segment of the peduncle. Legs much like Kroyer's figures of *S. typicus*, those of the first pair with the carpus twice as long as broad; propodus slightly narrower and a little longer than the carpus, the posterior edge furnished with long hairs and several stout spines. Legs of the second pair much stouter. Posterior caudal stylets with the terminal process fully as long as the ramus itself, the ramus as broad as long, the extremity obtusely rounded and furnished with very long hairs. Telson broader than long, transversely elliptical.

In the female the antennæ and second pair of legs are more slender than in the male.

In alcoholic specimens the antennulæ are marked with narrow bands of black or dark brown upon each segment of the flagellum and at

both ends of the second and third segments of the peduncle, and the antennæ are obscurely banded and tinged with a lighter color.

Length, about 6^{mm}.

It inhabits tubes constructed of grains of sand.

In deep water off Vineyard Sound and Buzzard's Bay.

UNCIOLOA IRRORATA Say. Plate IV, fig. 19. (p. 340.)

Loc. cit., p. 389, 1818; Stimpson, Marine Invertebrata of Grand Manan, p. 45.

This species grows to a much larger size than described by Say, being frequently 15^{mm} in length.

New Jersey to the Bay of Fundy, and probably much farther north, and from low water to more than 400 fathoms in depth.

HYPERIA, species. (p. 439.)

A large species of *Hyperia* was several times found upon the large red jelly-fish (*Cyanea*) in Vineyard Sound. The same species is common in the Bay of Fundy, but has not been identified with certainty.

Another species of *Hyperia* was taken at the surface, in company with *Salpa*, in Vineyard Sound, early in September.

PHRONIMA, species. (p. 439.)

A species of this peculiar genus was taken at the surface, in company with *Salpa*, off Gay Head, early in September. It is closely allied to the *P. Atlantica* of Guérin. According to Professor Verrill's notes it is, in life, translucent, scarcely tinged with yellowish white, and nearly invisible in the water; the eyes red.

Another form allied to the last was taken with it, and is possibly the male of the same species, but differs from it, and from the characters usually assigned to the genus, in possessing well-developed antennulæ. In life, according to Professor Verrill, it was translucent whitish, the body spotted with dark brown, and the eyes blackish.

THYROPIUS, species.

A single specimen of a species of this genus was taken with the *Phronima* and *Salpa*, off Gay Head, early in September.

CAPRELLA GEOMETRICA Say. Plate V, fig. 20. (p. 480.)

Loc. cit., p. 390, 1818; Bate, Catalogue Amphip. Crust. British Mus., p. 357, Pl. 56, fig. 8.

North Carolina to Vineyard Sound, especially among eel-grass; very abundant in Great Egg Harbor, New Jersey, April, 1871.

CAPRELLA, species. (p. 316.)

A larger species of *Caprella*, which is common in the Bay of Fundy, was frequently dredged in Vineyard Sound.

ISOPODA.

SCYPHACELLA Smith, gen. nov.

Near *Scyphax*, Dana.* Antenna composed of eight distinct segments,

* U. S. Exploring Expedition, Crust., p. 734, Pl. 48, fig. 5.

with a geniculation at the articulation of the fourth with the fifth segment; terminal portion, corresponding to the flagellum, composed of three closely articulated segments, besides a minute apical one; mandibles slender, without palpi; exposed portion of the maxillipeds formed of only two segments; the basal one with a narrow, elongated portion, which is abruptly narrowed at the articulation of the terminal segment, and sends a slender process beneath it to the middle of its inner margin; the terminal segment much narrower than the basal, and tapering toward the extremity; legs subequal, the posterior not shorter than the others; terminal segment of the abdomen produced between the posterior caudal appendages, which are short and essentially as in the allied genera.

This genus differs from *Scyphax* most notably in the form of the maxillipeds, which in *Scyphax* have the terminal segment broad and serrately lobed, while in our genus it is elongated, tapering, and has entire margins. In *Scyphax*, also, the posterior pair of thoracic legs are much smaller than the others, and weak; the last segment of the abdomen is truncated at the apex, and the articulations between the segments of the terminal portion of the antennæ are much more complete than in our species. The general form and appearance of the genera are the same, and the known species agree remarkably in habits, like *Scyphax*, according to Dana, occurring on the beach of Parua Harbor, New Zealand, and found in the sand by turning it over for the depth of a few inches.

SCYPHACELLA ARENICOLA Smith, sp. nov. (p. 337.)

Body elliptical; abdomen not abruptly narrower than the thorax; the whole dorsal surface, except the extremity of the abdomen, covered with small, depressed tubercles, which give rise to minute spinules; eyes prominent, round; antenna a little longer than the breadth of the body; first and second segments short, equal; third, fourth, and fifth successively longer, the fifth being rather longer than the terminal portion, which is more slender than the fifth segment, tapers regularly to the tip, and is composed of three successively much shorter segments, and a very short, somewhat spiniform, but obtuse, terminal one; all the segments, except the minute terminal one, scatteringly beset with spinules; legs beset with small spines; the ischial, meral, carpal, and propodal segments subequal; terminal process of the last segment of the abdomen narrow, triangular, with the apex slightly rounded, and the dorsal surface a little concave; posterior caudal appendages much shorter than the abdomen; rami slightly unequal, the outer stout, spinulose, the inner a little shorter and much more slender.

Color, in life, nearly white, with chalky white spots and scattered, blackish dots arranged irregularly. Eyes black.

Length, 3-4^{mm}.

Found at Somers's and Beesley's Points, on Great Egg Harbor, New Jersey, in April, 1871, burrowing in the sand of the beaches, just above

ordinary high-water mark, in company with several species of *Staphylinidae*, and will very likely be found on Long Island and the southern coast of New England.

PHILOSCIA VITTATA Say.

Jour. Acad. Nat. Sci., Philadelphia, vol. i, p. 429, 1818.

Under rubbish below high-water mark, Connecticut and New Jersey.

SPHÆROMA QUADRIDENTATA Say. Plate V, fig. 21. (p. 315.)

Jour. Acad. Nat. Sci. Philadelphia, vol. i, p. 400, 1818.

Massachusetts to Florida.

IDOTEA CÆCA Say. Plate V, fig. 22. (p. 340.)

Loc. cit., p. 424, 1818. Gould, Invertebrata of Massachusetts, p. 337, 1841.

Massachusetts to Florida.

IDOTEA TUFTSII Stimpson. (p. 340.)

Marine Invertebrata of Grand Manan, p. 39, 1853.

Bay of Fundy and off New London, Connecticut.

IDOTEA IRRORATA Edwards. Plate V, fig. 23. (p. 316.)

Hist. nat. des Crust., vol. iii, p. 132, 1840. *Stenosoma irrorata* Say, loc. cit., p. 423, 1818; Gould, Invertebrata of Massachusetts, p. 338, 1841.

Bay of Fundy to Great Egg Harbor, New Jersey.

IDOTEA ROBUSTA Kroyer. Plate V, fig. 24. (p. 439.)

Naturhist. Tidssk., 2d R., Bind ii, p. 108, 1846; Stimpson, Proceedings Acad. Nat. Sci., Philadelphia, 1862, p. 133.

South shore of Long Island to the Arctic Ocean. A pelagic species.

IDOTEA PHOSPHOREA Harger, sp. nov. (p. 316.)

Resembling *I. irrorata* in size and shape, but easily distinguished from that species by the pointed abdomen.

Antennæ less than half the length of the body, antennulæ attaining the end of the third segment of the antennæ. Front slightly excavated with the lateral angles salient. Head about twice as broad as long, turgid, and usually with a pair of tubercles on the vertex. Eyes placed a little before the middle of the lateral margin, hemispherical, black. First segment of thorax produced laterally around the back part of the head nearly to the eyes, showing no epimeral sutures. Second segment much longer on the median line, but shorter at the sides than the first; the epimera occupy the anterior two-thirds of the lateral margin. Third segment slightly longer than the second; the epimera occupying still more of the lateral margin. Fourth segment of about the same length as third; the epimera occupying nearly or quite all the lateral margin. The remaining three thoracic segments gradually decrease in size; the epimera occupy the whole lateral margin and increase in size posteriorly. The first two abdominal segments are distinct and acute at the sides. The third is similar to these at the sides, but is only separated

from the last by an incision reaching about half way to the median line, Last segment entire, ovate behind, and cuspidate. The style on the second pair of branchial plates in the male is slender, surpasses the laminae, and reaches the middle of the terminal cilia; it is obliquely truncated at the end.

Many of the specimens, especially the smaller ones, are furnished with a row of prominent tubercles along the back, and sometimes with lateral rows.

Length, 10-25^{mm}; breadth, 3-7.5^{mm}.

Long Island Sound to Bay of Fundy.

ERICHSONIA FILIFORMIS Harger. Plate VI, fig. 26. (p. 316.)

Stenosoma filiformis Say, loc. cit., p. 424, 1818.

Small, slender, and nearly linear in outline. Antennulae not quite attaining the fourth segment of the antennae, which are six-jointed, and more than half as long as the body, with the first segment short, second and third increasing in length, last three segments about equal; head elevated between the eyes, where it is surmounted by a bifid tubercle; first and second thoracic segments with a lateral salient angle behind the evident angulated epimera; third and fourth segments with their lateral borders emarginate, and the epimera concealed or rarely visible from above at the emargination; last three thoracic segments angulated in front of the epimera, which are also angular. This arrangement, especially in the smaller specimens, gives the appearance of fourteen serrations on each side of the thorax. There is a row of tubercles along the median line. Abdominal segments consolidated into a single piece, which is furnished with a divergent tooth on each side near the base, and is expanded and obtusely triangular at the apex. The style on the second pair of branchial plates in the male is strong and curved, surpasses the cilia, and is acute and sharply serrate near the end.

Length, 5-9^{mm}.

Vineyard Sound to Great Egg Harbor, New Jersey.

ERICHSONIA ATTENUATA Harger, sp. nov. Plate VI, fig. 27. (p. 370.)

Body smooth, narrowly linear in outline. Antennulae slightly surpassing the second segment of the antennae, which are more than half the length of the body, and have the last segment longest. Head excavated in front; eyes small, black, prominent; first thoracic segment short; second, third, and fourth segments about equal in length, twice as long as the first; third segment broadest, last three segments gradually decreasing in length. Epimera visible from above only in the last two or three segments, but the sutures are evident, except in the first segment, and their position moves gradually from the anterior portion of the segment in the second to the posterior in the seventh segment. Abdominal segments consolidated into a single piece, which is slightly dilated laterally near the base, and obtusely triangular at the tip. The

style on the second pair of branchial plates in the male is straight, slightly surpasses the cilia, and is acute at the end.

The color in life is usually uniform dark green, sometimes with an obscure dorsal stripe of a lighter color.

Length, 15^{mm}.

Abundant among eel-grass at Great Egg Harbor, New Jersey, and also found at New Haven, Connecticut.

EPELYS TRILOBUS Smith. Plate VI, fig. 28. (p. 370.)

Idotea triloba Say, loc. cit., p. 425, 1818.

Great Egg Harbor, New Jersey to Vineyard Sound.

EPELYS MONTOSUS Harger. (p. 370.)

Idotea montosa Stimpson, Marine Invert., Grand Manan, p. 40, 1853.

Bay of Fundy to Long Island Sound.

JÆRA COPIOSA Stimpson. (p. 315.)

Loc. cit., p. 40, Pl. 3, fig. 29, 1853. *J. nivalis* Packard, Memoirs Boston Soc. Nat. Hist., vol. i, 296, (*non* Kroyer.)

Long Island Sound to Labrador.

LIMNORIA LIGNORUM White. Plate VI, fig. 25. (p. 379.)

Pop. Hist. Brit. Crust., p. 227, Pl. 12, fig. 5. *Cymothoa lignorum* Rathke, Skrivt. af Naturh. Selsk., vol. 101, t. 3, f. 14, 1799, (teste Bate and Westwood.) *Limnoria terebrans* Leach, Trans. Linn. Soc., London, vol. xi, p. 371, 1815. Gould, Invertebrata of Massachusetts, p. 388, 1841.

Great Egg Harbor, New Jersey, to the Bay of Fundy and Europe.

NEROCILA MUNDA Harger, sp. nov. (p. 459.)

Elongated, oval, smooth, and polished. Antennæ and antennulæ nearly equal in length, about as long as the head. Head flattened, about one-third broader than long, slightly narrowing anteriorly, produced and broadly rounded in front, subequally trilobed behind, the middle lobe largest. Eyes black, consisting of an irregularly rounded patch of rather indistinct ocelli visible both above and below. First thoracic segment longer than the others, excavated in front for the three lobes of the head; epimeral sutures of this segment indistinct, but the posterior lateral angles of the segment are somewhat produced and broadly rounded. The next three segments have this angle produced so as to become a small tooth in the fourth thoracic segment; in the last three segments it is much produced, becoming a long acute tooth in the seventh. The epimera of the second segment are rounded behind; the remaining epimera are slightly angular behind, becoming more acute posteriorly; those of the second, third, and fourth segments extend backward about as far as the segment to which they belong, but in the last three segments the produced angles of the segments surpass the epimera, so that the angle of the sixth segment nearly attains the end of the seventh epimeron.

The abdomen is composed of six segments, the first five short and about equal in length; the sixth equal in length to the other five, truncate in front and rounded behind. The spines beneath the abdomen, or "abdominal epimera," are acute, the second a little more slender than the first, and extending not quite to the posterior angle of the fourth abdominal segment. The internal plate of the caudal stylets is oval and obliquely truncate, shorter than the external, which is narrow, ovate, acute behind, extending about half its length beyond the tip of the abdomen and longer than the preceding segment of the stylet. Claws of the anterior feet strongly hooked, those of the posterior feet feebly so.

Color, in alcohol, brown, with two narrow dorsal bands of lighter color.

Length, 15^{mm}; breadth, 7^{mm}.

This species is allied to *N. bivittata*, but differs from that species as figured by Milne Edwards, (Atlas du Règne animal de Cuvier, Crust., Plate 66, fig. 5,) in the shortness of three posterior epimera, the regularly rounded terminal segment of the abdomen, and the shape of the caudal stylets.

A single specimen was obtained on the dorsal fin of *Ceratacanthus aurantiacus*.

CONILERA CONCHARUM Harger. (p. 459.)

Ega concharum Stimpson, Marine Invert. Grand Manan, p. 42, 1853.

Vineyard Sound; Charleston, South Carolina.

LIVONECA OVALIS Harger. Plate VI, fig. 29. (p. 457.)

Cymothoa ovalis Say loc. cit., p. 394, 1818.

These animals are usually distorted, and not, as represented in the figure, symmetrical on the two sides.

The specimen figured was taken from a blue-fish near the gill.

ANTHURA BRUNNEA Harger, sp. nov. (p. 426.)

Nearly uniform in size throughout, but slightly narrower anteriorly. Antennulæ and antennæ nearly equal in length, scarcely longer than the head. Front projecting between and each side of the bases of the antennulæ into prominent angles. Eyes small and situated in the sides of the lateral prominences. Thoracic segments smooth and shining above; the third with a slight semicircular depression on the middle of the anterior margin. This depression is still more strongly marked on the three following segments. First segment slightly longer and narrower than the others; second to fifth about equal; sixth and seventh considerably shorter; the seventh about three-fourths the length of the sixth; all the segments carinated below. Dorsal surface of the basal portion of the abdomen similar to the posterior segment of the thorax, showing no indication of segments. Terminal portion flat, smooth, and narrowly ovate at tip. Appendages of the penultimate segment lamelliform, similar in form to the terminal plate but not quite equaling it. First pair of feet short and thickened. All the feet slightly hairy.

In life whitish mottled with dull, purplish brown above. Eyes black, retaining their color in alcohol. Length, 14–15^{mm}.

Great Egg Harbor, New Jersey, and Vineyard Sound.

ANTHURA BRACHIATA Stimpson. (p. 511.)

Marine Invertebrata of Grand Manan, p. 43, 1853.

This species is greatly constricted at the articulations of the second thoracic segment, and by that character is easily distinguished from *A. brunnea*.

Bay of Fundy to Vineyard Sound.

TANAIS FILUM Stimpson. (p. 381.)

Marine Invertebrata of Grand Manan, p. 43, 1853.

Bay of Fundy to Vineyard Sound.

CEPON DISTORTUS Leidy. (p. 557.)

Jour. Acad. Nat. Sci. Phila., vol. iii, p. 149, Pl. 11, figs. 26–32, 1855.

Branchial cavity of *Gelasimus pugilator*, Atlantic City, New Jersey.

ENTOMOSTRACA.

The Ostracoda and the minute Copeopoda of our coast have not yet been sufficiently studied by any one for us to attempt to enumerate even the more common species.

COPEPODA.

SAPPHIRINA, species. Plate VII, fig. 33. (p. 439.)

A beautiful species of this remarkable genus was taken off Gay Head, Martha's Vineyard, September 2 and 8.

PHYLLOPODA.

ARTEMIA GRACILIS Verrill.

Amer. Jour. Sci., 2d series, vol. xlviii, p. 248, 1869; Proceedings Amer. Assoc. Adv. Sci., vol. xviii, p. 235, figs. 1 and 2, 1870.

In tubs of concentrated sea-water at New Haven, Connecticut; Charlestown, Massachusetts; and in salt-vats at Falmouth, Massachusetts.

SIPHONOSTOMA.

ERGASILUS LABRACES Kroyer. (p. 459.)

Nat. Tidsskrift, 1863–64, p. 303, Pl. 11, fig. 2, (teste Zoological Record for 1865.)

According to Kroyer, found upon the striped bass (*Roccus lineatus*) from Baltimore, and liable, therefore, to occur on the coast of New England.

ARGULUS CATOSTOMI Dana and Herrick. (p. 459.)

Amer. Jour. Sci., 1st series, vol. xxx, p. 383, 1836, and vol. xxxi, p. 297, plate, 1837.

Parasitic on the "sucker" (*Catostomus*) in Mill River, near New Haven, Connecticut.

ARGULUS LATICAUDA Smith, sp. nov. (p. 452.)

Carapax orbicular, longer than broad; antero-lateral margin with a deep sinus from which a deep sulcus extends to the center of the carapax; sinns of the posterior margin about twice as deep as broad, extending a little less than a third of the length of the carapax. Eyes large. Body scarcely projecting beyond the posterior margin of the carapax. Tail orbicular, slightly longer than broad, its posterior sinus narrow, extending scarcely a fourth the length. Antennulæ and antennæ much as in *A. Catostomi*, to which the species bears considerable resemblance. The squamiform appendage upon the base of the prehensile legs expands into a broad posterior margin, which is divided into three broad, closely approximated lobes, of which the extremities are broad, truncated, and slightly and irregularly excavated; the terminal portion of the leg is much as in *A. Catostomi*, the ultimate segment longer than the penultimate and armed at the tip with two claws. Natatory legs short, the anterior ones not projecting beyond the carapax.

In alcoholic specimens most of the carapax is opaque and black with a thick deposit of pigment.

Length of entire animal, in the largest specimen, 5^{mm}; length of carapax, 3.7; breadth of carapax, 3.2; length of tail, 1.3; breadth of tail, 1.1.

Found among algæ in Vineyard Sound.

A small specimen taken at surface early in September had the opaque portions of the carapax dark brown in life, and in alcohol it retains about the same color.

ARGULUS LATUS Smith, sp. nov. (p. 452.)

Carapax large, orbicular, broader than long; the antero-lateral border with a broad shallow sinus; the sinus of the posterior margin not deeper than broad, its depth scarcely more than a fifth of the length of the carapax. Body projecting considerably beyond the posterior margin of the carapax. Tail a third as long as the carapax, about two-thirds as broad as long, the lateral margins slightly curved and nearly parallel, the sinus very broad and extending more than a third of the whole length. Disks of the sucking legs about a fourth as wide as the carapax. Squamiform appendage upon the base of the prehensile legs with a papilose area upon the expanded distal portion, the posterior margin without teeth or lobes, but the outer margin of the expanded portion armed with numerous very small teeth; ultimate segment longer than the penultimate, and apparently without any hooks at the tip. Natatory legs all long, even the anterior projecting beyond the sides of the carapax.

Color of alcoholic specimens yellowish white.

Length, 3.0^{mm}; length of carapax, 2.2; breadth of carapax, 2.5; length of tail, 0.7; breadth of tail, 0.45.

Taken at the surface, in Vineyard Sound, July 1.

ARGULUS MEGALOPS Smith, sp. nov. (p. 452.)

Carapax subelliptical, longer than broad; the antero-lateral margin with a deep sinus; the posterior lobes of the carapax, each side of the shallow and narrow sinus, broadly rounded. Eyes very large, their diameter a tenth as great as the breadth of the carapax. Body projecting much beyond the posterior margin of the carapax. Tail somewhat ovate, about two-thirds as broad as long, the sinus only a small notch, extending not more than a tenth of the length. Natatory legs very long, all projecting beyond the carapax. Squamiform appendages upon the bases of the prehensile legs, with a pappilose area upon the expanded portion, and the posterior margin armed with three rather slender teeth, separated by broad spaces; the terminal segment of the leg armed with two small hooks.

Color of alcoholic specimens, yellowish white.

Length, 2.2^{mm}; length of carapax, 1.3; breadth of carapax, 1.0; length of tail, 0.7; breadth of tail, 0.47.

Vineyard Sound, taken at the surface, July 8.

ARGULUS ALOSÆ Gould. (p. 459.)

Invertebrata of Massachusetts, p. 340, 1841.

Parasitic upon the alewife in Massachusetts Bay, according to Gould.

CALIGUS CURTUS Müller. (p. 459.)

Entomostraca, p. 130, Pl. 21, figs. 1, 2, 1785; Kroyer, Nat. Tidsskrift, vol. i, p. 619, Pl. 6, fig. 2, 1837. *Caligus Mülleri* Leach, Encycl. Brit., Suppl., vol. i, p. 405, Pl. 20, figs. 1-8, 1816, (teste Baird et al. ;) Baird, British Entomostraca, p. 271, Pl. 32, figs. 4, 5. *Caligus Americanus* Pickering and Dana, Amer. Jour. Sci., vol. xxxiv, p. 225, Pl. 3-5, 1838; Dana, U. S. Expl. Expd., Crust., Pl. 93.

Abundant upon the cod-fish of our coast and of Europe. It is probably the *Caligus piscinus* of Gould and other American writers.

CALIGUS RAPAX Edwards. (p. 457.)

Hist. nat. des Crust., tome iii, p. 453, Pl. 38, fig. 9-12, 1840; Baird, op. cit., p. 270, pl. 32, figs. 2, 3; Steenstrup and Lütken, Bidrag til Kundskab om det aabne Havs Snyltekrebe og Lernæer, p. 359, Pl. 2, fig. 4, 1861.

Vineyard Sound, on the sting ray, (*Trygon centroura*), and small specimens, both male and female, taken at the surface at Wood's Hole, September 3, in the evening. These specimens from the surface, according to Professor Verrill's notes, were light flesh color, thickly speckled with minute brown spots, the eyes bright red.

LEPEOPHTHEIRUS, species. (p. 459.)

A species with a long tail, and somewhat like the *L. gracilis*, (Van Benaden sp.,) was found upon the sting ray (*Trygon centroura*) taken in Vineyard Sound.

LEPEOPHTHEIRUS, species. (p. 459.)

A species with a very short tail, and approaching Heller's genus *Anuretes*. South shore of Long Island, upon a flounder, (*Channopsetta ocellaris*.)

The *Lepeophtheirus salmonis* Kroyer, is found upon the salmon of the northern coast of New England.

ECHTHROGALEUS COLEOPTRATUS Steenstrup and Lütken. (p. 459.)

Op. cit., 380. *Dinematura coleoptrata* Guérin, Iconographie du Règne animal, Crust. Pl. 35, fig. 6. *Dinemoura alta* Baird, British Entomotraca, p. 285, Pl. 33, figs. 6, 7.

Vineyard Sound, September 19, from the back fin of the mackerel-shark, (*Lamna punctata*.) It has been found upon the English coast and off the Azores.

ECHTHROGALEUS DENTICULATUS Smith, sp. nov. (p. 459.)

Carapax broader than long, with a very slight median emargination in the outline of the front. Posterior portion of the body scarcely longer and not quite as wide as the carapax. Dorsal plates, or elytra, covering much more than half the genital segment, their inner and posterior margins armed with a regular series of small teeth. The posterior lobes of the genital segment somewhat triangular and each terminated by a stout spine. Dorsal plate of the tail elongated, obtusely rounded at the extremity, and exposed from above by the very broad sinus in the genital segment. The tail itself broad, somewhat rectangular, but narrowed distally and not projecting behind the dorsal plate; the terminal lamellæ nearly as long as the tail, narrow, linear, nearly three times as long as broad, and armed at the tip with several setæ.

Length, 9^{mm}; breadth of carapax, 5.1; length of elytra along the inner margin, 2.5.

Vineyard Sound, on Atwood's shark, (*Carcharias Atwoodi*.)

? PANDARUS CRANCHII Leach. (p. 459.)

Dict. des Sci. nat., tome xiv, p. 535, 1819, (teste Edwards et al.); Edwards, Règne animal de Cuvier, 3^{me} éd., Crust., Pl. 78, fig. 2; Steenstrup and Lütken, op. cit., Pl. 11, fig. 22.

A number of specimens of a *Pandarus*, taken from a dusky shark (*Eulamia obscura*) on the south side of Long Island in 1870, differ only very slightly from the figures and descriptions of *P. Cranchii* quoted above.

PANDARUS, species. Plate VII, fig. 31. (p. 457.)

Vineyard Sound, on Atwood's shark, (*Carcharias Atwoodi*.) It is, perhaps, only a variety of the last species, but differs considerably from it, wanting almost wholly the series of spines upon the posterior margin of the carapax, having the caudal appendages shorter and obtuse, besides some slight differences in the natatory legs.

NOGAGUS LATREILLII Leach. Plate VII, fig. 32. (p. 457.)

Dict. des. Sci. nat., tome xiv, p. 536, 1819, (teste Edwards et al.); Règne animal de Cuvier, Crust., Pl. 79, fig. 3; Hist. nat. des Crust., tome iii, p. 459; Steenstrup and Lütken, op. cit., p. 384, Pl. 9, fig. 18.

Vineyard Sound, in company with the last species, on Atwood's shark. All the species of *Nogagus* are males of the allied genera, *Pandarus*,

Echthrogaleus, &c., and are only provisionally retained in a separate group, until it can be determined to which of these genera the different species really belong. This species is probably a *Pandarus*, and very likely the male of the last species.

Our specimens differ slightly from the figures given by Steenstrup and Lütken, the dentiform prominences on the sides of the genital segment in our specimens being much smaller than represented in their figures, the segments of the tail somewhat shorter and broader, and the terminal lamellæ also shorter and broader, while in other respects they agree well. Steenstrup and Lütken's specimens were taken from sharks caught in latitude 31° north, longitude 76° west, (in the Gulf Stream, off the South Carolina coast,) and in latitude 40° south, longitude 31° west, while Leach's came from latitude 1° south, longitude 4° east.

NOGAGUS TENAX Steenstrup and Lütken. (p. 457.)

Op. cit., pp. 384, 388, Pl. 10, fig. 20, 1861.

Vineyard Sound, with the last species, upon Atwood's shark. It has nearly as extended a range as the last species.

It is very different from the last species, having the branches of the posterior pair of natatory legs each composed of a single segment, and the tail also composed of a single segment, which is broader than long, and has the short, truncate caudal lamellæ attached to its obliquely truncated posterior angles. Length, 4.5^{mm}.

This species probably belongs to a different genus from the last, and is perhaps the male of *Echthrogaleus denticulatus*, with which it was associated. Both species of *Nogagus*, the *Pandarus* and *Echthrogaleus denticulatus*, were, however, all found on the same specimen of the shark, so that the association of males and females in one or two instances is not very good proof of their identity.

PANDARUS SINUATUS Say. (p. 459.)

Loc. cit., p. 436, 1818.

This species is apparently, as far as can be judged from Say's description, allied to *P. bicolor* Leach, a European species, which is probably not congeneric with the species which we have previously mentioned.

CECROPS LATREILLII Leach. (p. 459.)

Encycl. Brit., Suppl., vol. i, p. 405, Pl. 20, 1816, (teste Edwards et al. ;) Edwards, Hist. nat. des Crust., tome iii, p. 475; Baird, op. cit., p. 293, Pl. 34, figs. 1, 2.

According to Gould, (op. cit., p. 341,) this species has been found upon the sun-fish (*Orthogoriscus mola*) taken on the coast of Massachusetts.

ANTHOSOMA CRASSUM Steenstrup and Lütken. (p. 460.)

Op. cit., p. 367, Pl. 12, fig. 24, 1861. *Caligus crassus* Abildgaard, (teste Steenstrup and Lütken,) Naturh. Selsk. Skr., Bind iii, p. 49, pl. 5, [1794 ?] (teste Kroyer.) *Anthosoma Smithii* Leach, Encycl. Brit., Suppl., vol. i, p. 406, Pl. 20, 1816, (teste Edwards et al. ;) Kroyer, Nat. Tidsskrift, vol. i, p. 295, Pl. 2, fig. 2, 1836; Edwards, Hist. nat. des Crust., tome iii, 493, Pl. 39, fig. 5; Règne animal de Cuvier, Crust., Pl. 79, fig. 3; Baird, op. cit., p. 299, Pl. 33, fig. 9.

According to Gould, (op. cit., p. 341,) *Anthosoma Smithii* has been
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found upon the mackerel-shark (*Lamna punctata*) taken on the coast of Massachusetts.

LERNÆA BRANCHIALIS Linné. (p. 460.)

Systema Naturæ; Edwards, Hist. nat. des Crust., tome iii, p. 528; Steenstrup and Lütken, op. cit., p. 403, Pl. 13, fig. 28.

Found attached to the gills of the cod in the Bay of Fundy, and, undoubtedly, extends as far south as that fish. It is common in Northern Europe.

PENELLA PLUMOSA DeKay. (p. 460.)

Op. cit., p. 60, 1844.

Found, according to DeKay, upon *Diodon pilosus*, and a species of *Rhombus*.

ANCHORELLA UNCINATA Nordmann. (p. 460.)

Mikrographische Beiträge, Heft ii, p. 102, Pl. 8, figs. 8-12, Pl. 10, figs. 1-5, 1832; Baird, op. cit., p. 337, Pl. 35, fig. 9. *Lernæa uncinata* Müller, Zoologia Danica, vol. i, Pl. 33, fig. 2. 1788, (teste Nordmann et al.); Van Benaden, Poissons des côtes de Belgique, Mémoires Acad. Royale Belgique, tome xxxiii, Pl. 2, fig. 7, 1871.

Found upon cod-fish taken at New London, Connecticut. It is a common European species.

LERNEONEMA RADIATA Stp. and Ltk. Plate VII, fig. 30. (p. 458.)

Op. cit., p. 400, 1861. *Lerneocera radiata* Leseur, Journal Acad. Nat. Sci., Philadelphia, vol. iii, p. 288, Pl. 11, fig. 1, 1824.

At Great Egg Harbor, New Jersey, and in Vineyard Sound and Buzzard's Bay, very common upon the menhaden, (*Brevoortia Menhaden*.)

LERNEONEMA ?, species. (p. 460.)

A species belonging to this, or a closely-allied genus, was found upon a species of *Carangus* taken in Vineyard Sound.

According to Gould, (op. cit., p. 341,) *Penella filosa* Cuvier, (Guérin, op. cit., Zoophytes, Pl. 9, fig. 3; Edwards, Hist. nat. des Crust., tome iii, p. 525,) has been found upon *Orthogoriscus mola*, and might, therefore, occasionally occur south of Cape Cod. The same author also mentions (p. 341) *Chondracanthus cornutus* Cuvier, (Nordmann, op. cit., p. 111, Pl. 9, figs. 5-10; Edwards, Hist. nat. des Crust., tome iii, p. 500, Pl. 40, figs. 18-22,) and *Branchiella Thynni* Cuvier, (Edwards, op. cit., tome iii, p. 512; Steenstrup and Lütken, op. cit., p. 420, Pl. 15, fig. 36,) as occurring upon the coast of Massachusetts.

CIRRIPEDIA.

BALANUS AMPHITRITE Darwin. (p. 381.)

Monograph of the Cirripedia, pp. 240, 614, Pl. 5, fig. 2, 1854.

Found upon the bottoms of ships, but probably does not live long after arriving upon our coast. It is found in all the tropical and warmer temperate seas.

Balanus tintinnabulum Linné, (Darwin, op. cit., pp. 194, 611, Pl. 1, 2,

fig. 1,) occurs with the last species, but has not been noticed living. It has about the same range as the *B. amphitrite*.

BALANUS EBURNEUS Gould. (p. 381.)

Op. cit., p. 15, Pl. 1, fig. 6, 1841, Darwin, op. cit., pp. 248, 614, Pl. 5, fig. 4.

From Massachusetts Bay to Florida and the West Indies. It sometimes occurs in brackish or even fresh water. Professor J. Wyman found it living about 50 miles up the St. John's River, Florida, where the water was fresh enough to drink, and the specimens lived well when transferred to a vessel of perfectly fresh water.

BALANUS IMPROVISUS Darwin.

Op. cit., pp. 250, 614, Pl. 6, fig. 1.

Darwin gives this species as occurring in England, Nova Scotia, United States, West Indies, and South America, so that it undoubtedly occurs upon the coast of New England.

BALANUS CREMATUS Brugière. (p. 381.)

Encyclop. Method., 1798, (teste Darwin;) Darwin, op. cit., pp. 261, 615, Pl. 6, fig. 6.

Balanus rugosus Gould, op. cit., p. 16, Pl. 1, fig. 10.

Dredged abundantly in Vineyard Sound. It ranges from the arctic regions of the Atlantic to the Cape of Good Hope and the West Indies.

BALANUS BALANOIDES Stimpson. (p. 305.)

Marine Invertebrata of Grand Manan, p. 39, 1853; Darwin, op. cit., pp. 267, 615

Pl. 7, fig. 2. *Lepas balanoides* Linné, Systema Naturæ, 1767, (teste Darwin?)

Balanus ovalis and *elongatus* Gould, op. cit., pp. 17, 18, Pl. 1, figs. 7, 8.

Extremely abundant between tides. It inhabits the whole North Atlantic.

CORONULA DIADEMA De Blainville. (p. 460.)

Dict. des Sci. nat., 1824, (teste Darwin;) Gould, op. cit., p. 12; Darwin, op. cit.,

pp. 417, 623, Pl. 15, fig. 3, Pl. 16, figs. 1, 2, 7. *Lepas diadema* Linné, Systema

Naturæ, 1767, (teste Darwin.)

Attached to whales taken on the coast, both north and south of Cape Cod. It is found throughout the whole North Atlantic.

LEPAS FASCICULARIS Ellis and Solander. Plate VII, fig. 34. (p. 382.)

Zoophytes, 1786, (teste Darwin;) Darwin, op. cit., p. 92, Pl. 1, fig. 6.

Found in vast numbers in Vineyard Sound, in June and July, and frequently taken in the Bay of Fundy in August.

LEPAS PECTINATA Spengler. (p. 382.)

Darwin, op. cit., p. 85, Pl. 1, fig. 3. *Anatifa dentata* Gould, op. cit., p. 21, Pl. 1, fig.

11.

Attached to ships' bottoms, but probably does not live long after arriving on our coast. It lives throughout the warmer parts of the Atlantic.

LEPAS ANATIFERA Linné. (p. 382.)

Systema Naturæ, 1767, (teste Darwin;) Darwin, op. cit., p. 73, Pl. 1, fig. 1.

Occurs in the same way as the last species. It is common to the Atlantic, Pacific, and Indian Oceans, and the Mediterranean.

LEPAS ANSERIFERA Linné. (p. 382.)

Systema Naturæ, 1767, (teste Darwin;) Darwin, op. cit., p. 81, Pl. 1, fig. 4. *Anatifa striata* Gould, op. cit., p. 20.

This species probably occurs in the same way as the last. It has the same range.

CONCHODERMA AURITA Olfers. (p. 392.)

Darwin, op. cit., p. 141, Pl. 3, fig. 4. *Lepas aurita* Linné, Systema Naturæ, 1767, (teste Darwin.) *Otton Cuvieri* Gould, op. cit., p. 23.

On ships' bottoms, &c. It ranges through all the seas.

CONCHODERMA VIRGATA Olfers. (p. 392.)

Darwin, op. cit., p. 146, Pl. 3, fig. 2. *Lepas virgata* Spengler, 1790, (teste Darwin.) *Cineras vittata* Gould, op. cit., p. 22.

Occurs in the same way, and has the same range as the last species.

XIPHOSURA.

LIMULUS POLYPHEMUS Latreille. (p. 340.)

Hist. des Crust., (teste Edwards,) Hist. nat. des Crust., tome iii, p. 549; Say, loc. cit., p. 433; Gould, op. cit., p. 339; Packard, Memoirs Boston Soc. Nat. Hist., vol. ii, p. 155, Pl. 3-5, 1872, (on the development;) A. Milne Edwards, Annales des Sci. nat., 5^e sér., tome xvii, nos. 1 et 2, Dec., 1872, Pl. 5-16, (on the anatomy.) *Monoculus Polyphemus* Linné, Systema Naturæ; *Polyphemus occidentalis* Lamarck, Hist. des Anim. sans vert.; De Kay, op. cit., p. 55, Pl. 11, fig. 50. *Limulus australis* Say, loc. cit., p. 436. *Xiphosura Polyphemus* White, List of Crust. in British Mus., p. 121, 1847.

Casco Bay, on the coast of Maine, to Florida.

ANNELIDA.

POLYCHÆTA.

APHRODITA ACULEATA Linn. (p. 507.)

Systema Naturæ, ed. xii, vol. i, p. 1084, 1767; Malmgren, Öfvers. af Kong. Vet.-Akad. Förhandlingar, 1865, p. 52; Johnston, Catalogue of British Non-Parasitical Worms, p. 101, Pl. 9, 1865; Quatrefages, Histoire naturelle des Annelés, vol. i, p. 191, 1865.

Off Gay Head in 15 to 19 fathoms, mud; Bay of Fundy, 10 to 106 fathoms, mud; St. George's Bank, 50 fathoms; northward to Labrador. Northern coasts of Europe to Great Britain and Mediterranean.

LEPIDONOTUS SQUAMATUS Leach. Plate X, figs. 40, 41. (p. 320.)

Aphrodita squamata Linn., Syst. Nat., ed. x, p. 665; ed. xii, p. 1034. *Polynöe squamata* Savigny, Syst. Annel., 20 (t. Quatr.); Quatr., op. cit., p. 218. *Aphrodita punctata* Müll., Zool. Dan. Prod., p. 218 (t. Malmgren). *Lepidonotus squamatus* Malmgren, op. cit., p. 56; Johnston, op. cit., p. 109, Pl. 7, fig. 1. *Lepidonote armadillo* Leidy, Marine Invert. of Rhode Island and New Jersey, p. 16, Pl. 11, fig. 54. *Polynöe dasypus* Quatr., op. cit., vol. i, p. 226.

Great Egg Harbor, New Jersey; New Haven; Watch Hill, Rhode Island; Vineyard Sound, &c. Very common north of Cape Cod to Labrador and Iceland; northern coasts of Europe; Great Britain; France.

In the Bay of Fundy it occurs abundantly from above low-water mark to the depth of 80 fathoms.

LEPIDONOTUS SUBLEVIS Verrill, sp. nov. Plate X, fig. 42. (p. 320.)

Body oblong, somewhat narrowed toward each end, entirely covered by twelve pairs of large scales, or "elytra," which, with the exception of the first and last pairs, are broad oval, evenly rounded posteriorly, the outer lateral edge with a fine fringe; the posterior margin smooth. Their surface is iridescent and nearly smooth throughout, and destitute of tubercles, but has minute rounded granules, and appears punctate under a lens. The scales of the last pair are elongated, with the inner edge curved inward, but without a distinct emargination, such as is seen in the preceding species. Setæ numerous, slender but stiff, amber-yellow. Scales usually reddish or greenish brown, finely specked with dark brown. Length up to 30^{mm}; breadth, 8^{mm}.

This species is easily distinguished from the last by its nearly smooth scales, the form of the last pair, and the lighter-colored and more slender setæ.

Savin Rock, near New Haven; Vineyard Sound.

LEPIDONOTUS ANGUSTUS Verrill, sp. nov. (p. 494.)

Body elongated, narrow, of nearly uniform width throughout, convex above. Twelve pairs of elytra, which are only slightly imbricated and hardly cover the back completely, there being often a narrow naked dorsal space, but when the elytra are closely appressed the back is nearly covered. The elytra are rather small, regularly oval, except those of the terminal pairs; outer edge irregularly fringed; surface covered with small, slightly prominent, roundish granules. Posterior elytra with a deep emargination on the inner margin. Head larger and relatively broader than in *L. squamatus*, convex, with well-rounded sides, eyes larger and farther apart. Antennæ rather short. Setæ shorter than in either of the preceding species, of nearly uniform length, rather rigid, light amber-colored, forming short dense fascicles. Color variable; in one specimen the scales were yellowish gray and brownish, varied with dark specks, and with a central subcircular or somewhat crescent-shaped white spot, surrounded by a circle of dark brown specks,

which form an irregular dark spot on the inner border of the pale central spot.

Reefs off Watch Hill, Rhode Island, in 4 or 5 fathoms, among rocks and algæ.

HARMOTHÖE IMBRICATA Malmgren. (p. 321.)

Nordiska Hafs-Annulater, op. cit., p. 67, 1865, Pl. 9, fig. 8, A-E. *Aphrodita imbricata* Linn., Syst. Nat., ed. xii, p. 1084, 1767. *Aphrodita cirrata* Müller, Prodr. Zoöl. Dan., No. 2644 (t. Malmgren); Fabricius, Fauna Greenlandica, p. 308, Pl. 1, fig. 70. *Lepidonote cirrata* Ersted, Grøn. Ann. Dorsib., 1843, p. 14, Pl. 1, figs. 1, 5, 6, 11, 14, 15; Stimpson, Invertebrata of Grand Manan, p. 36, 1853. *Polynöe cirrata* Sars, Arch. für. Naturg., vol. xi, 1845, p. 11, Pl. 1, figs. 12-21 (embryology).

New Haven; Watch Hill, Rhode Island; Vineyard Sound; Massachusetts Bay; Bay of Fundy and northward to Greenland; Iceland; and Spitzbergen. Northern coasts of Europe; Scotland. In the Bay of Fundy it is common from above low-water mark to 60 fathoms; in Vineyard Sound, from low-water mark to 15 fathoms; 25 fathoms off Buzzard's Bay.

STHENELAIS PICTA Verrill, sp. nov. (p. 348.)

(?) *Stigalton Mathildæ* Leidy, Marine Invert. Fauna of the Coasts of Rhode Island and New Jersey, p. 16, Pl. 11, f. 53, from Journal Philadelphia Acad., series ii, vol. iii, 1855 (non Aud. and Edw.) (?) *Sthenelais Leidyi* Quatr., op. cit., vol. i, p. 278 (no description).

Body depressed, much elongated, nearly uniform in breadth throughout; back convex; ventral surface flat. The whole dorsal surface is closely covered by the imbricated scales, of which there are more than 150 pairs. These, with the exception of the anterior and posterior pairs, are broadly lunate, with a deep emargination in the center of the anterior edge; the posterior and lateral margins are broadly rounded; the outer lateral edge is laciniately fringed; the posterior edge is smooth; the whole surface of the anterior scales is covered with minute, slightly elevated granules; farther back, the exposed portion of the surface of the scales is smooth, and the microscopic granules are restricted to the anterior and inner portions. The scales of the anterior pair are oval, and have their entire outer and anterior margins minutely but irregularly denticulate.

The head is small, rounded, contracted behind the posterior eyes and in front of the anterior ones; the eyes are near together, in a quadrangle; those in the anterior pair are a little farther apart, and lateral. The head is prolonged anteriorly into a narrow elliptical or oval portion, which forms the base of the median antennæ; close to and below each of the anterior eyes a prominent, membranous, ciliated process arises. The feet of the first pair, which are directed forward, are elongated, and bear a pair of slender, elongated, dorsal cirri, which are nearly as long as the antennæ; a much shorter, slender cirrus from the lower lobe, with a small, thin, membraneous process below; and a large fascicle of long,

slender setæ, as long as the median antennæ. The palpi are slender, longer than the antennæ; lateral feet prominent, projecting beyond the scales; setæ light yellow.

Color variable, generally light gray, with a dark brown median dorsal band, each scale often bordered on the posterior and inner edges with brown, which is connected with a blackish angular spot near the anterior margin, the rest of the scale being transparent and whitish; head dark brown, with a red central spot and a round whitish spot on each side. Length up to 150^{mm}; breadth usually about 4^{mm}.

Vineyard Sound, low-water mark to 14 fathoms; off Martha's Vineyard, 21 fathoms, sand; off New Haven, 4 to 5 fathoms, shelly. Great Egg Harbor (Leidy).

This species differs considerably in the form of the head, antennæ, &c., from the figure given by Leidy. His description is insufficient to determine whether he observed the same species.

NEPHTHYS INGENS Stimpson. Plate XII, figs. 59, 60. (p. 431.)

Marine Invertebrata of Grand Manan, p. 33, in Smithsonian Contributions, 1853.

Long Island Sound, off New Haven, 3 to 8 fathoms, mud, common; off Block Island, in 29 fathoms; Bay of Fundy, 10 to 60 fathoms.

This species is readily distinguished by the form of the head and position of the small antennæ; by the large median dorsal papilla on the proboscis, and the smaller ventral one; by the very prominent and widely separated rami of the posterior feet; and the dark color of the setæ. It grows to the length of 130^{mm} or more.

NEPHTHYS PICTA Ehlers. Plate XII, fig. 57. (p. 348.)

Die Borstenwürmer, vol. i, p. 632, Pl. 23, figs. 9, 35, 1868.

Vineyard Sound, low-water mark to 8 fathoms, muddy and shelly. Nahant; Charleston (Ehlers).

NEPHTHYS BUCERA Ehlers. Plate XII, fig. 58. (p. 416.)

Die Borstenwürmer, vol. i, p. 617, Pl. 23, fig. 8.

Vineyard Sound, 8 to 10 fathoms, shelly; Watch Hill, Rhode Island, 4 to 5 fathoms, among rocks and sand. Massachusetts Bay (Ehlers).

This species is remarkable both for the form of the head and the length of the setæ, which often exceed the diameter of the body.

NEPHTHYS CILIATA Rathke.

Beiträge zur Fauna Norwegens, p. 170, 1843; Malmgren, op. cit., p. 104, Pl. 12, figs. 17, A-C, 1865; Quatrefages, op. cit., p. 429 (*Nephtys*); Ehlers, Borstenwürmer, vol. i, p. 629, Pl. 23, fig. 36, 1868. *Nereis ciliata* Müller, Zoölog. Danica, vol. iii, p. 17, Pl. 89, figs. 1-4 (t. Ehlers). *Nephtys borealis* Ersted, Annulat. Danicor. consp., p. 32, 1843 (t. Malmgren).

Ehlers gives Edgartown as a locality for this species. It is a northern form, found at Iceland, Greenland, Spitzbergen, and along the northern coasts of Europe and Great Britain. Stimpson records it from the

Bay of Fundy, in 40 fathoms, mud. It was dredged near St. George's Bank in 85, 110, and 150 fathoms, mud, by Dr. A. S. Packard, on the "Bache," 1872.

EUMIDIA AMERICANA Verrill, sp. nov. (p. 494.)

Body long and slender. Head triangular, subcordate, broad and slightly emarginate posteriorly, the sides rapidly converging, the front end narrow and rounded, with four slender antennæ, which are as long as the head; odd median antenna long and slender, tapering, as long as or longer than the head. Eyes moderately large, round, convex, near the posterior margin of the head. Tentacular cirri long and slender; crowded. Proboscis elongated, subclavate, enlarging to the end, which is surrounded by about fourteen triangular papillæ; the basal two-thirds covered with small, slender, prominent papillæ, which are not crowded, but arranged in longitudinal rows; this part of the proboscis is, in the preserved specimens, longitudinally ridged and transversely wrinkled; the terminal third is nearly smooth, but usually minutely granulous. The lateral lamellæ, or branchiæ, are ovate-lanceolate, leaf-like, with curved tips; posteriorly they are larger and more acute. Length up to 50^{mm}; breadth, 1.5^{mm}.

Vineyard Sound, 8 to 12 fathoms, among compound ascidians.

EUMIDIA VIVIDA Verrill, sp. nov.

Head relatively a little longer than in the preceding species, with the sides more convex, and the front rounded; antennæ long and slender. Eyes brownish, very large, about twice as large as in the preceding species. Proboscis long, slender, clavate, nearly smooth, but with a few minute, distant papillæ; the terminal orifice surrounded by about eighteen very small papilliform denticulations. Branchiæ of the anterior segments long and narrow lanceolate; of the middle segments ovate. Length up to 45^{mm}; breadth, 1.5^{mm}.

Vineyard Sound, 8 to 12 fathoms, among ascidians.

EUMIDIA PAPILLOSA Verrill, sp. nov.

Head short, rounded, convex, emarginate posteriorly, the sides convex; antennæ not very slender; median odd one stout, tapering, acute, as long as the head. Eyes large; brown. Tentacular cirri rather stout, those of the two posterior pairs more than twice as long as the others. Proboscis long, clavate, densely covered with short, rounded papillæ, and with a circle of minute papillæ at the orifice.

Length up to 40^{mm}; breadth, 2^{mm}.

Vineyard Sound, 6 to 10 fathoms, among compound ascidians.

EULALIA PISTACIA Verrill, sp. nov.

Body moderately slender, depressed. Head convex, shorter than broad; in preserved specimens, sides well rounded, posterior margin slightly emarginate; median odd antenna small, slender, considerably

shorter than the head. Eyes large, brown. Tentacular cirri moderately long; the four posterior ones considerably longer than the others. Branchiæ narrow lanceolate anteriorly; ovate and leaf-like on the middle segments; longer and lanceolate posteriorly. Proboscis long, more or less clavate, smooth, but often showing longitudinal striations, and sometimes with a few very minute scattered papillæ toward the end; the orifice surrounded by a circle of numerous minute papillæ. Color bright yellowish green (epidote-green or pistachio-green), often with obscure darker markings posteriorly, and at the base of the appendages. Length up to 40^{mm}; breadth, 1.5^{mm}.

Vineyard Sound, 6 to 12 fathoms, among compound ascidians; off New Haven, 4 to 5 fathoms, among hydroids.

EULALIA GRANULOSA Verrill, sp. nov.

Body not very slender, considerably stouter than in the preceding species, and less tapering anteriorly. Head short cordate, decidedly emarginate behind, broader than long; sides prominently rounded; front small, rounded. Antennæ short; odd one slender, originating between the eyes, more than half the length of the head. Eyes large, round, convex, dark brown. Proboscis long, clavate, thickly covered throughout with round, scarcely prominent, crowded, rather large granules, each of which has a dark central spot; orifice surrounded by a circle of small papillæ. Tentacular cirri slender, acute, the two posterior pairs long, reaching the eighth segment. Lateral appendages large and prominent for the genus. Branchiæ of upper ramus rather large, ovate, leaf-like anteriorly; larger and obliquely ovate, with acuminate tips, farther back; branchiæ of lower ramus similar in form and nearly as large. Color bright grass-green. Length 55^{mm}, or more; breadth, 2^{mm}; length of proboscis, 6^{mm}.

Off New Haven, 4 to 5 fathoms, among hydroids.

EULALIA ANNULATA Verrill, sp. nov.

Body moderately slender; convex, tapering to both ends. Head longer than broad, somewhat oblong, truncate behind, the sides but little convex, narrowing but little to the obtusely rounded front. Proboscis covered with small prominent papillæ. Eyes two, large, dark brown or blackish, rather near together. Odd median antenna slender, more than half as long as the head, placed far in advance of the eyes; frontal antennæ rather large, about the same in length, but much stouter than the median one, with slender tips. Tentacular cirri very unequal, the two upper pairs much longer than the others, not very slender, reaching to the seventh or eighth segment in preserved specimens; the two lower pairs not more than one-third as long. Dorsal branchiæ narrow and acute throughout; the anterior ones are narrow lanceolate, with subacute tips; those farther back become still more elongated, narrow lanceolate, or almost linear lanceolate, with acuminate

tips, and in length equal to half the diameter of the body; posteriorly they become somewhat wider, with acute, curved tips. Caudal cirri small, narrow lanceolate, about as long as the posterior lateral lamellæ, or branchiæ. Color of preserved specimens pale greenish or bluish gray, with narrow annulations of golden brown, and iridescent. Length 50^{mm}, or more; breadth about 1.25^{mm}.

Vineyard Sound, 4 to 12 fathoms, among ascidians.

EULALIA GRACILIS Verrill, sp. nov.

Body very long and slender, with the segments deeply incised; posterior segments elongated. Head small, elongated, truncate behind; posterior angles not prominent, oblong, tapering but little toward the front, which is obtusely rounded; sides not swollen. Eyes of moderate size, brown, situated close to the posterior margin of the head. The four frontal antennæ are more than half as large as the head, rather stout, tapering, and the head is slightly constricted behind them; odd median one, small, slender, inconspicuous, about one-third the length of the head, placed considerably in advance of the eyes. Tentacular cirri rather stout, the two upper ones longest, rather more than twice as long as the head; the posterior pair, when extended backward, reaches the fifth setigerous segment in preserved specimens; the two lower ones are considerably stouter and smaller, nearly equal, and are somewhat longer than the head in alcoholic specimens. Branchiæ of the anterior segments short, oval, obtuse at the tip; posteriorly larger, elongated oval, leaf-like. Color light greenish brown or olive, with a row of dark brown spots along each side of the dorsal surface of the body.

Length up to 65^{mm}; breadth about 1^{mm}.

Vineyard Sound, 6 to 14 fathoms, among ascidians and hydroids.

This species is very active in its motions. In general appearance it resembles certain species of *Phyllodoce*, for which it might easily be mistaken, owing to the small size and translucency of the odd median antenna, which is not easily observed, especially with living specimens. The position of the tentacular cirri is, however, sufficient to distinguish the genus from *Phyllodoce* and *Eumidia*. The form of the head is quite peculiar, but somewhat resembles that of *Phyllodoce gracilis*, and also the preceding species.

One specimen of the *Eulalia gracilis* was found in which fissiparity was apparently about to take place. In this, one of the segments was larger than the rest, and had developed a distinct pair of eyes. The specimen unfortunately died before the separation took place.

PHYLLODOCE GRACILIS Verrill, sp. nov. Pl. XI, fig. 56. (p. 494.)

(?) *Phyllodoce maculata* A. Agassiz, Annals Lyceum New York, vol. viii, p. 333, fig. 53, 1866 (*non* Müller, *nec* Örsted).

Body very long and slender. Head longer than broad, decidedly cordate behind, with the posterior angles well rounded; the sides swell-

ing out opposite the eyes, then narrowing to near the antennæ, where there is a slight constriction, and expanding slightly at the end, which is obtusely rounded. Eyes very large, brown, wide apart, and sub-lateral, connected by a curved band of brown specks; antennæ rather large and long, about one-third as long as the head. Tentacular cirri large, the two posterior much the longest, reaching to about the eighth setigerous segment. Branchiæ of anterior segments broad oval or sub-circular, rounded at the end; posterior ones larger, broad oval, narrowed to the end. Proboscis with a large, swollen, basal portion, on which are twelve longitudinal rows of large, prominent, obtuse papillæ, about seven in each row; and a terminal smooth portion, which is somewhat longer, and about as broad at the end as the basal portion, but considerably narrower at its commencement; the orifice is surrounded by a circle of large, rounded papillæ. Color greenish, with a median dorsal row of dark brown spots, and another less conspicuous row along each side of the back, at the base of the lateral appendages.

Length up to 75^{mm}; breadth, 1 to 1.25^{mm}.

Watch Hill, Rhode Island, in 4 or 5 fathoms, rocky bottom.

The figure (56) copied from one of those given by Mr. Agassiz does not agree perfectly with the specimens described, but probably represents the same species. The head, as figured, is more oblong and the eyes nearer together than in my specimens; the tentacular cirri are less crowded. The anterior ones, in the preserved specimens at least, appear to arise from beneath the base of the head. Some of these differences may be due to the different states of extension and contraction; for the species in this family are all quite changeable in form during life, and usually contract very much in alcohol.

PHYLLODOCE CATENULA Verrill, sp. nov. (p. 494.)

Head somewhat longer than broad, slightly cordate posteriorly, with the posterior angles well rounded, and the sides full and convex; front broadly rounded, and with a slight emargination in the middle. Eyes large, dark brown, placed on the dorsal surface of the head; antennæ rather long, slender. Tentacular cirri long and slender, the two posterior much longer than the others. Branchiæ of anterior segments broad ovate, with rounded tips; farther back larger and longer, ovate, leaf-like, with acuminate tips. Proboscis with twelve rows of papillæ on the basal portion, which are prominent, somewhat elongated, obtuse, seven or eight in the lateral rows, those in each row close together. Color of body and branchiæ pale green, with a median dorsal row of dark brown spots, one to each segment; and two lateral rows, in which there is a spot at the base of each "foot;" head pale, or greenish white.

Length up to 75^{mm}; breadth about 1.5^{mm}.

Watch Hill, Rhode Island, in 4 to 6 fathoms, among rocks and algæ, and in tide-pools; Wood's Hole, at surface, evening, July 3. Very common in the Bay of Fundy, from low-water to 50 fathoms.

This species is closely allied to *P. pulchella* Malmgren, from Northern Europe, but differs somewhat in the form of the head, which is shorter and rounder in the latter; the branchiæ also differ in form. It is a very active species, and secretes a large quantity of mucus.

ETEONE ROBUSTA Verrill, sp. nov. (p. 488.)

Body large, stout, depressed, broadest in the middle, tapering gradually to each end. Head small, about as long as wide, convex, with a median depression; the sides rounded; front obtusely rounded. The four frontal antennæ are very small, short, obtuse, less than half the diameter of the head. Eyes very small, black. Tentacles very small and short, tapering, their length about one-half the diameter of the head, the two pairs about equal. Branchiæ small, sessile, anteriorly very small, oval, obtuse; in the middle region rounded, sub-oval. Color dark green, with the anterior portion somewhat paler, and with light green transverse bands between the segments; lateral appendages pale green.

Length, 125^{mm}; breadth in middle, 5^{mm}; length of head, 0.6^{mm}.

Watch Hill, Rhode Island, under stones, between tides, April 12, 1873.

ETEONE LIMICOLA Verrill, sp. nov. (p. 349.)

Body very long and slender, tapering gradually to both ends; depressed, and with deeply incised, elongated segments posteriorly; less depressed and with shorter and less distinct segments anteriorly. Head small, about as broad as long, the posterior angles well rounded, the sides with a slight constriction in advance of the eyes, narrowing rapidly; front narrow, convex; antennæ slender, about half the length of the head. Eyes minute, inconspicuous. Tentacular cirri about equal to the length of the head. Lateral appendages small on the anterior segments, becoming much more prominent farther back; anterior branchiæ very small, ovate, sessile; those farther back much larger, and narrow ovate. Color, when living, light green throughout.

Length about 80^{mm}; breadth, including appendages, 1.5^{mm}.

Great Egg Harbor, New Jersey, in mud at low-water.

ETEONE SETOSA Verrill, sp. nov.

Body long and slender, resembling the preceding in form, but somewhat less slender. Head shorter and broader, the posterior angles prominently rounded; two slight notches or emarginations on the posterior margin, the middle portion extending farther back than the lateral; sides rapidly tapering; front narrow. Antennæ less than half the length of the head. Eyes small, but quite distinct. Tentacular cirri scarcely as long as the head. Lateral appendages a little prominent on the anterior segments, but much less so than farther back; setæ numerous. The branchiæ are small, sessile, and inconspicuous anteriorly; larger and ovate farther back.

Length up to 75^{mm}; breadth about 2^{mm}.

Vineyard Sound, 6 to 12 fathoms, among ascidians.

Eteone, species undetermined.

A small and slender species was dredged off Gay Head, in 19 fathoms, soft mud.

Another very peculiar species of *Eteone* was obtained at Great Egg Harbor, New Jersey. In this the head is depressed and elongated, tapering, with short antennæ. The anterior part of the body is round and with the lateral appendages very small, closely appressed, and not at all prominent, giving to this part of the body a smooth appearance; on this part of the body the branchiæ are very small, lunate, sessile, closely appressed; farther back they become much larger, and rounded or ovate, while the setigerous lobe becomes prominent, and the setæ much longer and more numerous.

PODARKE OBSCURA Verrill, sp. nov. Pl. XII, fig. 61. (p. 319.)

Body convex above, flat below, with the segments deeply incised at the sides, moderately slender in full extension, but capable of great contraction, tapering gradually to the caudal extremity, and less toward the head. Head small, broader than long, emarginate in front, sides forming rounded angles; posterior margin nearly straight. Antennæ five, subequal, the outer pair articulated upon a short, thick basal segment; the odd median one is somewhat shorter, articulated upon a small basal segment, which arises in front of the anterior pair of eyes. Tentacular cirri long, slender, six on each side, two arising from each of the first three annulations, on each side; those on the middle are longest, those on the first shortest. Eyes four, small, red; those on each side close together, but those of the anterior pair are farthest apart. Proboscis with a large, swollen basal portion, and a smaller cylindrical terminal portion, the surface nearly smooth. Lateral appendages, or "feet," elongated, biramous. The upper branch is short, conical, bearing at its extremity a long, slender dorsal cirrus, nearly as long as the breadth of the body, or even exceeding it, and having a short basal joint; the setæ of the upper ramus are very few and small. The lower branch is much larger and longer, thick at base, tapering somewhat to the obtuse end, from which a small, terminal, obtuse, papilliform process arises; the short, acute, ventral cirrus arises from about the terminal third, and is less than half as long as the dorsal cirrus; the setæ are numerous and long, forming a broad, fan-shaped fascicle, in which the middle setæ are considerably longer than the upper and lower ones, and in length about equal to the setigerous lobe; these setæ are all compound, the middle ones having a very long, slender, acute terminal joint, and the shorter ones beneath having a much shorter terminal joint. Last segment small, rounded, bearing two long, slender anal cirri, much longer than the dorsal cirri. Color variable, most commonly very dark brown or blackish; sometimes dark brown with transverse bands of light flesh-color between the segments, and two intermediate transverse whitish lines on each segment.

Length up to 40^{mm} when extended; breadth, including setæ, 3^{mm}.

Wood's Hole, among eel-grass and at the surface, very abundant, especially at night, in July and August; also under stones, between tides.

AUTOLYTUS COENUTUS A. Agassiz. Pl. XIII, figs. 65, 66. (p. 397.)

Journal Boston Society of Natural History, vol. vii, p. 392, Plates 9-11, 1863.

Great Egg Harbor, New Jersey; New Haven; Watch Hill; Vineyard Sound; Massachusetts Bay; Eastport, Maine. Low-water mark to 15 fathoms.

AUTOLYTUS, species undetermined. (p. 398.)

Off New Haven, 4 to 6 fathoms, shelly, among hydroids.

AUTOLYTUS, species undetermined.

Females, filled with eggs, of a large species of this genus were taken at the surface of Vineyard Sound, April 30, by Mr. V. N. Edwards. These were about 40^{mm} in length, as preserved in alcohol, and rather stout, tapering to each end. The head is small, short, rounded in front. The eyes are small, and the two pairs are near together. The odd median antenna is more than twice as long as the breadth of the head; the lateral ones are about half as long; the first six setigerous segments have short setæ; the following ones have a fascicle of long, slender ones, equal to the breadth of the body.

SYLLIS, species undetermined. (p. 453.)

A single specimen from Vineyard Sound. The body is about 12^{mm} long; the antennæ are not very long; the palpi short; the dorsal cirri are rather long, and, like the antennæ, regularly beaded; the ventral cirri are small, tapering; the setæ are numerous, rather short.

GATTIOLA, species undetermined. (p. 453.)

Young specimens were taken several times in Vineyard Sound, at the surface. Adult specimens of a fine species of this genus were dredged in the Bay of Fundy in 1872, in 80 fathoms.

NEREIS VIRENS Sars. Pl. XI, figs. 47-50. (p. 317.)

Beskrivelser og Iakttagelser, etc., p. 53, Pl. 10, fig. 27, a, b, c, 1835 (t. Malmgren).

Nereis grandis Stimpson, Invertebrata of Grand Manan, p. 34, fig. 24, 1853.

Nereis Yankiana Quatrefages, Hist. des Annelés, i, p. 553, Pl. 17, figs. 7, 8 1865; *Alitta virens* Malmgren, op. cit., p. 183; Annulata polychæta, p. 56, Pl. 3, figs. 19, A-E, 1867.

New Haven, at low water; Watch Hill; Vineyard Sound; Massachusetts Bay; Eastport, Maine; northward to Labrador. Northern coasts of Europe to Great Britain.

NEREIS LIMBATA Ehlers. Pl. XI, fig. 51. (p. 318.)

Die Borstenwürmer, vol. i, p. 567, 1868.

Charleston, South Carolina, to Massachusetts Bay; half-tide mark to 4 to 6 fathoms in Long Island Sound.

NEREIS PELAGICA Linn. Pl. XI, figs. 52-55. (p. 319.)

Systema naturæ, ed. x, p. 654; ed. xii, p. 1086; Malmgren, *Annulata polychæta* p. 47, Pl. 5, figs. 35, A-D, 1867; Ehlers, op. cit., p. 511, Pl. 20, figs. 11-20, 1868; *Heteronereis grandifolia* Malmgren, *Nordiska Hafs-Annulater*, p. 108, Pl. 11, figs. 15, 16, B, B¹, C; *Ann. polychæta*, p. 60, Pl. 5, figs. 31, A-D; *Heteronereis arctica* (Ersted, *Grænland's Annul. dorsibr.*, p. 27, Pl. 4, figs. 50*, 51, 60, Pl. 5, figs. 65, 68 70*, male (t. Ehlers); *Heteronereis assimilis* (Ersted, op. cit., p. 28, Pl. 4, figs. 54, 61, Pl. 5, fig. 72, female (t. Ehlers).

Off New Haven; Watch Hill; Vineyard Sound; northward to Labrador. Greenland; Iceland; Spitzbergen; northern coasts of Europe to Great Britain. In the Bay of Fundy from low-water mark to 106 fathoms, common.

NEREIS FUCATA Aud. and Edwards. (p. 494.)

Histoire nat. litt. de la France, vol. ii, p. 188 (teste Malmgren); *Lycoris fucata* Savigny, *Syst. des Annélides*, p. 31, 1820 (t. Ehlers); *Descr. de l'Égypte*, éd. 2, xxi, p. 357 (t. Malmgren); *Nereilepas fucata* Malmgren, *Annulata polychæta*, p. 53, Pl. 3, figs. 18-18 E; Johnston, *Catalogue*, p. 158, fig. 30, 1865. *Heteronereis glaucopsis* Malmgren, *Nordiska Hafs-Annulater*, *Öfvers. af Kongl. Vet. Akad. Förh.*, 1865, p. 181, Pl. 11, figs. 16, 16 A; *Annulata polychæta*, p. 60, Pl. 4, figs. 26, 27, 1867. *Nereis fucata* Ehlers, *Borstenwürmer*, vol. i, p. 546, Pl. 21, figs. 41-44.

A specimen was dredged at Watch Hill, Rhode Island, in 4 to 6 fathoms, among rocks and algæ, which agrees well with Malmgren's description and figure of *Heteronereis glaucopsis*. Ehlers regards the latter as the heteronereis-form of *N. fucata*.

NEREIS, species undetermined.

Head sub-conical; antennæ small, slender; palpi small, shorter, and thicker; two upper pairs of tentacular cirri moderately elongated, subequal, lower ones very small. Posterior eyes elongated and on the upper side of the head; anterior pair small, lateral. Feet terminated by four small papillæ; dorsal and ventral cirri small, slender.

The only specimen observed is preserved in alcohol; it is a female filled with eggs. Vineyard Sound, 6 to 8 fathoms.

NECTONEREIS Verrill, genus nov.

Head prominent, depressed, oval, rounded in front, bearing two pairs of large eyes on the upper and lateral surfaces, and a pair of small antennæ beneath; palpi small or rudimentary. Tentacular cirri four on each side, as in *Nereis*. Proboscis small, similar to that of *Nereis*, but more simple; furnished with a pair of terminal hooks; with two anterior clusters of denticles on the upper side, and with five small clusters below, in a ring extending nearly half-way around it. Anterior part of body fusiform, consisting of about fourteen segments, on which the feet are divided into small, rounded lobes, with small ventral cirri; and with long dorsal cirri, those on the first seven segments swollen and gibbous toward the end, with a small acute terminal portion. Posterior part of

the body composed of numerous short segments, on which the feet are furnished with lamelliform appendages.

This remarkable annelid bears some resemblance, in the structure of the body and "feet," to *Heteronereis*, and there is probably another form to which it bears the same relation that *Heteronereis* bears to *Nereis*; but the structure of the head is very unlike that of any known genus, and, indeed, would not allow it to be placed in the family of *Nereidæ* without modifying the family-characters. There are no large palpi, corresponding to those of *Nereis*, and nothing to represent them, unless two small lobes close to the mouth be considered rudimentary palpi.

NECTONEREIS MEGALOPS Verrill, sp. nov. Plate XII, figs. 62, 63. (p. 440.)

Body slender, consisting of two parts; the anterior portion, containing fourteen setigerous segments, is broadest in the middle, tapering both ways, and separated from the posterior portion by a distinct constriction; the posterior portion is much longer and more slender, tapering gradually to the end, and consists of very numerous short segments, which are furnished with complex lateral appendages, with thin lamellæ and compound bladed setæ. Head broad oval, somewhat convex, and very smooth above; the lateral margins a little convex; the front obtusely rounded. Eyes very large, convex; the anterior ones largest, lateral and partially dorsal, oval; in contact with the posterior ones, which are somewhat smaller and more dorsal. Two small decurved antennæ, with swollen bases, are on the ventral side of the head; two small, rounded processes in front of the mouth. Tentacular cirri slender, the upper pair much the longest; the rather short lower pair arising near the mouth; the two intermediate pairs arise behind and close to the anterior eyes; all are slightly annulated. The "feet" on the first seven segments have a large dorsal cirrus, increasing in length from the first to the seventh, narrow at base, swollen and gibbous toward the end, with a slender, oblique, terminal portion; on the seven following segments the dorsal cirri are smaller, slender, tapering; the ventral cirri are small, with swollen bases on the first five segments, slender and tapering on the rest; the intermediate lobes of the feet are small and rounded, but more elongated on the first five segments. Setæ of different forms, many of them with a slender, often curved, acute terminal piece.

The lateral appendages of the posterior region have, on the upper ramus, a long, slender dorsal cirrus, strongly crenulate-lobed on the lower side; a small, rounded lamelliform process above its base; and a long, lanceolate process arising just below it, and in length equaling the cirrus; an ovate setigerous lobe, bearing a broad fan-shaped fascicle of compound setæ, extending about to the end of the dorsal cirrus; and a lower ovate-lanceolate lamelliform process, with the base expanded and extending backward, the tip reaching to about the outer third of

the cirrus; a single strong black spine supports the setigerous lobe. The lower ramus has a rounded setigerous lobe, and a large broadly-rounded lamelliform process, nearly as long as the longest one of the upper ramus and much broader; the setigerous lobe bears a broad fan-shaped fascicle of compound setæ, similar to those of the upper ramus, but a little shorter, and a single black basal spine; the ventral cirrus is slender, and there is a broad, rounded ventral lamella at its base. The setæ are rather stout, with a broad, thin, blade-like, terminal piece, which is generally lanceolate, with a rounded point, and often somewhat curved, but more commonly straight. A few setæ have a slender acute terminal piece. Anal segment with numerous small slender papilliform processes on each side, forming a circle.

Length up to 35^{mm}; breadth about 2.5^{mm}.

Vineyard Sound, swimming actively at the surface, both in the evening and in the brightest sunshine, in the middle of the day; July 3 to August 11.

DIOPATRA CUPREA Claparède. Plate XIII, figs. 67, 68. (p. 346.)

Annélides chétopodes du golfe de Naples, in Mémoires de la Société de Physiques et d'Hist. Nat. de Genève, vol. xix, p. 432, 1868. *Nereis cuprea* Bosc, Hist. nat. des Vers, vol. i, p. 143 (t. Claparède).

Charleston, South Carolina, to Long Island Sound and Vineyard Sound.

MARPHYSA LEIDYI Quatrefages. Plate XII, fig. 64. (p. 319.)

Histoire nat. des Annelés, vol. i, p. 337, 1865 (*M. Leidii*). *Eunice sanguinea* Leidy, Mar. Inv. Fauna of Rhode Island and New Jersey, p. 15, 1855 (*non* Montagu).

Great Egg Harbor, New Jersey, to Long Island Sound and Vineyard Sound. Low-water mark to 10 fathoms.

LYCIDICE AMERICANA Verrill, sp. nov. (p. 508.)

Body depressed, slender, narrowed toward each end; segments well-marked. Head much depressed, oblong, narrowed somewhat toward the front, which is truncate and somewhat emarginate in the middle; lower side bilobed, the lobes well rounded. The two eyes are lateral, just outside the bases of the lateral antennæ. The three antennæ are subequal, nearly as long as the diameter of the head; the odd median one is apparently a little longer than the lateral, and placed slightly farther back. The dorsal cirri are long and slender, exceeding the diameter of the body in living specimens; they have a small lobe near the base. Anal cirri four; the two lower exceeding the diameter of the body; the two upper ones less than half as long. Color light red, with a bright red dorsal vessel and dark brown intestines, showing through in the middle; eyes dark red.

Length, while living, about 40^{mm}; greatest diameter, 1.5^{mm}.

Off Gay Head, in 19 fathoms, soft mud.

NEMATONEREIS, species undetermined. (p. 508.)

A species, apparently belonging to this genus, was dredged in 29 fathoms, east of Block Island. The specimens have been lost or mislaid. In life the head was small, rounded, with one median dorsal antenna, about as long as the diameter of the head. Eyes two, small but conspicuous, dark brown. Dorsal cirri slender.

LUMBRICONEREIS FRAGILIS Örsted. (p. 507.)

Consp. Ann. Dan., p. 15, figs. 1, 2, 1843 (t. Malmgren). *Lumbricus fragilis* Müller, Prod. Zool. Dan., p. 216; Zool. Dan., vol. i, p. 22, Pl. 22, figs. 1-3, 1788, (t. Malmgren). *Lumbrineris fragilis* Malmgren, Annulata polychæta, p. 63, Pl. 14, figs. 83-83, D.

Mouth of Vineyard Sound and deeper waters outside; northward to Nova Scotia and Gulf of Saint Lawrence. Northern coasts of Europe. From low-water mark, in the Bay of Fundy, to 430 fathoms, off Saint George's Bank.

LUMBRICONEREIS OPALINA Verrill, sp. nov. Plate XIII, figs. 69, 70. (p. 342.)

Lumbriconereis splendida Leidy., op. cit., p. 15 (non Blainville).

Body cylindrical, much elongated, largest in the middle, tapering gradually toward the head, which is comparatively small; segments well marked. Head conoidal, obtuse, changing much in form during life; in extension considerably longer than broad, and more acute than in the figure. Eyes four, in a transverse row, the two middle ones larger and a little in advance of the others. The lateral appendages, or "feet," consist of a short, obtusely-rounded basal papilla, which bears the setæ; from the posterior and ventral end of this a prominent elongated lobe arises, which is somewhat curved and obtuse. These appendages are longer in the middle of the body than anteriorly. Setæ five to nine in each fascicle, and of several forms; one or two in each fascicle usually have a long, slender, flexible capillary point. Color reddish or brownish, with brilliant iridescence.

Length up to 400^{mm}; diameter in middle, 3^{mm}.

New Haven to Vineyard Sound; low-water mark to 14 fathoms.

LUMBRICONEREIS TENUIS Verrill, sp. nov. (p. 342.)

Body very long, slender, filiform, of nearly uniform diameter throughout, capable of great extension; segments very numerous, well marked. Head little narrower than buccal segment, depressed, obtusely pointed or rounded in front, without eyes. In the first to ninth pairs the lateral appendages have about six slender lanceolate setæ; those of the ninth pair have two slender spatulate setæ, with about six or seven lanceolate ones; at the sixteenth pair they begin to have recurved spatulate setæ, with two or three hook-like denticles at the end, while two or three lanceolate ones remain; posterior to the twenty-third or twenty-fourth pair only one of the long, slender, acute setæ remains, accompanied by

two or three of the spatulate hooks; the latter are about half as long as the former, slender toward the base, but gradually becoming broader toward the end, which is twice as broad, obtusely rounded, and curved back from about the middle; the hooks are nearly terminal on one side, the thin margin projecting beyond them. The basal lobe of the "feet" is very small; the posterior lobe is small but prominent. Color light red to dark red, somewhat iridescent.

Length up to 350^{mm}; diameter, 0.05^{mm} to 1^{mm}.

Great Egg Harbor, New Jersey, to New Haven and Vineyard Sound.

NINOË NIGRIPES Verrill, sp. nov. (p. 508.)

Body elongated, slender, broadest a short distance behind the head, at the middle of the branchiferous segments. Head depressed, elongated, conical, blunt at end, about twice as long as broad. The branchiæ are represented on the first two setigerous segments by a short, flattened lobe, arising from the outer and posterior face of the setigerous lobe. On the two following segments the lobe is divided into two or three parts; on the fifth there are usually three, more elongated, round, and more slender branchiæ, which increase in number and length on the succeeding segments until there are five, six, or more long, slender branchial filaments, which arise from the posterior face of the setigerous lobe, and diverge, forming a somewhat fan-shaped or digitate group; about the twenty-fourth segment the number rapidly diminishes, and after the twenty-seventh or twenty-eighth there remains but one small branchial process. The setigerous lobe is prominent, obtuse, turned forward. The setæ are numerous on the branchial segments, and rather long, of various shapes, but mostly bent, with an acute lanceolate point; posteriorly they are shorter and fewer, and mostly slender, margined setæ, with hooks at the spatulate end. Body flesh-color; the setæ dark, often blackish; branchiæ bright red.

Length of broken specimens, 20^{mm}; breadth anteriorly, 2^{mm}.

Vineyard Sound and Buzzard's Bay, and waters outside; in 8 to 29 fathoms, mud.

STAUROCEPHALUS PALLIDUS Verrill, sp. nov. (p. 348.)

Body rather slender, convex above, flattened below, largest in the middle, tapering slightly toward each end, composed of about seventy segments. Head small, depressed, rounded in front; antennæ four, slender, longer than the breadth of body, the two upper ones longer and more slender than the lower ones, strongly annulated or beaded; lower ones stouter, smooth, tapering. Eyes four, dark red; the posterior pair very small, placed between the bases of the upper antennæ; the anterior pair farther apart, placed between the bases of the upper and lower antennæ. Anal cirri four, the upper pair slender and about twice as long as the lower ones. Dorsal cirri elongated, slender, more than twice as long as the setigerous lobe, absent on the first setigerous segment, very small on the

second, but well developed on the third. Setæ rather long and slender. Color pale yellow, with red blood-vessels showing through anteriorly.

Length, 50^{mm}; breadth, 2^{mm}. This species moves like a *Nereis*.

Near New Haven light-house, in sand, at low-water mark.

RHYNCHOBOLUS AMERICANUS Verrill. Plate X, figs. 45, 46. (p. 342.)

Glycera Americana Leidy, op. cit., p. 15, Pl. 11, figs. 49, 50, 1855; Ehlers, Borstenwürmer, vol. i, p. 668, Pl. 23, figs. 43-46, 1868.

Charleston, South Carolina, to Long Island Sound and Vineyard Sound. Low-water mark to 10 fathoms.

I follow Claparède in adopting *Rhynchobolus* for those species of the old genus *Glycera* which have the proboscis armed at the end with four hooks or fangs.

RHYNCHOBOLUS DIBRANCHIATUS Verrill. Plate X, figs. 43, 44. (p. 341.)

Glycera dibranchiata Ehlers, op. cit., pp. 670-702, Pl. 24, figs. 10-23, 1868.

Great Egg Harbor, New Jersey, to Long Island Sound; Vineyard Sound; and Massachusetts Bay. Low-water mark to 8 fathoms.

Ehlers has given a very full anatomical description of this species.

EONE GRACILIS Verrill, sp. nov. (p. 508.)

Body very slender, terete; surface iridescent. Head elongated, acutely conical, composed of eight distinct, rounded annulations, the basal one with a pair of minute reddish eyes; antennæ four, slender. Feet prominent, elongated, more than equal to half the diameter of the body; they are uniramous on about thirty-two segments of the anterior part of the body, and bilobed, with a small obtuse dorsal cirrus; the upper lobe is prominent, more elongated than the lower one, both cylindrical, obtusely pointed; setæ compound, in two small fascicles, long, the free part exceeding the entire length of the foot. On the posterior half of the body there is a small, slightly elevated, mammilliform upper ramus, above the base of the lower ramus, and entirely separate from it, containing two or more small, acute, dark setæ, which project but slightly; the lower ramus is deeply bilobed, the lobes elongated, round, the upper one longest, the lower one acute; on the posterior side of the base of the upper lobe there is a minute, rounded setigerous lobe, and at the junction of the two lobes, on the posterior face, there is another small setigerous lobe; the setæ are long and slender, acute, many of them curved, arranged in small fascicles.

Length, 20^{mm}; diameter less than 1^{mm}.

Off Gay Head, 19 fathoms, in soft mud.

ARICIA ORNATA Verrill, sp. nov. (p. 344.)

Body rather stout, composed of numerous very short segments, much depressed and flattened anteriorly, strongly convex beneath in the middle region, flattened above throughout; breadth nearly the same

through a large part of the length, narrowed slightly and gradually toward the posterior end, and abruptly narrowed anteriorly close to the head, which is very small, short, conical, and acute at the tip. On the anterior thirty-two setigerous segments the feet consist of a small upper ramus, having a small, tapering dorsal cirrus and a minute setigerous lobe, bearing a small fascicle of slender and short setæ, and a lower ramus, separated by a narrow space, and consisting of a small upper papilla, and a long transverse row of minute, rounded papillæ, which surmount a narrow, somewhat elevated, crest-like ridge; the first twelve or thirteen segments having shorter rows, so as to leave a broad, naked ventral space, but those farther back having rows of papillæ that nearly meet beneath, and thus entirely covering the sides and ventral surface for a short distance; these crest-like ridges bear close rows of minute, hooked setæ. The branchiæ commence on the upper surface of the fifth setigerous segment, in the form of elongated papillæ, which become more elongated and narrow ligulate farther back. Posterior to the thirty-second segment the papilliform crests of the lower ramus disappear, and the lower ramus consists of an elongated papilliform, and finally cirriform, upper process, with a minute setigerous lobe at its base, bearing fine inconspicuous setæ; and an elongated membranous basal portion, decurrent down on the lateral surface of the segment; the upper ramus is connected at the base by a membranous web with the lower one, and consists of an elongated dorsal cirrus, similar in size and shape to the branchia, and a very small setigerous lobe, bearing a small fascicle of fine setæ. The branchiæ are connected by a slight web-like basal ridge with the dorsal cirri. Thus there are three parallel rows of cirriform or slender ligulate processes along each side of the back, leaving a broad, central, naked space all along the back.

Length up to 60^{mm} or more; breadth, 4^{mm}.

Savin Rock, burrowing in sand at low-water mark, May, 1872.

ANTHOSTOMA ROBUSTUM Verrill, sp. nov. Plate XIV, fig. 76. (p. 343.)

Body large, long, stout, thickest and rounded, or but slightly depressed, anteriorly; tapering rapidly to the head; posterior portion very long, narrowing gradually to the posterior end, flatter or concave above, well rounded below, higher than wide, with three rows of long, erect, ligulate, or narrow lanceolate processes along each side of the back, the four inner rows largest; and a pair of foliaceous processes on the sides of each segment. Head short, conical, acute. Proboscis large, broad, divided into about eighteen long, narrow, digitate, and sulcated lobes, with convoluted margins, broadest at the end, and free for a large part of their length, but united at the base by a membranous web; or it might be described as divided into a lower, two lateral, and two upper main lobes, each of which is again divided into three or four digitations. During life these are all continually changing in form and length, and generally only a few of the processes are protruded at one time. Branchiæ com-

mence on the twenty-sixth setigerous segment as minute papillæ; on the twenty-eighth they become prominent and acute-conical; farther back they become long, lanceolate, thin, foliaceous, as long as the diameter of the body.

On the twenty-three anterior setigerous segments the "feet" are represented by two short, dense, fan-shaped fascicles of setæ on each side. On the twenty-fourth segment a small papilliform lobe, or ventral cirrus, appears below the lower ramus, which rapidly becomes larger on the succeeding segments, becoming quite conspicuous on the twenty-ninth segment; at about the twenty-eighth it becomes broader, and divided into three small lobes, the lowest broadest and thinnest, and a bilobed setigerous lobe is developed. At the thirtieth the ventral lobe becomes broader, somewhat foliaceous, with a rounded outline; farther back this becomes still larger and more foliaceous, with a broadly-rounded flexuous outer border, and the upper branch of the setigerous lobe becomes an elongated ligulate process, directed upward, and similar in form to the branchiæ, though smaller and more slender, but the lower branch remains small and rounded; a small fascicle of long, slender setæ arises from between them. On the twenty-seventh segment an upper cirrus appears on both the upper and lower rami, in the form of a small papilla, which becomes somewhat elongated and tapering at the twenty-ninth; that of the lower ramus continues small throughout, and much shorter than the setigerous or ventral lobes, but that of the upper ramus becomes rapidly larger, longer, and more ligulate, corresponding nearly with the branchiæ in size, form, and rate of increase. On the middle and posterior regions the upper ramus consists of this long, thin, lanceolate cirrus and a fascicle of long, slender setæ, arising from the anterior face of its base, and in length considerably exceeding the cirrus; the setæ are pale yellow. Those of the upper ramus are short anteriorly, and become decidedly longer at the twenty-eighth segment, and on the thirty-second and subsequent segments they form a long, divergent, fan-shaped fascicle; color, when living, ocher-yellow, orange-yellow, to yellowish brown, generally brighter yellow posteriorly. Usually there are two rows of brown spots along the back, and posteriorly there is a dorsal red or reddish brown line; branchiæ blood-red.

Length of large specimens up to 375^{mm} or more; breadth, 10^{mm}; ordinary specimens are about 300^{mm} long and 7^{mm} broad. Owing to the facility with which it breaks up when disturbed, it is difficult to obtain entire specimens of large size.

Great Egg Harbor, New Jersey; New Haven; Wood's Hole; in sand, at low-water.

ANTHOSTOMA FRAGILE Verrill, sp. nov. (p. 344.)

Body long and slender, composed of very numerous segments, very fragile, and prone to divide spontaneously when disturbed; thickest and sub-cylindrical anteriorly, tapering rapidly to the head; posterior part

very long and slender, tapering gradually, flattened dorsally. Head distinctly annulated, elongated conical, very acute, with the tip slender and translucent; proboscis short and broad, not extending far beyond the tip of the head, with six or more broad, convoluted, changeable lobes, which are united at the base by a broad membranous expansion. The dorsal branchiæ first appear on the sixteenth setigerous segment as small papillæ; they become well developed and long ligulate at about the twentieth; increasing somewhat in length on the segments farther back. On the first thirteen segments behind the buccal the "feet" are represented by a very small, slightly-elevated lobe, above and below, each bearing a dense fascicle, that of the lower ramus widest, but the length of the setæ about equal in both. On the fourteenth segment a small tubercle appears on both rami; on the sixteenth these become elongated and somewhat cirriform, and the setæ become considerably longer on the fifteenth segment. At about the seventeenth segment the lower ramus becomes distinctly tri-lobed, and at the twentieth four-lobed, with the setigerous lobe bifid, and the two lower lateral lobes conical, acute, and swollen at the base; while the upper ramus is long and ligulate, like the branchiæ, and the setæ are long and slender, the lower fascicle smallest. Farther back the lobes of the lower ramus become still more developed, but keep their acute conical form, and the upper ramus and setæ continue to elongate until, on the posterior part of the body, they exceed in length the diameter of the body. Anal segment oblong, sub-cylindrical, smooth, with two long filiform cirri on the upper side; color, when living, brownish orange, dull yellow, ocher, light reddish, or flesh-color, with a red median dorsal line, and sometimes with the dorsal surface tinged with red posteriorly; a narrow, light ventral line, bordered with reddish. Sometimes the upper surface is maculate with fine polygonal, whitish spots, due, perhaps, to ova contained within the body; there are sometimes two obscure brownish spots on the upper side of the head.

Length up to 125^{mm}; diameter, 3^{mm}.

Great Egg Harbor, New Jersey; New Haven; Watch Hill; Wood's Hole; in sand, between tides, and gregarious.

ANTHOSTOMA ACUTUM Verrill, sp. nov. (p. 501.)

Body long and quite slender, tapering most toward the head, and very gradually posteriorly. Head very acutely pointed, with two rather indistinct reddish spots above, resembling imperfect ocelli. The branchiæ commence at the eleventh setigerous segment as small dorsal papillæ, and become prominent on the thirteenth; on the succeeding segments they become long and ligulate. Anteriorly the feet are represented by an upper ramus, consisting of a very small tuft of setæ, with a very small papilliform lobe above it, and a lower ramus, consisting of a small prominent papilla, with a fascicle of slender setæ, much larger than the upper one. On the fourteenth and succeeding segments

the dorsal cirrus of the upper ramus becomes longer, more slender, and ligulate. On the fifteenth segment a small, short, rounded ventral cirrus appears on the lower ramus, and farther back it becomes larger and more prominent, and the setigerous lobe becomes bilobed. Anal segment rounded, obtuse; cirri long and slender. Color light red.

Length up to 40^{mm}; diameter, 2.5^{mm}.

Off Gay Head, 19 fathoms, soft mud; also from the deeper parts of Vineyard Sound.

ANTHOSTOMA, species undetermined. (p. 508.)

Another species, not well studied, was dredged in the deeper waters off Gay Head and Buzzard's Bay. It differs from all the preceding in having eighteen anterior segments without branchiæ.

NERINE AGILIS Verrill, sp. nov. (p. 346.)

Body long and rather slender, anteriorly flattened, posteriorly more rounded. Head long conical, with a slender acute tip; mouth a transverse fissure beneath; eyes four, placed in front of the bases of the two large antennæ, small, black, the anterior ones a little farther apart; antennæ long, slender, with thickened bases, placed on the dorsal surface of the head, with their bases contiguous.

The branchiæ are slender, ligulate, and exist on all the segments except the first. On the first segment the "feet" are represented on each side by two small rounded lobes, bearing very small setæ, and placed just below the bases of the antennæ; on the succeeding twenty segments the lower ramus consists of a larger, somewhat semicircular lobe, bearing a broad cluster of slender, acute setæ, and separate from the upper ramus, which consists of a thin foliaceous process joined to the branchial cirrus, but with a free terminal portion, and bearing a broad, comb-like cluster of long acute setæ, nearly as long as the branchiæ, and much longer than those of the ventral ramus. On the twenty-first setigerous segment a small papilliform ventral cirrus appears on the lower ramus, and farther back it becomes more prominent and separate from the setigerous lobe. In the middle and posterior region the free portion of the cirriform lobe of the upper ramus is longer.

Color reddish or brownish green anteriorly, light green on the sides; branchiæ bright red. Length up to 60^{mm}; breadth, 2^{mm}; length of antennæ, 12^{mm}.

Great Egg Harbor, New Jersey, on the outer beach, burrowing in sand, at low-water mark.

SCOLECOLEPIS VIRIDIS Verrill, sp. nov. (p. 345.)

Body long, slender, depressed; both the upper and lower surfaces flattened, of nearly uniform breadth throughout most of the length, abruptly narrowed at each end, and somewhat tapering and more rounded posteriorly. Head with the central plate longer than broad,

forming an acute angle behind, anteriorly suddenly expanding into a wide transverse frontal lobe, broadly rounded in front, with a slight emargination in the middle, the lateral angles prominent and slightly auriculate or recurved. Eyes four, distant, the two pairs nearly parallel. Proboscis small, smooth, rounded. Antennæ slender, twice as long as the breadth of the body. The branchiæ are slender and ligulate anteriorly, and meet over the middle of the back; but farther back they gradually decrease in length, and disappear at about the anterior third. The upper ramus of the feet consists of a broad, thin, foliaceous upper ramus, rounded outwardly, connected, for most of its length, with the branchia, the upper end a little prominent; and a broad cluster of setæ, consisting of a small upper fascicle of slender aciculæ, scarcely as long as the branchia, and a comb-like group of shorter and somewhat stouter bent and acute setæ. The lower ramus consists of a small, thin, rounded process, bearing a transverse row of acute bent setæ, and a ventral tuft of longer and more slender ones. Posteriorly the slender setæ in the dorsal and ventral tufts are considerably longer; and several stouter, recurved, two-hooked, uncinæ setæ appear in the transverse rows of acute setæ, both in the upper and lower rami. Anal segment short, truncate or suburceolate, somewhat bilobed; the margin of the orifice crenulated with small rounded lobes, and with four small conical papillæ on the upper side. Color olive-green or bright green, darker posteriorly; branchiæ bright red; antennæ light green, with a row of black specks.

Length up to 100^{mm}; breadth, 3^{mm}.

Great Egg Harbor; New Haven; Watch Hill; Wood's Hole; burrowing in sand, at low-water.

SCOLECOLEPIS TENUIS Verrill, sp. nov. (p. 345.)

Body very long and slender, depressed, especially anteriorly, gradually tapering posteriorly. Head short and broad, slightly three-lobed in front, the central lobe broadly rounded, the lateral ones also rounded, somewhat smaller. Antennæ long and slender. The branchiæ are small, ligulate, and exist only on the anterior segments. The setæ of the dorsal fascicle are long and slender; but those of the first three segments are longer than the others, forming large fan-shaped fascicles directed upward and forward; those of the first segment longest, about twice as long as the breadth of the head. Farther back the setæ of the upper ramus become shorter, the upper ones slender, capillary, the lower ones stouter, somewhat bent, mostly acute, some uncinæ. Those of the lower ramus are shorter, setiform, forming large fascicles anteriorly. Farther back the upper ones are partly stouter, somewhat bent, and acute, and partly uncinæ, while a small ventral fascicle of slender ones still remains. Posteriorly the setigerous lobes of the feet become very small. Color light green; branchiæ red, tinged with green; antennæ whitish, with a red central line.

Length, 80^{mm}; breadth, 1.25^{mm}.

Great Egg Harbor, New Jersey; burrowing in sand, at low-water.

SCOLECOLEPIS CIRRATA Malmgren. (p. 501.)

Annulata polychæta, p. 91, Pl. 9, figs. 54 A-54 D. *Nerine cirrata* Sars, Nyt. Mag., vol. vi, p. 207 (teste Malmgren).

This is a larger and stouter species than either of the preceding. The front of the head is broadly rounded, with prominent, rounded, lateral angles; the foliaceous lateral appendages are larger and much wider.

Off Block Island, in 29 fathoms, and in the deepest parts of Vineyard Sound, near the mouth; off Saint George's Bank, in 110 and 150 fathoms. Northern coasts of Europe; Spitzbergen; Greenland. In 20-250 fathoms. (Malmgren).

SPIO SETOSA Verrill, sp. nov. Plate XIV, fig. 77. (p. 344.)

Nerine coniocephala? A. Agassiz, Annals Lyceum of Nat. Hist. of New York, vol. viii, p. 333, Pl. x, figs. 39-45, 1866, (*non* Johnston.)

Body long, moderately slender, flattened dorsally, convex below, obtuse anteriorly, slightly tapered toward the posterior end. Head with a prominent median lobe, which is sub-truncate and a little turned up at the front end, with the corners a little prominent and rounded; lateral lobes shorter than the median; on the posterior part of the vertex there is a small median, conical prominence. Eyes four, on the vertex, the posterior pair nearest together; antennæ long. Branchiæ moderately long, slender, ligulate, largest on the anterior segments. On the first three or four segments the upper ramus of the feet has a slender dorsal cirrus, which disappears farther back. The setæ of the upper ramus are long, acute, and form a broad fascicle, in which the upper ones are much longer and more slender, divergent; the lower stouter and more or less bent; they are longest on the first four or five segments, the upper ones considerably exceeding the branchiæ. The lower ramus is small and but slightly elevated; on the anterior segments it bears a small fascicle of short, acute, bent setæ, much shorter than those of the upper ramus, and closely crowded together in two or more rows, with a small ventral tuft of longer and more slender setæ; farther back the acute bent setæ begin to be replaced by uncinæ setæ, which, at about the tenth segment, form a complete transverse row, parallel with a row of slightly longer, pointed setæ, while the small ventral tuft of longer acute setæ still remains, and all the setæ in the broad fascicle of the upper ramus are acute and much longer. In the middle region of the body, the uncini of the lower ramus form a close row, containing fifteen to twenty; they are strongly recurved near the end and margined.

Length up to 80^{mm}; diameter about 2.5^{mm}.

New Haven; Wood's Hole; and Naushon Island; in sand, at low-water.

This species appears to be the same as the one studied by Mr. Agassiz, though it differs slightly from his figures, one of which I have copied.

SPIO ROBUSTA Verrill, sp. nov. (p. 345.)

Body stout, broadest anteriorly, tapering posteriorly, but little depressed except anteriorly, very convex beneath, flattened above. Head broad, somewhat angular; the median lobe truncated and slightly emarginate in front; lateral lobes a little shorter, wide, obtuse in front, slightly angulated laterally; a small median, conical elevation on the posterior part of the head. Antennæ long, rather stout. Branchiæ long, narrow, tapering. Upper ramus of the feet with a small, obtuse setigerous lobe, bearing a small fascicle of short setæ, considerably shorter than the branchiæ, even on the anterior segments, and a foliaceous process arising behind the setigerous lobe, broadly rounded on its thin outer edge; the upper end free and obtusely pointed; farther back the setæ are shorter and the foliaceous process smaller and less prominent. The lower ramus on the anterior segments has a small, prominent, semicircular foliaceous process and a small, dense fascicle of short setæ, crowded in several transverse rows; on the eighth and subsequent segments the foliaceous processes become larger and wider, and the setæ more numerous, crowded, and partly uncinatæ; still farther back the setæ are nearly all uncinatæ, except a very small ventral tuft of slender ones, and form long, double, transverse rows, projecting but little beyond the surface. Color greenish.

Length, 50^{mm}, or more; breadth, 3^{mm} to 3.5^{mm}.

Wood's Hole and Naushon Island; in sand, at low-water mark.

POLYDORA CILIATUM Claparède(?). Plate XIV, fig. 78. (p. 345.)

A. Agassiz, On the Young Stages of a Few Annelids, in *Annals Lyceum Nat. Hist. of New York*, vol. viii, pp. 323-330, figs. 26-38, 1866 (embryology).

Naushon Island and Massachusetts Bay; in muddy sand, at about half-tide (A. Agassiz).

The adults of this species were not found by us. The young were frequently taken in the towing-nets.

A young *Polydora*, belonging perhaps to a different species, was dredged off New Haven, in 4 to 6 fathoms, shelly bottom. It was about 12^{mm} long. The color was pale yellow, with small black spots along the sides between the fascicles of setæ; a red dorsal vessel; antennæ white.

OPHELIA SIMPLEX Leidy. (p. 319.)

Marine Invert. Fauna of Rhode Island and New Jersey, p. 16, 1855.

Body short, smooth, iridescent, well rounded above, flat below; usually found coiled up, so that the extremities meet, or nearly so, and resembling in general form the larvæ of certain beetles and flies. Head very acute conical; the buccal segment suddenly enlarges; mouth beneath, with thick evertile lips, the lower one generally protruded as a large rounded lobe. Posterior end terminated by about ten unequal, round, blunt, fleshy, simple papillæ, of which the two ventral ones

are considerably longest. The setæ commence opposite the mouth and extend to the posterior end; they form two fan-shaped fascicles on each side of each segment, closely approximate at their origin, but strongly divergent, the upper ones directed upward, the lower ones downward; the setæ are very long and slender on the middle segments, those of the upper fascicles longest, and exceeding half the diameter of the body; anteriorly they are considerably shorter; they are somewhat expanded toward the base, but have long and very slender tips. Dorsal cirri rather long and stout, transparent and wrinkled, blunt at tip, thickened at base; in length nearly equaling a third of the diameter of the body. Color yellowish white, tinged with brownish on the sides.

Length, 8^{mm} to 10^{mm}; diameter, 1.5^{mm}.

Savin Rock, at half-tide. Point Judith, Rhode Island, below low-water mark (Leidy).

The specimen above described was found under stones at Savin Rock, near New Haven, May 5. Its body was completely filled, from one end to the other, with comparatively large yellowish white eggs, which show through the transparent integument of the dorsal side very distinctly.

TRAVISIA CARNEA Verill, sp. nov. (p. 508.)

Body with twenty-four setigerous segments, oblong or fusiform, very changeable, round, usually tapering abruptly to each end. Head small, conical, acute; posterior end terminated by a small, bluntly rounded, or slightly clavate papilla; setæ small and slender. Branchiæ short, slender, commencing on the third setigerous segment and ceasing at the twentieth; longest about one-fourth as long as the diameter of the body. Segments of middle region tri-annulated. Color light red or deep flesh-color; branchiæ bright red.

Length, in extension, about 25^{mm}; 3^{mm} to 4^{mm} in diameter. It can contract to 12^{mm} or less in length.

Off Gay Head, Martha's Vineyard, in 19 fathoms, soft mud.

AMMOTRYPANE FIMBRIATA Verill, sp. nov. Plate XV, fig. 79. (p. 508.)

Body elongated, slender, smooth, thickest in advance of the middle, tapering gradually to both ends, convex, and well rounded above; lower surface with a median sulcus and rounded margins, separated from the upper surface by a deep groove. Head very acute. Eyes two, small, black. Proboscis small, sub-globular, smooth. Branchiæ long and slender. Caudal appendage spoon-shaped, deeply concave, transversely striated; the outer margin fringed with a row of small, slender papillæ; a pair of slender cirriform processes, about half its length, arises at its ventral base, and a longer single median one is generally concealed in its cavity. Setæ of the anterior segments long and slender, more than half the diameter of the body, shorter farther back. Color, when living, purplish flesh-color, shining and iridescent

on the dorsal surface; a row of elongated dark spots on each side between the fascicles of setæ; the setæ dark gray.

Length, 75^{mm}; diameter, 3^{mm}.

Off Buzzard's Bay, in 25 fathoms, mud; Bay of Fundy, 10 to 90 fathoms, mud; near Saint George's Bank, 110 and 150 fathoms, mud.

SCALIBREGMA BREVICAUDA Verrill, sp. nov. (p. 416.)

Body rather short, with a narrow, tapering anterior portion; a swollen middle region; and a narrow, tapering caudal portion; lower surface with a very narrow, smooth median area, divided transversely into a series of small rounded prominences by slight depressions. Head small, transverse, truncate or slightly concave in front, the angles produced and prominent. On the anterior region four segments bear short, tufted branchiæ, close to the base of the upper fascicles of setæ, which are rather long and slender; each of these segments also has a dorsal transverse row of rather large and conspicuous blackish granules on its posterior margin, and also a black spot on the sides below the branchiæ. The surface of all the anterior segments is regularly and rather finely granulous, the granules in transverse rows. The middle region, composed of about ten segments, is thicker, and sometimes much swollen, and the feet are represented only by small fascicles of slender setæ. The caudal region is less than one-half the entire length in preserved specimens, and is rather slender and tapering, composed of about sixteen segments; the rami of the feet consist of a prominent, obtuse papilla, both above and below, with a blackish spot at the end, and bearing a fascicle of slender setæ, in length rather exceeding half the diameter of this part of the body. Color, when living, dark brownish red, tinged with yellow at both ends.

Length, 32^{mm}; diameter, 2.5^{mm}.

Off New Haven, 4 to 6 fathoms, shelly bottom.

TROPHONIA AFFINIS Verrill. Pl. XIV, fig. 75. (p. 507.)

Siphonostomum affine Leidy, op. cit., p. 16 (148), 1855.

Body rather slender and elongated for the genus; skin irregularly rugose, granulous, anteriorly covered with small papillæ. The eight branchiæ are cylindrical, thick, blunt, unequal; two tentacles stouter than the branchiæ, sulcate beneath. On the four anterior segments the upper and lower fascicles of setæ are much elongated and directed forward. On the fifth and following segments those in the upper fascicles are capillary, divergent, six to ten in each fascicle; in the lower fascicles there are about three stout, slightly curved, acute, deep yellow setæ. On the third and fourth segments the setæ of the upper fascicles are longer and larger than those in the lower ones; posteriorly the lower setæ become longer, stouter, and more curved at the tip, the lowest one becoming hook-like.

Length, 60^{mm}; diameter, 3.5^{mm}.

Off Block Island, 29 fathoms; off Buzzard's Bay, 25 fathoms, mud.
Great Egg Harbor (Leidy).

BRADA SETOSA Verrill, sp. nov. (p. 508.)

Body short, oblong, sub-cylindrical, flattened below, tapering a little toward both ends, which are obtuse; composed of seventeen setigerous segments. Skin covered with small, prominent, acute papillæ. Upper fascicles of setæ long, slender, light colored; lower fascicles larger, composed of stouter, long, dark colored setæ, surrounded at base by small cirriform appendages. Ventral cirrus small.

Length of preserved specimen, 10^{mm}; diameter, 2.5^{mm}.

Off Gay Head, 8 to 10 fathoms, among muscels, &c.

STERNASPIS FOSSOR Stimpson, Plate XIV, fig. 74. (p. 507.)

Marine Invertebrata of Grand Manan, p. 29, fig. 19, 1853.

Off Gay Head, 19 fathoms, soft mud; common in the Bay of Fundy in 10 to 90 fathoms, mud; near Saint George's Bank, 110 fathoms, sandy mud; Casco Bay, 20 fathoms.

CIRRATULUS GRANDIS Verrill, sp. nov. Plate XV, figs. 80, 81. (p. 319).

Body large and stout, anteriorly subcylindrical, somewhat flattened and tapering slightly posteriorly, and rather abruptly tapered anteriorly. Head small, acute, with obscure brownish spots above, but apparently without distinct ocelli. Posterior end obtuse, the orifice surrounded by a thickened, slightly crenulated border. Posterior to the mouth there are about seven rather indistinct annuli (perhaps four biannulated segments) destitute of appendages; the two next segments bear two fascicles of small setæ on each side, and two crowded dorsal clusters of long slender branchial cirri; these clusters nearly meet on the dorsal line, leaving only a narrow naked space, and contain a large number of cirri, usually of various lengths, closely crowded together. Farther back the "feet" consist of small and slightly prominent upper and lower rami, connected by a slightly raised, transverse ridge; each ramus bears a small fascicle of short, slender, acute setæ, in a transverse row; and a few stouter curved spinules, which project but little from the surface; posteriorly the spinules are more numerous and the slender setæ fewer and a little longer, but they are scarcely equal to one-tenth of the diameter of the body. Along nearly the whole length of the body long slender branchial cirri arise from above most of the upper rami, but many of these are generally broken off in preserved specimens. In alcohol the lower surface of the body is generally flat or concave; the "feet" occupy an elevated lateral ridge, often separated from both the ventral and dorsal surface by a deep groove; and the dorsal surface is moderately convex. The annulations are short, very numerous, and distinct. Color, when living, dull yellow, yellowish green, yellowish orange, greenish orange to orange-brown, darkest anteriorly, and often

iridescent beneath; sides often with dark brown specks; anterior branchial cirri usually bright orange, with a red central line; lateral ones darker yellow or orange, generally with a central line of bright red, due to the blood-vessels showing through.

Length up to 150^{mm}; diameter, 5^{mm} to 7^{mm}; length of branchial cirri, 60^{mm} to 100^{mm}.

New Haven to Vineyard Sound; low-water to 6 fathoms, in sand and gravel; common.

CIRRATULUS TENUIS Verrill, sp. nov. (p. 416.)

Body slender, elongated, strongly annulated. Head conical, depressed, acute. The first four rings behind the mouth are longer than the rest, and destitute of appendages. The branchiæ and setæ commence at the fifth segment; the branchiæ form a cluster on each side, and are long and filiform; farther back and on the middle region there is usually a pair of branchial cirri on each segment, but posteriorly they become distant and irregular. Setæ long and slender in each ramus, the upper ones exceeding in length the diameter of the body on the anterior and middle regions, but becoming much shorter posteriorly. In alcohol the integument is iridescent. No eyes were detected.

Length, 40^{mm}; diameter, 1.25^{mm}.

Vineyard Sound, 6 to 12 fathoms, among compound ascidians; 23 fathoms off Martha's Vineyard.

CIRRHINEREIS FRAGILIS Quatrefages. (p. 397.)

Histoire naturelle des Annelés, vol. i, p. 464. *Cirrhatus fragilis* Leidy, op. cit., p. 147 (15), Plate 11, figs. 39-43, 1855.

Point Judith, Rhode Island, under stones at low water (Leidy). Specimens, apparently of this species, were dredged in Vineyard Sound.

NARAGANSETA CORALII Leidy. (p. 494.)

Marine Invertebrate Fauna of Rhode Island and New Jersey, p. 12 (144), Pl. 11, figs. 46-48, 1855; Quatrefages, op. cit., vol. i, p. 468.

New Haven; Watch Hill; Point Judith; in *Astrangia Danæ*.

Our largest specimen had ten pairs of cirri; the first three pairs originate from one segment, the lowest being stouter and lighter colored than the rest.

DODECACEREA, species undetermined. (p. 422.)

A species, belonging apparently to this genus, was dredged off New Haven Harbor, in shallow water, but the specimens are too young for accurate determination.

CLYMENELLA Verrill, gen. nov.

Body elongated, composed of about twenty-two segments exclusive of the cephalic and anal segments. All the segments, except the buccal and three anteanal, setigerous; they bear fascicles of slender setæ above

and series of hooks below. The anterior margin of the fourth setigerous segment is prolonged into a thin membranous collar. Proboscis swollen, longitudinally ribbed. Head with a prominent convex median plate, and with a raised border on each side and behind, the lateral and posterior lobes separated by notches. Anal segment funnel-shaped, the edge surrounded by papillæ.

CLYMENELLA TORQUATA Verrill. Plate XIV, figs. 71-73. (p. 343).

Clymene torquatus Leidy, op. cit., p. 14 (146), 1855.

Great Egg Harbor, New Jersey; New Haven; Vineyard Sound; Bay of Fundy; Saint George's Bank, &c. Low-water to 60 fathoms.

NICOMACHE DISPARE Verrill, sp. nov. (p. 512.)

Body elongated, with eighteen setigerous segments. Head elongated, sub-conical, with a small central plate, and a depressed point in front, and with low, narrow, lateral and posterior marginal lobes, separated by slight notches; on the anterior part of each lateral border there is a cluster of small, reddish brown, ocelli-like specks. Buccal lobe coalescent with the cephalic above. Proboscis swollen and plicate. The first two setigerous segments have small fascicles of slender, short setæ above, and a single uncinuate seta or hook below on each side. The third segment has much longer setæ in the upper fascicles and two hooks in the lower ones. The fourth has still longer, slender setæ in the upper fascicles, and about eight hooks in each of the lower ones. In the following segments the hooks become much more numerous. There is one short, biannulated, anteanal segment, destitute of setæ. Anal segment suburceolate, as long as broad, cylindrical toward its border, which is furnished on the ventral side with one long, slender cirrus, often as long as the diameter of the anal segment, and two short lateral ones; the rest of the border has a few, mostly very small, distant, unequal, obtuse papillæ or denticulations. The anal orifice is situated at the summit of a small cone, which rises from the bottom of the funnel. The last setigerous segment is longer than the anteanal, and a little longer than any of the ten that precede it, which are all short and subequal, broader than long, those toward the posterior end deeply incised at the intervals between them. The three anterior setigerous segments are shorter than broad; the fourth is twice as long; the fifth is three times as long; the sixth is five times as long. The color, when living, was light red, translucent, with conspicuous bright red blood-vessels, and with a bright red band at about the anterior third. The largest specimen obtained was 50^{mm} long and 2.5^{mm} in diameter after preservation in alcohol. In this specimen the anal segment is long, funnel-shaped, flaring but little toward the margin, and with four or five slight transverse annulations. The buccal segment has two transverse reddish lines on each side.

Off Buzzard's Bay in 25 fathoms; fifteen miles east of Block Island in 29 fathoms, sandy mud. It forms rough tubes of sand, which are not very firm.

MALDANE ELONGATA Verrill, sp. nov. (p. 343.)

Body large and much elongated, cylindrical, obliquely truncated at both ends; with nineteen setigerous segments, those of the middle region elongated; head depressed, with its dorsal surface very oblique; median lobe low, convex, obtusely rounded in front; lateral marginal lobes, or folds, low, rounded, thickened, separated by a shallow emargination from the posterior transverse fold, which is also thickened, little elevated, and divided into two parts by a slight sulcus; from the notch between the lateral and posterior lobes of the head, a lateral oblique sulcus curves downward and backward, and joins the first of the two transverse sulci, which are strongly marked on the ventral side of the buccal segment. Anterior setigerous segments strongly biannulated; the first two are short, the length about equal to the diameter; the next two are considerably longer; and those farther back become very much elongated; the last setigerous segment is short. The segments are considerably swollen where the setæ arise, especially in the middle region. The upper setæ are long and slender, mostly about half the diameter of the body, and form rather large fascicles on most of the segments. The last segment is obliquely truncated, its posterior border surrounding the base of the large anal process, which is obliquely placed, foliaceous, obovate, with the posterior edge broadly rounded, the upper surface concave, and the margin entire. Color dark umber-brown, or reddish brown, iridescent; the swollen parts of the rings are lighter yellowish brown, or grayish brown, the dark red blood-vessels often showing through; near the bases of the setæ there are usually small dark colored specks; head and buccal lobe thickly specked with dark brown or blackish.

Length of largest specimens, 300^{mm}; diameter, 4^{mm} to 5^{mm}; more frequently about half this size.

Savin Rock, near New Haven; in sandy mud at low-water mark, forming thick tubes composed of fine mud.

RHODINE ATTENUATA Verrill, sp. nov. (p. 508.)

Body slender, elongated, with the segments strongly marked, and the first setigerous segment very long. Head elongated, depressed, obtusely rounded in front; median lobe, or ridge, broad and but little elevated, except near the front of the head, where it becomes suddenly narrowed, more convex, with well marked foveæ on each side; lateral lobes rudimentary, scarcely apparent; on the posterior part of the head there is a prominent transverse elevation. Buccal lobe confluent with the cephalic. First setigerous segment swollen anteriorly and about as broad as the head at its anterior end where the setæ arise, but narrowed and gradually attenuated backward, its total length being about eight times its diameter; second and third setigerous segments about equal, nearly twice as long as broad, swollen in the middle, the front margin of each prolonged into a sheath-like collar; the three next

segments are short and rounded, about as long as broad, much narrowed at each end, and swollen in the middle; next two about twice as long as broad; succeeding segments more elongated. Anal segment wanting in the specimens examined.

Length about 50^{mm}; diameter about 1^{mm}.

Off Gay Head, 6 to 8 fathoms; fifteen miles east of Block Island, in 29 fathoms, sandy mud.

The *Clymene urceolata* Leidy, from Great Egg Harbor, will probably be found on the New England coast, but we have not met with it. It is peculiar in having an urceolate anal segment, with a smooth margin.

AMMOCHARES, species undetermined. (p. 508.)

A species which constructs slender, flexible tubes, covered with grains of sand, regularly and curiously attached by one end in an imbricated manner, was dredged fifteen miles east of Block Island, in 29 fathoms sandy mud, and in 23 fathoms off Martha's Vineyard. The worm is very slender, flesh-color, with a red dorsal vessel, and two small, red, ocelli-like spots.

NOTOMASTUS LURIDUS Verrill, sp. nov. (p. 342.)

Body long and rather large, composed of numerous segments, nearly cylindrical when living, and tapering but little, except close to the ends. In preserved specimens the anterior region, including about ten segments, is often a little swollen and slightly larger than the rest of the body; at other times it is even more slender than the posterior region. Head small, acute. Proboscis short and broad, swollen; in full expansion nearly twice the diameter of the body, nearly smooth, dark blood-red. The segments of the anterior region are longer than broad, in extension nearly twice as long, biannulated, and each of the annuli is again annulated with several transverse, more or less irregular sulci or furrows; ten of these segments bear fascicles of slender setæ both above and below, the fascicles on the first two setigerous segments being very small, and containing few setæ. The segments following the tenth setigerous one have a small transverse row of slender uncinatè setæ above, and a longer lateral transverse row of the same kind of setæ on each side; the "feet," or setigerous lobes, are but little prominent, the upper ones being dorsal and much smaller than the lateral ones. The surface of the body is transversely wrinkled, and covered with minute, irregular reticulations, giving it a slightly granulous appearance. Color, when living, dark purplish brown, with a bluish iridescence anteriorly, and a darker median dorsal line posteriorly; minute, white, raised spots, or slight papillæ, are scattered over the surface.

Length, 150^{mm} or more; diameter, 2^{mm}.

Savin Rock, near New Haven; in muddy sand, at low-water mark.

NOTOMASTUS FILIFORMIS Verrill, sp. nov. (p. 342.)

Body very long and slender, filiform, composed of very numerous short segments. Head very changeable in form, usually long, conical, and very acutely pointed. Proboscis smooth, obovate, or trumpet-shaped, when extended, and bright red. In the anterior region there are eleven setigerous segments, which bear small fascicles of slender setæ in both rami, those in the first five longer and acutely pointed; these segments are short, biannulate; the lower fascicles of setæ are largest and fan-shaped. In the middle region the segments are about as long as broad. Color, pale red to bright red, often mottled with whitish, and more or less yellowish posteriorly.

Length, 100^{mm}; diameter, 1^{mm}.

Great Egg Harbor, low-water to one fathom, in sandy mud; New Haven; Watch Hill; Vineyard Sound.

SABELLARIA VULGARIS Verrill, sp. nov. Plate XVII, figs. 88, 88a. (p. 321.)

Body rather stout, thickest anteriorly, tapering backward to the base of the long, slender caudal appendage. Two slender, red, oral tentacles arise near the mouth, between the bases of the operculigerous lobes, and, when extended, reach beyond the bases of the opercula. A single median lanceolate process also arises between the operculigerous lobes. A deep emargination exists on the ventral side, back of the mouth; on each side of this the front margin of the segment is prolonged into a tridentate lobe, the teeth or lobes being unequal, the inner ones largest, the middle ones more slender and acute, the outer one smallest and shortest; beyond these, toward the sides, there is another small acute process; two conical processes also project forward from the lateral margins, and also a fascicle of setæ. The ciliated prehensile cirri, or tentacles, are long and slender when extended, and reach considerably beyond the opercula. The setæ composing the opercula are golden yellow; the outer circle white at base. A row of small conical papillæ surrounds the bases of the opercula. Branchiæ long, lanceolate, acute, longer than the diameter of the body. Color of body yellowish flesh-color, or pale reddish, often with two rows of brown spots along the ventral surface; operculigerous lobes whitish or grayish, specked with blackish; branchiæ reddish or yellowish, with a red central line, often with a greenish tinge, or red centered with green; tentacles pale flesh-color, sometimes purplish; opercula blackish or grayish on the anterior surface, golden yellow on the sides, white at base; caudal process pale red or flesh-color.

Length about 25^{mm}, exclusive of caudal process; 2^{mm} to 2.5^{mm} in diameter.

Great Egg Harbor, New Jersey, to New Haven and Vineyard Sound; low-water to ten fathoms; very common. Eggs are laid in May and June.

CISTENIDES GOULDII Verrill, sp. nov. Plate XVII, figs. 87, 87a. (p. 323).

Pectinaria Belgica Gould, Invertebrata of Massachusetts, 1st ed., p. 7, Plate 1, fig. 1 (tube), 1841 (not of European writers). *Pectinaria auricomā* Leidy, op. cit., p. 14 (146), 1855 (not of European writers).

Body rather stout, little curved. Head with the dorsal surface obliquely truncated, its posterior marginal fold with a smooth border. Antennæ long, tapering, acute; frontal membrane or veil semicircular, its edge divided into rather long, slender, acute papillæ, about twenty-eight in number. Cephalic setæ in two broad groups, each containing about fifteen light golden setæ, which are somewhat curved upward, with long, slender, very acute tips, those in the middle of each group much the longest. Tentacles stout, obtuse, flattened, and folded up so as to form a groove beneath. Color light red or flesh-color, handsomely mottled with dark red and blue.

Length up to 40^{mm}; diameter, 7^{mm}.

Great Egg Harbor to New Haven and Cape Cod; low-water to 10 fathoms.

This species can easily be distinguished from *C. granulatus*, which is common in the Bay of Fundy, by the cephalic setæ or spines, which are fewer, much stouter, obtuse, and darker colored in the latter.

AMPHARETE GRACILIS Malmgren. Plate XVI, fig. 83. (p. 508).

Nordiska Hafs-Annulater, Ofvers. af kongl. vet. Akad. Förh., 1865, p. 365, Plate 26, figs. 75-75D.

Body flesh-colored, greenish posteriorly, with a conspicuous red median vessel; branchiæ light sea-green.

Length, 25^{mm} to 35^{mm}; diameter, 2.5^{mm} to 3^{mm}; length of branchiæ, 6^{mm} to 9^{mm}.

Off Gay Head, 10 fathoms; off Martha's Vineyard, 23 fathoms; east of Block Island in 29 fathoms; Bay of Fundy, 10 to 90 fathoms; northern coasts of Europe, Bahusia, at Koster Island, in 130 fathoms. Our specimens differ slightly from the description and figures of Dr. Malmgren, especially in usually having but twelve uncigerous segments in the posterior region, instead of thirteen, found by him in the European specimens. This may be due to difference of age or sex. There are, however, thirteen in one of our specimens.

AMPHARETE SETOSA Verrill, sp. nov. (p. 416.)

Body rather thick anteriorly, tapering rapidly backward. Cephalic lobe acute, with a much shorter, small, lateral lobe on each side. Branchiæ eight, transversely wrinkled, rather short; in preserved specimens about equal to the breadth of the body. Palmulæ, or cephalic fascicles of setæ, short and broad, rounded, fan-shaped, the setæ being nearly equal, the ventral ones a little longer than the lateral. Fourteen segments bear small fascicles of long setæ, supported by prominent lobes at the base. The posterior region consists of about ten uncigerous seg-

ments. Anal segments small, with two long slender cirri. Color of body translucent, light yellowish green; the anterior part of the body tinged with bright blood-red, due to the circulating fluid, showing through the integument; branchiæ greenish, with a central series of white spots; setæ of the palmulæ, deep yellow.

Length about 20^{mm}; diameter, 2.5^{mm} to 3^{mm}.

Off New Haven, low-water mark to 6 fathoms, shelly. It makes rough tubes about an inch long, covered with coarse sand and mud.

AMAGE PUSILLA Verrill, sp. nov.

Body rather slender. Head obtusely rounded in front; the middle lobe small, and but little larger than the lateral. Eight slender branchiæ, about twice as long as the diameter of the body, arranged in a crowded group; two farther back than the rest; and with no apparent naked median space. Twelve of the setigerous segments bear long fascicles of slender setæ. No "palmulæ," or cephalic setæ. Tentacles numerous and slender. Two small, slender anal cirri.

Length, 12^{mm}; diameter, 1.5^{mm}.

Off New Haven, 5 to 6 fathoms; shelly bottom.

MELINNA CRISTATA Malmgren. (p. 432.)

Nordiska Hafs-Annulater, loc. cit., p. 371, Plate 20, figs. 50-50D. *Sabellides cristata* Sars, Fauna littoralis Norvegiæ, vol. ii, pp. 19, 24, Pl. 2, figs. 1-7, 1856.

Mouth of Vineyard Sound, on muddy bottoms, in the deepest water; Bay of Fundy, on muddy bottoms, in 10 to 90 fathoms; near Saint George's Bank, in 110 and 150 fathoms, mud. Off the Scandinavian coast in 40 to 200 fathoms; Greenland; Spitzbergen.

The tube is soft, flexible, slender, and covered with fine mud.

TEREBELLIDES STROËMI Sars. (p. 507.)

Beskriv. og Iakttag., p. 48, Plate 13, figs. 31, a-d (teste Malmgren); Malmgren, Nordiska Hafs-Annulater, loc. cit., p. 396, Plate 48-48D, 1865.

East of Block Island, in 29 fathoms, sandy mud; Bay of Fundy, 10 to 90 fathoms, muddy; near Saint George's Bank, 85 to 150 fathoms. Greenland, 10 to 250 fathoms; Iceland; Spitzbergen; northern coasts of Europe; Adriatic Sea.

AMPHITRITE ORNATA Verrill. Pl. XVI, fig. 82. (p. 320).

Terebella ornata Leidy, Marine Invertebrate Fauna of Rhode Island and New Jersey, loc. cit., p. 14 (146), Plate 11, figs. 44, 45 (setæ), 1855.

Great Egg Harbor, New Jersey, to New Haven and Vineyard Sound; common in sand and gravel at low-water mark.

NICOLEA SIMPLEX Verrill, sp. nov. (p. 321.)

Body elongated, swollen anteriorly, especially above, attenuated posteriorly. Head with a rather large, well rounded, or nearly circular frontal membrane, which has a smooth margin; mouth with a small

posterior fold. Tentacles very numerous, crowded, long, and slender. Branchiæ four, rather small; those of the anterior pair somewhat the larger; those of both pairs are repeatedly dichotomously divided from close to the base. The divisions are short and not very numerous, and diverge at a wide angle. Fifteen segments bear small fascicles of slender setæ, commencing at the next behind the last branchiferous segment. The third and fourth setigerous segments of the male bear small, slender lateral cirri. Ventral shields about thirteen; the first six transversely oblong, and nearly equal in width; the last seven narrowing rapidly to the last, which is acutely triangular. Color, when living, light red, or flesh-color.

Length, 35^{mm}; diameter, 3^{mm} to 4^{mm}.

New Haven to Vineyard Sound, from low-water to 6 fathoms; off Watch Hill, 4 to 6 fathoms, in tubes composed of bits of shells and grains of sand, attached to *Laminaria*.

SCIONOPSIS Verrill, gen. nov.

Body composed of numerous segments, of which 17, following the third, bear fascicles of slender setæ, and the following ones have only small uncigerous lobes; second and third segments bear branchiæ, and have their anterior margins prolonged into membranous, collar-like expansions; that of the second forming broad, lateral lobes behind the tentacles; that of the third forming behind the branchiæ a dorsal collar or sheath, beneath which they can be retracted. Branchiæ typically four. Those of the first pair usually larger, but generally one or more are absent, and frequently the anterior ones are smallest, or those of the same pair may be unequal, owing probably to the facility with which they may break off and be reproduced; they are palmately branched and supported on elongated pedicels. Tentacles numerous and crowded.

This genus is allied more closely to *Pista* than to any other yet described, but differs in the structure of the branchiæ and character of the collar formed by the third segment.

SCIONOPSIS PALMATA Verrill, sp. nov. (p. 321.)

Body elongated; rather slender; thickened but not distinctly swollen anteriorly, tapering gradually to the posterior end. The setigerous feet commence at the fourth segment, or next behind the branchial collar, and are all quite prominent, the first three or four being a little smaller than the rest; the setæ are rather long. The uncigerous feet commence on the second setigerous segment. Behind the last setigerous segment the uncigerous feet are smaller, somewhat prominent, and extend to the anal segment. Ventral shields about 20; the most anterior ones are transversely oblong; the succeeding ones squarish, gradually tapering to the last, which are very narrow. Anal segment tapering; its orifice with a crenulated margin. Branchiæ large, with numerous palmate divisions

arising from the summit of the stout and rather long pedicels.* There are usually five or more main divisions in good-sized specimens, these spread outward from one point, are recurved at the ends, and flexuous and bipinnately branched, the lower pinnae being longest each time, and the ultimate divisions very numerous, fine, slender, and acute. The branchiæ of the posterior pair, in normal specimens, are considerably smaller, with the divisions less numerous, and the ramuli longer and more delicate. The pedicels of the anterior branchiæ are about as long as the diameter of the body, and are very contractile, as well as the branches, so that the gills can be contracted into a small compass and withdrawn under the dorsal collar, beneath which the pedicels arise. This branchial collar is formed by the prolongation of the margin of the third segment; on each side of the median line above, it is divided into two narrow, lanceolate processes directed forward; exterior to these there are two other wider and usually less prominent angles or lobes; laterally, the collar is prominent, with a broadly rounded, thin margin, which forms another angle on each side beneath; on the ventral side its edge recedes and is but little raised. The tentacular collar, formed by the second segment, expands into a broad, rounded, prominent lobe on each side; and on the ventral surface becomes narrower, though still prominent, and recedes in a broad, rounded sinus behind the posterior lobe of the mouth. The cephalic segment is bordered by a rather broad frontal membrane, emarginate above, and broadly rounded laterally. Tentacles very numerous, long, and slender. Color, light red, brownish red to dark reddish brown; the annulations often darker; the upper surface is usually more or less specked with flake-white; along each side, below, there is usually a row of squarish spots, brighter red than the rest of the body, each pair connected by a narrow, transverse line of red between the ventral shields, which are dull yellowish red; the segments along the sides are often bordered with red; branchiæ usually green, specked on the outer sides of the branches with flake-white, and with internal blood-red vessels, showing distinctly in all the divisions; the pedicel is usually bright red; tentacles, flesh-color.

Length up to 70^{mm}; diameter, 3^{mm}.

Great Egg Harbor to New Haven and Vineyard Sound; low-water mark to one fathom.

LEPRÆA RUBRA Verrill, sp. nov. (p. 382.)

Body elongated, somewhat swollen anteriorly, rapidly tapering to the very long, slender, posterior portion. All the segments posterior to the branchiæ bear small fascicles of slender setæ, as well as uncini; posterior to the twenty-fifth setigerous segment the uncigerous feet become

* In mentioning this species, on page 321, it was stated that it has but three gills, and, in fact, this is the most frequent number. Among the numerous examples examined, I have only recently found a specimen with both pairs of gills in their normal condition.

much narrower and more prominent; anteriorly they are very broad. Ventral plates rather broad anteriorly, those posterior to the seventh or eighth suddenly narrowed. Branchiæ in three pairs, small, finely arborescently divided, the divisions numerous; posterior pair considerably smaller than the others. Cephalic lobe with a somewhat prolonged frontal border, broadly rounded in front, with an entire margin. Color bright red; tentacles flesh-color.

Length, 50^{mm} or more; diameter, 2.5^{mm} to 3^{mm}.

Vineyard Sound; Wood's Hole on piles of wharves just below low-water mark.

POLYCIIRRUS EXIMIUS Verrill. Plate XVI, fig. 85. (p. 320).

Torquea eximia Leidy, op. cit, p. 14 (146), Plate 11, figs. 51, 52 (setæ), 1855.

In this species there are twenty-five setigerous segments, bearing small fascicles of long, slender setæ; about seventy posterior segments bear uncini only; anteriorly the uncini commence on the eighth setigerous segment. There are nine ventral shields, divided by a median ventral sulcus. The frontal lobe of the head is large, elongated oval or elliptical. The posterior lobe of the mouth is large, rounded. Body and tentacles bright blood-red; the body is often more or less yellowish posteriorly.

Great Egg Harbor to New Haven and Vineyard Sound; low-water to 10 fathoms.

A species of this genus was also dredged in 19 fathoms off Gay Head, but its identity with the above is uncertain. Another species, remarkable for its brilliant blue phosphorescence, is common in the Bay of Fundy. The *P. eximius* does not appear to be phosphorescent.

CHÆTOBRANCHUS Verrill, genus nov.

Allied to *Polycirrus* and, like the latter, destitute of blood-vessels. Body much elongated, composed of very numerous segments, nearly all of which bear fascicles of setæ. Segments of the middle region bear simple, or more or less branched, branchial cirri, each of their divisions tipped with slender setæ; these cirri are wanting on the anterior and posterior segments, the first and last ones being smaller and more simple than the rest. The cephalic segment expands into a broad, tentacular or frontal lobe, which is rounded or emarginate anteriorly, and often more or less scolloped laterally. Tentacles crowded, very numerous, long and slender in extension, capable of being distended by the blood, as in *Polycirrus*, &c.

CHÆTOBRANCHUS SANGUINEUS Verrill, sp. nov. (p. 320.)

Body greatly elongated, much attenuated posteriorly, more or less swollen anteriorly, but narrowed toward the head, the thickest portion being usually between the tenth and fifteenth segments. The branchial cirri commence at about the ninth segment, those of the first pair being short, simple cirri; those on the next segment are once forked; those on

the next have three or four branches; farther back they divide dichotomously above the base into numerous branches, all of which are supported upon a short basal pedicel, which may be a little elongated in expansion, the total length of the branchiæ being then greater than the diameter of the body; the branches are clustered, slender, delicate, and elongated, and each one is terminated by a small fascicle of slender, sharp, serrate setæ two to four or more in a group, so that the entire appendage may be regarded as a very remarkable enlargement and modification of the setigerous lobes of the "feet."

On the segments anterior to the ninth the setigerous lobes of the feet are short, conical, swollen at base, and bear a small fascicle of setæ; the ventral surface of the anterior segment is somewhat raised, and divided by a series of sulci or wrinkles into several lobes or crenulations, which are somewhat prominent and papilliform at the posterior margin of each segment, and have a granulous surface. There is a distinct median ventral sulcus. Between the adjacent branchial cirri anteriorly there are, on each side, four or more thickened, somewhat raised, squarish organs, with a granulous and apparently glandular structure; farther back these are reduced to two, then to one, and finally disappear on the segments of the posterior region, which is very long, slender, attenuated, composed of very numerous short segments, with only rudimentary appendages; after the branchial cirri become reduced to simple processes they still continue, on about forty segments, gradually decreasing in length and size; beyond this small setæ still exist on the segments, till near the end of the body. Anal segment small and simple, the orifice with slightly crenulated margins. Frontal membrane large and broad, versatile in form, often with a deep emargination in front, each lateral lobe divided into two or three subordinate lobes, or unequal scollops, the edges undulated; at other times the front edge and sides are broadly rounded and entire. The mouth is furnished with a large elongated ovate lobe, which is rounded, free, and prominent posteriorly. Tentacles very long, much crowded, and very numerous; in extension usually as long as the body. Color of body, anteriorly, deep blood-red; posteriorly, more or less mottled or centered with yellow, owing to the internal organs showing through the integument; tentacles and branchial cirri bright blood-red.

Length up to 350^{mm}; diameter 5^{mm} to 7^{mm} or more anteriorly; length of tentacles, in extension, 400^{mm} or more.

Great Egg Harbor to New Haven and Vineyard Sound; common at low-water mark, in mud.

POTAMILLA OCULIFERA Verrill. Plate XVII, fig. 86. (p. 322).

Sabella oculifera Leidy, op. cit., p. 13 (145), Plate 11, figs. 55-61, 1855.

Great Egg Harbor to New Haven; Vineyard Sound, low-water mark to 25 fathoms, off Buzzard's Bay. In the Bay of Fundy from low-water mark to 60 fathoms.

Closely related to *P. reniformis* of Northern Europe, and possibly identical with it.

SABELLA MICROPHALMA Verrill, sp. nov. (p. 323.)

Body rather short and stout, narrowed slightly anteriorly, tapering rapidly close to the posterior end, composed of about sixty segments, depressed, moderately convex above, flat below, especially when preserved in alcohol; anterior region composed of eight setigerous segments, having moderately long fascicles of setæ; posterior region composed of about fifty short segments, bearing very small fascicles of setæ; anal segment small, simple, with two very small ocelli-like spots; ventral shields of the anterior segments short, transversely narrow, oblong; median sulcus very distinct in the posterior region, dividing the ventral shields into two nearly rectangular parts, which are broader than long. Branchiæ numerous and long, often half as long as the body, connected by a slight web close to the base; the stalks smooth, with numerous minute ocelli, in two irregular rows; pinnæ numerous, long and slender; tips of the branchiæ without pinnæ. Collar broadly interrupted above, flaring and reflexed at the sides, with rounded upper angles, erect and sinuous at the latero-ventral margins, reflexed below, forming two short, rounded lobes, separated by a narrow but deep central sinus, within which there is a short bilobed organ. Tentacles thin, lanceolate, acute, in preserved specimens not so long as the diameter of the body. The anterior segment is divided by a deep dorsal sulcus, which is not conspicuous on the succeeding segments. Color of body greenish yellow, dull olive-green, or greenish brown; branchiæ pale yellowish, greenish, or flesh-color, often with numerous transverse bands of lighter and darker green, which extend to the pinnæ, and sometimes blotched with brown; collar translucent, specked with flake-white; ocelli dark reddish brown. Specimens, apparently belonging to this species, were taken from wood bored by *Teredo*, near New Haven. These had the body olive-green, specked with flake-white anteriorly, on the ventral side, especially on the first two segments; branchiæ mottled with greenish brown and white and specked with flake-white; ocelli brown, numerous.

Length, 30^{mm}; diameter, 2.5^{mm} to 3^{mm}. Preserved specimens are about 20^{mm} long, 2.5^{mm} broad.

New Haven to Vineyard Sound; low-water mark to 5 fathoms.

EUCHONE ELEGANS Verrill, sp. nov. Plate XVI, fig. 84. (p. 432.)

Body rounded, slender, gradually tapered backward; the anterior region, which forms about one-half of the entire length, consists of eight setigerous segments; these are biannulated and divided by a dorsal, longitudinal sulcus, and by a lateral sulcus on each side below the uncigerous lobes. The middle region consists of thirteen shorter biannulated segments, which bear small fascicles of setæ on the lower rami; these are divided by a ventral sulcus, and also by the lateral ones. The caudal region consists of about ten very short segments; all of which, except the last, bear small fascicles of setæ. These segments are margined by a rather broad membrane, wider and rounded

anteriorly, narrowing to the end. Collar broad, with a nearly even margin, often somewhat sinuous at the sides, divided above and below, the lobes rounded at the angles. The collar is a little broader below than above. Branchiæ long, slender, recurved in expansion, connected by a broad and very thin membrane, continued as thin borders of the branchiæ to their tips, which are destitute of pinnæ for some distance. Body pale flesh-color, with a darker median line, reddish anteriorly, darker greenish or brownish, posteriorly; branchiæ pale yellowish or greenish, each with a flake-white spot near the base outside. Other specimens were greenish gray, with green branchiæ. Some were flesh-color, with a bright-red dorsal vessel; the branchiæ flesh-color, without the white spots at the base.

Length, in extension, about 20^{mm}; diameter of body, 1.5^{mm}.

Deep water off the mouth of Vineyard Sound; off Martha's Vineyard, in 21 and 23 fathoms; off Block Island, in 29 fathoms, sandy mud, abundant. Cosco Bay, 7 to 20 fathoms.

This species makes slender tubes, covered with fine sand.

FABRICIA LEIDYI Verrill, sp. nov. (p. 323.)

Body very small and slender, tapering a little to both ends, in extension considerably exsert from the slender tube; eleven segments bear fascicles of setæ; the segments are about as long as broad, slightly constricted at the articulations, with the anterior margin a little prominent; anal segment small, tapered to a blunt point, bearing two small, dark ocelli. Branchiæ six, subequal, forming three symmetrical pairs, each one with five to seven slender pinnæ on each side; the basal pinnæ are about as long as the main stem, the others successively shorter, so that all reach to about the same level. Tentacles short, thick, bluntly rounded at the end, strongly ciliated. At the base of the branchiæ, on each side, is a red, pulsating vesicle, the pulsations alternating in the two; just back of these, on the first segment, are two brown ocelli; a little farther back, and near together, on the dorsal side, are two auditory vesicles, each with a round central corpuscle. The fourth and eleven succeeding segments bear small fascicles of acute, bent setæ, about as long as half the diameter of the body; on the middle segment there are about four or five setæ in a fascicle; on the ninth, three; on the tenth, two; on the eleventh, one or two, in the specimens examined. Intestine rather wide, but narrowed at the eighth setigerous segment, and after that slender, bordered by a red blood-vessel on each side. In the fourth setigerous segment there are three globular granulated organs. color, yellowish white, tinged with red by the circulating fluid.

Length about 3^{mm}; diameter about 0.25^{mm}; expanse of branchiæ, 0.8^{mm}. The specimens measured may be immature.

New Haven to Vineyard Sound, common at and below low-water mark; Cisco Bay.

SERPULA DIANTHUS Verrill, sp. nov. (p. 322.)

Body elongated, gradually attenuated to the posterior end; the posterior region considerably flattened; dorsal surface covered with minute papillæ and having a finely pubescent appearance under a lens. Collar broad and long, in living specimens sometimes one-third as long as the body; the posterior portion free dorsally, and in expansion about as long as the attached portion, extending backward and gradually narrowing to the end; the margins thin and undulated; the anterior border is divided into a broad revolute dorsal lobe, with an undulated margin, and two narrower lateral lobes, which are broadly revolute laterally, with the margin rounded and nearly even. Seven segments bear rather large fascicles of long, acute setæ. The first fascicle is remote from the next, and directed downward and forward, with the setæ longer than in the others; the six following fascicles are broad, and are directed downward and backward. The uncinæ setæ form long transverse rows anteriorly, but toward the posterior end they form short rows. Operculum funnel-shaped, longitudinally striated externally, with a long, slender pedicel; the upper surface is concave, with about thirty small, acute denticles around the margin; an inner circle of about twelve long, slender papillæ, incurved at tips and united at base, arises from the upper surface of the operculum. On the left side is a small rudimentary operculum, club-shaped at the end, with a short pedicel. Branchiæ are long rather slender, united close to the base, about eighteen on each side, in mature specimens, those toward the ventral border considerably longer, than the upper ones; tips naked for a short distance, slender, and acute; pinnæ very numerous, slender. Colors quite variable, especially those of the branchiæ; the branchiæ are frequently purplish brown, transversely banded with flake-white, alternating with yellowish green, the pinnæ usually having the same color as the portion from which they arise; on the exterior of the branchiæ the purple bands are often divided by a narrow longitudinal line of whitish; operculum brownish green on the outer surface, purplish on the sides, with white longitudinal lines toward the margin, greenish white at base; pedicel purplish, banded with white; collar pale translucent greenish, veined with darker green; body deep greenish yellow, the dorsal surface light yellow. Many other styles of coloration occur, some of which are described on page 322.

Length up to 75^{mm}; diameter about 3^{mm}.

Great Egg Harbor to New Haven and Cape Cod; low-water mark to 8 fathoms.

The tubes are long, variously crooked, and often contorted, sometimes solitary, frequently aggregated into masses four or five inches in diameter. They are nearly cylindrical, with irregular lines of growth, and sometimes with faint carinations.

SERPULA DIANTHUS, var. CITRINA Verrill. (p. 322.)

I have applied this name to a very marked color-variety, in which the

branchiæ are lemon-yellow or orange-yellow, without bands, but usually with a reddish central line; the operculum is usually yellow; collar and base of branchiæ bright yellow; body light yellow.

Found with the preceding, and often in the same cluster of tubes.

VERMILIA (?), species undetermined. (p. 416.)

The species thus indicated forms slender, more or less crooked, angular tubes, with two distinct carinations on the upper surface; they are about half an inch long, attached firmly by one side along their whole length. The branchiæ form a wreath, with about six on each side; pinnæ long and slender; two or more of the branchiæ bear pink, sack-like appendages. The branchiæ are reddish brown, annulated with narrow bands of white.

Diameter of tubes, about 1.25^{mm}; of expanded branchiæ, 4^{mm}. The specimens have been lost, and no observations were recorded concerning the operculum, so that the genus is still uncertain.

Long Island Sound, off New Haven, in 4 to 6 fathoms, on shells.

SPIRORBIS BOREALIS Daudin (?).

Rec. des mém. de mollusques, 1800. *Serpula spirorbis* Linné, Systema Naturæ, ed. xii, p. 1265. (?) *Spirorbis spirillum* Gould, Invertebrata of Mass., ed. i, p. 8, 1841; A. Agassiz, Annals Lyceum Nat. History of New York, vol. viii, p. 318, Plate 7, figs. 20-25 (embryology), 1866 (not of Linné and other European writers).

New Haven to Cape Cod, the Bay of Fundy, and northward; abundant on *Fucus*, *Chondrus crispus*, and other algæ, at low-water mark.

Whether this, our most common species, be identical with the European species known by this name is still uncertain.

The animals of the various species of *Spirorbis* are still very imperfectly known, and many species have been described from the tubes alone. Accurate descriptions or figures of the animals are necessary before the species can be determined satisfactorily.

This species has nine branchiæ, five on one side and four on the other, with the operculum. The branchiæ are large and broad with long pinnæ, the basal ones shorter, the distal ones increasing in length to near the end, so that each branchial plume is somewhat obovate in outline; the tips are naked only for a short distance. The branchial wreath, in full expansion, is about as broad as the entire shell. The operculum is oblique and one-sided, and supported on a long clavate pedicel, which is transversely wrinkled, and expands gradually into the operculum at the end, the enlargement being chiefly on one side; the outer surface is roughly granulous and usually covered with adhering dirt. The collar is broad, and has three fascicles of setæ on each side. The branchiæ are pale greenish white, centered with brighter green, due to the circulating fluid.

This is the species mentioned in the early part of this report (p. 332) under the name of *S. spirillum*. The true *spirillum* of Linné as a translucent tube, and is found in deeper water, on hydroids, &c.

SPIRORBIS LUCIDUS Fleming.

Edinburgh Encyclop., vol. vii, p. 68; Johnston, Catalogue of British Non-Parasitical Worms, p. 349; Malmgren, Annulata polychæta, p. 123. *Serpula lucida* Montagu, Test. Brit., p. 506 (t. Johnston). *Serpula porrecta* Fabricius, Fauna Grœnlandica, p. 378 (non Müller). *Spirorbis sinistrorsa* Montagu, op. cit., p. 504; Gould, Invertebrata of Massachusetts, ed. i, p. 9, Plate 1, fig. 4, 1841.

Deeper parts of Vineyard Sound, near the mouth, in 10 to 12 fathoms, on hydroids and bryozoa; off Gay Head, 10 fathoms; off Buzzard's Bay, in 25 fathoms, on *Caberea Ellisii*; off Block Island, in 29 fathoms, on *Caberea*; Casco Bay, 6 to 20 fathoms, on algæ, &c.; Bay of Fundy, 10 to 80 fathoms, on hydroids; Saint George's Bank, 30 to 60 fathoms. Greenland; northern coasts of Europe.

This species forms small, translucent, glossy, reversed spiral tubes, coiled in an elevated spire, the last whorls usually turned up, or even erect and free.

There are six branchiæ, which are large and broad, with long, slender pinnæ, which do not decrease in length till near the end; the naked tips are short and acute. The operculum is sub-circular, somewhat obliquely attached to the slender pedicel, which is about half as long as the extended branchiæ, and enlarges rather suddenly close to the operculum; the outer surface of the operculum appears nearly flat, and is covered with adherent dirt. The collar is broad, with undulated and revolute edges. The three fascicles of setæ are long and slender. Ocelli two, conspicuous. The animal, in expansion, is usually much exert from the tube. Anterior part of the body bright red; branchiæ pale greenish; their bases and posterior part of the body bright epidote-green.

It is the species catalogued as *S. porrecta* (?) on pages 498 and 504.

OLIGOCHÆTA.

CLITELLIO IRRORATA Verrill, sp. nov. (p. 324.)

Body very slender, the largest about 60^{mm} long, 0.75^{mm} in diameter, distinctly annulated. Head conical, a little elongated, subacute; setæ commencing on the first segment; those on the anterior segments in fascicles of two or three, very short, small, in length not one-third the diameter of the body, more or less curved like an italic *f*, obtusely pointed at the end; some of them are but slightly bent at the tip, others are strongly hooked; farther back there are three or four setæ in the fascicles, and they are somewhat longer, and two or more in many of the fascicles are forked, the others simple, spinous, more or less curved; in the upper fascicles posteriorly, and sometimes throughout the whole length, there are two or three much longer, very slender, hair-like, flexible bristles, but these are often absent from most of the segments, perhaps accidentally. The intestine is voluminous, slightly constricted at the articulations; two bright red blood-vessels, distinctly visible through the integuments, run along the intestine, one above and one below, following its flexures, without contractile lacunæ.

New Haven to Wood's Hole and Casco Bay, under stones in the upper part of the fucus-zone, and nearly up to high-water mark.

The above description was made from living specimens taken at Savin Rock, near New Haven.

Some of the specimens obtained at Wood's Hole appear to differ somewhat from this description, but the differences may be chiefly due to their being taken in the breeding season. In these the anterior fascicles consist of two short setæ, which are slightly curved in the form of an italic *f*, and are subacute, not bifid at tips. At the ninth to twelfth setigerous segments a thickening occurs, forming a clitellus; on the ninth segment the setæ are replaced by a small mammiform, bilobed organ; on the tenth there is a pair of prominent obtuse papillæ, swollen at base. On the posterior segments only two setæ were observed in each of the four fascicles, but they were longer, more slender, and more curved at the tip than the anterior ones. In each of the segments slender cæcal tubes, forming about two loops on each side, were noticed. Length, about 35^{mm}.

LUMBRICULUS TENUIS Leidy.

Marine Invertebrate Fauna of Rhode Island and New Jersey, p. 16 (145), Plate 11, fig. 64, 1855.

Point Judith, Rhode Island, abundant about the roots of grasses on the shore of a sound (Leidy). We did not obtain this species.

HALODRILLUS Verrill, genus nov.

Body long and slender. Blood white or colorless. Setæ small, acute, in four fan-shaped fascicles on each segment. The alimentary canal consists of a pyriform pharynx, followed by a portion from which several (five to seven) rounded or pyriform cæcal lobes, of different sizes, arise on each side and project forward and outward; these are followed by a large two-lobed portion, beyond which the intestine is constricted, then thickened and convoluted, and covered with polygonal, greenish, glandular cells, which become fewer farther back, where the intestine becomes a long, narrow, convoluted tube. In the anterior part of the body, around the stomach and cæcal lobes, there are numerous convolutions of slender tubes. The blood-vessels running along the intestine contain a colorless fluid.

HALODRILLUS LITTORALIS Verrill, sp. nov. (p. 324.)

Body round, slender, moderately long, tapering to both ends, but thickest toward the anterior end, tapering more gradually posteriorly. Head small, conical, moderately acute, or obtuse, according to the state of contraction; mouth a transverse, slightly sinuous slit beneath. The setæ commence with four fascicles on the first segment behind the buccal; the setæ are slightly curved, forming rounded, fan-shaped fascicles of four to six setæ, the middle setæ being longer than the upper and lower ones; posteriorly the setæ are less numerous. Caudal segment

tapered, obtuse, or slightly emarginate at the end, with a simple orifice. The blood contains minute, oblong corpuscles. Color milk-white. Length, 25^{mm} to 40^{mm}; diameter, 0.5^{mm} to 1^{mm}.

New Haven; Wood's Hole; Casco Bay, Maine; very common under dead sea-weeds and stones near high-water mark.

ENCHYTRÆUS TRIVENTRALOPECTINATUS Minor.

American Journal of Science, vol. xxxv, p. 36, 1863.

In this species, according to Minor, there are three pairs of ventral fascicles of setæ before the dorsal ones commence; the pharynx extends to the fourth pair of ventral fascicles, from which a narrow œsophagus extends to a little back of the sixth pair; here a gradual enlargement of the alimentary canal occurs, ending abruptly just back of the eighth in a narrow, twisted tube, and this gradually enlarges at the ninth ventral fascicle into a moderate sized alimentary canal. No eyes. Length, about 10^{mm}.

New Haven, near high-water mark (Minor).

BDELLODEA.

Comparatively few leeches have hitherto been met with in this region. Many additional species, parasitic on fishes, undoubtedly remain to be discovered.

BRANCHIOBELLA RAVENELII Diesing. Plate XVIII, fig. 89. (p. 458.)

Sitzungsberichte der kais. Akad. der Wissenschaften, Wien, xxxiii, p. 482, 1859.

Phyllobranchus Ravenelii Girard, Proceedings of the American Association for the Advancement of Science for 1850, vol. iv, p. 124, 1851. (?) *Branchellion Orbiniensis* Quatrefages, Annals des sci. natur., sér. 3, vol. xviii, pp. 279-325, Plate 6, figs. 1-13, Pl. 7-8, 1852 (anatomy).

In describing this species Mr. Girard mistook the anterior for the posterior end, and described the large posterior sucker, or acetabulum, as the head. The color is dark brown, purplish, or dark violaceous, specked with white.

Vineyard Sound, on a stingray (*Myliobatis Freminvillei*), in several instances; a number usually occurred together. Charleston, South Carolina, on a "skate," species unknown (Girard). Atlantic Ocean, on a torpedo (Quatrefages).

CYSTOBRANCHUS VIVIDUS Verrill. (p. 458.)

American Journal of Science and Arts, ser. 3, vol. iii, p. 126, fig. 1, 1872.

New Haven, on the minnow (*Fundulus pisculentus*), both in fresh and brackish water; November and December.

ICHTHYOBDELLA FUNDULI Verrill. (p. 458.)

American Journal of Science and Arts, loc. cit., p. 126.

New Haven, on *Fundulus pisculentus*, with the last.

PONTOBELLA RAPAX Verrill, sp. nov. Plate XVIII, fig. 91. (p. 458.)

Body, in extension, long and slender, rounded, thickest behind the middle, attenuated anteriorly. Acetabulum nearly circular, not much wider than the body. Head small, obliquely truncated, rounded. Color dark olive, with a row of square or oblong white spots along each side; head and acetabulum whitish, tinged with green. The young are reddish brown.

Length, 30^{mm} to 40^{mm}; diameter, 1.5^{mm} to 2^{mm}.

Vineyard Sound, on the ocellated flounder, (*Chaenopsetta ocellaris*).

PONTOBELLA, species undetermined. (p. 458.)

Body slender, cylindrical, strongly annulated; the largest seen was about 12^{mm} long and 0.75^{mm} in diameter when extended. Head obliquely campanulate, attached by a narrow pedicel-like neck. Acetabulum oblique, round, only a little wider than the body. Color pale greenish or greenish white, with scattered microscopic specks of blackish. No distinct ocelli, but there are several dark stellate pigment-spots on the head, similar to those on the body. Perhaps all the specimens are immature.

Savin Rock, New Haven, on *Mysis Americanus*, below low-water mark.

MYZOBDELLA LUGUBRIS Leidy. (p. 458.)

Proceedings of the Academy of Natural Sciences of Philadelphia, vol. v, p. 243, 1851; Diesing, op. cit., p. 489.

Parasitic on the edible crab (*Callinectes hastatus*), attached about the bases of the legs. We have not obtained this species on the coast of New England, but it may be expected to occur here.

MALACOBDELLA OBESA Verrill, sp. nov. Plate XVIII, fig. 90. (p. 458.)

Body stout, broad, thick, convex above, flat below, broadest near the posterior end, narrowing somewhat anteriorly; the front broadly rounded, with a median vertical slit, in which the mouth is situated. Acetabulum large, rounded, about as broad as the body. Intestine convoluted posteriorly, visible through the integument. Between the intestine and lateral margins, especially posteriorly, the skin is covered with small stellate spots, looking like openings, within and around which are large numbers of small round bodies, like ova. Color yellowish white. Length, 30^{mm} to 40^{mm}; breadth, 12^{mm} to 15^{mm}.

Salem, Massachusetts; Long Island Sound; parasitic in the branchial cavity of the long clam (*Mya arenaria*).

MALACOBDELLA MERCENARIA Verrill, sp. nov. (p. 458.)

Malacobdella grossa Leidy, Proceedings Academy Natural Sciences of Philadelphia, vol. v, p. 209 (*non* Blainville).

Body, in extension, elongated, oblong, with nearly parallel sides, or tapering slightly anteriorly; anterior end broad, obtusely rounded,

emarginate in the center, but not deeply fissured. In contraction the body is broader posteriorly. Dorsal surface a little convex; lower side flat. Acetabulum round, rather small, about half the diameter of the body in the contracted state, but nearly as broad when the body is fully extended. The intestine shows through the integument distinctly; it is slender, and makes about seven turns or folds. Color pale yellow, with minute white specks beneath and on the upper surface anteriorly, giving it a hoary appearance; middle of the dorsal surface irregularly marked with flake-white; laterally reticulated with fine white lines.

Length in extension, 25^{mm}; breadth, 4^{mm}; in partial contraction, 18^{mm} long; 5^{mm} to 6^{mm} wide.

New Haven, parasitic in the branchial cavity of the round clam (*Venus mercenaria*), October, 1871. Philadelphia, in the same clam (Leidy).

GYMNOCOPA.

TOMOPTERIS, species undetermined. (p. 453.)

Young specimens of a species of this genus were taken in the evening in Vineyard Sound. They are too immature for accurate identification.

A large and fine species of *Tomopteris* was taken by Mr. S. I. Smith, in Eastport harbor, in July, 1872. This was about 40^{mm} in length. An excellent drawing of it was made by Mr. Emerton from the living specimens. It is, perhaps, the adult state of the Vineyard Sound species.

CHÆTOGNATHA.

SAGITTA ELEGANS Verrill, sp. nov. (p. 440.)

Body slender, thickest in the middle, tapering slightly toward both ends. Head somewhat broader than the neck, and about equal to the body where thickest, slightly oblong, a little longer than broad, obtuse, rounded in front or sub-truncate, sometimes with a slightly prominent small central lobe or papilla; the anterior part of the head rises into a crest-like median lobe considerably higher than the posterior part; ocelli two, minute, widely separated, on the posterior half of the head; the anterior lateral borders of the head are slightly crenulated. The fascicles of setæ or spinules on the sides of the head each contain about eight setæ, which are considerably curved, with acute tips, and reach as far as the anterior border of the head. Caudal fin ovate; its posterior edge broadly rounded. The posterior lateral fins commence just in advance of the ovaries, and extend back considerably beyond them, so as to leave a naked space somewhat less than their length between their posterior ends and the caudal fin; on this naked part, just in advance of the caudal fin, are two small, low, lateral papillæ connected with the male organs; two other smaller papillæ are situated at about the posterior third of the lateral fins. The median lateral fins are about equal in length to the posterior ones, and separated from them by a

naked space less than their own length; the distance from the anterior end of the middle fins to the anterior border of the head is equal to twice the length of the fins; the length of the latter is about one-sixth of the entire length of the body. The color is translucent whitish, nearly diaphanous.

Length, about 16^{mm}; diameter, about 0.9^{mm}.

Wood's Hole and Vineyard Sound, at surface, July 1; off Gay Head, among *Salpæ*, September 8, in the day-time.

SAGITTA, species undetermined. (p. 440.)

A much larger and stouter species than the preceding was taken in abundance by Mr. Vinal N. Edwards, in Vineyard Sound, at various dates, from January to May.

Its length is generally 25^{mm} to 30^{mm}. I have not seen it living.

GEPHYREA or SIPUNCULOIDS.

PHASCOLOSOMA CEMENTARIUM. Verrill Plate XVIII, fig. 92. (p. 416.)

Sipunculus cementarius Quatrefages, op. cit., vol. ii, p. 628, 1865. *Phascolosoma Bernhardus* Pourtales, Proceedings American Association for Advancement of Science for 1851, p. 41, 1852. *Sipunculus Bernhardus* Stimpson, Invertebrata of Grand Manan, p. 28 (non Forbes.)

Deeper parts of Vineyard Sound, 10 to 15 fathoms; off Block Island, 29 fathoms; Bay of Fundy, 2 to 90 fathoms, abundant; near Saint George's Bank, 45 to 430 fathoms.

PHASCOLOSOMA, species undetermined. (p. 353.)

A species similar to the last in size and form, with a thick integument, thickly covered throughout with small rounded papillæ or granules, but without the dark chitinous hooks seen on the posterior part of the latter.

Vineyard Sound.

PHASCOLOSOMA GOULDII Diesing. Plate XVIII, fig. 93. (p. 353.)

Revision der Rhyngodeen, op. cit., p. 764, 1859. *Sipunculus Gouldii* Pourtales, Proceedings of American Association for the Advancement of Science for 1851, vol. v, p. 40, 1852; Keferstein, Zeitschrift für wissenschaftliche Zoologie, vol. xv, p. 434, Plate 33, fig. 32, 1865, and vol. xvii, p. 54, 1867.

New Haven to Massachusetts Bay, at Chelsea Beach; common in sand and gravel at low-water mark.

SCOLECIDA.

TURBELLARIA.

RHABDOCÆLA or NEMERTEANS.

BALANOGLOSSUS AURANTIACUS Verrill. (p. 351.)

Stimpsonia aurantiaca Girard, Proceedings Academy of Natural Sciences of Philadelphia, vol. vi, p. 367, 1854. *Balanoglossus Kowalevskii* A. Agassiz, Memoirs American Academy of Arts and Sciences, vol. ix, p. 421, Plates 1-3, 1873.

Fort Macon, North Carolina, to Naushon Island. Charleston, South

Carolina (Girard). Newport, Rhode Island, to Beverly, Massachusetts (A. Agassiz). In sand between tides.

A reexamination of living specimens of the southern form will be necessary before their identity with the northern one can be positively established. I am unable to separate them with preserved specimens.

See page 351; also American Journal of Science, ser. 3, vol. v, p. 235.)

NEMERTES SOCIALIS Leidy. (p. 324.)

Marine Invert. Fauna of Rhode Island and New Jersey, p. 11 (143), 1855.

Great Egg Harbor to New Haven and Vineyard Sound. Very common under stones, between tides.

NEMERTES VIRIDIS Diesing.

Sitzungsberichte der kais. Akad. der Wissenschaften, vol. xlv, p. 305, 1862. *Planaria viridis* Müller, Zoöl. Dan. Prodröm, 2684, 1776 (t. Fab.); Fabricius, Fauna Grœnlandica, p. 324, 1780. *Notospermus viridis* Diesing, Syst. Helminth, vol. i, p. 260, 1850. *Nemertes olivacea* Johnston, Mag. of Zoology and Botany, vol. i, p. 536, Pl. 18, fig. 1. *Borlasia olivacea* Johnston, Catalogue British Non-parasitical Worms, p. 21, Pl. 2^b, fig. 1, 1865. *Nemertes obscura* Desor, Boston Journal of Natural History, vol. vi, pp. 1 to 12, Plates 1 and 2, 1848. *Polia obscura* Girard in Stimpson's Marine Invertebrata of Grand Manan, p. 28, 1853.

Body very changeable in form; in full extension long and slender, sub-terete, tapering toward both ends, the length being sometimes 150^{mm} to 200^{mm}, while the diameter is 2^{mm} to 3^{mm}; in contraction the body becomes much shorter and stouter, more or less flattened, and obtuse at the ends, large specimens often being only 30^{mm} or 40^{mm} long and 4^{mm} to 5^{mm} broad. The head is flattened, more or less bluntly rounded, and is furnished with a row of small dark ocelli on each side, which vary in number and size according to the age, the large specimens often having six or eight on each side, while the small ones have but three or four, and the very young ones have only a single pair. The lateral fossæ of the head are long and deep, in the form of slits, and extend well forward to near the terminal pore. The latter in some states of contraction appears like a slight vertical slit or notch, but at other times appears circular; the proboscis is long, slender toward the base, clavate toward the end, the terminal portion transversely wrinkled. The ventral opening or mouth is situated opposite to or a little behind the posterior ends of the lateral fossæ; it is ordinarily small and elliptical, with a distinct lighter colored border, but is capable of great dilation when the creature is engaged in swallowing some annelid nearly as large as itself.

In alcoholic specimens the body is usually thickened and rounded anteriorly, more slender and somewhat flattened farther back, often acute at the posterior end; head obtusely rounded or sub-truncate, with a small terminal pore and two lateral fossæ, which are short and extend forward very near to the terminal pore; ventral opening or mouth small and round, situated slightly behind the posterior ends of the lateral fossæ; ocelli not apparent. The color, when living, is very variable,

most commonly dark olive-green or blackish green above, and somewhat lighter below, the head margined with lighter; frequently the color is dark liver-brown or reddish brown, and the back is usually crossed by faint pale lines, placed at unequal distances.

Buzzard's Bay and Vineyard Sound, under stones, between tides, and in 4 to 6 fathoms, rocky bottoms, very common; Casco Bay and Bay of Fundy; and northward to Labrador and Greenland. Also on the northern coasts of Europe to Great Britain. Abundant under stones between tides, and in shallow water.

The specimens referred to on page 324 as probably belonging to *Cerebratulus*, were most likely identical with this species.

NEMERTES (?) species undetermined (a). (p. 498.)

Body elongated, moderately stout; head not distinct from the body. Color uniform bright brownish red.

Length, 25^{mm}.

Off Watch Hill, Rhode Island, among rocks, in 4 to 6 fathoms. A species, apparently the same, also occurred in 25 fathoms off Buzzard's Bay.

This was red with two dark red spots anteriorly. No ocelli were detected.

NEMERTES, (?), species undetermined (b).

Body slender, sub-terete; head not distinct from body. Ocelli inconspicuous, apparently about three in a row on each side of front of head. Color of head and body, above, brownish red, with a whitish ring around the neck, which recedes in the middle, above.

Length, 8^{mm}.

Off Watch Hill, with the preceding.

This is, perhaps, a species of *Cosmocephala*.

NEMERTES, species undetermined (c).

Body slender; head not separated by a constriction. Ocelli very numerous, arranged in a long cluster on each side of the head. Color uniform olive-green above and below.

Length, 35^{mm}; breadth, 1.3^{mm} to 2^{mm}.

New Haven Harbor, on the piles of a wharf, in brackish water.

TETRASTEMMA ARENICOLA Verrill, sp. nov. Plate XIX, fig. 98. (p. 351.)

Body sub-terete, long, slender, slightly depressed, of nearly uniform width; the head is very versatile, usually sub-conical or lanceolate, flattened, occasionally becoming partially distinct from the body by a slight constriction at the neck. Ocelli four, those in the anterior pair nearer together. The lateral fossæ are long and deep slits on the sides of the head; mouth or ventral pore small, often sub-triangular, situated just back of the posterior ends of the lateral fossæ. Body deep flesh-color or pale purplish. Length, about 100^{mm}, in extension.

Savin Rock, near New Haven, in sand at low-water mark.

This species is, perhaps, not a true *Tetrastemma*. It is here only provisionally referred to that genus.

MECKELIA INGENS Leidy. Plate XIX, figs. 96, 96a. (p. 349.)

Marine Invertebrate Fauna of Rhode Island and New Jersey, p. 11 (143), 1855. (?)

Meckelia Pocohontas Girard, Proceedings of Academy of Natural Sciences of Philadelphia, vol. vi, p. 366, 1854.

Fort Macon, North Carolina; Great Egg Harbor to New Haven and Vineyard Sound. Low-water mark to 8 fathoms. Charleston, South Carolina (Girard).

MECKELIA LACTEA Leidy. (p. 350.)

Proceedings of Academy of Natural Sciences of Philadelphia, vol. v, p. 243, 1851.

Great Egg Harbor to New Haven and Vineyard Sound. Low-water mark to 10 fathoms. Perhaps the young of the preceding species.

MECKELIA ROSEA Leidy. (p. 350.)

Proceedings Academy Natural Sciences of Philadelphia, vol. v, p. 244, 1851.

Great Egg Harbor to New Haven and Vineyard Sound. Common in sand at low-water mark.

MECKELIA LURIDA Verrill, sp. nov. (p. 508.)

Body long, large, stout, much depressed throughout, and thin posteriorly, somewhat thickened anteriorly. Head changeable in form, often acute; lateral fossæ long. Ventral opening large, elongated. Proboscis long, slender, emitted from a terminal pore. In some specimens there was a slender, acute, caudal papilla. Color deep chocolate-brown, with lighter margins. Length, 150^{mm} to 250^{mm}; breadth up to 10^{mm} or more.

Off Gay Head, 19 fathoms, soft mud; off Buzzard's Bay, 25 fathoms; off Block Island, 29 fathoms, sandy mud; Casco Bay, 10 to 68 fathoms.

CEREBRATULUS (?), species undetermined (a). (p. 508.)

This is a dark olive-green species, with paler margins, the anterior part darkest.

Off Block Island, in 29 fathoms; off Gay Head, in 19 fathoms, soft mud.

COSMOCEPHALA OCHRACEA Verrill, sp. nov. Plate XIX, figs. 95, 95a. (p. 325.)

Body elongated, moderately slender, somewhat flattened but thick, and with the margins rounded, obtuse at both ends or subacute posteriorly; broadest and often swollen anteriorly; gradually and slightly tapering posteriorly; the integument is translucent and the internal median organs show quite distinctly; lateral organs voluminous, extending the whole length of the body along each side, and showing through as dull yellowish white mottlings. Head continuous with the

body, obtuse; a slight groove, usually appearing as a whitish line on each side, runs obliquely across the ventral and lateral surface of the head, diverging from the mouth and curving somewhat forward at the sides; terminal pore small and inconspicuous; mouth, or ventral pore, small. Ocelli numerous, arranged as in the figure, but varying somewhat in number. (See p. 325.) Color dull yellowish, or yellowish white, often tinged with deeper yellow or orange anteriorly, with the median line lighter; a reddish internal organ shows through as an elongated red spot between the posterior ocelli.

Length, 50^{mm} to 70^{mm}; breadth, 2.5^{mm} to 3^{mm}.

New Haven to Vineyard Sound; under stones, between tides.

POLINA GLUTINOSA Verrill, sp. nov. Plate XIX, fig. 97. (p. 324.)

Body rather slender and elongated in extension, usually broadest in the middle and tapering to both ends, but quite versatile in form; head not distinct, usually obtuse; posterior end narrower, usually obtuse or slightly emarginate; integument soft, secreting a large quantity of mucus; the lateral organs extend to the head. Ocelli numerous, variable in number, usually eight or ten on each side, arranged in three pairs of short, oblique, divergent rows, two to four in each; terminal pore of the head moderately large; no lateral fossæ could be detected. There appears to be a terminal opening at the posterior end. Color dull yellow or pale orange yellow, sometimes brighter orange, especially anteriorly; posteriorly usually lighter, with a faintly marked dusky or greenish median line.

Length, 25^{mm} to 30^{mm} in extension; breadth, 1.3^{mm} to 2^{mm}.

Great Egg Harbor to New Haven and Vineyard Sound; low-water mark to 6 fathoms.

MONOCELIS AGILIS Leidy. (p. 325.)

Marine Invert. Fauna of Rhode Island and New Jersey, p. 11 (143), 1855.

Monops (?) *agilis* Diesing, Sitzungsberichte der kais. Akad. der Wissenschaften, vol. xlv, p. 232, 1862 (*non Monops agilis* Schultze, sp.)

New Haven; Point Judith, Rhode Island, at low-water, creeping on *Mytilus edulis* (Leidy).

ACELIS CRENULATA Diesing.

Op. cit. p. 206. *Acostomum crenulatum* Schmarada, Neue wirbell. Th., vol. i, p. 1, 3, Pl. 1, fig. 2 (t. Diesing).

Hoboken, New Jersey, in brackish water (Schmarada).

GENUS UNDETERMINED.

Body very long and slender, almost filiform, slightly flattened, with rounded sides; the flat sides are longitudinally striated, the narrower rounded sides are marked with numerous short, distinct, separate, transverse lines or depressions, corresponding to opaque internal organs. In one of the smaller specimens one end is acute conical, terminated by a

slender incurved point; the other end is obtusely rounded, depressed and translucent at the end, apparently with a transverse orifice beneath. The largest specimen, and one of the smaller, has one end corresponding in form to that last described: the other is rounded, a little enlarged, subtruncate, apparently with a terminal orifice. A yellowish internal organ, with transverse divisions, runs along each side internally. In life the color was grayish white, with four very slender double longitudinal lines of dark slate-color.

Length of largest specimens, in alcohol, 80^{mm}; diameter, 0.7^{mm}; smallest ones, 40^{mm}; diameter, 0.5^{mm}.

Wood's Hole, swimming very actively at the surface in the evening, June 29 and July 13, 1871.

This species was taken by Mr. S. I. Smith, who recorded the color. I did not observe it myself in the living state. The above description was made from preserved specimens. Its characters cannot all be made out satisfactorily with alcoholic specimens, and its generic and family affinities are uncertain. In general appearance, when living and moving, it resembles *Gordius* and *Rhamphogordius*.

DENDROCELA or PLANARIANS.

STYLOCHOPSIS LITTORALIS Verrill, sp. nov. Plate XIX, fig. 99. (p. 325.)

Body flat with thin margins, very changeable in form, broad oval, elliptical or oblong, rounded or sub-truncate at the ends, often with the margins undulated. The tentacles are small, round, obtuse, translucent, each containing an elongated group of about ten or twelve minute black ocelli on the anterior surface. The tentacles are situated at about the anterior fourth of the body, and are separated by about one-fourth of its breadth. Dorsal ocelli about eight, forming four groups of two each, in advance of the tentacles; marginal ocelli numerous, small, black, most conspicuous beneath, and most numerous on the anterior portion, arranged in two or more irregular rows near the margin, extending back to the middle of the sides or beyond. Color pale greenish or brownish yellow, veined or reticulated with lighter, and with a light median stripe posteriorly; beneath flesh-color, with a median elongated light spot, narrowest in the middle, due to internal organs.

Length, 8^{mm}; breadth, about 6^{mm}.

New Haven to Vineyard Sound; under stones, between tides.

PLANOCERA NEBULOSA Girard. Plate XIX, fig. 100. (p. 325.)

Proceedings of the Academy of Natural Sciences of Philadelphia for 1853, vol. vi, p. 367, 1854.

Savin Rock near New Haven, under stones at low-water. Charleston, S. C. (Girard).

LEPTOPLANA FOLIUM Verrill, sp. nov. (p. 487.)

Body very flat, with the margin thin and undulated; outline versatile, usually cordate or leaf-like, broadest and emarginate posteriorly, the

posterior borders well rounded, and the side a little convex, narrowing to an obtuse point at the anterior end; sometimes oblong or elliptical, and but little narrowed anteriorly; the posterior emargination is usually very distinct, often deep, and sometimes in contraction has a small projecting angular point in the middle, but at times the emargination nearly disappears. Ocelli in four groups, near the anterior end; the two posterior clusters are smaller than the anterior and wider apart; the anterior clusters are very near the others, and close together, almost blending on the median line, and are composed of numerous very minute crowded ocelli, less distinct than those of the other clusters. Color pale yellowish flesh-color, veined with dendritic lines of darker flesh-color, or with whitish; an indistinct pale reddish spot behind the anterior ocelli; an interrupted longitudinal whitish stripe in the middle, due to the internal organs, and a small median whitish stripe posteriorly.

Length, 20^{mm} to 25^{mm}; breadth, 10^{mm} to 15^{mm}.

Off Watch Hill, 4 to 6 fathoms, among rocks and algæ; off Block Island, in 29 fathoms; off Buzzard's Bay, in 25 fathoms.

PLANARIA GRISEA Verrill, sp. nov. (p. 487.)

Body elongated and usually oblong in extension, often long oval or somewhat elliptical, obtusely pointed or rounded posteriorly; head subtruncate in front, often a little prominent in the middle; the angles are somewhat prominent, but not elongated. Ocelli two, black, each surrounded by a reniform, white spot. Color yellowish green or grayish, with a central whitish stripe in the middle of the back, surrounded by darker; head margined with whitish.

Length, in extension, 12^{mm}; breadth, 3^{mm}.

Watch Hill, Rhode Island, under stones, between tides.

PROCERODES WHEATLANDII Girard. (p. 325.)

Proceedings Boston Soc. Natural History, vol. iii, p. 251, 1851; Stimpson, op. cit., p. 6, 1857. *Planaria frequens* Leidy, Marine Invert. Fauna of Rhode Island and New Jersey, p. 11, 1855. *Procerodes frequens* Stimpson, op. cit., p. 6; this Report, p. 325.

New Haven to Casco Bay. Point Judith (Leidy). Manchester, Massachusetts (Girard). Abundant under stones, between tides.

FOVIA WARRENI Girard. (p. 480.)

Proceedings of the Boston Society of Natural History, vol. iv, p. 211, 1852; Stimpson, Prodromus, p. 6, 1857. *Vortex Warrenii* Girard, op. cit., vol. iii, pp. 264 and 363, 1851; Diesing, op. cit., vol. xiv, p. 229, 1862.

A small, narrow, oblong, red Planarian, apparently belonging to this species, was collected at Wood's Hole, among eel-grass, and also in Casco Bay. Chelsea, Massachusetts (Girard).

BDELLOURA CANDIDA Girard. (p. 460.)

Proceedings Boston Society Natural History, vol. iv, p. 211, 1852. *Vortex candida* Girard, op. cit., vol. iii, p. 264, (for 1850), 1851. *Bdelloura parasitica* Leidy, Proceedings Academy Natural Sciences of Philadelphia for 1851, vol. v, p. 242, 1852; Stimpson, Prodrômus, p. 6, 1857.

Great Egg Harbor; New Haven; Massachusetts Bay. Parasitic on the gills of the "horseshoe-crab" (*Limulus Polyphemus*).

BDELLOURA RUSTICA Leidy.

Proceedings Acad. Natural Sciences of Philadelphia, vol. v, p. 242, 1852; Stimpson, Prodrômus, p. 6, 1857.

Great Egg Harbor, on *Ulva latissima* (Leidy).

NEMATODES.

PONTONEMA MARINUM Leidy. Plate XVIII, fig. 94. (p. 325.)

Marine Invertebrate Fauna of Rhode Island and New Jersey, p. 12 (144), 1855.

Great Egg Harbor to New Haven and Vineyard Sound; very abundant from above low-water mark to 10 fathoms.

PONTONEMA VACILLATUM Leidy. (p. 326.)

Marine Invertebrate Fauna of Rhode Island and New Jersey, p. 12 (144), 1855.

Great Egg Harbor to Vineyard Sound, with the preceding.

Various other small, free Nematodes are frequently met with, but they have not been carefully examined.

Numerous species are also parasitic in the stomach, intestine, muscles and other organs of fishes, crustacea, worms, &c. (See page 456.)

MOLLUSCA.

CEPHALOPODA.

DIBRANCHIATA.

OMMASTREPHES ILLECEBROSA. (p. 441.)

Loligo illecebrosa Lesueur, Journal Acad. Natural Sciences, Philadelphia, vol. ii, p. 95, Plate 10, 1821; Gould, Invertebrata of Massachusetts, ed. i, p. 318, 1841; Dekay, Natural History of New York, Mollusca, p. 4, 1843. *Ommastrephes sagittatus* Binney,* in Gould's Invertebrata of Mass., ed. ii, p. 510, 1870, but not Plate 25, fig. 339 (*non* Lamarek, sp.)

A large specimen, taken at Eastport, Maine, was ten inches long, exclusive of the arms. When preserved in alcohol the caudal-fin was rather more than one-third of the length of the head and body together; its width was equal to about three-fourths of its length. The colors of this specimen were described on page 442. A small specimen from Newport, R. I., agrees in color and most other respects with the larger specimens, but differs somewhat in the proportions, especially of the caudal fin, probably owing to its immaturity. This specimen, in alcohol,

* Binney's, Plate xxvi, Figs. 341-344, erroneously referred to *Loligopsis parvo*, apparently represents this species.

is 84^{mm} long, exclusive of the arms; the body is 72^{mm} long, 15^{mm} broad; the caudal fin is 25^{mm} long and 36^{mm} broad.

A fresh specimen, caught in Casco Bay, had the following proportions: Length of head and body, not including the arms, 221^{mm}; length of caudal fin, 86^{mm}; breadth of fin, 90^{mm}; diameter of body, 35^{mm}; length of upper arms, 80^{mm}; of second pair, 100^{mm}; of third pair, 100^{mm}; of extensile arms, 182^{mm}; of the ventral pair, 90^{mm}.

Greenport, Long Island, (Sanderson Smith); Newport, Rhode Island; Provincetown, Massachusetts; Casco Bay; Mount Desert, Maine; Bay of Fundy.

Ommastrephes Bartramii (Lesueur, sp.) is found in the Gulf Stream off our coasts, and may sometimes occur accidentally on our shores. It is a more slender and elongated species than the preceding, with a relatively shorter caudal fin. It is also darker colored. The figure given by Binney in the last edition of Gould's *Invertebrata of Massachusetts* (Plate 25, fig. 340) does not represent this species.

LOLIGO PEALII Lesueur. Plate XX, figs. 102-105. (p. 440.)

Journal Acad. Natural Sciences, Philadelphia, vol. ii, p. 92, Pl. 8, 1821; Dekay, Natural History of New York, Mollusca, p. 4, Pl. 38, fig. 354 (copied from Lesueur); Binney, in Gould's *Invertebrata of Mass.*, ed. ii, p. 514 (Pl. 25, fig. 340,) probably represents this species, certainly not *O. Bartramii*.)

South Carolina to Massachusetts Bay. Very common in Long Island Sound and Vineyard Sound.

The young, from an inch to two inches in length, were taken from the middle of July to the last of August in great numbers, at the surface, in Vineyard Sound, by Mr. Vinal N. Edwards.

LOLIGO PUNCTATA Dekay.

Natural History of New York, Mollusca, p. 3, Pl. I, fig. 1, 1843; Binney, in Gould's *Invertebrata of Mass.*, ed. ii, p. 513.

This is probably identical with the preceding species. The slight differences noticed are probably sexual, but as I have not been able to fully satisfy myself in regard to this, I have not thought it proper to unite them at this time.

Long Island Sound.

LOLIGO PALLIDA Verrill, sp. nov. Plate XX, figs. 101, 101a. (p. 441.)

Body stout, tapering rapidly backward. Anterior border of mantle with a prominent, obtusely rounded, median dorsal lobe, from which the margin recedes on each side; on the lower side the margin is concave in the middle, with a projecting angle on each side. Caudal fin large, about as broad as long, more than half as long as the body. Siphon large and stout; upper pair of arms considerably smaller and shorter than the others, slender at tips, margined along the inner dorsal ridge with a thin membrane. Second pair of arms stouter and longer, triquetral, slightly margined on the outer angle. Third pair much stouter and considerably longer, with a membranous fold along the middle of the

outer surface, which expands into a thin membrane toward the end. Tentacular arms long and slender, in extension longer than the body, the portion that bears suckers forming about one-third the whole length; in the female the larger suckers on the middle of this portion are not so large as the largest on the other arms, and are arranged in about four rows; those near the tips of the arms are very small and crowded. In the male the principal suckers of the tentacular arms are very much larger than in the female, and considerably exceed those of the other arms; they form two alternating rows along the middle of the arm, and external to them there is a row of smaller suckers on each side, alternating with them; the suckers toward the tips are very numerous, small, and crowded; outside of the suckers, on each side, there is a marginal membrane with a scalloped edge; another membranous fold runs along the outer surface and expands into a broad membrane near the end; the arms of the ventral pair are intermediate in length between those of the second and third pairs. Ground-color of body, head, arms, and fins pale, translucent, yellowish white; entire ventral surface pale, with small, distant, brownish circular spots, which are nearly obsolete on the siphon and arms; the upper surface is covered with pale brown, unequal, circular spots which are not crowded, having spaces of whitish between them; the spots are more sparse on the head and arms, but somewhat clustered above the eyes. The general appearance of the animal when fresh is unusually pale and gelatinous. The "pen" is broad, quill-shaped, translucent, and amber-colored. A medium-sized male specimen preserved in alcohol measures 145^{mm} from the base of the dorsal arms to the posterior end of the body; length of body, 120^{mm}; length of caudal fin, 70^{mm}; breadth of fin, 75^{mm}; length of first pair of arms, 42^{mm}; of second pair, 50^{mm}; of third, 60^{mm}; of tentacular arms, 150^{mm}; of ventral pair, 53^{mm}.

Long Island Sound.

The *Spirula Peronii* Lamarck, (*Spirula fragilis* in Binney's Gould, p. 516, fig. 755), is occasionally cast up, on the outer beaches of Nantucket, but it probably does not occur alive in our waters.

GASTROPODA.

PECTINIBRANCHIATA.

BELA HARPULARIA Adams. Plate XXI, fig. 108. (p. 508.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 92, 1858; Gould's Invertebrata of Mass., ed. ii, p. 352, fig. 191. *Fusus harpularius* Couthony, Boston Journal Natural History, vol. ii, p. 106, Pl. 1, fig. 10, 1838; Gould's Invertebrata of Mass., ed. i, p. 291, fig. 191, 1841. *Mangelia harpularia* Stimpson, Shells of New England, page 48, 1851.

Massachusetts Bay to Labrador and Greenland. Off Gay Head, 10 to 19 fathoms; in the Bay of Fundy frequent in from 1 to 80 fathoms. Fossil in the Post-Pliocene "Leda-clays" of Labrador (Packard); and Canada (Dawson).

BELA PLEUROTOMARIA Adams.

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 92, 1858; Gould, Invert. of Mass., ed. ii, p. 355, fig. 625. *Fusus pleurotomarius* Couthouy, Boston Journal of Natural History, vol. ii, p. 107, Plate 1, fig. 9, 1838. *Fusus rufus* Gould, Invert. of Mass., ed. i, p. 190, fig. 192 (*non* Montagu). *Buccinum pyramidale* Ström, N. A. Dan. iii, p. 296, fig. 22 (t. Loven). *Defrancia Vahlü* (Beck) Möller, 1842 (t. Loven). *Mangelia pyramidalis* Stimpson, Shells of New England, p. 49.

Off the coast of Long Island, in 46 fathoms (Stimpson). Massachusetts Bay to Labrador; in Casco Bay and the Bay of Fundy not uncommon in 18 to 60 fathoms. Greenland (Möller). Finmark (Lovén). Fossil in the Post-Pliocene deposits of Canada, Labrador, Great Britain, and Scandinavia.

The identification of this species with the *Buccinum pyramidale* Ström, is somewhat uncertain; if correct, the latter name has priority.

BELA PPLICATA Adams. Plate XXI, fig. 107. (p. 383.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 92, 1858. *Pleurotoma plicata* C. B. Adams, Boston Journal of Natural History, vol. iii, p. 318, Plate 3, fig. 6; Gould, Invert. of Mass., ed. i, p. 282, fig. 187; ed. ii, p. 350, fig. 612. *Pleurotoma plicosa* C. B. Adams, Contributions to Conchology, vol. i, p. 54, 1850; Jay, Catalogue, ed. iv, p. 327. *Pleurotoma brunnea* Perkins, Proc. Boston Soc. Nat. History, vol. xiii, p. 121, 1869.

Near New Haven, rare. Huntington and Greenport, Long Island (Sanderson Smith). New York (Dekay). Dartmouth, Massachusetts, and New Bedford Harbor, in mud, (C. B. Adams). Beaufort, N. C. (Dr. E. Coues). Indian Pass, Florida (E. Jewett).

MANGELIA CERINA. (p. 432.)

Verrill, American Journal of Science, vol. iii, p. 210, 1872. *Pleurotoma cerinum* Kurtz and Stimpson, Proceedings of the Boston Society of Natural History, vol. iv, p. 115, 1851; Stimpson, Shells of New England, p. 49, Pl. 2, fig. 2, 1851.

Shell elongated, fusiform, rather acute at apex, composed of about seven whorls; apical whorls smooth, the others angulated in the middle and decidedly flattened just below the suture; suture distinct, but shallow, undulated; the body whorl has about eleven prominent, longitudinal, sub-acute plications or ribs, separated by wide, concave interspaces. The ribs are most prominent at the angulation above the middle of the lower whorl, and do not extend on the flattened sub-sutural band. The whole surface is covered by fine, raised, revolving lines, often alternately larger and smaller, separated by wider striæ, and crossed by fine, distinct lines of growth, rendering them slightly nodulous. The revolving lines are most distinct on the sub-sutural band, and are often nearly obsolete over the summits of the ribs. Outer lip acute, with a decided angle at about the posterior fourth, where it recedes to form a decided, rounded notch, at and just above the angle; middle portion nearly straight, gradually curving and receding toward the anterior end; canal short, straight, and somewhat contracted. Color whitish, or slightly yellow; inner surface light wax-yellow. Length, 6.5^{mm}; breadth, 3^{mm}; length of aperture, 3^{mm}.

Vineyard Sound, 3 to 10 fathoms; near New Haven. New Bedford, Mass., and Charleston, S. C. (Stimpson). Staten Island; Greenport and Huntington, Long Island, low water to 3 fathoms, (S. Smith). Beaufort, N. C. (Coues). Fossil in the Post-Pliocene of South Carolina.

PLEUROTOMA BICARINATUM Couthouy. Plate XXI, fig. 106. (p. 418.)

Boston Journal of Natural History, vol. ii, p. 104, Plate 1, fig. 11, 1838; Gould, Invert. of Mass., ed. i, p. 231, fig. 186; ed. ii, p. 349, fig. 618. *Mangelia bicarinata* Stimpson, Shells of New England, p. 49. *Defrancia bicarinata* H. and A. Adams, Genera of Mollusca, vol. i, p. 95.

Stonington, Conn. (Linsley). Vineyard Sound, 6 to 12 fathoms, rare; Massachusetts Bay; Bay of Fundy. This is a rare and imperfectly known species. I have never had opportunities to examine the living animal.

The generic relations of this and the two preceding shells are still doubtful.

BUCCINUM UNDATUM Linné. Plate XXI, fig. 121. (p. 494.)

Systema Naturæ, ed. xii, p. 1204. Gould, Invertebrata of Massachusetts, ed. i, p. 305; ed. ii, p. 366, fig. 634. *Buccinum undulatum* Möller, in Kroyer's Tidsskrift, vol. iv, p. 84, 1842 (t. Stimpson). Stimpson, Review of the Northern Buccinums, in Canadian Naturalist, October, 1865. *Buccinum Labradorense* Reeve, Conch. Icon., vol. iii, Buc. i, 5, 1846 (t. Stimpson).

Mouth of Vineyard Sound and off Gay Head, 6 to 19 fathoms. Off New Jersey, north latitude 40°, west longitude 73°, in 32 fathoms, sandy bottom, (Captain Gedney).

Near Stonington, Conn. (Linsley); Montauk Point, Long Island, and Little Gull Island (S. Smith). Not common south of Cape Cod, except on the outer islands and in deep water; common in Massachusetts Bay; and very abundant on the coast of Maine, and northward to Greenland. On the European coast it occurs from Iceland and the North Cape to France, and from low water to 650 fathoms. In the Bay of Fundy it is abundant from above low-water mark to 100 fathoms.

As a fossil it is common in the Post-Pliocene deposits of Maine, Canada, Labrador, and Great Britain. Mr. Desor obtained it from the Post-Pliocene formation of Nantucket Island.

The ordinary American specimens from shallow water differ considerably in form from the typical European specimens, but the species is quite variable on both coasts, and I have examined large specimens from Saint George's Bank and La Have Bank, dredged by Mr. S. I. Smith, which differ very little from the common European form, and it is easy to form series connecting these with our common shore specimens. I am, therefore, unable to agree with Dr. Stimpson, who considered our shell distinct from the European, and adopted the name *undulatum* for it.

NEPTUNEA CURTA Verrill.

Fusus corneus Say, Amer. Conch., iii, Plate 29, 1831 (*non* Linné, Pennant, etc.).

Fusus Islandicus Gould, Invert. of Mass., ed. i, p. 284; ed. ii, p. 371, fig. 638 (*non* Chemnitz, Gmelin, etc.). *Fusus curtus* Jeffreys, British Conchology, vol. iv, p. 336, 1867.

Massachusetts Bay to Labrador. Casco Bay, 6 to 50 fathoms; common in the Bay of Fundy from low-water mark to 80 fathoms. Linsley reports it, as *F. corneus*, from fish-stomachs at Stonington, Connecticut. In the Yale Museum are dead shells of this species, which have been occupied by *Eupaguri*, found on Fire Island Beach, on the south side of Long Island, by Mr. S. I. Smith. It probably inhabits the deep water off Block Island.

The dentition of this species is decidedly buccinoid. The central plates are transversely oblong, deeply concave above, with the lateral angles produced; below armed with three small, nearly equal, short teeth, the central one largest, beyond which, on each side, it is concave, the outer angles being a little prominent. The lateral plates are large, with an outer, very strong, curved tooth, and two much smaller, slightly curved ones near the inner end, the innermost being slightly the largest.

The dentition agrees very closely with that of *N. antiqua*, the type both of the genus *Neptunea*, Bolton, 1798, and *Chrysodomus*, Swainson, 1840, but it is very different from that of *Sipho Berniciensis* (*S. Islandicus* Trosch.), which Troschel refers to the Faciolaridæ. The latter is evidently the type of a genus (*Sipho*) very distinct from *Neptunea*; but among the European species, *gracilis*, *propinqua*, *buccinata*, and the true *Islandica* (as described by Jeffreys) are closely related to *curta*, and belong to the genus *Neptunea*, in the family Buccinidæ.

NEPTUNEA (*Neptunella*) PYGMÆA. Plate XXI, fig. 115. (p. 508.)

- Fusus Islandicus*, var. *pygmæus*, Gould, Invert. of Mass., ed. i, p. 284, fig. 199, 1841. *Tritonium pygmæum* Stimpson, Shells of New England, p. 46, 1851. *Fusus Trumbullii* Linsley, Amer. Journal Science, ser. i, vol. xlviii, p. 28, fig. 1, 2, 1845 (non Gould, 1848). *Fusus pygmæus* Gould, Invert. of Mass., ed. ii, p. 372, fig. 639. *Neptunea* (*Sipho*) *pygmæa* H. and A. Adams, Genera Recent Mollusca, vol. i, p. 81, 1858. *Chrysodomus pygmæus* Dall, Proc. Boston Soc. Nat. Hist., vol. xiii, p. 242, 1870.

Deep water off New London and Stonington, Connecticut, northward to the Gulf of Saint Lawrence. East of Block Island, 29 fathoms, sandy mud; off Buzzard's Bay, 25 fathoms; off Gay Head, 19 fathoms, mud, abundant and large; off Edgarton, 18 to 20 fathoms; Casco Bay, 10 to 40 fathoms, common; Eastport, Maine, and Bay of Fundy, low water to 100 fathoms (A. E. V.). Near Saint George's Bank, 40 to 150 fathoms; east of Saint George's Bank, 430 fathoms; and off Halifax (S. I. Smith).

The odontophore in this species is long and slender; the dentition is buccinoid. The middle plate is small, transversely oblong, concave above, below convex, with one very small central tooth; lateral plates relatively large and strong, with a large, curved outer tooth, and a smaller bifid inner tooth, widely separated from the outer one.

The peculiarities in the dentition of this species, in connection with the singular woolly or velvety epidermis, indicate that this species should form the type of a sub-genus, or perhaps even a distinct genus. For the group I would propose the name *Neptunella*.

FULGUR CARICA Conrad. Pl. XXII, fig. 127. (p. 355.)

Proceedings of the Academy of Nat. Sciences, Philadelphia, vol. vi, p. 319, 1853; Gill, on the Genus Fulgur and its Allies, in American Journal of Conchology, vol. iii, p. 145, 1867. *Murex carica* Gmelin, Syst. Nat., p. 3545, 1788. *Fulgur eliceans (pars)* Montfort, Conch. Syst., vol. ii, p. 503, 1810, fig. (t. Gill). *Pyrula carica* Lamarek, Anim. sans Vert., ed. i, vol. vii, p. 138, 1822; Gould, Invert. of Mass., ed. i, p. 296. *Busycon carica* Gould, op. cit., ed. ii, p. 383, fig. 646; Stimpson, in American Journal of Conchology, vol. i, p. 61, 1865.

Eastern coast of the United States; northward to Cape Cod; southward to northern Florida, and west Florida. Abundant in Vineyard Sound, in 1 to 10 fathoms; also in Long Island Sound, near New Haven. Nantucket (Adams); St. Augustine, Florida (H. S. Williams); west Florida (E. Jewett.) It occurs in the Miocene formation of Maryland and Virginia, and in the Post-Pliocene deposits of Virginia, North Carolina, South Carolina, and Florida.

SYCOTYPUS CANALICULATUS Gill. (p. 355.)

American Journal of Conchology, vol. iii, p. 149, 1867. *Murex canaliculatus* Linné, Syst. Nat., ed. xii, p. 1222. *Pyrula canaliculata* Lamarek, Anim. sans Vert., vol. vii, p. 137, 1822; Gould, Invert. of Mass., ed. i, p. 294, fig. 206. *Busycon canaliculatum* H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 151, 1858; Gould, Invert. of Mass., ed. ii, p. 380, fig. 645. *Fulgur canaliculata* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, 1822; Conrad, Proc. Phil. Acad., vol. vi, p. 219, 1853.

Eastern coast of the United States; northward to Cape Cod and Nantucket; southward to Georgia and Northern Florida, Western Florida, and northern shores of Gulf of Mexico. Abundant in Vineyard Sound, Long Island Sound, &c., in 1 to 8 fathoms. St. Augustine, Florida (H. S. Williams). Found fossil in the Post-Pliocene of Virginia, North and South Carolina, and Northern Florida; in the Pliocene of South Carolina; and Miocene of Maryland.

NASSA VIBEX Say. Plate XXI, fig. 114. (p. 371).

Journal Academy Nat. Sciences, Philadelphia, vol. ii, p. 231, 1822; Gould, Invertebrata of Mass., ed. ii, p. 365, fig. 633. *Nassa fretensis* Perkins, Proceedings Boston Soc. Nat. History, vol. xiii, p. 117, figure, 1869 (variety).

Eastern coast of the United States; northward to Vineyard Sound; southward to Florida, and the Gulf of Mexico; not abundant north of Cape Hatteras. In Vineyard Sound and Long Island Sound, found sparingly in shallow water among eel-grass. New Bedford (Adams). Lloyd's Harbor, Huntington, and Northport, Long Island (S. Smith); Egmont Key, Florida (Jewett). It has been found in the Pliocene and Post-Pliocene of South Carolina.

Some of Say's original specimens were from South Carolina, others from Great Egg Harbor, New Jersey. At the latter locality I have also collected among eel-grass, in shallow water, the variety described by Dr. Perkins as *N. fretensis*, which is the most common form in all the more northern localities. Specimens intermediate between these and the ordinary southern forms are, however, of frequent occurrence, and the typical form also occurred in Vineyard Sound, with the variety.

TRITIA TRIVITTATA Adams. Plate XXI, fig. 112. (p. 354.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 122, 1858. *Nassa trivittata* Say, Journal Acad. Natural Sciences, Philadelphia, vol. ii, p. 231; Gould, Invert. of Mass., ed. ii, p. 364, fig. 632. *Buccinum trivittatum* Adams, Boston Journal of Nat. Hist., vol. ii, p. 265; Gould, op. cit., ed. i, p. 309, fig. 211.

Gulf of Saint Lawrence to Northern Florida. Eastport, Maine, and Bay of Fundy, 3 to 30 fathoms, not abundant; Casco Bay, 1 to 40 fathoms, abundant; Vineyard Sound and Buzzard's Bay, 0 to 14 fathoms, abundant; off Block Island, 29 fathoms; Long Island Sound, common. Gaspé, Canada (Dawson). Fossil in the Post-Pliocene of Point Shirley, Mass., Nantucket (Desor), Gull Island (Smith), Virginia, South Carolina, and North Carolina; in the Pliocene of South Carolina; and in the Miocene of Maryland, Virginia, and South Carolina.

ILYANASSA OBSOLETA Stimpson. Plate XXI, fig. 113. (p. 468.)

American Journal of Conchology, vol. i, p. 61, Plate 9, figs. 11, 12, 1865. *Nassa obsoleta* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 232, 1822; Binney's Say, p. 77, 1858; Gould, Invertebrata of Mass., ed. ii, p. 362, fig. 631; *Buccinum obsoletum* Gould, Invert. of Mass., ed. i, p. 308, fig. 210; *Tritia obsoleta* H. and A. Adams, Genera, p. 122, 1858.

Eastern and southern coasts of the United States; northward to Casco Bay, Maine, and the mouth of the Kennebeck River, and local in the southern part of the Gulf of Saint Lawrence; southward to Florida and the northern shores of the Gulf of Mexico. Extremely abundant on the whole coast south of Cape Cod; more local farther north, and mostly restricted to sheltered bays and harbors. It has not been found on the eastern part of the coast of Maine nor in the Bay of Fundy. An isolated colony of this species is found on the western and southern shores of the Gulf of Saint Lawrence and Prince Edward's Island (Bell, Dawson).

As a fossil it has been found in the Post-Pliocene deposits at Point Shirley, in Chelsea, Massachusetts (Stimpson); at Nantucket Island (Desor); Virginia; and South Carolina. It is also reported from the Pliocene of South Carolina.

UROSALPINX CINEREA Stimpson. Plate XXI, fig. 116. (p. 306.)

American Journal of Conchology, vol. i, p. 58, Plate 8, figs. 6 and 7, 1865. *Fusus cinereus* Say, Journal Academy Nat. Science, Philadelphia, vol. ii, p. 236, 1822; American Conchology, Plate 29, 1831. *Buccinum plicosum* Menke, Syn., ed. ii, p. 69, 1830, (t. Gould); Gould, Invertebrata of Mass., ed. i, p. 303, fig. 213. *Buccinum cinereum* Gould, op. cit., ed. ii, p. 370, fig. 637.

Eastern coast of the United States; northward to Massachusetts Bay, and local farther north, to the Gulf of Saint Lawrence; southward to Georgia and Northern Florida, and on the west coast of Florida, at Tampa Bay. Abundant in Vineyard Sound, Buzzard's Bay, Long Island Sound, and along the coast of the Middle States, especially on oyster-beds. In Vineyard Sound it occurs from above low-water mark to 8 fathoms. It occurs in some of the shallow and sheltered branches

of Casco Bay, especially at the upper end of Quahog Bay, but has not been found on the islands, nor farther eastward along the coast of Maine, nor in the Bay of Fundy. A colony exists, however, in the southern part of the Gulf of Saint Lawrence, associated with the preceding and other southern species. It is found fossil in the Post-Pliocene of Point Shirley, Massachusetts, Nantucket, Gardiner's Island, Virginia, North Carolina, and South Carolina; in the Pliocene of South Carolina; and in the Miocene of Maryland.

EUPLEURA CAUDATA H. and A. Adams. Plate XXI, fig. 117. (p. 371.)

Genera of Recent Mollusca, vol. i, p. 107, 1853; Stimpson, Amer. Journal of Conchology, vol. i, p. 53, Plate 8, fig. 5 (dentition), 1865. *Ranella caudata* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 236, 1822; Gould, Invert. of Mass., ed. i, p. 297, fig. 176; ed. ii, p. 386, fig. 648.

Eastern coast of the United States; northward to Nantucket and Cape Cod; southward to northern Florida, and western Florida, at Tampa Bay. At Vineyard Sound it occurred living in considerable numbers in the shallow ditches on the marshes, as well as in the sound itself, in 1 to 8 fathoms; off New Haven, in 1 to 5 fathoms, not abundant; Great Egg Harbor, frequent among eel-grass in shallow water. Egmont Key, Florida (Jewett).

In the fossil state this species has been found in the Post-Pliocene of Virginia, North and South Carolina, and Florida; in the Pliocene of South Carolina; and in the Miocene of Maryland and South Carolina.

PURPURA LAPILLUS Lamarek. Plate XXI, figs. 118 to 120. (p. 306.)

Anim. sans Vert., ed. i, vol. vi, 1822; ed. ii, vol. x, p. 79; Gould, Invert. of Mass., ed. i, p. 301; ed. ii, p. 360, fig. 630. *Buccinum lapillus* Linné, Syst. Naturæ, ed. xii, p. 1202, 1767.

Watch Hill, Rhode Island; Montauk Point, Long Island; Cuttyhunk Island; shores of Vineyard Sound, at Nobsca Point; northward to the Arctic Ocean. On the European coast southward to Portugal. North-eastern coast of Asia. Sitka (Middendorff). This species is local south of Cape Cod, and has not been found to the eastward of Stonington, Connecticut, in Long Island Sound. It is extremely abundant along the northern coasts of New England and Nova Scotia, often nearly covering the surface of the rocks toward low-water mark, where they are encrusted by *Balanus balanoides*, upon which it chiefly feeds, inserting its proboscis between the opercular valves of the barnacle.

This shell has been found in the Post-Pliocene deposits at Waterville, Maine, and at Gardiner's Island, but is not a common fossil in this country. In England it is found in the Red-Crag and all later formations; it also occurs in the Post-Pliocene deposits of Scandinavia. The fossils show the same variations that are seen in the recent shells.

PTYCHATRACTUS LIGATUS Stimpson.

American Journal of Conchology, vol. i, p. 59, plate 8, fig. 8 (dentition), 1865. *Fasciolaria ligata* Mighels and Adams, Boston Journal of Nat. History, vol. iv, p. 51, Plate 4, fig. 17, 1842; Gould, Invert. of Mass., ed. ii, p. 335, fig. 647.

Casco Bay, Maine, to Labrador. Stonington, Connecticut (Linsley).

Casco Bay, 20 to 40 fathoms; Bay of Fundy, 15 to 60 fathoms. Halifax (Willis); Gaspé (Whiteaves); Murray Bay (Dawson); Mingan (Foote). This shell occurs sparingly at all these localities. It has not been recorded from south of Cape Cod by any one except Linsley, and it must be regarded as a very doubtful member of the fauna of Southern New England until rediscovered.

Dr. Dawson records one broken specimen from the Post-Pliocene of Montreal.

ANACHIS AVARA Perkins. (p. 306.)

Proceedings, Boston Soc. Nat. History, vol. xiii, p. 113, 1869 (in part). *Columbella avara* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 230, 1822; (in part) Gould, Invert. of Mass., ed. i, p. 313; ed. ii, p. 356 (in part).

Cape Cod to Northern Florida; Western Florida and the northern shores of the Gulf of Mexico. Vineyard Sound, from 0 to 10 fathoms; Long Island Sound; Great Egg Harbor, New Jersey; Nantucket (Adams); Fort Macon (Cones); South Carolina (Gibbes); Georgia (Couper); Western Florida (Jewett). North of Cape Cod, it is local and rare; Massachusetts Bay (Stimpson).

Fossil in the Post-Pliocene of North and South Carolina, and in the Pliocene of South Carolina.

Among the shells usually referred to this species there are great variations in form and sculpture, and the color is quite inconstant. The numerous specimens that I have examined from various localities can, however, be arranged in two groups, between which I have found no specimens that can be regarded as truly intermediate, although most of their distinctive characters are variable in each series. For the present, therefore, I have with some hesitation followed Mr. Ravenel in regarding these two principal forms as distinct species. As these species (or varieties) have not been distinguished by most writers, it is probable that some of the northern localities given above should properly go under the next species, which is far more abundant in Vineyard Sound and Long Island Sound than the typical *avara*, while the latter predominates in the collections from Fort Macon, North Carolina, and southward. The figures given by Dr. Gould represent the ordinary northern form of the following species. In the first part of this report both forms are included under *avara*.

From Fort Macon I have specimens that agree perfectly with Say's original description of *avara*. These are less elongated than the next species, and rather fusiform, the thickest part being but little below the middle, with the spire acute. The mature shells have ten flattened whorls; the first three or nuclear whorls are smooth; some of the succeeding ones usually have numerous vertical costæ; the last whorl has 10 to 13 more or less prominent, smooth obtusely rounded, somewhat curved costæ, separated by wider concave intervals, and gradually disappearing below the middle; below the costæ are numerous, well im-

pressed revolving grooves, of which 8 or 10 are wider and deeper than the rest; similar but finer grooves cross the spaces between the costæ, but are mostly obsolete on the costæ; the middle whorls usually have a similar number of costæ, which are less prominent, and often more or less obsolete, while the spaces between are crossed by numerous fine revolving striæ. The canal is short, broad, and nearly straight; the outer lip well rounded, not incurved anteriorly, but with a decided emargination posteriorly. Length of mature shells, 13^{mm}; diameter, 6^{mm}, often smaller.

Specimens of the same size and form from Vineyard Sound and New Haven agree closely with the above description in most respects, but have 14 or 15 costæ on the last whorl, and about 20 on the preceding ones, where the costæ are so crowded that the spaces between are often narrower than the costæ.

ANACHIS SIMILIS Verrill. Plate XXI, fig. 109.

Columbella similis Ravenel, Proc. Acad. Nat. Sci., Philad., 1861, p. 41. *Columbella translirata* Ravenel, op. cit., p. 42. *Columbella avara* (in part) Gould, Invert., ed. i, p. 313, fig. 197; ed. ii, p. 356, fig. 726.

Massachusetts Bay to Georgia. Abundant in Vineyard Sound and Long Island Sound; Great Egg Harbor. Fort Macon (Dr. Yarrow.) This species is usually much more elongated than the preceding, with a more elevated spire, the broadest place being a little above the lower third of the length. Whorls, 10; flattened; the nuclear whorls smooth. The canal is longer, and usually distinctly excurved; the outer lip is more or less incurved anteriorly, so as to slightly narrow the canal; the body-whorl has 18 to 20 or more rather regular, obtuse costæ, separated by spaces of about the same width, generally slightly nodular close to the suture; at some distance below the middle of the whorl they gradually disappear, but sometimes there are also smaller intermediate costæ below the middle of the whorl (var. *translirata*); the lower part of the whorl is covered with numerous well-impressed, revolving grooves, which cross the lower ends of the costæ, rendering them nodulous; on the upper part of the whorls the revolving grooves are larger and more distinct than in the preceding species, and usually continue over the costæ; the one next below the suture is usually larger than the rest, and thus produces the subsutural nodules; the grooves are generally least distinct in the middle of the lower whorl, which is sometimes slightly angulated. On the middle whorls there are numerous (usually more than 25) regular costæ, like those of the last one, and crossed by about 5 distinct revolving grooves, more conspicuous in the spaces between; the upper one largest, usually producing a distinct series of nodules on each whorl. Color exceedingly variable, generally dark reddish brown, chestnut, or light yellowish brown, more or less mottled and specked with whitish; there is often a subsutural band of white, or the nodules are white, and also a band of white around the middle

of the last whorl, but these are frequently absent. Length of a rather large specimen, 17^{mm}; breadth, 7^{mm}; length of an average specimen, 13^{mm}; breadth, 5^{mm}; length of a slender specimen, 15^{mm}; breadth, 5^{mm}.

ASTYRIS LUNATA Dall. Plate XXI, fig. 110. (p. 306.)

Proceedings Boston Soc. Natural History, vol. xiii, p. 242, 1870. *Nassa lunata* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. v, p. 213, 1826. *Buccinum lunatum* Adams, Boston Journ. Nat. Hist., vol. ii, p. 226; Gould, Invert. of Mass., ed. i., p. 312, fig. 196. *Columbella lunata* Gould, op. cit., ed. ii, p. 359, fig. 629. *Fusus Trumbulli* Gould, Amer. Journ. Science, vol. vi, p. 235, fig. 7, 1848, (*non* Linsley). *Buccinum Wheatleyi* DeKay, Nat. Hist. of New York, Mollusca, p. 132, Plate 7, fig. 162, 1843. *Columbella Gouldiana* Ag. MSS.; Stimpson, Shells of New England, p. 48, 1851; Smith, Annals Lyceum Nat. Hist. of New York, vol. viii, p. 398, fig. 5, 1865. *Astyris "lunata* Say" and *A. "Trumbulli* Linsl.," H. and A. Adams, Genera, vol. i, p. 187 (typographical errors).

Massachusetts Bay to Northern Florida and the northern shores of the Gulf of Mexico; local and not abundant north of Cape Cod, at Provincetown, Nahant, and Swampscott, Massachusetts. Very abundant in Vineyard Sound, from low-water to 10 fathoms; and in Long Island Sound; Great South Bay, Long Island; and Great Egg Harbor, New Jersey; Fort Macon, North Carolina, and southward. Estella Pass, Florida (Jewett); Georgia (Couper).

Fossil in the Post-Pliocene deposits of South Carolina; and at Gardiner's Island, New York (S. Smith); and in the Pliocene of South Carolina.

The color-variety, separated by several writers as *C. Gouldiana*, is identical with the *Wheatleyi* of DeKay.

ASTYRIS ZONALIS Verrill. Plate XXI, fig. 111. (p. 399.)

Buccinum zonalis Linsley, American Journal of Science, ser. i, vol. xlviii, p. 285, 1845 (no description); Gould, Amer. Journ. Science, series ii, vol. vi, p. 236, fig. 8, 1848. *Columbella dissimilis* Stimpson, Proceedings Boston Soc. Nat. History, vol. iv, p. 114, 1851; Shells of New England, p. 47, 1851; Gould, Invert. of Mass., ed. ii, p. 358, fig. 628.

Long Island Sound, near New Haven; Vineyard Sound; Casco Bay; Eastport, Maine, 10 to 60 fathoms. Grand Menan, New Brunswick, in 8 fathoms, sand, (Stimpson). Stonington (Linsley).

ASTYRIS ROSACEA H. and A. Adams. (p. 508.)

Genera of Recent Mollusca, vol. i, p. 187, 1858. *Buccinum rosaceum* Gould, American Journal of Science, xxxviii, p. 197, 1840; Invert. of Mass., ed. i, p. 311, fig. 195, 1841. *Columbella rosacea* Stimpson, Shells of New England, p. 47, 1851; Gould, Invert. of Mass., ed. ii, p. 257, fig. 627. (?) *Fusus Holbölli* Möller, Naturhistorisk Tidsskrift, vol. iv, p. 83, 1842.

East of Block Island, 29 fathoms, fine sandy mud; Stonington, Connecticut (Linsley); Massachusetts Bay to Gulf of Saint Lawrence; Isles of Shoals, 20 fathoms, and West Isles, 10 fathoms (Stimpson); Casco Bay, 10 to 20 fathoms; Bay of Fundy, 8 to 60 fathoms; Sable Island, Nova Scotia (Willis); Grand Menan, in deep water, (Stimpson).

The identity of *A. Holbölli*, from Greenland, with this species, is very doubtful, for it was described as smooth, with a firm corneus, fuscoluteus epidermis.

LUNATIA HEROS Adams. Plate XXIII, figs. 133 to 136. (p. 353.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 207, 1858; Gould, Invert. of Mass., ed. ii, p. 338, figs. 608, 609. *Natica heros* Say, Jour. Acad. Nat. Sci., Philadelphia, vol. ii, p. 243, 1822; Gould, Invert., ed. i, p. 231. *Natica triseriata* Say, op. cit., vol. v. p. 209 (color-variety); Gould, Invert., ed. i, p. 233. *Lunatia triseriata* Gould, op. cit., ed. ii, p. 340, fig. 610.

Georgia to Gulf of Saint Lawrence and southern coast of Labrador. Coast of New Jersey, near Great Egg Harbor, abundant and large, (A. E. V.); southern side of Long Island, at Fire Island beach, abundant, (S. I. Smith); Long Island Sound, at New Haven, not common; Vineyard Sound, abundant from low-water to 10 fathoms; Casco Bay, common; Bay of Fundy, common from low-water to 40 fathoms; Saint George's Bank, common, (S. I. Smith); Gaspé (Dawson); Georgia (Couper). The variety *triseriata* has the same distribution, and is the more common form in the deeper waters, but is also found on the sand-flats at low-water. It is common in Casco Bay and Bay of Fundy, in 1 to 40 fathoms; off Martha's Vineyard, 10 to 20 fathoms; and off New London, Connecticut, 10 fathoms.

This species has been found fossil in the Miocene of Maryland, Virginia, and South Carolina; in the Pliocene of South Carolina; and in the Post-Pliocene of Canada and South Carolina.

LUNATIA IMMACULATA Adams. Plate XXIII, fig. 131. (p. 508.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 207. *Natica immaculata* Totten, American Journal of Science, ser. i, vol. xxviii, p. 351, fig. 6, 1835; Gould, Invertebrata, ed. i, p. 234, fig. 168, 1841. *Mamma* (?) *immaculata* Gould, ed. ii, p. 344, fig. 614.

Stonington, Connecticut, and eastern end of Long Island, to Gulf of Saint Lawrence. Off Martha's Vineyard, 20 fathoms; east of Block Island, 29 fathoms. Stonington (Linsley); Off Napeague Point, Long Island (S. Smith); Newport, R. I. (Totten). Massachusetts Bay, Casco Bay, and Bay of Fundy, 5 to 80 fathoms, common; often found living at low-water mark in the Bay of Fundy.

NEVERITA DUPLICATA Stimpson. Plate XXIII, fig. 130. (p. 354.)

Smithsonian Check List, p. 5, 1860; Gould, Invert. of Mass., ed. ii, p. 345, fig. 615. *Natica duplicata* Say, Jour. Acad. Nat. Sciences, Philadelphia, vol. ii, p. 247, 1822; Gould, Invert., ed. i, p. 236, fig. 164, 1841. *Lunatia duplicata* H. and A. Adams, Genera Recent Mollusca, vol. i, p. 207, 1858.

Massachusetts Bay to Northern Florida; northwestern Florida to Yucatan. Local and not common north of Cape Cod. Abundant at Nantuckèt; Vineyard Sound; Long Island Sound; southern coast of Long Island; New Jersey; and southward. Saint Augustine, Florida (Williams). Tampa Bay, Florida, and Egmont Key, abundant, (Jewett). Texas (Schott). Near Vera Cruz, Mexico (coll. T. Salt).

Fossil in the Miocene of Maryland, Virginia, North and South Carolina; Pliocene of South Carolina; and Post-Pliocene of Virginia, North Carolina, South Carolina, Saint John's River, and Tampa Bay, Florida.

NATICA PUSILLA Say. Plate XXIII, fig. 132. (p. 417.)

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 257, 1822; Stimpson, Shells of New England, p. 43, 1851; Gould, Invert. of Mass., ed. ii, p. 344, fig. 613, (not of ed. i); Sanderson Smith, in Annals Lye. Nat. History, New York, vol. ix, p. 396, fig. 4, 1870.

Vineyard Sound to Northern Florida. In Vineyard Sound and Buzzard's Bay this species is common in 2 to 10 fathoms. Huntington and Gardiner's Bay, Long Island, 4 to 5 fathoms, (S. Smith). South Carolina (Kurtz). Fort Macon, North Carolina (Coues). Georgia (Couper).

Acrybia flava H. and A. Adams, = *Natica flava* Gould, Invert., ed. i, p. 239, fig. 162; *Bulbus flavus* Gould, op. cit., ed. ii, p. 347, fig. 616. This species was catalogued by Linsley (1845) as from the stomachs of haddock taken off Stonington, Connecticut. It has not been subsequently recorded from south of Cape Cod by any one. It is not improbable that there was some mistake, either in respect to the locality or the identity of the specimens referred to by Linsley. It is an arctic species, found in the Bay of Fundy and at Saint George's Bank; northward to Greenland (Möller, as *N. nana*).

Natica clausa Brod. and Sowerby, was erroneously given by Mr. Perkins (Proc. Boston Soc. Nat. Hist., vol. xiii, p. 162) as from "Stonington, Connecticut, Linsley." It does not occur in Mr. Linsley's list, nor has it been found living, to my knowledge, south of Cape Cod. It occurs in Massachusetts Bay and northward to the Arctic Ocean. It is not uncommon in the Bay of Fundy from 6 to 109 fathoms; and in Casco Bay from 9 to 60 fathoms. One small dead specimen was dredged by us in 19 fathoms, off Gay Head.

CERITHIOPSIS GREENII Verrill. Plate XXIV, fig. 153. (p. 383.)

Cerithium Greenii C. B. Adams, Boston Journal of Natural History, vol. ii, p. 287, Plate 4, fig. 12, 1838; Gould, Invert., ed. i, p. 579, fig. 184. *Bittium Greenii* H. and A. Adams, Genera, vol. i, p. 287, 1858; Gould, Invert., ed. ii, p. 322, fig. 591.

Massachusetts Bay to South Carolina. Vineyard Sound and Buzzard's Bay, 3 to 10 fathoms; Long Island Sound, near New Haven. Dartmouth Harbor (Adams); Boston Harbor (Stimpson); Long Island (S. Smith); Fort Macon, North Carolina (Coues). Also reported from Bermuda.

Jeffreys (in Annals and Mag. Nat. Hist., Oct., 1872, p. 244) regards this as identical with the European *C. tubercularis*, and gives it a northern distribution. Both opinions appear to be incorrect.

CERITHIOPSIS EMERSONII Adams. Plate XXIV, fig. 151. (p. 417.)

H. and A. Adams, *Genera*, p. 240, 1858; Gould, *Invert.*, ed. ii, p. 387, fig. 649
Cerithium Emersonii C. B. Adams, *op. cit.*, p. 284, Plate 4, fig. 10, 1833; Gould,
Invert., ed. i, p. 275, fig. 180.

Cape Cod to South Carolina. Vineyard Sound and Buzzard's Bay, 3 to 10 fathoms, shelly. Nantucket (Adams); Huntington and Greenport, Long Island (S. Smith). Fossil in the Miocene of North Carolina, (Conrad). Jeffreys (in *British Conchology*, vol. iv, p. 257) regards this species as identical with *Cerithium metula* Lovén, 1846, on the authority of Danielssen. This appears to be an erroneous identification.

CERITHIOPSIS TEREBRALIS Adams. Plate XXIV, fig. 150. (p. 417.)

H. and A. Adams, *Genera*, vol. i, p. 241, 1858; Gould, *Invert.*, ed. ii, p. 389, fig. 650. *Cerithium terebrale* C. B. Adams, *Boston Journal Nat. Hist.*, vol. iii, p. 320, Plate 3, fig. 7, 1840; Gould, *Invert.*, ed. i, p. 276, fig. 181. *Cerithium terebellum* C. B. Adams, *Catalogue Genera and Species of Recent Shells in Collection of C. B. A.*, p. 13, 1847.

Cape Cod to South Carolina. Vineyard Sound and Buzzard's Bay, 2 to 12 fathoms, not uncommon. New Bedford, Massachusetts (Adams). Greenport and Huntington, Long Island (S. Smith). Fort Macon, North Carolina (Coues).

TRIFORIS NIGROCINCTUS Stimpson. Plate XXIV, fig. 152. (p. 305.)

Smithsonian Check-List, p. 5, 1860; Gould, *Invert.*, ed. ii, p. 323, fig. 592. *Cerithium nigrocinctum* C. B. Adams, *Boston Jour. Nat. Hist.*, vol. ii, p. 286, Plate 4, fig. 11, 1833; Gould, *Invert.*, ed. i, p. 277, fig. 182.

Cape Cod to South Carolina. Vineyard Sound and Buzzard's Bay, low-water to 10 fathoms, not uncommon; near New Haven; and Great Egg Harbor, New Jersey. Dartmouth, Massachusetts (Adams). Huntington and Greenport, Long Island (S. Smith). Fort Macon (Coues).

BITTIUM NIGRUM Stimpson. Plate XXIV, fig. 154. (p. 305.)

Smithsonian Check-List, p. 5, 1860; Gould, *Invert.*, ed. ii, p. 321, fig. 590. *Pasithea nigra* Totten, *American Jour. of Science*, vol. xxvi, p. 369, Plate 1, fig. 7, 1834. *Cerithium reticulatum* Totten, *op. cit.*, vol. xxviii, p. 352, fig. 8, 1835 (*non* Da Costa). *Cerithium Sayi* Menke (t. Gould); Gould, *Invert.*, ed. i, p. 278, fig. 183.

Massachusetts Bay to South Carolina; local north of Cape Cod, in Boston Harbor (Totten), and in the Gulf of Saint Lawrence, at Pictou and Prince Edward's Island (Dawson). It is not found on the coast of Maine nor in the Bay of Fundy. Vineyard Sound and Buzzard's Bay, abundant, low-water to 8 fathoms, among algæ and eel-grass; Long Island Sound; and Great Egg Harbor, New Jersey, abundant. Fort Macon (Coues).

The *Bittium alternatum* (*Turritella alternata* Say, 1822) is a very closely related species, and probably identical with this.

Turritella erosa Couthouy, recorded, with a mark of doubt, by Linley, as from the stomach of a cod, off Stonington, Conn., was perhaps

incorrectly identified. It may have been a worn *Cerithiopsis terebralis*. The true *T. erosa* is a decidedly northern species, common in Casco Bay and the Bay of Fundy, and extending northward to the Arctic Ocean, and southward on the northern coasts of Europe, and on the North Pacific coast of America. It has not been recorded from south of Cape Cod by any one except Linsley.

VERMETUS RADICULA Stimpson. Plate XXIV, fig. 157. (p. 417.)

Shells of New England, p. 37, 1851; Gould, Invert., ed ii, p. 316, fig. 584. *Vermetus lumbricalis* Gould, ed. i, p. 246, and various other American authors, (*non* Lamarek).

Cape Cod to Florida. Vineyard Sound and Buzzard's Bay, 3 to 10 fathoms, not uncommon; Long Island Sound. Fort Macon, North Carolina, common, (Coues).

Fossil in the Post-Pliocene of North Carolina.

CÆCUM PULCHELLUM Stimpson. Plate XXIV, fig. 158. (p. 417.)

Proceedings Boston Society of Natural History, vol. iv, p. 112, 1851; Shells of New England, p. 36, Plate 2, fig. 3, 1851; Gould, Invert., ed. ii, p. 315, fig. 583.

Vineyard Sound, 1 to 4 fathoms, and dead on shore at Nobsca Beach. New Bedford (Stimpson). Greenport, Long Island, 10 fathoms, sand, (S. Smith).

Dead shells of this species readily lose the outer layer, in which the annulations are formed; they then become white and smooth, without any trace of annulations, and might be mistaken for a different species.

CÆCUM COOPERI Smith.

Sanderson Smith, Annals Lyceum Nat. Hist., New York, vol. vii, p. 154, 1860; *op. cit.*, vol. ix, p. 393, fig. 3, 1870, (*non* Carpenter, 1864). *Cæcum costatum* Verrill, American Journal of Science, vol. iii, p. 283, 1872; this Report, p. 417.

Vineyard Sound, 8 to 10 fathoms. Gardiner's Bay, Long Island, 4 to 5 fathoms, sand, (Smith).

The first description of this species was formerly overlooked by me; as it antedates the description of the Californian species to which Dr. Carpenter gave the same name, the present species must be called *Cooperi*.

In the adolescent stage of growth this species enlarges rather rapidly, and has 12 or 13, distinct, elevated, rounded costæ, narrower than the intervals between; the circular grooves are numerous, unequal, interrupted over the costæ, and broader toward the aperture. The aperture is rounded within; its margin is stellated externally by the costæ.

CREPIDULA FORNICATA Lamarek. Plate XXIII, fig. 129. (p. 417.)

Animaux sans Vert., vol. vii, p. 641; Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 225, 1822; Gould, Invert., ed. i, p. 158, fig. 17; ed. ii, p. 271, fig. 532(?). *Patella fornicata* Linné, Syst. Nat., ed. xii, p. 1257.

Casco Bay, Maine, to Florida, and the northern shores of the Gulf of Mexico. Local north of Massachusetts Bay; in the southern part of

the Gulf of Saint Lawrence, at Prince Edward's Island, &c. Halifax (Willis). Saint George's Bank (S. I. Smith). It is common in the shallow and sheltered parts of Casco Bay, but has not been found east of the Kennebeck River, on the coast of Maine, nor in the Bay of Fundy. Very abundant in Vineyard Sound and Buzzard's Bay, from low-water to 12 fathoms; in Long Island Sound, near New Haven, low-water to 6 fathoms; Great Egg Harbor, New Jersey; and everywhere southward. Egmont Key and Tampa Bay, Florida (E. Jewett).

Fossil in the Miocene of Maryland, North and South Carolina; Pliocene of South Carolina; and Post-Pliocene of North and South Carolina, Gardiner's Island, New York, and Nantucket Island.

The *fornicata* of Linné was described as a Mediterranean species, and may not be identical with the American shell.

CREPIDULA PLANA Say. Plate XXIII, fig. 127.

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 226, 1822; Gould, Invert., ed. i, p. 159, fig. 16; ed. ii, p. 272, fig. 533. *Crepidula unguiformis* Stimpson, Shells of New England, p. 30, 1851; this Report, pp. 355, 417 (*non* Lamarck, 1822).

Massachusetts Bay to Florida and the northern shores of the Gulf of Mexico. Local and less abundant farther north, in Casco Bay, Maine; Nova Scotia (Willis); Gulf of Saint Lawrence (Bell, Dawson); and Saint George's Bank (S. I. Smith). Not found on the eastern part of the coast of Maine, nor in the Bay of Fundy. Very common in Vineyard Sound, Buzzard's Bay, and Long Island Sound, from low-water mark to 12 fathoms, on the *outside* of oysters, *Limuli*, and various dead shells, as well as on the *inside* of various dead univalve shells; in all these situations frequently associated with the preceding species, but no intermediate forms have been observed.

Fossil in the Miocene of North and South Carolina; Pliocene of South Carolina; and in the Post-Pliocene of Gardiner's Island, New York, North Carolina, South Carolina, and Florida.

The Mediterranean shell, *C. unguiformis* Lamarck, is a distinct species.

CREPIDULA CONVEXA Say. Plate XXIII, fig. 128. (p. 355.)

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 227, 1822; Gould, Invert., ed. i, p. 160, fig. 15; ed. ii, p. 273, fig. 534. *Crepidula glauca* Say, op. cit., p. 226; Gould, Invert., ed. ii, p. 274, fig. 535; ed. i, p. 151, fig. 14. *Crepidula acuta* H. C. Lea, American Jour. Science, ser. i, vol. xlii, p. 108, Plate 1, fig. 4, 1842.

Massachusetts Bay to Florida. Less abundant and local farther north; at Quahog Bay, Maine; Nova Scotia (Willis); and Gulf of Saint Lawrence. Very common in Vineyard Sound, Buzzard's Bay, Long Island Sound, shores of Long Island, and Great Egg Harbor, New Jersey. Fort Macon, North Carolina (Coues). Georgia (Couper).

Fossil in the Post-Pliocene of Virginia and South Carolina.

The distribution of this species is probably identical with that of *Eupagurus longicarpus* and *Ilyanassa obsoleta*, with which it is nearly always

associated. At Quahog Bay, Maine, this species occurs on the back of the dead shells of *I. obsoleta*, which are occupied by the hermit-crab, just as in the waters of Southern New England; and these, with numerous other southern forms associated with them, constitute a genuine southern colony, occupying a warm, sheltered bay, surrounded on all sides by the northern fauna.

The depressed variety (*glauca*) is found chiefly on broad and nearly flat surfaces of large bivalve shells, stones, &c. The very convex varieties adhere mainly to the surfaces of small convex univalves.

CRUCIBULUM STRIATUM Adams. Plate XXIII, figs. 125, 126. (p. 417.)

H. and A. Adams, Genera of Recent Mollusca, vol. i, p. 366; Gould, Invert., ed. ii, p. 275, fig. 536. *Calyptrea (Dispotrea) striata* Say, Journ. Acad. Nat. Sciences Philadelphia, vol. v, p. 216, 1836. *Crucibulum (Dispotrea) striata* H. and A. Adams, Genera, vol. i, p. 366, 1858.

Bay of Fundy to New Jersey. Eastport Harbor and Bay of Fundy, low-water mark to 30 fathoms, common; Frenchman's Bay and Mount Desert, Maine, 3 to 10 fathoms, common; Casco Bay, Maine, 6 to 40 fathoms; Vineyard Sound and Buzzard's Bay, 3 to 12 fathoms, not uncommon. Gardiner's Bay and Montauk Point, Long Island (S. Smith). Off New London, Conn. (coll. T. M. Prudden). Saint George's Bank (S. I. Smith). Northern New Jersey (Say).

LITTORINA IRRORATA Gray. (p. 372.)

Zoology of Captain Beechey's Voyage, p. 133, Plate 38, fig. 1, 1839. Gould, Invert., ed. ii, p. 311, fig. 579. *Turbo irroratus* Say, Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 239, July, 1822; Binney's Say, p. 81. *Phasianella sulcata* Lamarck, Animaux sans Vert., ed. i, vol. vii, p. 54, Aug., 1822; ed. ii, vol. ix, p. 244. *Littorina sulcata* Deshayes, in Lamarck, op. cit., vol. ix, p. 203, 1843.

Vineyard Sound to Florida and the northern shores of the Gulf of Mexico. Vineyard Sound, sparingly; Long Island Sound, near New Haven, rare. Stratford, Connecticut, on high sedge (Linsley). Huntington, Long Island (S. Smith). Comparatively rare and local north of Maryland; very abundant farther south.

Many of the shells of this species found on our shores have undoubtedly been brought from Virginia and Maryland with the southern oysters planted in our waters, but it is probably indigenous in certain localities.

LITTORINA RUDIS. *Plate XXIV, fig. 137. (p. 305.)

Gould, Invert., ed. i, p. 257, fig. 165, 1841; ed. ii, p. 304, fig. 575. *Turbo rudis* Maton, Nat. Hist. and Antiq. West. Count., vol. i, p. 277, 1797, (t. Jeffreys); Donovan, British Shells, vol. i, Plate 33, fig. 3, 1800, (t. Gould.) *Turbo obligatus* Say, Jour. Acad. Nat. Sci., Philad., vol. ii, p. 241, 1822. *Turbo vestitus* Say, op. cit., p. 241, 1822 (variety *tenebrosa*). *Littorina Grönlandica* Möller, in Kroyer's Tidsskrift, vol. iv, p. 82, 1842. *Turbo tenebrosus* Montagu, Test. Brit., p. 303, Plate 20, fig. 4, 1803 (variety). *Littorina tenebrosa* Gould, ed. i, p. 259, fig. 166; ed. ii, p. 306, fig. 576.

Among the additional names that appear to have been applied to the various

states of this variable species are: *L. saxatilis* Johnson; *Turbo sulcatus* Leach; *Turbo jugosus* Montagu; *L. patula* (var.) Jeffreys; *L. neglecta* Bean; *T. ventricosus* Brown; *L. marmorata* Pfeiffer; *Nerita littorea* Fabricius (non Linné); *L. Grönlandica* Möller, Lovén, Mörch; *L. rudissima* Bean; *L. zonaria* Bean; *L. neglecta* Bean, etc.

Great Egg Harbor, New Jersey, northward to the Arctic Ocean; Greenland; Iceland; Spitzbergen. Northern coasts of Europe to Great Britain and Spain. Local south of Long Island Sound; abundant on all the rocky shores of Southern New England, from New York to Cape Cod, and at the eastern end of Long Island; local at Great Egg Harbor, among *Fucus*, on the stones of an old pier. Extremely abundant on all the northern shores of New England and northward. Fossil in the Post-Pliocene of Canada, Great Britain, and Scandinavia.

LITTORINA PALLIATA. Plate XXIV, fig. 138. (p. 305.)

Gould, Invert. of Mass., ed. i, p. 260, fig. 167, 1841; ed. ii, p. 309, fig. 578. *Turbo palliatus* Say, op. cit., p. 240, 1822. *Littorina neritoidea* DeKay, Mollusca New York, p. 105, Plate 6, figs. 109-111 (non *Turbo neritoidea* Linné). *Littorina littoralis* Stimpson, Shells of New England, p. 33, (non Forbes and Hanley; non *Nerita littoralis* Linné). *Turbo littoralis* Fabricius, Fauna Grönlandica, p. 402, 1780 (non Linné). *Littorina arctica* Möller, Kroyer's Tidsskrift, vol. iv, p. 82, 1842. (?) *Littorina limata* Lovén, Ofversigt af Kongl. Vet.-Akad. Förhandlingar, vol. iii, p. 154, 1846. *Littorina Peconica* S. Smith, Annals Lyceum Nat. Hist., New York, vol. vii, p. 155, 1860.

Great Egg Harbor, New Jersey, to the Arctic Ocean; Greenland, Spitzbergen, Finmark, and Norway. Very abundant from New York to Cape Cod and northward, wherever *Fuci* grow on rocks between tides; local and less abundant south of Long Island Sound.

Fossil in the Post-Pliocene of Great Britain and Scandinavia.

Should this species prove to be identical with *L. obtusata* (Linné, sp.) of Europe, as there is reason to anticipate, its range will be nearly coincident with that of *L. rudis*, with which it is always found associated on our coast. Several writers have already united the two forms, but no satisfactory comparisons of large series of specimens, from many localities on both coasts, have been made.

LACUNA VINCTA Turton. Plate XXIV, fig. 139. (p. 305.)

Gould, Invert., ed. i, p. 262, figs. 169, 178*, 1841; ed. ii, p. 302, fig. 573. *Turbo vincta* Montagu, Test. Brit., p. 307, Plate 20, fig. 3, (t. Gould). *Trochus divaricatus* Fabricius, Fauna Grönlandica, p. 392, 1780 (non Linné). *Lacuna divaricata* Lovén, op. cit., p. 155, 1846; Jeffreys, British Conchology, vol. iii, p. 346.

According to Jeffreys, the following are among the synonyms or varieties of this species: *Turbo canalis* Montagu; *T. quadrifasciata* Mont.; *Phasianella fasciata*, *P. bifasciata*, *P. cornea*, and *P. striata* Brown; *Lacuna solidula* Lovén; *L. labiosa* Lovén; *L. frigida* Lovén.

New York to the Arctic Ocean; Greenland, Iceland, Lapland, Scandinavia, Great Britain, France; on the Pacific coast of America southward to Puget Sound. Long Island Sound, common, but rather local; Watch Hill, Rhode Island, among algæ, in 4 to 5 fathoms; Vineyard

Sound; Buzzard's Bay. Very abundant north of Massachusetts Bay, in Casco Bay, Bay of Fundy, Labrador, etc. Staten Island and Long Island (S. Smith).

Fossil in the Post-Pliocene of northern Great Britain and Scandinavia.

Lacuna neritoidea Gould.

American Journ. of Science, vol. xxxviii, p. 197, 1840; Invert., ed. i, p. 263, fig. 170; ed. ii, p. 303, fig. 574.

This species is a very doubtful inhabitant of this region, having been recorded by no one except Linsley, 1845, who reports it from Long Island Sound (Oyster River and Long Beach, Stratford, Connecticut). I have never been able to find it in the same region, nor has any one else had better success. Linsley's specimens may have been incorrectly named. It occurs in Massachusetts Bay; at Cape Elizabeth, Casco Bay; Grand Menan Island, etc.; northward to Greenland; and on the northern shore of Europe.

LITTORINELLA MINUTA Stimpson. Plate XXIV, fig. 140. (p. 469.)

Researches upon the Hydrobiinæ and Allied Forms, p. 42, May, 1865, in the Smithsonian Miscellaneous Collections. *Turbo minutus* Totten, American Journ. Science, ser. i, vol. xxvi, p. 369, fig. 6, 1834. *Cingula minuta* Gould, Invert., ed. i, p. 265, fig. 171. *Rissoa minuta* Gould, op. cit., ed. ii, p. 298, fig. 566. *Ecrobia minuta* (provisional name) Stimpson, op. cit., p. 42, 1865. ? *Cingula modesta* Lea, Boston Journal of Natural History, vol. v, p. 238, Plate 24, fig. 5.

The tentacles in this species are rather short, scarcely exceeding the breadth of the head, slightly tapering, blunt; the eyes are on low prominences on the outer side of the bases of the tentacles; rostrum large, stout, transversely wrinkled, longer than the tentacles, tapering somewhat, but divided at the end by a deep emargination into two rounded lobes, which are often somewhat expanded. Foot short and broad, subtruncate anteriorly, with the angles broad and but little produced, posterior end broadly rounded.

New Jersey to Nova Scotia and Gulf of Saint Lawrence. Abundant along the brackish and muddy shores of Long Island Sound, Buzzard's Bay, Vineyard Sound, Massachusetts Bay, Casco Bay, and Bay of Fundy.

It is not confined to brackish waters, but often occurs also on the ocean shores, under stones between tides.

LITTORINELLA LÆVIS Verrill.

Cingula laevis Dekay, Natural History of New York, Mollusca, p. 111, Plate 6, fig. 118 (poor), 1843. *Odstomia limnoidea* (Dekay, MSS.), Linsley, Amer. Journ. Science, ser. i, vol. xlvi, p. 234, 1845 (no description). (?) *Rissoa Stimpsoni* S. Smith, Annals Lyceum Nat. Hist., New York, vol. ix, p. 393, fig. 2, 1870.

Long Island Sound, near New Haven. Stratford, Connecticut (Linsley); near New York (Dekay); Greenport, Long Island (S. Smith).

RISSOA ACULEUS Stimpson. Plate XXIV, fig. 141. (p. 306.)

Proc. Boston Soc. Nat. Hist., vol. iv, p. 15, 1851; Shells of New England, p. 34; Gould, Invert., ed. ii, p. 299, fig. 568. *Cingula aculeus* Gould, Invert., ed. i, p. 266, fig. 172, 1841. *Trochus striatellus* Fabricius, Fauna Grönl., p. 393, (*non* Linné). (?) *Rissoa saxatilis* Möller, Index Mollusca Grönl., in Kroyer's Tidskrift, vol. iv, p. 82, 1843. (?) *Rissoa arctica* Lovén, Ofversigt af Kongl., Vet.-Akad. Förhandlingar, vol. iii, p. 156, 1846.

Long Island Sound to Greenland. New Haven, Connecticut, and vicinity, common. Watch Hill, Rhode Island; Vineyard Sound; Stratford, Connecticut (Linsley); Gull Island (Smith). Common on the shores of Massachusetts Bay, Casco Bay, and Bay of Fundy.

Lovén's *R. arctica* was from Finmark, and, to judge from the descriptions, may not be identical with our species. Mr. Jeffreys regards it as a variety of *R. striata* of Europe. He also unites the American shell with *R. striata*, thus: "The variety *arctica* (under the specific name *aculeus* given to it by Professor Stimpson) inhabits the northern sea-board of the United States." (See British Conchology, vol. iv, p. 38). It is natural to infer that a writer who does not appear to have seen the accurate description and figure of this species published in the well-known work of Dr. Gould, ten years previous to Dr. Stimpson's earliest publications, cannot have devoted much time or attention to the American shells, and therefore his opinions should not have too much weight in such cases.

In reality, our shell differs widely from *R. striata*. It agrees more nearly with the English *R. proxima* (Alder, Forbes and Hanley), but apparently differs from it in the soft parts. The foot in our shell is broadly and slightly rounded anteriorly, with the angles only slightly produced, and tapers backward to a bluntly-rounded posterior end. The tentacles are long, slender, slightly tapering, with blunt tips. The eyes are situated near their bases on the dorso-lateral aspect, and are scarcely elevated above the general surface. The snout is rather long, often a little expanded at the end, and divided by a deep emargination into two lobes, which often, in a dorsal view, show a slight emargination on their outer surface. No opercular cirrus was observed. This species belongs to the genus *Onoba* of H. and A. Adams. The *R. saxatilis* was described by Möller as having the whorls *smooth*, but he refers to *T. striatellus* of Fabricius, which had spiral striations, as in our species.

RISSOA EXARATA Stimpson. (p. 495.)

Proceedings Boston Soc. Nat. Hist., vol. iv, p. 15, 1851; Shells of New England, p. 34, Plate 1, fig. 3, 1851; Gould, Invert., ed. ii, p. 301, fig. 571. *Cingula arenaria* Mighels and Adams, Boston Jour. Nat. Hist., vol. iv, p. 49, Plate 4, fig. 24, 1842 (*non* Montagu, sp.). *Rissoa Mighelsii* Stimpson, Proc. Bost. Soc. Nat. Hist., vol. iv, p. 15, 1851; Shells of New England, p. 34; Gould, Invert., ed. ii, p. 301, (but not figure 570, which is probably *R. sulcosa*).

Stonington, Connecticut, to Gulf of Saint Lawrence. Watch Hill, Rhode Island, 4 to 5 fathoms, among rocks and algæ (white variety); Casco Bay,

6 to 25 fathoms; Bay of Fundy, 4 to 20 fathoms. Fossil in the Post-Pliocene of Canada. This species is usually brownish or chestnut-color, but is also frequently white.

Rissoa eburnea Stimpson, has been recorded (as *Rissoella* (?) *eburnea*) by Dr. G. H. Perkins, from Long Island Sound, near New Haven, but I have seen no undoubted shells of this species from any locality south of Massachusetts Bay. The shell referred to by Dr. Perkins was beach-worn, and may have been some other species. The figure given in the second edition of Gould's Invertebrata (fig. 564, p. 297), does not represent this species. See the figure in Stimpson's Shells of New England, Plate 1, figs. 1, 1a. This shell appears to be a *Jeffreysia*.

From Huntington, Long Island, I have seen a shell closely resembling *Rissoa latior* Stimpson, (M. and Adams, sp.), if not identical with it.

SKENEA PLANORBIS. Plate XXIV, fig. 142. (p. 383.)

Forbes and Hanley, British Mollusca, vol iii, p. 156, Plate 74, figs. 1-3, and Plate G, G, figs. 1 and 1a (animal); Stimpson, Shells of New England, p. 35; Gould, Invert., ed. ii, p. 296, fig. 563. *Turbo planorbis* Fabricius, Fauna Grönl., p. 394, 1780. *Skenea serpuloides* Gould, Invert., ed. i, 247, fig. 189.

Long Island Sound to Greenland, Iceland, Spitzbergen, Scandinavia; and northern and eastern coasts of Europe generally, to England and France. Near New Haven, Connecticut, common; Watch Hill, Rhode Island; Cuttyhunk Island. Very common on all rocky shores in Massachusetts Bay, Casco Bay, and Bay of Fundy. Fossil in the Post-Pliocene of Scotland and Scandinavia.

STYLIFER STIMPSONII Verrill. (p. 460.)

American Journal of Science, vol. iii, pp. 210 and 283, 1872.

Shell white, short, swollen, broad oval; spire short, rapidly enlarging. Whorls four or five, the last one forming a large part of the shell; convex, rounded, with the suture impressed, surface smooth, or with very faint striæ of growth; a slightly impressed revolving line just below the suture. Aperture large and broad. Length about .15 of an inch; breadth, .12.

Parasitic on the dorsal surface of *Strongylocentrotus Dröbachiensis*, from off New Jersey, in 35 fathoms (Captain Gedney); and Saint George's Bank, north latitude 41° 25', west longitude 65° 50', 3'', in 60 fathoms, (S. I. Smith).

EULIMA OLEACEA Kurtz and Stimpson. Plate XXIV, fig. 149. (p. 418.)

Proceedings Boston Soc. Nat. Hist., vol. iv, p. 115, 1851; Stimpson, Shells of New England, p. 39, Plate 1, fig 6, 1851; Gould, Invert., ed. ii, p. 332, fig. 603.

Vineyard Sound to Beaufort, North Carolina. In Vineyard Sound it is not uncommon on *Thyone Briareus*, in 4 to 10 fathoms. Buzzard's Bay (Stimpson).

ODOSTOMIA PRODUCTA Gould. Plate XXIV, fig. 143. (p. 418.)

Invert., ed. i, p. 270, fig. 175, 1841; ed. ii, p. 325, fig. 593. *Jaminia producta* Adams, Boston Journal Nat. Hist., vol. iii, p. 322, Plate 3, fig. 8, 1840.

Vineyard Sound to New Jersey.

ODOSTOMIA FUSCA Gould. Plate XXIV, fig. 144. (p. 307.)

Invert., ed. i, p. 270, fig. 176; ed. ii, p. 325, fig. 594. *Pyramis fusca* Adams, op. cit., vol. ii, p. 282, Plate 4, fig. 9, 1839.

Cape Cod to New Jersey.

This species is referred both to *Turbonilla* and *Odostomia* by H. and A. Adams, in the same work (Genera Moll., pp. 231, 232).

ODOSTOMIA DEALBATA Stimpson.

Smithsonian Check-List, p. 5, 1860; Gould, Invert., ed. ii, p. 327, fig. 595. *Chemnitzia dealbata* Stimpson, Proc., Boston Soc. Nat. Hist., vol. iv, p. 114, 1851; Shells of New England, p. 41.

Long Island Sound to Boston Harbor. New Haven, Connecticut (Perkins). Boston (Stimpson).

ODOSTOMIA BISUTURALIS Gould. (p. 307.)

Invert., ed. ii, p. 327, (not fig. 597). *Turritella bisuturalis* Say, Journ. Acad. Nat. Sci., Philadelphia, vol. ii, p. 244, 1822. *Chemnitzia bisuturalis* Stimpson, Shells of New England, p. 42. *Jaminia exigua* Couthouy, Boston Journ. Nat. Hist., vol. ii, Plate 1, fig. 7, 1838. *Odostomia exigua* Gould, Invert., ed. i, p. 272, fig. 177.

New Jersey to Massachusetts Bay. Boston (Say); Chelsea (Couthouy); Staten Island; Greenport, and Huntington, Long Island (S. Smith). Not uncommon in Long Island Sound, Vineyard Sound, and Buzzard's Bay.

The figure (597) in the second edition of Gould's Invertebrata does not represent this species, but apparently a variety of *O. trifida*.

ODOSTOMIA TRIFIDA Gould. Plate XXIV, figs. 145, 146. (p. 307.)

Invert., ed. i, p. 274, fig. 179, 1841; ed. ii, p. 328, fig. 598. *Actæon trifidus* Totten, Amer. Journ. Science, ser. i, vol. xxvi, p. 363, Plate 1, figs. 4, a, b, 1834.

New Jersey to Massachusetts Bay. Staten Island (S. Smith); Lynn, Massachusetts (Haskell). Common in Long Island Sound, Vineyard Sound, and Buzzard's Bay.

ODOSTOMIA IMPRESSA Stimpson. Plate XXIV, fig. 147. (p. 418.)

American Journ. Science, vol. xxiv, p. 444, 1860; Gould, Invert., ed. ii, p. 330, fig. 600. *Odostomia insculpta* Dekay, Nat. Hist. N. Y., Mollusca, p. 115, Plate 31, fig. 297, 1843. *Turritella impressa* Say, Journ. Acad. Nat. Sci., Philadelphia, vol. ii, p. 244, 1822; Binney's Say, p. 84. *Chemnitzia impressa* Stimpson, Shells of New England, p. 42, 1851.

Long Island Sound to South Carolina. Near New Haven, Connecticut, rare. East River (Dekay); Maryland (Say); Beaufort, North Carolina (Stimpson, Coues).

ODOSTOMIA SEMINUDA Gould. Plate XXIV, fig. 148. (p. 418.)

Invert., ed. i, p. 273, fig. 178, 1841; ed. ii, p. 329, fig. 599. *Jaminia seminuda* C. B. Adams, Boston Journal Nat. Hist. vol. ii, p. 280, Plate 4, fig. 13, 1839. *Chemnitzia seminuda* Stimpson, Shells of New England, p. 42, 1851. *Turbonilla seminuda* H. and A. Adams, Genera Moll., vol. i, p. 231.

Massachusetts Bay to South Carolina. Common in Vineyard Sound and Buzzard's Bay, in 2 to 10 fathoms; Long Island Sound, less common. Massachusetts Bay (Stimpson). Greenport and Huntington, Long Island (S. Smith). Fort Macon, North Carolina (Coues).

TURBONILLA INTERRUPTA Adams. (p. 418.)

H. and A. Adams, Genera, vol. i, p. 231, 1858; Gould, Invert., ed. ii, p. 231, fig. 601 (bad figure). *Turritella interrupta* Totten, Amer. Jour. Science, ser. i, vol. xxviii, p. 352, fig. 7, 1835; Gould, Invert., ed. i, p. 263, fig. 173 (incorrect).

Cape Cod to South Carolina. Quite common in Vineyard Sound and Buzzard's Bay, in 3 to 10 fathoms; Long Island Sound, off Thimble Islands and New Haven, 3 to 5 fathoms, rather rare. Huntington and Greenport (S. Smith). Dartmouth, Massachusetts (Adams). Newport, Rhode Island (Totten). Fort Macon, North Carolina (Coues).

I have received from Prof. E. S. Morse specimens of this shell obtained from mud in the harbor of Portland, Maine, but they are dead and bleached. I am not aware that it has been found living so far north on our coast. Fossil in the Post-Pliocene of South Carolina. |

Lovén records this species as from the coast of Norway, but possibly his shell is a different species, or else a variety of *T. rufa* of Southern Europe, which is certainly very closely related to our species, and is considered the same by Jeffreys. If so, the name given by Totten has precedence of *rufa* (Philippi, 1836). Farther and more extensive comparisons must be made before the identity of the two forms can be established.

The figure given in the first edition of Gould's Invertebrata, and copied in the second edition, does not correctly represent this shell, and was, perhaps, drawn from some other species, for it does not agree with Gould's description, which is accurate. The spire, as represented, is too acute and too rapidly tapered; the last or body whorl is too large; the aperture has not the right form; and the peculiar sculpture is not brought out at all. Totten's figure, though somewhat coarse, is characteristic.

TURBONILLA ELEGANS Verrill. Plate XXIV, fig. 155. (p. 418.)

American Journal of Science, ser. iii, vol. iii, pp. 210, 282, Plate 6, fig. 4, 1872.

Shell light yellowish, elongated, moderately slender, acute. Whorls ten or more, well rounded, not distinctly flattened; suture rather deeply impressed; surface somewhat lustrous, with numerous rounded vertical costæ, narrower than the concave interspaces, fading out below the middle of the last whorl; and with numerous fine revol-

ing grooves, which are interrupted on the costæ, but distinct in the intervals; on the upper whorls there are about five; and on the lower half of the last whorl usually five or six distinct and continuous ones. Aperture broad oval, anteriorly rounded and slightly effuse; outer lip thin, sharp; columella nearly straight at base within, slightly revolute outwardly, regularly curved anteriorly where it joins the outer lip, and not forming an angle with it. The epidermis is thin, light yellow, sometimes with a darker, yellowish, revolving band on the middle of the last whorls, and also with the revolving striæ darker.

Vineyard Sound, 6 to 10 fathoms; Long Island Sound, near New Haven, 5 fathoms.

TURBONILLA AREOLATA Verrill, sp. nov.

Shell small, slender, with eight or more whorls, slightly obelisk-shaped, owing to the more rapid narrowing of the upper whorls; apical or nuclear whorl very small, reversed; the other whorls are moderately convex, somewhat flattened in the middle, and crossed by numerous rather crowded, narrow, transverse costæ, of which there are twenty-five or more on the lower whorls; interstices interrupted by numerous rather conspicuous, revolving, impressed lines, of which there are about six on the upper whorls; these divide the interstices into series of pretty regular, small, squarish pits, but do not cross the costæ; the body-whorl is subangulated below the middle, where the costæ disappear, below which the base is marked only by fine revolving lines; suture impressed. Aperture oval, acute posteriorly, rounded and slightly spreading anteriorly; outer lip sharp, thin, slightly angulated below the middle, rounded and slightly effuse anteriorly; columella smooth, somewhat curved, scarcely forming an angle at its junction with the outer lip. Length, 4^{mm}; breadth, 1.5^{mm}.

Long Island Sound, near New Haven.

The crowded costæ and numerous spiral lines produce a closely cancellated appearance, which is sufficient to distinguish this from the two preceding species. From the following it differs much in sculpture, form, shape of aperture, and columella, and especially in the minute size of the apical whorl.

TURBONILLA COSTULATA Verrill, sp. nov.

Shell small, long conical, translucent, glossy white, banded faintly with pale brown, subacute, with a relatively large, smooth, reversed apical whorl; the other whorls are six or more, flattened, and but slightly convex, enlarging regularly, crossed by numerous straight, smooth, rounded, transverse costæ, of which there are upward of twenty on the lower whorls; interstices rather narrower than the costæ, deep, and interrupted by numerous very minute revolving lines, which are scarcely visible under an ordinary pocket-lens, and do not cross the costæ; suture impressed. The body-whorl is subangulated below the

middle, the costæ vanishing at the angulation; the base is covered with numerous microscopic revolving lines; on the body-whorl there are two revolving bands of pale brown, one above and one below the angulation. Aperture long ovate, acute posteriorly, a little angulated on the outer side, rounded and slightly prolonged anteriorly. Outer lip thin and sharp, round and slightly effuse anteriorly; columella smooth, nearly straight, but scarcely forming an angle where it joins the outer lip. Length, 4^{mm}; breadth, 1.5^{mm}.

Somewhat resembles *T. interrupta*, but the costæ are more crowded, the spiral lines are very much finer and more numerous, and the nuclear-whorl is much larger.

Long Island Sound, near New Haven, Conn.

TURBONILLA STRICTA Verrill, sp. nov.

Shell white, subulate, very acute, with a very minute reversed apical whorl; whorls ten, besides the nucleus, gradually and regularly enlarging, flattened or only very slightly convex, crossed by straight, obtuse, transverse costæ, of which there are about sixteen or eighteen on the lower whorls; the two upper whorls are nearly smooth; suture impressed. Aperture irregularly oblong-ovate, acute posteriorly, rounded anteriorly; outer lip flattened, thickened internally, in mature shells, and minutely crenulate within; columella smooth, nearly straight, thickened, forming an angle where it joins the outer lip. Length, 4.5^{mm}; breadth, 1^{mm}.

Long Island Sound, off New Haven, Connecticut.

This is probably the shell recorded from this region as *T. nivea* (Stimpson, sp.) by Dr. G. H. Perkins. It differs from the *nivea* in the form of the aperture and lip, and in being smaller and much more acute, though having the same number of whorls.

TURBONILLA EQUALIS Verrill.

Turritella aqualis Say, Journal Acad. Nat. Sciences, vol. v, p. 203, 1826; Binney's Say, p. 119.

"Shell subulate, white; volutions ten, each with about twenty-two, transverse, elevated, obtuse, equal lines, with interstitial grooves of the same diameter; suture distinct, impressed; aperture rounded at base, and destitute of any distinct emargination. Length one-fifth of an inch." (Say.)

My specimens agree well with the above description. The shell is very slender and acute, with a small distinctly reversed apical whorl; the remaining nine whorls are somewhat flattened, and all are crossed by obtuse, transverse costæ, which are a little oblique, especially at the upper ends, close to the sutures; on the body-whorl there are about twenty, but fewer on the upper ones; at the base of the body-whorl they vanish, leaving it smooth; the interstices between the costæ are deep and apparently smooth. The aperture is round ovate, well rounded or sub-circular anteriorly; the inner lip having a raised and thin

margin. Length, 4.5^{mm}; breadth, 1.25^{mm}. Vineyard Sound, 6 to 8 fathoms.

Menestho albula Möller (Fabricius, sp.), was recorded by Linsley (as *Pyramis striatula* Couth.) from the stomachs of ducks at Bridgeport, Connecticut. It has not been found south of Cape Cod by any one else, and as it is a rare deep-water shell on our northern coast, it is not likely to have been obtained by ducks. It is found in Massachusetts Bay, Casco Bay, Bay of Fundy, and northward to Greenland. Linsley's shell may have been *Odostomia impressa*.

SCALARIA LINEATA Say. Plate XXI, fig. 123. (p. 418.)

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 242, 1822; Binney's Say, pp. 83, 180, Plate 27, lower left figure; Gould, Invert., ed. i, p. 250; ed. ii, p. 312, fig. 580.

Vineyard Sound, Buzzard's Bay, and Long Island Sound; southward to South Carolina and Georgia. Fossil in the Post-Pliocene of North and South Carolina.

SCALARIA MULTISTRIATA Say. Plate XXI, fig. 122. (p. 418.)

Journ. Acad. Nat. Sciences, Philadelphia, vol. v, p. 208, 1826; Amer. Conchology, iii, Plate 27; Binney's Say, pp. 119, 180, Plate 27, lower right figure; Gould, Invert., ed. ii, p. 313, fig. 581.

Vineyard Sound, Buzzard's Bay and Long Island Sound; southward to Florida. Fossil in the Post-Pliocene of South Carolina.

SCALARIA ANGULATA Say.

American Conchology, iii, Plate 27, upper figures, 1831, as a variety of *S. clathrus*; Sowerby, Thes. Conch., part iv, p. 86, Plate 32, fig. 5, 1844. *Scalaria Humphreysii* Kiener, Iconographie des Coquilles Viv., p. 15, Plate 5, fig. 16, 1838-9.

Connecticut to Florida. Stonington (Linsley); Greenport, Long Island (S. Smith). Outer beach at Great Egg Harbor, New Jersey (A. E. V.); Fort Macon and Beaufort, North Carolina, common, (Stimpson, Coues); South Carolina (Kiener). Rare and perhaps accidental north of New Jersey.

SCALARIA GRÆNLANDICA Perry.

Conch., 1811, (t. Mörch); Sowerby, Thesaurus Conch., part iv, p. 101, Plate 34, figs. 105, 106, 1844; Gould, Invert., ed. i, p. 249, fig. 170*; ed. ii, p. 314, fig. 582. *Turbo clathrus Grænlandicus* Chemnitz, Conch., xi, t. 1878, 1879 (t. Gould). *Scalaria subulata* Couthouy, Boston Jour. Nat. Hist., vol. ii, p. 93, Plate 3, fig. 4, 1838.

Cape Cod to the Arctic Ocean, and northern coasts of Europe, southward to Bergen. South Shoals, off Nantucket (Agassiz, t. Stimpson). Common in Casco Bay and Bay of Fundy, from 10 to 109 fathoms. Fossil in the Post-Pliocene of Nantucket, rare, (Desor); and in the Red-Crag, Norwich-Crag, and later deposits in Great Britain.

Janthina fragilis Lamarek; Gould, Invert., ed. i, p. 240; ed. ii, p. 277. This has been found cast ashore at Nantucket, but probably does not occur living so far north. It inhabits the Gulf Stream farther south.

RHIPIDOGLOSSA.

MARGARITA OBSCURA Gould. Plate XXIV, fig. 156. (p. 508.)

Invert., ed. i, p. 253, fig. 171*, 1841; ed. ii, p. 283, fig. 545. *Turbo obscurus* Couthouy, Boston Journ. Nat. Hist., vol. ii, p. 100, Plate 3, fig. 2, 1838.

Stonington, Connecticut, to Labrador. Rare and confined to the outer waters south of Cape Cod; off Martha's Vineyard, 20 to 25 fathoms. Stonington, from haddock's stomach, (Linsley). Common in Massachusetts Bay, Casco Bay, and in the Bay of Fundy, from extreme low-water mark to 100 fathoms. East of Saint George's Bank, in 430 fathoms, (S. I. Smith).

Margarita ornata DeKay, N. Y. Mollusca, p. 107, Plate 6, fig. 104, 1843, was described as occurring in the vicinity of New York, but I have not met with it in Long Island Sound.

DOCOGLOSSA.

ACMÆA TESTUDINALIS Forbes and Hanley. Plate XXIV, figs. 159, 159a. (p. 307.)

British Mollusea, vol. ii, p. 434, Plate 62, figs. 8, 9, and Plate A A, fig. 2; Carpenter, Report of British Association for 1856, pp. 219, 366, 1857; Dall (subgenus, *Collisella* Dall), American Journal of Conchology, vol. vi, p. 249, 1871. *Lottia testudinalis* Gould, Invert., ed. i, p. 153, fig. 12. *Tectura testudinalis* Gould, Invert., ed. ii, p. 267, fig. 529. *Patella testudinalis* Müller, Prodromus Zool. Danica, p. 227, 1776.

Variety *alveus*. (fig. 159 a). *Patella alveus* Conrad, Journal Acad. Nat. Sciences, Philadelphia, vol. vi, Plate 11, fig. 20, 1831. *Lottia alveus* Gould, Invert., ed. i, p. 154, fig. 13. *Tectura alveus* Gould, Invert., ed. ii, p. 269, fig. 530.

Long Island Sound to the Arctic Ocean; circumpolar. It extends southward on the European coasts to Southern Sweden, England, and Ireland; in the North Pacific, southward to Sitka and the Island of Jesso, Japan. It is comparatively rare and local south of Cape Cod; at New Haven, very rare; Watch Hill, Rhode Island; Martha's Vineyard, Cuttyhunk, and adjacent islands. Huntington and Greenport, Long Island (S. Smith). Fossil in the Post-Pliocene of Labrador (Packard); Greenland, Scandinavia, and Great Britain.

POLYPLACOPHORA.

CHÆTOPLEURA APICULATA Carpenter. Plate XXV, fig. 167.

Chiton apiculatus Say, Amer. Conch., part vii, appendix, (?) 1834; Binney's Say, p. 231; Gould, Invert., ed. i, p. 146, fig. 20; ed. ii, p. 258, fig. 522. *Leptochiton apiculatus*, this Report, p. 399.

Cape Cod to Eastern and Western Florida. Common in Vineyard Sound and Buzzard's Bay, in 3 to 12 fathoms, shelly. Off New London, Connecticut (coll. T. M. Prudden).

Dr. P. P. Carpenter informs me that this species belongs to the genus *Chatopleura* of Gray (*non* Adams).

TRACHYDERMON RUBER Carpenter. Plate XXV, fig. 166.

Chiton ruber Lowe, Zool. Journ., vol. ii, p. 101, Plate 5, fig. 2 (t. Gould); Gould, Invert., ed. i, p. 149, fig. 24; ed. ii, p. 260, fig. 523. *Leptochiton ruber* H. and A. Adams, Genera, vol i, p. 473; this Report, p. 399.

Off New London, Connecticut, to the Arctic Ocean and northern coasts of Europe. Rare and local in the colder outer waters south of Cape Cod. Off New London, 8 fathoms; off Watch Hill, 5 fathoms. Stonington (Linsley). Very common in Casco Bay and Bay of Fundy, from low-water mark to 40 fathoms.

Dr. Carpenter assures me that this species should be referred to *Trachydermon*.

Linsley records "*Chiton fulminatus* Couth." (= *C. marmoreus* Gould, Invert., ed. ii, p. 261, fig. 524) as from cod-fish taken off Stonington, Connecticut, but as it has not been confirmed from south of Cape Cod, this must be regarded as a doubtful identification. This species is found from Massachusetts Bay northward to the Arctic Ocean and northern coasts of Europe. It is common in the Bay of Fundy, from low-water mark to 40 fathoms, on "nullipore" (*Lithothamnion*).

"*Chiton albus*" (= *Trachydermon albus*, t. Carpenter) has been mentioned as from this region, but probably erroneously. White specimens of *C. apiculata* are often mistaken for it, when superficially examined. The genuine *albus* is a northern species, with about the same distribution as the preceding. It is abundant in the Bay of Fundy, from low-water to 80 fathoms.

PULMONATA.

MELAMPUS BIDENTATUS Say. Plate XXV, figs. 169, 169a. (p. 463.)

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 245, 1822; Gould, Invert., ed. ii, p. 467, fig. 721. *Auricula bidentata* Gould, Invert., ed. i, p. 117, fig. 131. *Melampus corneus* Stimpson, Shells of New England, p. 51, 1851.

Massachusetts Bay to Florida, and along the northern shores of the Gulf of Mexico to Texas. Very common on the shores of Vineyard Sound, Buzzard's Bay, Long Island, and Long Island Sound. Fossil in the Post-Pliocene of South Carolina.

ALEXIA MYOSOTIS Pfeiffer. Plate XXV, fig. 168. (p. 383.)

Pfeiffer, Mon. Auric. Viv., p. 148, (t. Binney); Gould, Invert., ed. ii, p. 463, figs. 718, 719. *Auricula myosotis* Draparnaud, Tabl. Moll. Fr., p. 53. *Auricula denticulata* Gould, Invert., ed. i, p. 199, fig. 129 (*non* Montfort).

New Jersey to Nova Scotia; also on the Atlantic and Mediterranean coasts of Europe. It is common at Eastport, Maine; Portland, Maine; and at the mouth of West River, near New Haven, Connecticut; also near New York City.

TECTIBRANCHIATA.

BULLA SOLITARIA Say. Plate XXV, fig. 161. (p. 371.)

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 245, 1822; Binney's Say, p. 84; Gould, Invert., ed. i, p. 162, fig. 92; ed. ii, p. 222, fig. 513. *Bulla insculpta* Totten, American Journ. Science, vol. xxviii, p. 350, fig. 4, 1835.

Massachusetts Bay to South Carolina. Common in the muddy lagoons

and salt-ponds along the shores of Vineyard Sound, Buzzard's Bay, and Long Island Sound. Abundant in a small pond near Holmes' Hole; in New Haven Harbor, in ditches near Fort Hale.

CYLICHNA ORYZA Stimpson. Plate XXV, fig. 164. (p. 432.)

Smithsonian Check-List, p. 4, 1860; Gould, Invert., ed. ii, p. 221, fig. 512. *Bulla oryza* Totten, Amer. Jour. Science, vol. xxviii, p. 350, fig. 5, 1835; Gould, Invert., ed. i, p. 163, fig. 93.

Cape Cod to South Carolina. Not uncommon in Vineyard Sound, Buzzard's Bay, and Long Island Sound. This species was recorded as from Casco Bay by Dr. Mighels, but as this habitat has not been confirmed subsequently, it was probably based on an erroneous identification. Fossil in the Post-Pliocene of Canada (Dawson).

CYLICHNA ALBA Lovén. Plate XXV, fig. 163. (p. 508.)

Öfversigt af Kongl. Vet.-Akad. Förhandlingar, vol. iii, p. 142, 1846; Gould, Invert., ed. ii, p. 220, fig. 511. *Volvaria alba* Brown, Ill. Conch. G. B., iii, p. 3, figs. 43, 44. *Bulla triticea* Couthouy, Boston Jour. Nat. Hist., vol. ii, p. 83, Plate 2, fig. 8, 1838; Gould, Invert., ed. i, p. 165, fig. 98.

Near Block Island, northward to the Arctic Ocean; northern coasts of Europe to Bergen; and on the northwest coast of America, south to Sitka. Fossil in the Post-Pliocene of Canada and Great Britain.

Most of the specimens of this shell dredged in the Bay of Fundy are opaque, yellowish brown or chestnut color, but those from Casco Bay are nearly all clear white and translucent, although of equal size.

UTRICULUS CANALICULATUS. Plate XXV, fig. 160. (p. 432.)

Stimpson, Smithsonian Check-List, p. 4, 1860; Gould, Invert., ed. ii, p. 219, fig. 510. *Volvaria canaliculata* Say, Jour. Acad. Nat. Sciences, Philadelphia, vol. v, p. 211, 1826; Binney's Say, p. 121. *Bulla canaliculata* Gould, Invert., ed. i, p. 166, fig. 97. *Tornatina canaliculata* H. and A. Adams, Genera, vol. ii, p. 13.

Massachusetts Bay to South Carolina. Common in Buzzard's Bay and Vineyard Sound, in 2 to 8 fathoms; less common in Long Island Sound. Fort Macon, North Carolina, abundant, (Dr. Yarrow). Fossil in the Post-Pliocene of North and South Carolina; and the Pliocene of South Carolina.

AMPHISPHYRA DEBILIS Verrill. Plate XXV, fig. 162. (p. 432.)

Bulla debilis Gould, Amer. Journ. Science, ser. i, vol. xxxviii, p. 196, 1840; Invert., ed. i, p. 164, fig. 95, 1841. *Diaphana debilis* Gould, Invert., ed. ii, p. 216, fig. 507. *Bulla pellucida* Brown, 1844. *Amphisphyra pellucida* Lovén, op. cit., p. 143, 1846. *Bulla hyalina* Turton, Mag. Nat. Hist., vol. vii, p. 353, 1834, (t. Jeffreys), (non Gmelin).

Cape Cod to the Arctic Ocean; and on the northern coasts of Europe, southward to Great Britain, Madeira, etc. Stonington, Connecticut, from stomach of cod (Linsley). Not uncommon in Casco Bay and Bay of Fundy, and northward, in 6 to 50 fathoms. Very rare south of Cape Cod. Fossil in the Post-Pliocene of Canada, Great Britain, Norway, and Sweden.

ACTÆON PUNCTO-STRIATA Stimpson. Plate XXV, fig. 165.

Shells of New England, p. 51, 1851; H. and A. Adams, Genera, vol. ii, p. 5. *Tor-natella puncto-striata* C. B. Adams, Boston Jour. Nat. Hist., vol. iii, p. 323, Plate 3, fig. 9, 1840; Gould, Invert., ed. i, p. 245, fig. 188; ed. ii, p. 224, fig. 515.

Cape Cod to South Carolina. Vineyard Sound, and Buzzard's Bay, not uncommon; Long Island Sound, rare; Huntington and Greenport, Long Island (S. Smith).

DORIDELLA Verrill.

Body smooth, oval, convex. Dorsal tentacles retractile, without sheaths. Head prominent, the lateral angles prolonged anteriorly as short oral palpi or tentacles. Foot broad, cordate. Branchiæ tufted, situated near the posterior end, on the right side, in the groove between the mantle and foot.

DORIDELLA OBSCURA Verrill. Plate XXV, figs. 173 *a, b*. (p. 400.)

American Journal of Science, vol. 1, p. 408, figs. 2, 3, November, 1870.

Body broad oval, 7.5^{mm} long and 5^{mm} broad; back convex, smooth. Foot broad, cordate in front. Oral disk broad, emarginate or with concave outline in front; the angles somewhat produced, forming short, obtusely pointed, tentacle-like organs, which in extension project beyond the front edge of the mantle. Dorsal tentacles small, stout, retractile. The branchiæ consist of a tuft of slender filaments, usually concealed by the edge of the foot. Color of body dark brown, lighter toward the edge, as if covered with nearly confluent blackish or brown spots, the whitish ground-color showing between them; foot, oral disk, and dorsal tentacles white; the central part of the body, beneath, with a three-lobed yellow spot due to the internal organs. Young specimens are flesh-color or yellowish brown above, specked with darker brown.

Vineyard Sound and Long Island Sound to Great Egg Harbor, New Jersey. Savin Rock, at low-water, under stones; off South End, 4 to 5 fathoms, shelly.

NUDIBRANCHIATA.

DORIS BIFIDA Verrill. Plate XXV, fig. 176. (page 307.)

American Journal of Science, vol. 1, p. 406, 1870.

Outline broad oval, widest anteriorly, about 25^{mm} long by 12^{mm} broad, in extension; back very convex, mantle covered with numerous, scattered, small but prominent, pointed papillæ. Tentacles rather long, thickest in the middle, the outer half strongly plicated with about twenty folds, but with a smooth tip, the base surrounded by small papillæ. Gills retractile into a single cavity, united together by a partial web, deeply frilled, much subdivided, bipinnate, the subdivisions fine and slender. Foot very broad, in extension projecting back beyond the mantle about a quarter of an inch, slightly tapering, rounded and slightly notched at the end. Oral disk or veil crescent-shaped, the front

a little prominent, the sides extended backward, and forming a curve continuous with that of the foot.

Color purplish brown, sprinkled with white specks; tentacles deep brown, speckled with white, tips yellowish; gills purplish at base, the edges and tips usually yellow; foot similar in color to mantle, but lighter.

Long Island Sound, at Savin Rock, near New Haven, to Eastport, Maine, under stones, at low-water mark.

ONCHIDORIS PALLIDA Verrill. (p. 495.)

American Journal of Science, vol. 1, p. 403, 1870; vol. iii, p. 212, 1872. *Doris pallida* Ag. MSS.; Stimpson, Invert. of Grand Manan, p. 26, 1853; Gould, Invert., ed. ii, p. 229, Plate 20, figs. 284, 287, 288, 291.

Off Cuttyhunk Island; Massachusetts Bay; Casco Bay; Bay of Fundy. In Eastport Harbor, not uncommon, from low-water mark to 30 fathoms.

POLYCERA LESSONII D'Orbigny. (p. 400.)

Magazine de Zoöl., vol. vii, p. 5, Plate 105 (t. Gould); Alder and Hancock, Brit. Nud. Moll., Fam. 1, Plate 24; Gould, Invert., ed. ii, p. 226, Plate 17, figs. 242-248. *Doris illuminata* Gould, Invert., ed. i, p. 4, 1841.

Long Island Sound to Labrador; European coasts, from Sweden to France and Great Britain. Savin Rock, near New Haven, Connecticut, at low-water, and off South End in 4 to 5 fathoms; Watch Hill, Rhode Island, 3 to 6 fathoms. Common in Casco Bay and Bay of Fundy, from low-water mark to 20 fathoms.

DENDRONOTUS ARBORESCENS Ald. and Hancock. (p. 495.)

British Nud. Moll., Fam. 3, Plate 3, 1850; Gould, Invert., ed. ii, p. 234, Plate 22, figs. 311-313. *Doris arborescens* Müller, Zoöl. Dan. Prod., p. 229, 1776; Fabricius, Fauna Gröul., p. 346, 1780. *Tritonia arborescens* Cuvier; Gould, Invert., ed. i, p. 5. *Tritonia Reynoldsii* Couthouy, Boston Journ. Nat. Hist., vol. ii, p. 74, Plate 2, figs. 1-4, 1838.

Watch Hill, Rhode Island, in 4 to 5 fathoms, common on *Laminaria* among *Obelia*; northward to Greenland; on the European coasts south to Great Britain and France; Sitka (Middendorff). Very common in the Bay of Fundy and Casco Bay, from above low-water mark to 60 fathoms. Rare and local south of Massachusetts Bay.

DOTO CORONATA Lovén. Plate XXV, fig. 170. (p. 400.)

Arch. Scand. Nat., p. 151 (t. Stimpson); Öfvers. af Kongl. Vet.-Akad. Förhandlingar, vol. iii, p. 139, 1846; Alder and Hancock, Brit. Nud. Moll., Fam. 3, Plate 6; Gould, Invert., ed. ii, p. 236, Plate 16, figs. 233-237. *Doris coronata* Gmelin, Syst. Nat., p. 3105, 1790.

New Jersey to Labrador; on the northern European coasts, southward to Great Britain, Holland, and France. Great Egg Harbor, New Jersey, 1 fathom, (A. E. V. and S. I. Smith); Long Island Sound, near New Haven; off Gay Head, Martha's Vineyard; off Watch Hill, Rhode Island, 4 to 5 fathoms, on *Obelia*. Common in Massachusetts Bay, Casco Bay, and Bay of Fundy, from low-water mark to 15 fathoms.

ÆOLIS PAPILLOSA Lovén. (p. 495.)

Öfvers. af Kongl. Vet.-Akad. Förh., vol. iii, p. 139, 1846; Gould, Invert., ed. ii, p. 238, fig. 518, and Plate 18, figs. 257-263. *Limax papillosus* Linné, Syst. Nat., ed. xii, vol. i, p. 1082, 1767. *Æolis farineacea* Gould, MSS.; Stimpson, Invert. Grand Manan, p. 25, 1853.

Rhode Island to the Arctic Ocean; northern coasts of Europe to Great Britain. Rare south of Cape Cod; Watch Hill, among roots of *Laminariae*; very common in Casco Bay and Bay of Fundy, from above low-water mark to 20 fathoms.

ÆOLIS, OR MONTAGUA. Species undetermined. (p. 495.)

A species about an inch long, with bright red, fusiform branchiæ, arranged in seven or eight transverse clusters on each side. Foot with prominent and acute auricles anteriorly.

Off Gay Head, 4 to 5 fathoms, rocks.

MONTAGUA PILATA Verrill. (p. 383.)

Æolis pilata Gould, Invert., ed. ii, p. 243, Plate 19, figs. 270, 277, 279, 231, 1870.
Æolidia pilata, this Report, p. 383. (See errata.)

Long Island Sound to Massachusetts Bay. Abundant in New Haven Harbor, on piles of Long Wharf.

MONTAGUA VERMIFERA Verrill.

Æolis vermiferus S. Smith, Annals Lye. Nat. Hist., N. Y., vol. ix, p. 391, 1870.

Greenport, Long Island (Smith). Long Island Sound, off Thimble Islands, 4 to 5 fathoms, among rocks.

The specimens from Thimble Islands differ somewhat from the original description. They were about half an inch long; moderately stout; the foot lanceolate, rapidly tapered posteriorly to a point, but not produced far beyond the branchiæ, nor slender-pointed; anteriorly the angles are somewhat produced, triangular, and pointed, their length equal to about half the breadth of the foot. Head rounded; tentacles rather stout, obtuse; the oral longer than the dorsal ones; the latter are transversely wrinkled. The branchial papillæ are fusiform, moderately stout, obtuse, arranged in about twelve transverse rows on each side, forming six clusters, the two rows forming each cluster separated by a narrow elliptical naked space, narrower than the spaces between the clusters; in each anterior row there are six or seven papillæ, the upper ones larger, the lowest short and blunt. Foot translucent, white, with a flake-white streak on the upper side posteriorly; body pale yellowish, minutely specked with greenish and flake-white; back of the dorsal tentacles there is, on each side, an orange patch, and there are others along the back; papillæ dark brown internally, irregularly specked with flake-white externally, forming toward the end an ill-defined white ring; the extreme tips are white; tentacles similar in color to the body.

MONTAGUA GOULDII Verrill, sp. nov.

Body elongated, rather slender; foot with the anterior angles only slightly prominent, and obtusely rounded; posteriorly it tapers gradually to an elongated slender point. Tentacles long, slender, not serrate, the dorsal ones a little longer than the oral; eyes small, black; branchial papillæ fusiform, moderately stout, grouped in eight or more transverse rows on each side, the rows being grouped two by two, so as to form transverse clusters, with two rows each, the rows of the clusters being separated by spaces narrower than those between the clusters. Color of body light yellow or tinged with pale orange; tentacles pale orange, with a flake-white stripe on the posterior surface; branchial papillæ dark brown or reddish brown internally, with a ring of opaque white close to the tips.

Length about 20^{mm}.

Off Thimble Island, in 4 to 5 fathoms, with the preceding species.

This is nearly allied to *M. Mananensis* Stimpson, but the angles of the foot are less produced and not acute, and the proportions of the tentacles are different. Dr. Gould seems to have confounded this species with *M. diversa* (*Æolis diversa* Couth.), and one of his figures (Plate 19, fig. 280) apparently represents this species; but certainly does not represent *M. diversa*, which was originally described and figured as having the oral tentacles longer than the dorsals (See Gould's figs. 267, 268, copied from Couthouy.)

CORYPHELLA GYMNOTA Verrill.

Eolis (Tergipes) gymnota Couthouy, Boston Jour. Nat. Hist., vol. ii, p. 69, Plate 1, fig. 3, 1838; Gould, Invert., ed. i, p. 7; ed. ii, p. 249, Plate 16, figs. 238-241.

Montagua gymnota H. and A. Adams, Genera, vol. ii, p. 74. *Cavolina gymnota*, this Report, p. 383. (See errata.)

Wood's Hole to Boston, Massachusetts.

TERGIPES DESPECTUS Adams. (p. 495.)

H. and A. Adams, Genera, vol. ii, p. 76, 1858. *Eolidia despecta* Johnston, Loud.

Mag. Nat. Hist., vol. viii, p. 378, fig. 35^e. *Eolis despecta* Alder and Hancock,

Brit. Nud. Moll., Fam. 3, Plate 37. *Æolis (Tergipes) despecta* Gould, Invert., ed. ii, p. 248, Plate 16, figs. 222-225.

Stonington, Connecticut, to Bay of Fundy and northward; northern coasts of Europe to Great Britain. Off Watch Hill, 4 to 5 fathoms, on *Laminaria*, among hydroids, abundant; Casco Bay; Eastport Harbor.

HERMÆA CRUCIATA A. Agassiz, MSS. Plate 25., fig. 175.

Gould, Invert., ed. ii, p. 253, Plate 17, fig. 256.

Naushon Island (A. Agassiz).

ELYSIA CILLOTICA Gould. Plate XXV, fig. 172. (p. 480.)

Invert., ed. ii, p. 255, Plate 17, figs. 251-255, 1870.

Great Egg Harbor, New Jersey, in pools on salt-marsh at low-water (A. E. V. and S. I. Smith). Cambridge, Massachusetts (Agassiz).

ELYSIELLA CATULUS Verrill. Plate XXV, fig. 171. (p. 480.)

American Journ. Science, vol. iii, p. 234, Plate 7, figs. 5, 5^a, 1872. *Placobranchus catulus* Agassiz, MSS.; Gould, Invert., ed. ii, p. 256, Plate 17, figs. 249, 250, 1870.

Great Egg Harbor, New Jersey, to Massachusetts Bay. New Haven Harbor and Wood's Hole, among eel-grass, common.

PTEROPODA.

GYMNOSOMATA.

CLIONE PAPILLONACEA Pallas. (p. 444.)

Spicil. Zoöl., x, p. 37, Plate 1, figs. 18, 19, (?) 1774. *Clio limacina* Phipps, Voyage to North Pole, p. 195, 1774 (t. Gould). *Clio retusa* Müller, Prod. Zoöl. Dan., 2742, 1776 (non Linné); Fabricius, Fauna Grönlandica, p. 334, 1780 (description excellent). *Clio borealis* Brugiere, Encyc. Meth., Vers., i, p. 502, 1792 (t. Gould). *Clione borealis* Gray, Brit. Mus. Pteropoda, p. 36, 1850; Stimpson, Shells of New England, p. 27, 1851; H. and A. Adams, Genera, vol. i, p. 62, Plate 7, fig. 7. *Clione limacina* Stimpson, Smithsonian Check-Lists, p. 4, 1860; Binney in Gould, Invert., ed. ii, p. 507, fig. 754 (poor). *Clio Miquelonensis* Rang, Ann. Sci. Nat., ser. i, vol. v, p. 235, Plate 7, fig. 2, 1825.

New York to the Arctic Ocean; on the northern coasts of Europe south to Great Britain. Off Stonington, Connecticut (A. E. V. and D. C. Eaton); Vineyard Sound (V. N. Edwards); Portland, Maine (C. B. Fuller).

The synonymy of this species has been greatly and unnecessarily confused. The *Clio retusa* of Linné was a southern Pteropod, having a triquetral shell. In a foot-note on page 1094 of the twelfth edition of the Systema Naturæ, he states that he had not seen the genus *Clio*, but adopts it from Brown. He gives three species mentioned by Brown, all having shells.

THECOSOMATA.

STYLIOLA VITREA Verrill. Plate XXV, fig. 178. (p. 443.)

American Journ. Science, vol. iii, p. 234, Plate 6, fig. 7, 1872.

Shell smooth, polished, diaphanous, almost glassy, long conical, rather slender, slightly curved toward the acute apex; animal white; locomotive organs obovate, with the end broadly rounded, and bearing slender tapering tentacle-like processes near the middle of the anterior edge; intermediate lobe short, rounded in front.

Length of shell, 11.5^{mm}; diameter, 2^{mm}.

Taken among *Salpa*, off Gay Head, Martha's Vineyard, in the afternoon, September 9, 1871.

Several other species of this and other related genera were taken by Messrs. S. I. Smith and Oscar Harger, off Saint George's Bank, in 1872, on the United States steamer Bache. These may occasionally occur also in the vicinity of Nantucket and Martha's Vineyard.

CAVOLINA TRIDENTATA. Plate XXV, fig. 177. (p. 444.)

H. and A. Adams, Genera, vol. i, p. 51, Plate 6, figs. 1, 1^a; Verrill, op. cit., p. 284. *Anomia tridentata* Forskal, Fauna Arab., p. 124, 1775; Icon., Plate 40, fig. b, (t. Lamarck). *Hyalæa cornea* Lamarck, Syst. des Anim., p. 140, 1801. *Hyalæa tridentata* Lamarck, Anim. sans Vert., ed. ii, vol. vii, p. 415.

Mediterranean Sea and the warmer parts of the Atlantic. The shells were dredged off Martha's Vineyard, at two localities, in 19 and 22 fathoms.

DIACRIA TRISPINOSA Gray. (p. 444.)

British Museum Pteropoda; H. and A. Adams, Genera, i, p. 52, Plate 6, fig. 2^a; Gould, Invert., ed. ii, p. 504. *Hyalæa trispinosa* Lesueur, in Blainville, Dict. des Sci. Nat., vol. xxii, p. 82, 1824; Forbes and Hanley, Brit. Moll., vol. ii, p. 380, Plate 5, fig. 3; Stimpson, Shells of New England, p. 27.

Gulf Stream and warmer parts of the Atlantic generally. Occasionally cast ashore at Nantucket (Stimpson).

SPIRIALIS GOULDII Stimpson. (p. 443.)

Proc. Boston Soc. Nat. Hist., vol. iv, p. 8, 1851; Shells of New England, p. 27, Plate 1, fig. 4. *Heterofusus balea* and *H. retroversus* Binney, in Gould, Invert., ed. ii, p. 505, Plate 27, figs. 345-349, (not of European writers). *Spirialis Flemingii* A. Agassiz, Proc. Boston Soc. Nat. Hist., vol. x, p. 14, 1865, (not of Forbes). *Heterofusus Alexandri* Verrill, Amer. Jour. Science, vol. iii, p. 281, 1872 (young).

Near Naushon Island and Nahant, Massachusetts (A. Agassiz). Twenty miles off No Man's Land, in stomach of herring, (S. I. Smith). Off Saint George's Bank, in Gulf Stream, (S. I. Smith and O. Harger). The identity of this species with the *Limacina balea* Möller, of Greenland, is very questionable. The description of the latter is brief, and no mention is made of the spiral sculpture, which is an important character of *S. Gouldii*.

LAMELLIBRANCHIATA.

DIMYARIA.

TEREDO NAVALIS Linné. Plate XXVI, fig. 183. Plate XXVII, fig. 186. (pp. 384, 482.)

Systema Naturæ, ed. xii, p. 1267, 1767; Tryon, Proc. Acad. Nat. Sciences, vol. xiv, p. 468, 1862; Gould, Invert., ed. ii, p. 23, fig. 355; Jeffreys, Brit. Conch., vol. iii, p. 171.

Coast of United States, from Florida to Vineyard Sound; coasts of Europe, from Sweden (Christiania) and Great Britain to Sicily; Algeria and the Black Sea (Jeffreys); Senegal. Great Egg Harbor, New Jersey; New Haven Harbor, in piles of wharves; Wood's Hole, in piles of wharf; Vineyard Sound and Buzzard's Bay, in cedar buoys.

This is the most abundant species on our Atlantic coast, south of Massachusetts Bay, where it also probably occurs.

TEREDO MEGOTARA Hanley. Plate XXVII, fig. 188. (p. 387.)

Forbes and Hanley, Brit. Conch., vol. i, p. 77, Plate 1, figs. 1, 2; Plate 18, figs. 1, 2; vol. iv, p. 247; Tryon, op. cit., p. 466, 1862; Jeffreys op. cit., p. 176; Gould, Invert., ed. ii, p. 30, fig. 357.

Massachusetts Bay to South Carolina. Common in floating drift-wood, in the North Atlantic; north to Greenland, Iceland, and Spitzbergen; coasts of Scandinavia and Great Britain. Fossil in the Post-Pliocene of Scandinavia.

TEREDO THOMSONII Tryon. Plate XXVII, fig. 187. (p. 387.)

Proc. Acad. Nat. Sci., Philadelphia, vol. xv, p. 28, Plate 2, figs. 3, 4, 5, 1863; Gould, Invert., ed. ii, p. 31, fig. 358.

New Bedford, Massachusetts, in cedar buoys (Tryon). Provincetown, Massachusetts, in whale-ship (Atwood).

TEREDO DILATATA Stimpson.

Proc. Boston Soc. Nat. Hist., vol. iv, p. 113, 1851; Shells of New England, p. 26; Tryon, op. cit., p. 464, 1862; Gould, Invert., ed. ii, p. 32, fig. 359.

Massachusetts to South Carolina (Tryon). Cape Ann, in buoys, (Stimpson). Provincetown, Massachusetts (Gould). Greenport, Long Island (S. Smith). I have not met with this species south of Cape Cod.

XYLOTRYA FIMBRIATA Jeffreys. Plate XXVII, fig. 189. (p. 387.)

Annals and Mag. Nat. Hist., ser. iii, vol. vi, p. 126, 1860; Tryon, op. cit., p. 478, 1862; Gould, Invert., ed. ii, p. 34, fig. 361. *Teredo palmulata* Forbes and Hanley, Brit. Moll., vol. i, p. 86, Plate 2, figs. 9-11, (non Lamarek). *Xylotrya palmulata* Stimpson, Check-List, p. 3, 1860; Perkins, Proc. Boston Soc. Nat. Hist., vol. xii, p. 141, 1869.

Long Island Sound to Florida; Pacific coast, at the Straits of Fuca; Europe. In an old submerged wreck near New Haven. From the hull of the "Peterhoff," used in the blockade of the southern coast during the late war. Frequent in vessels from foreign ports.

PHOLAS TRUNCATA Say. Plate XXVII. fig. 200. (p. 372.)

Journal Acad. Nat. Sciences, Philadelphia, ser. i, vol. ii, p. 321, 1822; Binney's Say, p. 107; Hanley, Recent Shells, p. 6, Plate 9, fig. 26; Tryon, op. cit., p. 202; Gould, Invert., ed. ii, p. 33, fig. 364.

Vineyard Sound to Florida. Payta, Peru (Tryon). Common on the shores of Long Island Sound, near New Haven. The large specimens from Sable Island (Gould), mentioned by Tryon, were not this species, but *Z. crispata*.

PHOLAS COSTATA Linné. (p. 433.)

Systema Naturæ, ed. xii, p. 1111, 1762; Tryon, Proc. Acad. Nat. Sciences, Philadelphia, xiv, p. 201, 1862; Gould, Invert., ed. ii, p. 37, fig. 363.

Caribbean Sea to Buzzard's Bay. Southern Europe (Linné). New Bedford Harbor, living, (Gould); Wood's Hole, Massachusetts, dead

shells dredged, (A. E. V.); Long Island Sound. Atlantic City, New Jersey (Tyron). Specimens from the east and west coasts of Florida; and from near Vera Cruz, Mexico (coll., Mr. Salt), are also in the museum of Yale College.

ZIRPHÆA CRISPATA Mörch, 1853. (p. 433.)

H. and A. Adams, Genera, vol. ii, p. 327, Plate 89, figs. 5, 5a, 1853; Tryon, op. cit., p. 211, 1862. *Pholas crispata* Linné, Syst. Nat., ed. xii, p. 1111, 1767; Gould, Invert., ed. i, p. 27. *Zirpha crispata* Gray, Figures of Moll. Anim., Plate 338, fig. 5, and 339, fig. 5, 1857; Ann. and Mag. Nat. Hist., ser. ii, vol. viii, p. 385, 1851; Gould, Invert., ed. ii, p. 39, fig. 365.

Stonington, Connecticut, to Gulf of Saint Lawrence; Iceland; northern coasts of Europe, south to France, and the southern coasts of Great Britain; west coast of North America, south to California. Charleston, South Carolina (Stimpson, t. Gould). New Jersey (t. Gould). Wood's Hole, dead shells dredged, (A. E. V.). Common in Casco Bay, in 10 to 20 fathoms, perforating hard clay and sunken but sound wood; also in the Bay of Fundy, in 8 to 70 fathoms, in hard clay. Mr. C. B. Fuller has obtained fine large specimens in submerged tree-stumps at extreme low-water mark on Jewell's Island, Casco Bay. Fossil in the Post-Pliocene of Maine, Scandinavia; and in the Coralline and Red Crags of Great Britain. Its occurrence at Charleston, South Carolina, needs confirmation.

Martesia cuneiformis Gray, 1851; Tryon, op. cit., p. 219. *Pholas cuneiformis* Say, Jour. Acad. Nat. Sci., Philad., vol. ii, p. 322, 1822.

This species was found by Mr. Perkins in oyster-shells, near New Haven, but it was probably brought from farther south (Maryland or Virginia) in the oysters. It inhabits the coasts of Florida and the West Indies.

Diplothyra Smithii Tryon, op. cit., p. 450, 1862.

This species was described from specimens found in oyster-shells at Staten Island, where they were supposed to have lived. If really indigenous there, it may be expected to occur in Long Island Sound.

SAXICAVA ARCTICA Deshayes. Plate XXVII, fig. 192. (p. 309.)

Elem. Conch., Plate xii, figs. 8, 9 (t. Gould); Forbes and Hanley, Brit. Moll., vol. i, p. 141, Plate 6, figs. 4-6; Gould, Invert., ed. ii, p. 89, fig. 397. *Mya arctica* Linné, Syst. Nat., ed. xii, p. 1113, 1767. *Mytilus rugosus* Linné, Syst. Nat., ed. xii, p. 1156. *Saxicava rugosa* Lamarek, Anim. sans Vert., ed. ii, vol. vi, p. 152; Gould, Invert., ed. ii, p. 87; Jeffreys, Brit. Conch., vol. iii, p. 81. *Mytilus pholadis* Linné, Mant. Plant., p. 543. *Saxicava pholadis* Lamarek, op. cit., vol. vi, p. 152. (?) *Saxicava distorta* Say, Jour. Acad. Nat. Sci., Philad., vol. ii, p. 313, 1822; Gould, ed. i, p. 62.

Georgia and South Carolina to the Arctic Ocean; northern coasts of Europe to the Mediterranean; Pacific Coast of America, south to Santa Barbara, California. Various other parts of the world are given as localities by different authors. On our coast this shell is very common from Massachusetts Bay to Labrador, occurring from low-water mark to 50

fathoms or more. In Casco Bay it is extremely abundant in rocky, cavernous pools, among the ledges at low-water mark, and mostly attached by a byssus, associated with *Modiola modiolus*. I also found specimens in 10 to 15 fathoms, perforating recent and sound shells of *Cyprina Islandica*. In the Gulf of Saint Lawrence, near Anticosti Island, where limestone abounds, I have found it burrowing in the limestone in large numbers. South of Cape Cod it is far less abundant, though not uncommon in Long Island Sound. Var. *distorta* (Say) is common from Fort Macon to Georgia, and is possibly a distinct species. Fossil in the Post-Pliocene of Maine, New Brunswick, Canada, Anticosti, Labrador, Scandinavia, and Great Britain; in the Coralline and Red Crags of England, etc. Var. *distorta* is found in the Miocene of Maryland.

MYA ARENARIA Linné. Plate XXVI, fig. 179. (pp. 357, 463.)

Systema Nature, ed. xii, p. 1112, 1767; Gould, Invert., ed. i, pp. 40, 359; ed. ii, p. 55, fig. 375. *Mya mercenaria* and *M. acuta* Say, Journal Acad. Nat. Sci., Philadelphia, vol. ii, p. 313, 1822.

South Carolina to the Arctic Ocean; northern coasts of Europe, south to England and France; northeastern coast of Asia, south to China and Japan (Hakodadi). Sitka (Middendorff). South Carolina (Gibbs). Fort Macon, North Carolina (Dr. Yarrow). Comparatively scarce south of Cape Hatteras. Very abundant from New Jersey northward, both in brackish estuaries and on the open coasts. Particularly large and fine in Long Island Sound (see p. 463). Casco Bay and Bay of Fundy, from half-tide mark to 40 fathoms, those dredged being all young. Fossil in the Post-Pliocene of Scandinavia, Greenland, Labrador, Canada, New England, Virginia, South Carolina, etc.; in the Red-Crag and all later formations in Great Britain; and in the Miocene of Virginia.

CORBULA CONTRACTA Say. Plate XXVII, fig. 191. (p. 418.)

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 312, 1822; Gould, Invert., ed. i, p. 43, fig. 37; ed. ii, p. 60, fig. 377.

Cape Cod to Florida. Common, living, in Vineyard Sound and Buzzard's Bay, in 5 to 19 fathoms; Long Island Sound, near New Haven, not uncommon in shallow water. Georgia (Couper). Fossil in the Post-Pliocene of Virginia, North and South Carolina; and in the Pliocene of South Carolina. A closely related species occurs in the Miocene of Maryland.

LYONSIA HYALINA Conrad. Plate XXVII, fig. 194. (p. 358.)

American Marine Conchology, p. 51, Plate 11, fig. 2, 1831; Gould, Invert., ed. ii, p. 64, fig. 380. *Mya hyalina* Conrad, Jour. Acad. Nat. Sci., Philadelphia, vol. vi, p. 261, Plate 11, fig. 12, 1831. *Ostodesma hyalina* Couthouy, Boston Jour. Nat. Hist., vol. ii, p. 166, 1839; Gould, Invert., ed. i, p. 46, fig. 31.

Florida to Gulf of Saint Lawrence. Common in Long Island Sound, Buzzard's Bay, Vineyard Sound, Massachusetts Bay, Casco Bay, and Bay of Fundy; low-water mark to 30 fathoms; Beaufort, North Carolina (Coues).

CLIDIOPHORA TRILINEATA Carpenter. Plate XXVII, fig. 193. (p. 418.)

Proc. Zool. Soc., London, 1864, p. 597; Mollusks of W. N. America, p. 226. *Pandora trilineata* Say, Journ. Acad. Nat. Sciences, Philadelphia, vol. ii, p. 261, 1822; Gould, Invert., ed. i, p. 44; ed. ii, p. 62, fig. 379.

Florida to Gulf of Saint Lawrence. Common in Long Island Sound; off Block Island, 29 fathoms; Buzzard's Bay; Vineyard Sound; Casco Bay; and Bay of Fundy; low-water mark, to 30 fathoms; Great Egg Harbor, New Jersey, 1 fathom. Beaufort, North Carolina (Cones, Yarrow). Fossil in the Post-Pliocene of Virginia and South Carolina; and in the Pliocene of South Carolina. A closely-related form, *C. crassidens* (Conrad, sp.), occurs in the Miocene of Virginia.

PERIPLOMA POPYRACEA Verrill. Plate XXVII, fig. 197. (p. 509.)

Amer. Journal Science, vol. iii, pp. 213, 285, Plate 7, figs. 1, 1^a, 1^b (animal and hinge), 1872. *Anatina papyraria* Say, op. cit., p. 314, 1822. *Anatina papyracea* Gould, Invert., ed. i, p. 47, fig. 28; ed. ii, p. 66, fig. 382. *Anatina fragilis* Totten (name provisional), Amer. Jour. Science, vol. xxviii, p. 347, fig. 1, 1835.

New Jersey to Labrador. Anticosti Island (A. E. V.); not uncommon in Massachusetts Bay, Casco Bay, and Bay of Fundy, 10 to 100 fathoms. Less frequent south of Cape Cod; off Block Island, in 29 fathoms, (A. S. Packard); Newport, Rhode Island (Totten); Greenport, Long Island (S. Smith). Chateau Bay, Labrador (Packard).

This species, when young, is liable to be confounded with *Thracia myopsis* Beck = *T. Couthouyi* Stimpson (see Plate XXVII, fig. 196), but they are easily distinguished by the structure of the hinge. The latter occurs in Massachusetts Bay, Bay of Fundy, etc., northward to Greenland, but has not been recorded from south of Cape Cod.

COCHLODESMA LEANUM Couthouy. Plate XXVII, fig. 198. (p. 418.)

Boston Jour. Nat. Hist., vol. ii, p. 170, 1839; Stimpson, Shells of New England, p. 22; Gould, Invert., ed. i, p. 49, figs. 29, 30; ed. ii, p. 63, fig. 383. *Anatina Leana* Conrad, Jour. Acad. Nat. Sciences, vol. vi, p. 263, Plate 11, fig. 11, 1831.

North Carolina to the Gulf of Saint Lawrence. Vineyard Sound and Long Island Sound, not uncommon in 3 to 10 fathoms; Casco Bay and Eastport, Maine, rarely obtained alive; banks off Nova Scotia (Willis); Saint George's Bank (S. I. Smith and O. Harger). A related species, *C. antiquatum* (*Periploma antiquata* Conrad), occurs in the Miocene of Virginia.

THRACIA CONRADI Couthouy. (p. 426.)

Boston Jour. Nat. Hist., vol. ii, p. 153, Plate 4, fig. 2, 1839; Gould, Invert., ed. i, p. 50; ed. ii, p. 69, fig. 384. *Thracia declivis* Conrad, Amer. Mar. Conch., p. 44, Plate 9, fig. 2, 1831 (not of Pennant).

Long Island to Gulf of Saint Lawrence. Vineyard Sound, 6 to 8 fathoms; Casco Bay, 6 to 15 fathoms; Frenchman's Bay, near Mount Desert, Maine, 3 to 8 fathoms. Eastport, Maine, in 6 fathoms, and Grand Menan (Stimpson); Nahant, Massachusetts (Haskell); Rhode Island

and Buzzard's Bay (Gould); Labrador (Packard). Fossil in the Post-Pliocene (Leda-clay) at Saco, Maine (Fuller).

This species burrows so deeply in the mud or sand that it is seldom taken alive with the dredge.

THRACIA TRUNCATA Mighels and Adams. Plate XXVII, fig. 195. (p. 509.)

Boston Jour. Nat. Hist., vol. iv, p. 38, Plate 4, fig. 1, 1842; Gould, Invert., ed. ii, p. 72, fig. 386.

Long Island to Greenland. Off Block Island, 29 fathoms; Casco Bay, 10 to 20 fathoms; Bay of Fundy. Off Long Island, 37 fathoms, (Gould). Greenland, in 60 fathoms, (Mörch).

ENSATELLA AMERICANA Verrill. Plate XXVI, fig. 182; Plate XXXII, fig. 245. (p. 356.)

American Jour. Science, vol. iii, pp. 212, 284, 1872. *Solen Americanus* Gould, Invert., ed. ii, p. 42, 1870 (provisional name). *Solen ensis* Gould, op. cit., ed. i, p. 28; and ed. ii, p. 40 (*non* Linné); Dekay, Nat. Hist. New York, Moll., p. 242, Plate 33, fig. 313. *Ensis Americana* H. and A. Adams, Genera, vol. ii, p. 342.

Florida to Labrador. Common at Great Egg Harbor, New Jersey; Long Island Sound; Buzzard's Bay; Vineyard Sound; Massachusetts Bay; Casco Bay; Bay of Fundy; Gulf of Saint Lawrence; low-water mark to 20 fathoms, sandy. Fort Macon, North Carolina, abundant, (Coues). Georgia (Couper). Labrador, rare (Packard). Saint George's Bank (S. I. Smith).

Fossil in the Post-Pliocene of Portland, Maine; Point Shirley, Massachusetts; Nantucket; Virginia; and South Carolina; in the Pliocene of South Carolina; and Miocene of Maryland; North and South Carolina.

In this species the siphonal tubes, in mature shells, protrude about 35^{mm}, and are united together for about half their length, beyond which they are round and divergent, subequal. Both orifices are surrounded by a similar circle of numerous papillæ, of three sizes; the larger ones are enlarged in the middle, acute at tips, with a large black spot on each side of the base; alternate with these are somewhat smaller ones of the same form and with similar basal spots; alternating with the primary and secondary ones are small tapering papillæ, less than half the length of the longest; numerous slender tapering papillæ are also scattered irregularly over the sides of the free portions of both tubes, in some cases in irregular rows of four to six, while on the ventral side of the branchial tube two rows of alternating papillæ extend along the whole length of the siphon. The mantle is closed ventrally for most of its length; there is a posterior opening for the protrusion of the foot, and a small opening just in advance of it, and another opening near the middle of the ventral border; the latter is fringed with small conical papillæ. Foot long; the end bulbous, obliquely truncated and beveled laterally.

Solen viridis Say. This species has been recorded from the southern coast of New England by several writers (Stonington, Connecticut, Linsley; Rhode Island, Conrad), but I have myself met with no authentic New England specimens. It may, however, occur rarely and perhaps accidentally. It is not uncommon on the outer beach at Great Egg Harbor, New Jersey, and farther south, to Florida.

SILIQUA COSTATA Adams. Plate XXXII, fig. 244. (p. 358.)

H. and A. Adams, Genera, vol. ii, p. 345, 1858. *Solen costatus* Say, Jour. Acad. Nat. Sci., Philad., vol. ii, p. 315, 1822; Hanley, Recent Shells, p. 15, Plate 9, fig. 28 (non *Leguminaria costata* Schum., 1817 = *Siliqua radiata* Linné, sp.). *Solen Sayii* Gray, Griffith's Cuvier, xii, Plate 31, fig. 3 (t. Gould). *Machara costata* Gould, Invert., ed. i, p. 34, and fig. on p. 24, 1841; ed. ii, p. 47, fig. 370.

Cape Hatteras to Gulf of Saint Lawrence. Rare or local north of Casco Bay. Not observed in the Bay of Fundy. Common in Massachusetts Bay; Vineyard Sound; Great Egg Harbor, New Jersey. Comparatively rare in Long Island Sound, near New Haven; Fire Island Beach, Long Island (S. I. Smith). Coney Island, etc. (S. Smith). Rimouski, Gulf of Saint Lawrence, common, (Bell). Banks off Nova Scotia (Willis). The earliest name for this genus appears to be *Siliqua* Muhlfeldt, 1811. It was named *Leguminaria* by Schumacher in 1817, and *Machara* by Gould, in 1841. The latter name is, moreover, preoccupied by *Machara* Cuvier, 1832.

TAGELUS GIBBUS Gray. Plate XXVI, fig. 181; Plate XXX, fig. 217. (p. 373.)

Proc. Zool. Soc., London, xv, 1847; Dall, Proc. Boston Soc. Nat. Hist., vol. xiii, p. 251, 1870. *Solen gibbus* Spengler, Skrivt. Nat. Selks., vol. iii, p. 104, 1794 (t. Gould). *Solen Guineensis* Chemnitz, Conch., xi, p. 202, Plate 198, fig. 1937, 1799. *Solen Caribæus* Lamarck, Anim. sans Vert., ed. ii, vol. vi, p. 58. *Solecurtus Caribæus* Gould, Invert., ed. i, p. 30. *Solecurtus gibbus* Forbes and Hanley, Brit. Moll., vol. i, p. 267; Gould, Invert., ed. ii, p. 43, fig. 367. *Siliquaria notata* Schumacher, Essai d'un Nouv. Syst. des Habit. des Vers test., p. 129, Plate 7, figs. 2, 3, 1817 (not the genus *Siliquaria* Brug.; Lamarck, 1801). *Siliquaria gibba* H. and A. Adams, Genera, p. 347, Plate 93, figs. 5, 5a, 1858.

Caribbean Sea, West Indies, and Gulf of Mexico to Cape Cod. Similar if not identical species are found on the Pacific coast of Central America, and on the west coast of Africa. Vineyard Sound and Buzzard's Bay, not uncommon; Great Egg Harbor, New Jersey, abundant. Fort Macon, North Carolina, very common (Coues). Alabama (Mighels). Fossil in the Post-Pliocene of Virginia, South Carolina, and Florida; in the Pliocene of South Carolina; and in the Miocene of North and South Carolina.

The name, *Siliquaria* Schumacher, 1817, adopted for this genus by several recent writers cannot be retained, because preoccupied by Brugiere, 1791, and by Lamarck (see Syst. des Anim., 1801, p. 98) for a genus of *Vermetide*.

This genus is widely different from the restricted genus *Solecurtus*

Blainv., 1824, = *Macha* Oken, 1835, and undoubtedly belongs to the *Tellinidæ*, near *Psammobia*, as shown by the structure of the soft parts. (See page 373 and Plate xxvi, fig. 181).

TAGELUS DIVISUS. Plate XXX, fig. 218. (p. 435.)

Dall, op. cit., p. 251, 1870. *Solen divisus* Spengler, op. cit., p. 96, 1794 (t. Gould). *Solen bideus* Chemnitz, op. cit., p. 203, Plate 198, fig. 1939, 1799. *Solen fragilis* Pulteney, Dorset Catal., p. 28, Plate 4, fig. 5, 1798 (t. Gould). *Solen centralis* Say, Journ. Acad. Nat. Sci., Philad., vol. ii, p. 316, 1822. *Solecurtus bideus* Forbes and Hanley, op. cit., vol. i, p. 266; Stimpson, Shells of New England, p. 22. *Solecurtus divisus* Gould, Invert., ed. ii, p. 44, fig. 368. *Macha divisus* Gray, Catal. Brit. Moll., p. 160. *Leguminaria Floridana* Conrad, Proc. Acad. Nat. Sci., Philad., vol. iv, p. 121, 1848. *Mesopleura bidentata* Conrad, Catal. Solenidæ, Amer. Jour. Conch., vol. iii, Appendix, p. 23, 1867.

Gulf of Mexico and West Indies to Cape Cod. Vineyard Sound and Buzzard's Bay, not common. Rhode Island, rather common, (Gould). Fort Macon, North Carolina, common, (Cones). Tampa Bay, Florida, (Conrad, Jewett).

MACOMA FRAGILIS Adams. Plate XXX, fig. 222.

H. and A. Adams, Genera, vol. ii, p. 400, 1858.

Var. fusca = *Macoma fusca* Adams. (p. 359.)

Genera, vol. ii, p. 400; Gould, Invert., ed. ii, p. 93, fig. 400. *Psammobia fusca* Say, Journ. Acad. Nat. Sci., Philad., vol. v, p. 220, 1826. *Sanguinolaria fusca* Conrad, Amer. Mar. Conch., p. 34, Plate 7, fig. 1, 1831; Gould, Invert., ed. i, p. 66, fig. 42.

Var. fragilis.

Venus fragilis O. Fabricius, Fanna Grönlandica, p. 413, 1780. *Tellina Grönlandica* Beek, Lyell, in Trans. Geol. Soc., London, vol. v, p. 137, Plate 16, fig. 8, 1841. *Macoma Grönlandica* Packard, Mem. Boston Soc., vol. i, pp. 235, 243, etc., 1866; Dawson, Notes on Post-Pliocene Geology of Canada, p. 72, from Canadian Naturalist, vol. vi, 1872. *Tellina Fabricii* Hanley; Sowerby, Thesaurus, p. 112, (t. Möreh).

Georgia to Greenland. *Var. fusca* is abundant on the entire coast of New England, Long Island, and New Jersey. Georgia (Say, Couper). *Var. fragilis* is abundant from Long Island Sound and Massachusetts Bay to Labrador. The two forms grade into one another insensibly.

A closely related but apparently distinct species, *M. Bathica* (Linné, sp.), is abundant in the Baltic and elsewhere on the northern coasts of Europe, and has been regarded as identical by several writers. Another similar form, *inconspicua* (Sowerby), occurs on the northwest coast of America, but is regarded as distinct by Dr. P. P. Carpenter and others.

As a fossil, *var. fragilis* is abundant in the Post-Pliocene deposits of New England, New Brunswick, Canada, Labrador, and Greenland; *var. fusca* occurs in the Post-Pliocene of New England, Virginia, North Carolina, and South Carolina.

MACOMA SABULOSA Mörch.

Tellina (Macoma) sabulosa Mörch, in Naturh. Bidrag til Beskr. af Grönland, p. 90, 1857. *Tellina sabulosa* Spengler, Skrivt. Nat., vol. iv, part 2, 1798. *Tellina proxima* Gray, Zoöl. Beechey's Voyage, p. 154, Plate 44, fig. 4, 1839. *Tellina sordida* Couthouy, Boston Jour. Nat. Hist., vol. ii, p. 59, Plate 3, fig. 11, 1839. *Sanguinolaria sordida* Gould, Invert., ed. i, p. 67, 1841. *Tellina lata* Lovén, Öfvers. af Kongl. Vet.-Akad., Förhand., vol. xi, p. 195, 1846 (not *Tellina lata* Gmelin, 1790, which is a *Thracia*, t. Mörch). *Tellina calcarea* Lyell, Phil. Trans., 1836 (not Chemnitz, 1782 = a *Mactra*, t. Mörch). *Macoma proxima* Gould, ed. ii, p. 95, fig. 401; this Report, p. 503. *Macoma calcarea* Adams; Dawson, op. cit., p. 73.

Connecticut to the Arctic Ocean; northern coasts of Europe; North Pacific; south on the coast of Asia to Hakodadi, Japan; and, perhaps (as *M. expansa*, a doubtful variety), on the west coast of America south to Puget Sound. Off Block Island, in 29 fathoms, rare; Casco Bay, 3 to 60 fathoms, not uncommon; Quahog Bay, Maine, 3 to 5 fathoms, soft mud, large and abundant; Bay of Fundy, 4 to 80 fathoms. Stonington and Stratford, Connecticut (Linsley); Saint George's Bank (S. I. Smith). Fossil in the Post-Pliocene of Maine, New Brunswick, Canada, Labrador, Scandinavia, and Great Britain.

The *Tellina tenera* Leach, 1818 (*non* Say), has been regarded as a synonym of this species by most writers; Mörch considers it identical with *M. fragilis*.

ANGULUS TENER. Plate XXVI, fig. 180; Plate XXX, fig. 223. (p. 358.)

Tellina (Angulus) tener H. and A. Adams, Genera, vol. ii, p. 398, 1858. *Angulus tener* Verrill, Amer. Jour. Science, vol. iii, p. 290, Plate 6, figs. 1, 1a, 1872. *Tellina tenera* Say, Jour. Acad. Nat. Sci., Philad., vol. ii, p. 303, 1822; Hanley, Recent Shells, p. 65, Plate 9, fig. 38; Gould, Invert., ed. i, p. 68, fig. 44; ed. ii, p. 97, fig. 403.

Florida to Gulf of Saint Lawrence. Common on the coast of New Jersey, Long Island, Long Island Sound, Buzzard's Bay, Vineyard Sound, Massachusetts Bay; less common in Casco Bay and Bay of Fundy. Gaspé, Canada (Dawson). Fort Macon, North Carolina (Coues). A closely-allied form (*A. declivis* = *Tellina declivis* Conrad, Journ. Acad. N. Sc., Phil., vol. vii, p. 131) occurs in the Miocene of Virginia.

ANGULUS TENELLUS Verrill. Plate XXX, fig. 224.

Angulus modestus Verrill, Amer. Jour. Science, vol. iii, pp. 210, 285, Plate 6, figs. 2, 2a, 1872; this Report, p. 418, (*non* Carpenter, 1864).

Shell smooth, shining, more or less iridescent, with very fine concentric striae. Form similar to that of *A. tener*, but more oblong, and with the anterior dorsal margin nearly straight, or even slightly concave; the beaks are at about the posterior third, and scarcely prominent; the posterior end slopes rapidly, and is subtruncate at the end; the ventral margin is but slightly convex in the middle, and sub-parallel with the dorsal margin. The shell is often a little thickened, and firmer than in *A. tener*, but is sometimes as thin. Color, pink, light straw-color, or

white; often banded concentrically with these colors. The hinge-margin is stouter and the teeth stronger than in *A. tener*, and different in relative size and proportions; the ligament-plate is also longer.

Long Island Sound and Vineyard Sound; 4 to 10 fathoms, mud and sand.

TELLINA TENTA Say. Plate XXX, fig. 223. (p. 432.)

American Conchology, Part vii, Plate 65, fig. 3, 1837; Binney's Say, p. 228; Hanley, Recent Shells, p. 65, Plate 14, fig. 10; Gould, Invert., ed. i, p. 68, fig. 43; ed. ii, p. 96, fig. 402. *Tellina (Peronca) tenta* H. and A. Adams, Genera, vol. ii, p. 499, 1858.

Cape Cod to South Carolina. Vineyard Sound and Buzzard's Bay, 2 to 10 fathoms, mud, common; Long Island Sound; Great Egg Harbor. Greenport, Long Island (S. Smith); Fort Macon, North Carolina (Coues); South Carolina (Say).

Fossil in the Post-Pliocene of South Carolina.

Tellina versicolor Cozzens.

Jay, Catalogue Shells, ed. ii, p. 12, 1836; Dekay, Nat. Hist. New York, Moll., p. 208, Plate 26, fig. 272.

Glass House Point, near New York (Cozzens); Stratford, Connecticut (Linsley).

I have met with no shells corresponding precisely with the description of this species.

GASTRANELLA Verrill.

American Journal of Science, vol. iii, p. 286, 1872.

"Shell oblong, more or less irregular, and sometimes with the ventral margin inflexed; pallial sinus large; ligament external, elongated. Right valve with two small cardinal teeth; the posterior one thin, directed obliquely backward. Left valve with two cardinal teeth; the posterior one stout, bilobed; the anterior one smaller. No distinct lateral teeth. Animal with long, slender, separate siphonal tubes, with a simple circle of papillæ at the ends; mantle well open anteriorly; foot ligulate. The curious little shell for which this genus is constituted apparently resembles *Gastrana* more than any other described genus."

GASTRANELLA TUMIDA Verrill. Plate XXVII, fig. 190. (p. 418.)

American Jour. Sci., vol. iii, pp. 210, 286, Plate 6, figs. 3, 3a, 1872.

Shell small, variable in form, swollen above, more or less elongated oval, or oblong, with rounded ends, compressed posteriorly. The beaks are rounded, somewhat prominent, incurved but not approximate, and directed somewhat forward; the anterior dorsal margin is deeply concave in front of the beaks, but without a distinct lunule, at the anterior end regularly rounded or a little prolonged, compressed; ventral margin slightly convex, or nearly straight and sub-parallel with the dorsal margin, or incurved, in the different specimens; posterior end broadly rounded in some, decidedly prolonged in others; dorsal posterior mar-

gin usually nearly straight for at least half its length, sometimes a little convex and gradually sloping throughout. Surface with fine, somewhat irregular, concentric striæ, slightly iridescent. Color white, with the umbos purple. Length, 4^{mm}; height, 2.5^{mm}.

Long Island Sound, near New Haven, 4 to 6 fathoms, shelly and gravelly bottom, among hydroids and sponges (A. E. V.).

Abra æqualis Say.

American Conch., Part iii, Plate 23; outer figures, 1831; Binney's Say, p. 132, same plate; Stimpson, Check-List, p. 3, 1860. *Amphidesma æqualis* Say, Journ. Acad. Nat. Sci., Philadelphia, vol. ii, p. 307, 1822; American Conch., Part iii, Plate 23; Binney's Say, pp. 100, 132. *Semele æqualis* Verrill, Amer. Jour. Science, vol. iii, p. 210, 1872.

Florida and Gulf of Mexico to Cape Hatteras; rare and local farther north. Stonington, Connecticut, from cod-stomachs (Linsley). Fort Macon, North Carolina, abundant (Coates, Yarrow). Texas (Rœmer). Charleston, South Carolina (Say).

The occurrence of this southern species at Stonington needs confirmation. I have seen no specimens from north of Cape Hatteras.

Fossil in the Miocene of North and South Carolina.

CUMINGIA TELLINOIDES Conrad. Plate XXX, fig. 221. (p. 418.)

Journ. Acad. Nat. Sci., Philad., vol. vii, p. 234, 1837; Gould, Invert., ed. i, p. 56, fig. 36; ed. ii, p. 79, fig. 390. *Maetra tellinoides* Conrad, Journ. Acad. Nat. Sci., Philad., vol. vi, p. 253, Plate 9, figs. 2, 3, 1831.

Cape Cod to Florida. Common in Vineyard Sound and Buzzard's Bay, 3 to 12 fathoms; Long Island Sound, less common. Fort Macon, North Carolina (Coates, Yarrow). Florida (Conrad). Fossil in the Post-Pliocene of Nantucket Island, South Carolina, and North Carolina; in the Pliocene of South Carolina; and in the Miocene of Virginia and South Carolina.

CERONIA ARCTATA Adams. (p. 426.)

H. and A. Adams, Genera, vol. ii, p. 414, 1853; Gould, Invert., ed. ii, p. 80, fig. 391. *Maetra arctata* Conrad, Journ. Acad. Nat. Sci., Philad., vol. vi, p. 257, Plate 11, fig. 1, 1831. *Mesodesma arctata* Gould, Invert., ed. i, p. 57, fig. 39.

Long Island to River Saint Lawrence. Stonington, Connecticut (Linsley). East Hampton and Montauk, Long Island (S. Smith). Nantucket (Gould). Common in Massachusetts Bay; Casco Bay, and Eastport, Maine, rare. Nova Scotia (Willis).

Donax fossor Say.

Journal Acad. Nat. Sciences, Philadelphia, vol. ii, p. 306, 1822; Binney's Say, pp. 99, 226, Plate 61, fig. 2.

This species may possibly occur occasionally on the Southern New England coast, but I am not aware of any authentic instances. I have found it quite common living on the outer beach at Great Egg Harbor, New Jersey, and it has been found as far north as the southern side of Long Island.

MACTRA SOLIDISSIMA Chemnitz. Plate XXVIII, fig. 202. (p. 358.)

Conch., x, p. 350, Plate 170, fig. 1656, 1788; Gould, Invert., ed. i, p. 51; ed. ii, p. 73, fig. 387. *Maetra gigantea* Lam., Anim. sans Vert., ed. ii, vol. vi, p. 97. *Maetra similis* Say, Journ. Acad. Nat. Sci., Philadelphia, vol. ii, p. 309, 1822; Binney's Say, p. 101. *Spisula solidissima* Gray, Charlesworth's Mag. Nat. Hist., vol. i, p. 373, 1837; H. and A. Adams, vol. xi, p. 378. *Hemimaetra solidissima* Conrad, Amer. Journ. Conch., vol. iii, appendix, p. 32; Perkins, Proc. Bost. Soc. Nat. Hist., vol. xiii, p. 346, 1869. *Spisula Sayi* Gray, op. cit., p. 373.

Florida and Gulf of Mexico to Labrador. Very abundant on the outer beach at Great Egg Harbor, New Jersey; Long Island; Long Island Sound; Vineyard Sound; Cape Cod; Massachusetts Bay; Casco Bay; Bay of Fundy, low water-mark to 10 fathoms, sandy. Fort Macon, North Carolina (Coues); Labrador (Packard); St. George's Bank (S. I. Smith); West Florida (Jewett); Texas (Rømer).

Fossil in the Post-Pliocene at Point Shirley, Chelsea, Massachusetts (Stimpson); and apparently in the Miocene of North and South Carolina (Conrad, as "*M. similis*?").

MULINIA LATERALIS Gray. Plate XXVI, fig. 185, B. (p. 373.)

Charlesworth's Mag. of Nat. Hist., vol. i, p. 376, 1837; Meek, Smithsonian Check-Lists, Miocene, p. 11, 1864. *Maetra lateralis* Say, Journ. Acad. Nat. Sci., Philad., vol. ii, p. 309, 1822; Gould, Invert., ed. i, p. 54, figs. 34, 35; ed. ii, p. 77, fig. 389. *Standella lateralis* H. and A. Adams, Genera, vol. ii, p. 382, 1858; Conrad, Proc. Philad. Acad., vol. xiv, p. 573, 1862.

Massachusetts Bay to Florida, and on the northern shores of the Gulf of Mexico to Galveston, Texas. Very abundant in Long Island Sound; common in Buzzard's Bay and Vineyard Sound, 1 to 15 fathoms, mud. Boston and near Lynn, Massachusetts (Gould). Fort Macon, North Carolina (Coues). Georgia (Couper). Texas (Rømer).

Fossil in the Post-Pliocene of Virginia, North Carolina, South Carolina, and Florida (Saint John's River); in the Pliocene of South Carolina; and in the Miocene of Virginia, North and South Carolina.

PETRICOLA PHOLADIFORMIS Lamarck. Plate XXVII, fig. 199. (p. 372.)

Anim. sans Vert., ed. i, vol. v., p. 505, 1818; ed. ii, vol. vi, p. 159; Say, Amer. Conch., Part vi, Plate 60, fig. 1, 1834; Binney's Say, p. 222 (same plate); Hanley, Recent Shells, p. 52, Plate 13, fig. 49; Gould, Invert., ed. i, p. 63; ed. ii, p. 90, figs. 398, 399. *Petricola fornicata* Say, Journ. Acad. Nat. Sci., Philadelphia, vol. ii, p. 319, 1822. *Petricola dactylus* Say, Amer. Conch., Part vi, Plate 60, fig. 2 (non Sowerby, Hanley, etc.); Gould, Invert., ed. i, p. 65; ed. ii, p. 92, fig. 41.

Florida and Gulf of Mexico to Massachusetts Bay; local and more rare farther north, at Quahog Bay, Maine; and in the southern part of the Gulf of Saint Lawrence, as at Prince Edward's Island (Dawson); Nova Scotia (Willis). Very common in Long Island Sound, near New Haven; Buzzard's Bay; Vineyard Sound (Lackey's Bay, etc.); and Massachusetts Bay (Chelsea, Nahant, etc.). Fort Macon (Coues);

Florida (Conrad); Texas (Rømer); Cuba (D'Orbigny). Fossil in the Post-Pliocene of Virginia, South Carolina, and Florida; and in the Pliocene of South Carolina. A similar form, if not identical (*P. Carolinensis* Conrad), occurs in the Miocene of South Carolina.

A species scarcely to be distinguished from this was sent to me in large numbers from La Paz, Gulf of California, by Captain Pedersen.

VENUS MERCENARIA Linné. Plate XXVI, fig. 184 (animal). (p. 359.)

Systema Naturæ, ed. xii, p. 1131, 1767; Gould, Invert., ed. i, p. 85, fig. 67; ed. ii, p. 133, fig. 445. *Mercenaria violacea* Schumacher, Essai d'un Nouveau Syst., p. 135, Plate 10, fig. 3, 1817; Adams, Genera, vol. ii, p. 419. *Mercenaria mercenaria* Chenu, Man. Conch., vol. ii, p. 82, figs. 356-358, 1862. *Crassivenus mercenaria* Perkins, Proc. Boston Soc. Nat. Hist., vol. xiii, p. 147, 1869. *Venus notata* Say, Journ. Acad. Nat. Sci., Philadelphia, vol. ii, p. 271, 1822 (variety); Gould, Invert., ed. i, p. 87, fig. 67; ed. ii, p. 135, fig. 446. *Venus praparea* Say, op. cit., p. 271, 1822; Binney's Say, p. 95.

Florida to Massachusetts Bay; more rare and local farther north, at Quahog Bay, Maine; Nova Scotia (Willis); and in the southern part of the Gulf of Saint Lawrence, to the Bay of Chaleur. It is not found on the coast of Maine, east of Kennebeck River, nor in the Bay of Fundy. Very common in Vineyard Sound, Buzzard's Bay, Long Island Sound, and southward. Fort Macon (Coues); South Carolina (Gibbes); Georgia (Couper); Texas (Rømer). Fossil in the Post-Pliocene of Point Shirley, Nantucket Island, Gardiner's Island, Virginia, and South Carolina; in the Pliocene of South Carolina; and in the Miocene of Maryland, Virginia, North and South Carolina.

CALLISTA CONVEXA Adams. Plate XXX, fig. 219. (p. 432.)

H. and A. Adams, Genera, vol. ii, p. 425, 1858: *Cythera convexa* Say, Journ. Acad. Nat. Sci., Phil., vol. iv, p. 149, Plate 12, fig. 3, 1824 (fossil); Gould, Invert., ed. i, p. 84, fig. 49; ed. ii, p. 131, fig. 444 (recent). *Dione convexa* Deshayes, Catal. Conch. Biv., British Museum, p. 71, 1853. *Cythera morrhua* Linsley, Amer. Jour. Sci., vol. xlviii, p. 276, 1845 (no description); Gould, op. cit., ser. ii, vol. vi, p. 233, 1848 (young). *Cythera Sayana* Conrad, Amer. Jour. Sci., ser. i, vol. xxiii, p. 345, 1833 (recent); Fossils of the Medial Tertiary of the U. S., p. 13, Plate 7, fig. 3, 1838 (fossil). *Cythera Sayii* Perkins, Proc., Boston Soc. Nat. Hist., vol. xiii, p. 147, 1869. *Callista (Caryatis) convexa* Römer; Verrill, Amer. Jour. Sci., vol. xlix, p. 277, March, 1870.

New Jersey to Gulf of Saint Lawrence. Fort Macon, North Carolina, dead valves on the beach, plenty, but perhaps fossil, (Coues, Yarrow). Great Egg Harbor, New Jersey; Long Island Sound; Vineyard Sound, and Buzzard's Bay, 2 to 10 fathoms, mud, common; Casco Bay, 3 to 8 fathoms, mud, adult, living; Eastport, Maine, rare. Nova Scotia (Willis); Prince Edward's Island (Dawson).

Fossil in the Post-Pliocene of Virginia and North Carolina; in the Pliocene of South Carolina; and in the Miocene of Maryland, North and South Carolina.

The name *Sayana* given to this species in 1833 (loc. cit.) by Mr. Con-

rad, was accompanied by a short description of recent specimens from Rhode Island and New Jersey. He gave *C. convexa* Say as a synonym, however, remarking that it "appears not to differ from the *C. convexa* of Say, but I have changed the name because M. Brogniart had previously applied it to a very dissimilar species." More recently, however, he has indicated his belief that the two are distinct (Catal. Miocene Shells, in Proc. Phil. Acad., vol. xiv, p. 575, 1862), although he recognizes the "*Sayana*" as a Miocene shell, but he has not pointed out the differences, if any exist, so far as known to me. Should the recent shell prove to be distinct from the fossil one described by Say, it should therefore bear the name *Callista Sayana*.

In this species the animal is white, or pale salmon-color. The border of the mantle sometimes protrudes considerably beyond the edge of the shell, and is delicately undulated or frilled; the siphon tubes, in full expansion, are smooth and rather longer than the shell, and are united quite to the ends; the orifices are simple, without apparent papillæ, and the branchial is considerably larger than the other; a well-marked groove extends along the whole length of the siphon, indicating the partition between the tubes.

TOTTENIA GEMMA Perkins. Plate XXX, fig. 220. (p. 359.)

Proc. Boston Soc. Nat. Hist., vol. xiii, 1869 (in errata); by error, *Totteniana* (p. 148). *Venus gemma* Totten, Amer. Jour. Science, vol. xxvi, p. 367, figs. 2a, b, 1834. *Gemma gemma* Deshayes, Catal. Conch. Biv., British Museum, p. 113, 1853; H. and A. Adams, Genera, vol. ii, p. 419, Plate 107, fig. 3. *Gemma Totteni* Stimpson, Check-List, p. 3, 1860.

South Carolina to Labrador. Very abundant in Long Island Sound, Buzzard's Bay, Vineyard Sound, Nantucket, and Massachusetts Bay; common in Casco Bay, and at Grand Menan Island. Nova Scotia (Willis). Prince Edward's Island (Dawson). Indian Harbor, Labrador (Packard). Fort Macon, North Carolina (Coates).

An allied species (*T. spherica* H. C. Lea, sp.) occurs in the Miocene of Virginia.

TOTTENIA MANHATTENSIS Verrill.

Venus Manhattensis Prime, in Jay's Catalogue of Shells, ed. iv, supplement, p. 466, 1852. *Venus (Gemma) Manhattensis* Prime, Annals Lyc. Nat. Hist. N. Y., vol. vii, p. 482 (figure), 1862. *Gemma Manhattensis* Gould, Invert., ed. ii, p. 138, fig. 449.

North Carolina to Vineyard Sound. Hell Gate (Prime). Greenport and Huntington, Long Island (S. Smith). Near New Haven, rare. Fort Macon, North Carolina (Yarrow).

I have seen but few specimens of this shell, and am not fully satisfied that it is distinct from the preceding. Its color is not constant, some specimens being pale straw-color, others purplish. Mr. Prime originally described it as white.

CYPRINA ISLANDICA Lamarck. Plate XXVIII, fig. 201. (p. 508.)

Animaux sans Vert., ed. ii, vol. vi, p. 290; Gould, Invert., ed. i, p. 82; ed. ii, p. 443.
Venus Islandica Linné, Syst. Nat., ed. xii, p. 1131.

Eastern end of Long Island to the Arctic Ocean; on the northern European coasts southward to England. Off Block Island, 29 fathoms, sandy mud; off Gay Head, Martha's Vineyard, 19 fathoms, soft mud; common in Casco Bay, 10 to 80 fathoms; Bay of Fundy, 6 to 90 fathoms; Saint George's Bank, 45 fathoms; and Gulf of Saint Lawrence. Montauk, Long Island (S. Smith). Fossil in the Post-Pliocene of Scandinavia, Scotland, England, Sicily, and other parts of Europe. In North America it appears not to have been found fossil hitherto, and it must, therefore, be rare in our northern Post-Pliocene or glacial deposits, if not altogether absent.

CARDIUM PINNULATUM Conrad. Plate XXIX, fig. 209. (p. 505.)

Journal Acad. Nat. Sciences, Philadelphia, ser. i, vol. vi, p. 260, Plate 11, fig. 8, 1831; Gould, Invert., ed. i, p. 90, fig. 57; ed. ii, p. 141, fig. 452.

Long Island Sound to Southern Labrador. Near New Haven, Connecticut, rare; Buzzard's Bay and Vineyard Sound, 4 to 12 fathoms, common; very common in Massachusetts Bay, Casco Bay, Bay of Fundy, and Gulf of Saint Lawrence, 2 to 80 fathoms. Labrador, south of Straits of Belle Isle (Packard). Huntington, Gardiner's and Peconic Bays, Long Island (S. Smith.) Off New London, Connecticut, (coll. T. M. Prudden).

Fossil in the Post-Pliocene of New Brunswick.

LEVICARDIUM MORTONI. Plate XXIX, fig. 208. (p. 358.)

Perkins, Proc. Boston Soc. Nat. Hist., vol. xiii, p. 150, 1869. *Cardium Mortoni* Conrad, op. cit., vol. vi, p. 259, Plate 10, figs. 5, 6, 7; Gould, Invert., ed. i, p. 91; *Liocardium Mortoni* Stimpson, Check-List, p. 2, 1860; Gould, Invert., ed. ii, p. 143, fig. 453.

Florida and northern shores of the Gulf of Mexico to Cape Cod; rare and local farther north. Common in Long Island Sound, Buzzard's Bay, Vineyard Sound, and about Nantucket. Dartmouth Lakes, Halifax, Nova Scotia (Willis, t. Gould). West Florida (Jewett). Fort Macon (Coes). Fossil in the Post-Pliocene of South Carolina.

Serripes Grönlandicus Beck (*Aphrodite Grönlandica* Stimpson; Gould, Invert., ed. ii, p. 144, fig. 454). This species was recorded as from Stonington, Connecticut, by Linsley, but has not since been found south of Cape Cod, and must, therefore, be regarded as a doubtful inhabitant of our waters. It occurs from Massachusetts Bay to the Arctic Ocean, but is rare south of the Gulf of Saint Lawrence and Labrador. Casco Bay and Mount Desert, Maine, 8 to 30 fathoms, rare, (A. E. V.).

CYCLOCARDIA BOREALIS Conrad. Plate XXIX, fig. 216. (p. 418.)

Amer. Journ. Conchology, vol. iii, p. 191, 1867. *Cardita borealis* Conrad, Amer. Mar. Conch., p. 39, Plate 8, fig. 1, 1831; Gould, Invert., ed. i, p. 94, fig. 59; ed. ii, p. 146, fig. 455. *Actinobolus borealis* H. and A. Adams, Genera, vol. ii, p. 487, 1858.

(?) *Venericardia cribraria* Say, Amer. Conch., Part v, cover, 1832; Binney's Say, p. 205. (?) *Venericardia granulata* Say, Jour. A. Nat. Sci., Philadelphia, vol. iv, p. 142, Plate 12, fig. 1. *Cardita granulata* Conrad, Fossils of Medial Tert. of U. S., p. 13, Plate 7, fig. 1.

New Jersey to Labrador. Common in the deeper parts of Vineyard Sound, near its mouth, and off Gay Head and Buzzard's Bay, 10 to 25 fathoms; off Block Island, 29 fathoms; very common in Casco Bay, Bay of Fundy, and Gulf of Saint Lawrence, 3 to 80 fathoms. Sandy Hook, and Montauk, Long Island (S. Smith). Off New London, Connecticut (T. M. Prudden). Saint George's Bank, 25 to 65 fathoms, (S. I. Smith). Straits of Belle Isle, 50 fathoms; Chateau Bay, 50 fathoms; Long Island, Labrador, 15 fathoms, (Packard). A species, regarded as identical by Dr. Carpenter, occurs on the North Pacific coast of America as far south as Catalina Island, and on the northeast coast of Asia.

Fossil in the Post-Pliocene of Gardiner's Island; Nantucket and Point Shirley, Massachusetts; and Labrador. The Miocene form, *C. granulata* (Say, sp.) is very closely allied to this, if not identical. It is found in Virginia and Maryland.

CYCLOCARDIA NOVANGLIÆ Morse. Plate XXIX, fig. 215. (p. 418.)

Actinobolus (Cyclocardia) Nova-anglicæ Morse, First Annual Report of Trustees of Peabody Acad. of Science, Salem, p. 76, cut, 1869. *Cyclocardia Novanglicæ* Verrill, Amer. Journ. Science, vol. iii, p. 211, 1872.

Connecticut to Gulf of Saint Lawrence. Mouth of Vineyard Sound and off Gay Head, 10 to 25 fathoms; Casco Bay, and Bay of Fundy, 3 to 40 fathoms, not uncommon. Off New London, Connecticut (T. M. Prudden).

ASTARTE UNDATA Gould. Plate XXIX, fig. 203. (p. 508.)

Invert., -ed. i, p. 80, fig. 46, 1841 (provisional name); Philippi, Abbildungen und Beschr. neuer oder wenig gek. Conch., vol. ii, p. 1, Plate 1, fig. 1, 1850; Verrill, Amer. Journ. Science, vol. iii, p. 213, 1872. *Crasina latisulca* Hanley, Recent Shells, p. 87, Plate 14, fig. 35, 1843. *Astarte sulcata* Gould, Invert., ed. i, p. 78, fig. 46, 1841 (not of European writers); ed. ii, p. 119, fig. 432 (poor figure, from an old, deformed shell).

Var. *lutea* = *Astarte lutea* Perkins, Proc. Boston Soc. Nat. Hist., vol. xiii, p. 150, figure, 1869.

Long Island Sound to the southern part of the Gulf of Saint Lawrence. Off Gay Head and Buzzard's Bay, and in the deeper parts of Vineyard Sound, 8 to 25 fathoms, common; off Block Island, 29 fathoms; very common in Casco Bay and Bay of Fundy, 5 to 100 fathoms; Saint George's Bank, 20 to 85 fathoms. Off New London, Connecticut, (T. M. Prudden). Southern part of Gulf of Saint Lawrence (Whiteaves). Var. *lutea* occurs rarely near New Haven (Perkins); and more frequently off Gay Head and in Vineyard Sound, 8 to 19 fathoms, with the ordinary varieties. It resembles the European *sulcata* more than the common or typical varieties do, but passes insensibly into the ordinary forms. The shells referred to *undata*, by Dawson and Whiteaves, from

Gaspé, Canada, are not this species, but a short variety of *A. elliptica*. The latter is a much more northern shell, and I have dredged but one specimen on the New England coast (off Casco Bay, 65 fathoms).

Fossil at Point Shirley, Massachusetts, in the Post-Pliocene, (Stimpson, as *A. sulcata*); and at Gardiner's Island (S. Smith).

ASTARTE CASTANEA Say. Plate XXIX, fig. 204. (p. 432.)

American Conchology, Part i, 1830, Plate 1; Binney's Say, p. 150, Plate 1; Gould, Invert., ed. i, p. 76, fig. 45; ed. ii, p. 117, fig. 431. *Venus castanea* Say, Journ. Acad. Nat. Sci., Philad., vol. ii, p. 273, 1822; Binney's Say, p. 96. *Crassina castanea* Lamarck, Anim. sans Vert., ed. ii, vol. vi, p. 258; Hanley, Recent Shells, p. 83, Plate 9, fig. 27.

Great Egg Harbor, New Jersey, to Nova Scotia. Common on the shores of Long Island, Nantucket, Martha's Vineyard, and Cape Cod; Long Island Sound, not very common; Vineyard Sound and Buzzard's Bay, 5 to 20 fathoms, frequent; Casco Bay and Bay of Fundy, 5 to 20 fathoms, not common. Massachusetts Bay, abundant, (t. Gould). Saint George's Bank, 25 to 40 fathoms, (S. I. Smith). Halifax and Sable Island, Nova Scotia (Willis). Off Cape Sable, Nova Scotia (A. E. V.). Off New London, Connecticut (T. M. Prudden). Fossil in the Post-Pliocene at Nantucket and Point Shirley, Massachusetts.

ASTARTE QUADRANS Gould. Plate XXIX, fig. 205. (p. 509.)

Invert., ed. i, p. 81, fig. 48, 1841; ed. ii, p. 123, fig. 434; Verrill, Amer. Journ. Sci., vol. iii, p. 237, 1872. *Astarte Portlandica* Mighels, Boston Journ. Nat. Hist., vol. iv, pp. 320, 345, Plate 16, fig. 2, 1843 (variety); Gould, Invert., ed. ii, p. 127, fig. 441.

Stonington, Connecticut, to Gulf of Saint Lawrence. Mouth of Vineyard Sound, and off Martha's Vineyard, 19 to 25 fathoms, rare; Massachusetts Bay; Casco Bay; Bay of Fundy, in 6 to 40 fathoms, not uncommon. Saint George's Bank (S. I. Smith). Gulf of Saint Lawrence (Whiteaves).

Var. *Portlandica* occurs, with intermediate forms, in Casco Bay and Bay of Fundy, 10 to 25 fathoms, not common.

GOULDIA MACTRACEA Gould. Plate XXIX, figs. 206, 207. (p. 418.)

Invert., ed. ii, p. 128, fig. 442, 1870. *Astarte mactracea* Linsley, Amer. Jour. Sci., vol. xlviii, p. 275 (figure), 1845; Gould, op. cit., ser. ii, vol. vi, p. 233, figs. 1, 2, 1843. (?) *Astarte lunulata* Conrad, Jour. Acad. Nat. Sciences, Philad., vol. vii, p. 151, 1837; Fossils of the Medial Tertiary of the U. S., p. 45, Plate 21, fig. 8, 1840; *Gouldia lunulata* Conrad, Catal. of Miocene Shells, in Proc. Acad. Nat. Sci., Philad., vol. xiv, p. 578, 1862.

Florida and northern shores of the Gulf of Mexico to Cape Cod. Common, living, and of large size, in Vineyard Sound and Buzzard's Bay, especially at Wood's Hole, 3 to 10 fathoms. Stonington, in stomach of cod (Linsley). Huntington and Greenport, Long Island (S. Smith). Off New London, Connecticut (coll. T. M. Prudden). Fort Macon (Coues). South Carolina (Kurtz). West Florida (E. Jewett). Tampa Bay (Conrad).

Fossil (*G. lunulata*) in the Post-Pliocene of North and South Carolina; in the Pliocene of South Carolina; and in the Miocene of Maryland and Virginia. The fossil shell is probably identical with the recent one, but I have not had suitable specimens of the former for comparison; if identical, the species should be called *G. lunulata*.

LUCINA FILOSA Stimpson. Plate XXIX, fig. 212. (p. 509.)

Shells of New England, p. 17, 1851; Gould, Invert., ed. ii, p. 98, fig. 404. *Lucina radula* Gould, Invert., ed. i, p. 69 (*non* Montagu, sp.). ? *Lucina contracta*, Say, Jour. Acad. Nat. Sciences, Philad., vol. iv, p. 145, Plate 10, fig. 8; Conrad, Fossils of the Medial Tertiary of U. S., p. 40, Plate 20, fig. 5, 1840.

Stonington, Connecticut, to Maine. Off Block Island, 29 fathoms, sandy mud; off Gay Head, 19 fathoms, soft mud; Casco Bay and Portland Harbor. Stonington (Linsley). Boston Harbor (Stimpson). Phillip's Beach (Holder). Rhode Island (Conrad, as *L. contracta*).

Fossil in the Post-Pliocene of Gardiner's Island (S. Smith). *L. contracta* occurs in the Miocene of Virginia; it was formerly regarded by Conrad as identical with the recent shell from Rhode Island, but is probably a distinct, though closely-allied species. Mr. Jeffreys identified this species with *L. borealis* (Linné) of Europe; the latter is also found on the Pacific coast at Vancouver Island and Catalina Island (Cooper and P. P. Carpenter).

CYCLAS DENTATA. Plate XXIX, fig. 211. (p. 418.)

Lucina dentata Wood, General Conchology, p. 195, Plate 46, fig. 7, 1815; Gould, Invert., ed. ii, p. 99, fig. 45. *Lucina divaricata* Gould, Invert., ed. i, p. 70, (*non* Linné, sp.). *Lucina strigilla* Stimpson, Shells of New England, p. 17, 1851.

Brazil and West Indies to Cape Cod. Not uncommon, dead, but rarely obtained living, in Vineyard Sound, 6 to 14 fathoms. Coney Island (S. Smith). Nantucket (Gould). St. George's Bank (S. I. Smith). Fort Macon, North Carolina, abundant, (Cones, Yarrow). Georgia (Couper).

Fossil in the Post-Pliocene of North Carolina, South Carolina, and Florida; and in the Pliocene of South Carolina. The same, or a closely-related species, (*L. Conradi* D'Orb., Prod., iii, p. 117, 2194, t. Conrad, in Proc. Acad. Nat. Sci., Phil., 1862, p. 577=*L. divaricata* Conrad, Fossils of Med. Tert., p. 38, Plate 20, fig. 3) occurs in the Miocene of Virginia.

CRYPTODON GOULDII Adams. Plate XXIX, fig. 213. (p. 509.)

H. and A. Adams, Genera, vol. ii, p. 470, 1858; Gould, Invert., ed. ii, p. 100, fig. 406. *Lucina Gouldii* Philippi, Zeitsch. f. Malak., 1845, p. 74 (t. Gould). *Thyasira Gouldii* Stimpson, Shells of New Eng., p. 17, 1851. *Lucina flexuosa* Gould, Invert., ed. i, p. 71, fig. 52 (*non* Montagu, sp.).

Stonington, Connecticut, to Gulf of Saint Lawrence. Off Block Island, 29 fathoms; Buzzard's Bay, 6 fathoms, mud; common in Massachusetts Bay, Casco Bay, and Bay of Fundy, 5 to 60 fathoms, muddy and sandy. Nova Scotia (Willis). Gaspé, Canada (Whiteaves). Murray Bay (Dawson). Gulf of Saint Lawrence, 20 to 300 fathoms (White-

aves). Greenland (Mörch). Labrador, 15 to 50 fathoms, (Packard). Fossil in the Post-Pliocene at Montreal, rare, (Dawson); Brunswick, Maine (Packard).

Possibly some of the Gulf of Saint Lawrence specimens may belong to the following species.

CRYPTODON OBESUS Verrill. Plate XXIX, fig. 214. (p. 509.)

American Journ. Science, vol. iii, pp. 211, 287, Plate 7, fig. 2, 1872.

Shell white, irregularly and rather coarsely concentrically striated, much swollen in the middle; the transverse diameter nearly equal to the length; the height considerably exceeding the length. The beaks are prolonged and turned strongly to the anterior side. The lunular area is rather large and sunken, somewhat flat, in some cases separated by a slight ridge into an inner and an outer portion. Anterior border with a prominent rounded angle; ventral margin prolonged and rounded in the middle; posterior side with two strongly-developed flexures, separated by deep grooves. Interior of shell with radiating grooves, most conspicuous toward the ventral edge.

Length of the largest specimen, 15^{mm}; height, 18^{mm}; thickness, 13^{mm}. The smaller specimens have about the same proportions.

Six single valves, some of them quite fresh, were obtained off Norman's Land at different localities. They were all right valves, and the smallest was 12.5^{mm} of an inch in height. The specimen from Labrador agrees nearly in form and structure, and is only 5.75^{mm} in height and 5^{mm} in length.

This species appears to be more nearly related to *C. flexuosus* of Europe than to *C. Gouldii*. The European species is nearly intermediate between the two American shells in form; but judging from the specimens that I have had opportunities to examine, the three forms ought to be kept distinct. *C. Gouldii* is a thinner and more delicate shell, more rounded, relatively much longer, and is seldom more than 6^{mm} to 7^{mm} in breadth.

Block Island to Labrador. East of Block Island, in 29 fathoms, fine sandy mud; off Gay Head, 19 fathoms, mud; Casco Bay, 60 fathoms, mud. Labrador (Packard). East of Saint George's Bank, 430 fathoms (S. I. Smith).

Turtonia minuta Stimpson.

Shells of New England, p. 16, 1851 (*non* Alder, Forbes and Hauley, etc.); Gould, Invert., ed. ii, p. 85, fig. 395. *Venus minuta* Fabricius, Fauna Grönlandica, p. 412, 1780. *Turtonia nitida* Verrill, Amer. Journ. of Sci. vol. iii, p. 286, Plate 7, figs. 4, 4a, 1872.

Massachusetts Bay to Greenland. Common under stones and in rocky pools at low-water, in Massachusetts Bay and Casco Bay. Although this species has not yet been found south of Cape Cod, so far as I am aware, it will probably be found hereafter on the more exposed rocky shores, as at Point Judith, Watch Hill, or on some of the outer islands.

The American specimens of this shell differ so widely in form, and especially in the structure of the hinge, from all the European specimens with which I have compared them, as well as from the descriptions and figures, that I cannot regard them as identical. Dr. Gould has well defined the form and external characters of our shell. I have seen no European specimens so elongated in form as the American examples seen by me invariably are, but depend less on the external form than on the structure of the hinge for distinguishing them. (See the greatly enlarged figure in the Amer. Journal of Science).

Having had opportunities to study northern specimens of this shell, since I gave it the name *nitida*, I have become fully satisfied that the original shell described by Fabricius is identical with the American species, rather than with the European. His description corresponds well with our best specimens. The European species, if, as I believe, distinct from ours, should, therefore, retain the name *T. purpurea* (Montagu, sp.); and *minuta* should be restored to the American form.

KELLIA PLANULATA Stimpson. Plate XXX, fig. 226. (p. 310.)

Shells of New England, p. 17, 1851; Gould, Invert., ed. ii, p. 83, fig. 393. *Kellia rubra* Gould, Invert., ed. i, p. 60, (*non* Montagu, sp.).

Long Island Sound to Greenland. Near New Haven, Connecticut, rare; Vineyard Sound and Buzzard's Bay, 1 to 8 fathoms, not common; Casco Bay; Eastport, Maine, 8 to 15 fathoms; Bay of Fundy. Montauk and Greenport, Long Island, low-water to 6 fathoms, mud; and Gull Island, low-water, under stones, (S. Smith). Boston Harbor, 5 fathoms, shelly, (Stimpson). Sable Island, Nova Scotia (Willis). Greenland (Mörch).

MONTACUTA ELEVATA Stimpson. (p. 418.)

Shells of New England, p. 16, 1851; Gould, Invert., ed. ii, p. 86, fig. 396. *Montacuta bidentata* Gould, Invert., ed. i, p. 59, 1841 (*non* Montagu, sp., 1803).

Long Island Sound to Massachusetts Bay. Savin Rock, near New Haven, rare; Naushon Island, Vineyard Sound, rare. Greenport, Long Island (S. Smith). New Bedford (Gould). Chelsea Beach (Stimpson).

LEPTON FABAGELLA Conrad.

Marine Conchology, p. 53, Plate 11, fig. 3, 1831; Dekay, Nat. History of New York, Mollusca, p. 243, Plate 32, fig. 307, A, B.

Rhode Island (Conrad).

I have not seen specimens of this shell. It seems to be rare and little known.

A closely-related species (*L. mactroides* Conrad, Fossils Medial Tert., p. 19, Plate X, fig. 5, 1839) is found in the Miocene of Maryland.

SOLENOMYA VELUM Say. Plate XXIX, fig. 210. (p. 360.)

Journal Acad. Nat. Sciences, Philad., vol. ii, p. 317, 1822 (*Solemya*); Gould, Invert., ed. i, p. 35; ed. ii, p. 48, fig. 371.

North Carolina to Nova Scotia. Great Egg Harbor, New Jersey; Long Island Sound, near New Haven, low-water to 6 fathoms, not uncommon

very common in Buzzard's Bay and Vineyard Sound, 1 to 5 fathoms, especially in soft mud, in coves; Chelsea Beach, etc., Massachusetts Bay, common; Casco Bay, rare. Nova Scotia (Willis). Huntington and Greenport, Long Island, rare, (S. Smith).

SOLENOMYA BOREALIS Totten.

Amer. Jour. Science, vol. xxvi, p. 366, fig. 1, *h, i*, 1834 (*Solemya borealis*); Gould, Invert., ed. i, p. 36; ed. ii, p. 50, fig. 372.

Connecticut to Nova Scotia. Newport, Rhode Island (Totten). Chelsea and Nahant, Massachusetts (Gould). Casco Bay and Portland Harbor rare; Vineyard Sound, at Cuttyhunk Island, rare. Stonington, Connecticut (Linsley).

This species may prove to be only the mature state of the preceding, but I have never seen specimens intermediate in character.

YOLDIA LIMATULA Stimpson. Plate XXX, fig. 232. (p. 432).

Shells of New England, p. 9, 1851; H. and A. Adams, Genera, vol. ii, p. 548, Plate 126, figs. 5, *5b*, 1858; Gould, Invert., ed. ii, p. 154, fig. 462. *Nucula limatula* Say, Amer. Conch., ii, Plate 12, middle figures, 1831; Gould, Invert., p. 93, fig. 62. *Leda limatula* Stimpson, Shells of New England, p. 10, 1851.

North Carolina to Gulf of Saint Lawrence. Common in Long Island Sound; Buzzard's Bay; Vineyard Sound; Casco Bay, in 2 to 12 fathoms, soft mud; less common in the Bay of Fundy, 4 to 30 fathoms. Beaufort, North Carolina (Stimpson, Coues). Huntington and Greenport, Long Island (S. Smith). Nova Scotia (Willis). The specimens from Long Island Sound are as large and fine as the northern ones.

Fossil in the Post-Pliocene of Canada, Virginia, North and South Carolina; and in the Pliocene of South Carolina. An allied species (*Y. laevis* Say, sp., Conrad) occurs in the Miocene of Maryland and South Carolina.

Yoldia myalis Stimpson; Gould, Invert., ed. ii, p. 160, fig. 467; *Nucula myalis* Couthouy, 1838. This is often confounded with *Y. limatula*, though quite distinct. It is a more arctic species, ranging from Massachusetts Bay to the Arctic Ocean and Spitzbergen, but it has not been found south of Cape Cod, so far as known to me. The shells reported as such, that I have seen, are *Y. limatula*. Gould reports the latter as from Nordland (McAndrew), but we suspect that *Y. myalis* or *Y. sapotilla* may have been, in this case, mistaken for *Y. limatula*.

YOLDIA SAPOTILLA Stimpson, 1851. Plate XXX, fig. 231. (p. 509.)

H. and A. Adams, Genera, vol. ii, p. 548; Gould, Invert., ed. ii, p. 159, fig. 466. *Nucula sapotilla* Gould, Invert., ed. i, p. 100, fig. 61, 1841; Hanley, Recent Shells, p. 170, Plate 20, fig. 3. *Leda (Yoldia) sapotilla* Stimpson, Shells of New England, p. 10, 1851. *Yoldia arctica* Mörch, op. cit., p. 93, 1857 (t. Dawson, from specimen; non *Y. arctica* Sars).

Long Island to the Arctic Ocean, comparatively rare and local, chiefly in deep water, south of Cape Cod. Off Gay Head, 19 fathoms, soft mud; off Buzzard's Bay, 25 fathoms, sand; east of Block Island, 29 fathoms, S. Mis. 61—44

fine sandy mud; common in Casco Bay and Bay of Fundy, 4 to 100 fathoms, mud. Greenport, Long Island (S. Smith). Massachusetts Bay (Gould). Nova Scotia (Willis). Labrador (Packard). Greenland (Mörch).

This species seems to be unknown among our Post-Pliocene shells. Having examined several hundred specimens from many different localities and depths, I am satisfied that it is perfectly distinct from *Y. limatula*, with which certain writers are inclined to unite it.

Yoldia Gouldii.

Nucula Gouldii DeKay, Nat. Hist. New York, Mollusca, p. 180, Plate 13, fig. 221, 1843.

This was originally described by DeKay as from Long Island Sound. I have seen no specimens corresponding with the description in all respects. It is, perhaps, a short variety of *Y. sapotilla*.

YOLDIA OBESA Stimpson, 1851. (p. 509.)

H. and A. Adams, Genera, vol. ii, p. 548, 1858; Gould, Invert., ed. ii, p. 155, fig. 463. *Leda obesa* Stimpson, Proc. Boston Soc. Nat. Hist., vol. iv, p. 13, 1851; Shells of New England, p. 10, Plate 2, fig. 1, 1851. *Nucula navicularis* Mighels, Boston Journal Nat. History, p. 323, 1843 (*non* Couthouy, Gould).

Block Island to Gulf of Saint Lawrence. East of Block Island, 29 fathoms, rare; Casco Bay and off Cape Elizabeth, 30 to 95 fathoms; Bay of Fundy, 40 to 100 fathoms, rare; near Saint George's Bank, 110 and 150 fathoms (Packard). Massachusetts Bay (Stimpson).

YOLDIA THRACIFORMIS Stimpson, 1851. (p. 509.)

Smithsonian Check-List, p. 2, 1860; H. and A. Adams, Genera, vol. ii, p. 548, 1858 (*thraciiformis*); Gould, Invert., ed. ii, p. 157, fig. 465; Mörch, op. cit., p. 21, 1857. *Nucula thraciiformis* Storer, Boston Jour. Nat. History, vol. ii, p. 122, figure, 1838; Gould, Invert., ed. i, p. 97, fig. 66. *Leda thraciiformis* Stimpson, Shells of New England, p. 9, 1851. *Nucula navicularis* Couthouy, Boston Journ. Nat. History, vol. ii, p. 178, Plate 4, fig. 4, 1839, (young); Gould, Invert., ed. i, p. 103. *Yoldia angularis* Möller, op. cit., p. 92, 1842 (t. Mörch).

Long Island to Greenland. Off Fire Island, south of Long Island, in 10 fathoms; and off Race Point, Cape Cod, in 30 fathoms, (Stimpson). Not uncommon, and of large size, in Casco Bay, 15 to 95 fathoms; and Bay of Fundy, 10 to 100 fathoms; near Saint George's Bank, 85 fathoms (Packard).

LEDA TENUISULCATA Stimpson. (p. 509.)

Shells of New England, p. 10, 1851; Gould, Invert., ed. ii, p. 161, fig. 468. *Nucula tenuisulcata* Couthouy, Boston Journ. Nat. Hist., vol. ii, p. 64, Plate 3, fig. 8, 1838. *Nucula minuta* Gould, Invert., ed. i, p. 101, 1841 (*non* Fabricius, sp).

Rhode Island to Gulf of Saint Lawrence. Common in Massachusetts Bay, Casco Bay, and Bay of Fundy, 6 to 80 fathoms. Nova Scotia (Willis). Newport, Rhode Island (t. S. Smith). Southern part of the Gulf of Saint Lawrence (Whiteaves). Particularly abundant in Eastport Harbor, 10 to 30 fathoms; Saint George's Bank and vicinity, 40 to 150

fathoms (Smith, Packard). Fossil in the Post-Pliocene at Saco and Portland, Maine (Packard); ? Canada (Dawson, as *L. pernula*, var.)

NUCULA PROXIMA Say. Plate XXX, fig. 230. (p. 418.)

Journ. Acad. Nat. Sciences, Philad., vol. ii, p. 270, 1822; Gould, Invert., ed. i, p. 103, fig. 63; ed. ii, p. 150, fig. 458.

South Carolina to Gulf of Saint Lawrence. Common in Long Island Sound, Buzzard's Bay, and Vineyard Sound, 2 to 19 fathoms; off Buzzard's Bay and Block Island, 25 to 29 fathoms; common in Massachusetts Bay, Casco Bay, and Bay of Fundy, 4 to 80 fathoms; very abundant in Trenton Bay, Mount Desert, Maine, 10 fathoms, soft mud. Nova Scotia (Willis). Saint George's Bank (S. I. Smith). Fort Macon, North Carolina (Coues). Long Island, abundant, (S. Smith). Fossil in the Post-Pliocene of North and South Carolina; in the Pliocene of South Carolina; and in the Miocene of Maryland and South Carolina.

NUCULA DELPHINODONTA Mighels. Plate XXX, fig. 229. (p. 509.)

Boston Journal Nat. Hist., vol. iv, p. 40, Plate 4, fig. 5, 1842; Gould, Invert., ed. ii, p. 153, fig. 461. *Nucula corticata* Möller, Naturhistorisk Tidsskrift, vol. iv, p. 90, 1842. ? *Nucula radiata* Dekay, Nat. Hist. New York, Moll., p. 179, Plate 12, fig. 216, 1843.

Rhode Island to Greenland. East of Block Island, 29 fathoms; off Gay Head, 19 fathoms, soft mud; Massachusetts Bay, common; Casco Bay, 6 to 95 fathoms, common; Frenchman's Bay, Mount Desert, common; Bay of Fundy and Eastport Harbor, 10 to 100 fathoms, mud, common; Nova Scotia (Willis); Gulf of St. Lawrence (Whiteaves). Greenland (Möller, Mörch). Northern Europe (t. Jeffreys).

Nucula tenuis Turton (Montagu, sp.)

Gould, Invert., ed. i, p. 105, fig. 64; ed. ii, p. 149, fig. 457.

This species was recorded as from cod-stomachs, at Stonington, Connecticut, but was not met with by us. Its occurrence south of Cape Cod needs confirmation. It is an arctic species; common in Casco Bay and the Bay of Fundy, in 10 to 100 fathoms, mud; and northward to the Arctic Ocean. Also on the northern coasts of Europe, south to Great Britain. It is also found in the Post-Pliocene of New England and Canada.

SCAPHARCA TRANSVERSA. Plate XXX, fig. 228. (p. 309.)

H. and A. Adams, Genera, vol. ii, p. 538, 1858. *Arca transversa* Say, Jour. Acad. Nat. Sci., Philad., vol. ii, p. 269, 1822; Gould, Invert., ed. i, p. 96; ed. ii, p. 148, fig. 456a.

Florida to Cape Cod. Long Island Sound, near New Haven, low-water to 8 fathoms; Buzzard's Bay and Vineyard Sound, 2 to 10 fathoms; Great Egg Harbor, New Jersey, 1 fathom. Nantucket (Gould). Long Island, abundant; Greenport, 3 to 10 fathoms (S. Smith). Fort Macon, North Carolina (Coues). South Carolina (Kurtz). Georgia (Couper).

Fossil in the Post-Pliocene of Nantucket, Gardiner's Island, Virginia, North and South Carolina; and in the Miocene of Virginia and North Carolina. According to Gould, found fossil at Provincetown, Massachusetts, in an artesian boring, 120 to 200 feet beneath the surface, (Post-Pliocene?)

ARGINA PEXATA Gray. Plate XXX, fig. 227. (p. 309.)

Proc. Zool. Soc., London, 1847; H. and A. Adams, Genera, vol. ii, p. 540, Plate 125, figs. 7, 7a, 1858. *Arca pexata* Say, Jour. Acad. Nat. Sciences, Philad., vol. ii, p. 263, 1822; Gould, Invert., ed. i, p. 95, fig. 60; ed. ii, p. 147, fig. 456.

Florida and northern shores of Gulf of Mexico to Cape Cod; rare and local farther north, in Massachusetts Bay. Very common in Long Island Sound, low-water to 10 fathoms; Buzzard's Bay; Vineyard Sound; Great Egg Harbor, New Jersey. On beach at Provincetown, Massachusetts (S. I. Smith). Staten Island and Long Island, abundant (S. Smith). Fort Macon, North Carolina (Yarrow). Georgia (Couper). West Florida (Jewett). Texas (Rømer).

Fossil in the Post-Pliocene of Gardiner's Island (?) (S. Smith); in the Miocene of South Carolina.

ARCA PONDEROSA Say.

Journ. Acad. Nat. Sciences, Philadelphia, vol. ii, p. 267, 1822; Binney's Say, p. 92.

This species occurs on the beach at Edgartown, Martha's Vineyard, associated with the other common sand-dwelling shells of that region. The valves are apparently tolerably fresh, though worn, and no fossil shells have been found in that vicinity. It occurs in the same way on the southern side of Long Island, near Fire Island (S. I. Smith and S. Smith). But I am not aware that it has been found living north of Cape Hatteras; nevertheless, it may occur locally in shallow water off shore. The specimens found may possibly have been washed out from submerged Post-Pliocene deposits.

It is found living at Fort Macon, North Carolina, and southward to the Gulf of Mexico.

HETEROMYARIA.

MYTILUS EDULIS Linné. Plate XXXI, fig. 234. (pp. 307, 432.)

Systema Naturæ, ed. xii, p. 1157, 1767; Gould, Invert., ed. i, p. 121, fig. 82; ed. ii, p. 183, figs. 483, 484. *Mytilus borealis* Lamarck, Anim. sans Vert., ed. ii, vol. vii, p. 46; Dekay, Nat. Hist. N. Y., Moll., p. 182, Plate 13, fig. 222, Plate 24, fig. 256. *Mytilus pellucidus* Pennant, Brit. Zool., vol. iv, p. 237, Plate 66, fig. 3, (t. Gould) = variety *pellucidus* Gould, Invert., ed. ii, p. 184, fig. 484. *Mytilus notatus* Dekay, op. cit., p. 182, Plate 13, fig. 223, 1843.

Circumpolar: Arctic Ocean south to North Carolina, on the American coast; south to Great Britain, France, and the Mediterranean and Black Seas, on the European coast; south to Monterey and San Francisco, on the North Pacific coast; south to China and Japan, on the Asiatic coast. Very abundant in Great Egg Harbor, New Jersey, Long

Island Sound, Buzzard's Bay, Vineyard Sound, Massachusetts Bay, Casco Bay, Bay of Fundy (littoral to 50 fathoms), and northward. Fort Macon, North Carolina (Coes).

Fossil in the Post-Pliocene of Greenland, Labrador, Canada, Lake Champlain, Maine, New Brunswick, Point Shirley, Massachusetts, and Saint John's River, Florida; in the Post-Pliocene of Scandinavia, Russia, and Great Britain; in the Red Crag and all later formations in England.

MODIOLA MODIOLUS Turton. Plate XXXI, fig. 237. (p. 309.)

British Bivalves, p. 199, Plate 15, fig. 3, 1822; Gould, Invert., ed. i, p. 123; ed. ii, p. 186, fig. 485; DeKay, op. cit., p. 185, Plate 24, fig. 257. *Mytilus modiolus* Linné, Syst. Nat., ed. xii, p. 1158. (?) *Modiola papuana* Lamarck, Anim. sans Vert., ed. ii, vol. vii, p. 17; Say, Amer. Conch., Plate 45.

Circumpolar: Greenland southward to New Jersey; on the European coast from Spitzbergen southward to Great Britain and France; in the North Pacific southward to Monterey, California, on the American coast; and southward to Northern Japan on the Asiatic coast. Long Island Sound, not very common; Vineyard Sound and Buzzard's Bay, not abundant; common in Massachusetts Bay; abundant in Casco Bay and Bay of Fundy, low-water to 80 fathoms. Staten Island and Long Island (S. Smith). Fossil in the Post-Pliocene of Point Shirley, Massachusetts, Montreal, Canada, Scotland, Ireland, Sicily, etc.; in the Coralline Crag, Red Crag, and later formations in England.

MODIOLA PLICATULA Lamarck. Plate XXXI, fig. 238. (p. 307.)

Anim. sans Vert., ed. i, 1819; ed. ii, vol. vii, p. 22; Gould, ed. i, p. 125, fig. 81; ed. ii, p. 188, fig. 486; DeKay, op. cit., p. 184, Plate 14, fig. 258; Hanley, Recent Shells, p. 240. *Mytilus plicatus* Deshayes, Encyclop. Meth., Plate 220, fig. 5; Stimpson, Shells of New England, p. 12. *Modiola semicosta* Conrad, Jour. Acad. Nat. Sci., Philad., vol. vii, p. 244, Plate 20, fig. 7, (t. Gould). *Mytilus demissus* Dillyn, Catal. Recent Shells, vol. i, p. 314 (t. Gould). *Brachydontes plicatulus* H. and A. Adams, Genera, vol. ii, p. 517; Perkins, op. cit., p. 156.

Georgia, to Casco Bay, Maine; more rare and local farther north; in the southern part of the Gulf of Saint Lawrence, and on the coast of Nova Scotia; nor observed on the coast of Maine east of the Kennebeck River, nor in the Bay of Fundy. Very abundant at Egg Harbor, New Jersey, Long Island Sound, Buzzard's Bay, and Vineyard Sound; less abundant in Massachusetts Bay, near Salem, Massachusetts, etc.; local in sheltered muddy coves about Casco Bay and Quahog Bay, Maine. Mouth of the Kennebeck River (C. B. Fuller). Prince Edward's Island (Dawson). Nova Scotia (Willis). Fort Macon, North Carolina (Coes). Georgia (Couper).

MODIOLA HAMATUS Verrill. (pp. 374, 475.)

American Journ. Science, vol. iii, p. 211, Plate 7, fig. 3, 1872. *Mytilus hamatus* Say, Journ. Acad. Nat. Sci., Philadelphia, vol. ii, p. 265, 1822; American Conchology, Plate 50; Binney's Say, pp. 91, 204, Plate 50. *Aulacomya hamatus* Adams, Genera, vol. ii, p. 513. *Brachydontes hamatus* Perkins, op. cit., p. 156, 1869.

Long Island Sound to Florida, and the shores of the Gulf of Mexico

to Vera Cruz. New Haven, common on oysters, living, but perhaps introduced from Virginia. New York Harbor, on oysters, (S. Smith). Fort Macon, North Carolina (Yarrow). Georgia (Couper). Tampa Bay, Florida (Conrad, Jewett). Texas (Rømer). Near Vera Cruz (coll. T. Salt, in Yale museum).

MODIOLARIA NIGRA Lovén. Plate XXXI, fig. 236. (p. 433.)

Öfvers. af Kongl. Vet.-Akad., Förhandl., vol. iii, p. 187, 1846; Möreh, Naturhist. Bidrag, Grönland, p. 93, 1857; H. and A. Adams, Genera, vol. ii, p. 515, 1858; Gould, Invert., ed. ii, p. 190, figs. 487, 488. *Modiola nigra* Gray, Appendix to Parry's Voyage, p. 244, 1824; Hanley, Recent Shells, p. 242. *Mytilus discrepans* Stimpson, Shells of New England, p. 12, 1851 (not of European authors). *Modiola nexa* Gould, Invert., ed. i, p. 128, fig. 86 (young).

Circumpolar: Greenland, southward to Long Island; Spitzbergen, southward to Great Britain and Holland; Behring's Straits, southward to Okhotsk. Not uncommon and of good size in Vineyard Sound, 10 to 15 fathoms, off Gay Head, etc.; common in Casco Bay and Bay of Fundy, of large size, low-water to 60 fathoms; Stonington, Connecticut, in stomach of cod, (Linsley).

Fossil in the Post-Pliocene of Maine, Canada, Labrador, and Northern Europe.

MODIOLARIA DISCORS Beck.

Lovén, Öfvers. af Kongl. Vet.-Akad. Förhandl., vol. iii, p. 187, 1846; Gould, Invert., ed. ii, p. 83, figs. 489, 490. *Mytilus discors* Linné, Syst. Nat., ed. xii, p. 1159; Stimpson, Shells of New England, p. 12, (*non* Gould, ed. i). *Mytilus discrepans* Montagu, Test. Brit., p. 169. *Modiola discrepans* Lamarck, Anim. sans Vert., ed. ii, vol. vii, p. 23; Gould, Invert., ed. i, p. 129, fig. 83. *Modiola levigata* Gray, Appendix to Parry's Second Voyage, p. 245. *Mytilus levigatus* Stimpson, Shells of New England, p. 12. *Modiolaria levigata* Lovén, op. cit., p. 187, 1846; Stimpson, Check-List, p. 2, 1860; this Report, p. 509.

Circumpolar: Greenland, southward to Long Island; Finmark, southward to Great Britain; Behring's Straits, southward to Puget Sound. Very common in Casco Bay and Bay of Fundy, low-water to 100 fathoms; not uncommon in Massachusetts Bay; rare and local south of Cape Cod. Saint George's Bank and vicinity, common, (S. I. Smith, Packard). Gardiner's Bay, Long Island, rare, (S. Smith). North of Hebrides, in 530 fathoms, (t. Jeffreys).

Fossil in the Post-Pliocene of Canada, Greenland, and Northern Europe. I am unable to separate *M. levigata*, as a species, from the ordinary New England form, usually referred to *M. discors*, the differences being due chiefly to age. The common European form of *discors* shows more differences, but is probably only a dwarf variety of the same species.

MODIOLARIA CORRUGATA Möreh. Plate XXXI, fig. 235. (p. 509.)

Op. cit., p. 94, 1857; Stimpson, Check-List, Smithsonian Inst., p. 2, 1860; Gould, Invert., ed. ii, p. 193, fig. 491. *Mytilus corrugatus* Stimpson, Shells of New England, p. 12, 1851. *Mytilus discors* Gould, Invert., ed. i, p. 130, fig. 84 (*non* Linné, sp.).

Long Island to Greenland and Northern Europe. Off Martha's Vine-

yard and Buzzard's Bay, 20 to 25 fathoms, rare; Casco Bay, 15 to 95 fathoms, not common; Bay of Fundy, 10 to 100 fathoms, frequent. Saint George's Bank (S. I. Smith, A. S. Packard). Gardiner's Bay, 5 fathoms, one specimen, (S. Smith). Off New London, Connecticut (T. M. Prudden). Gulf of Saint Lawrence (Whiteaves). Murray Bay (Dawson). Nova Scotia (Willis). Labrador (Packard). Arctic Ocean, near Behring's Straits, 30 fathoms, (Stimpson, N. P. Expl. Exp., t. Gould).

Fossil in the Post-Pliocene of Canada (Dawson).

CRENELLA GLANDULA Adams. Plate XXXI, fig. 233. (p. 418.)

H. and A. Adams, Genera, vol. ii, p. 515, 1858; Gould, Invert., ed. ii, p. 194, fig. 492. *Modiola glandula* Totten, American Journal Science, ser. i, vol. xxvi, p. 367, figs. 3, e, f, g, 1834; Gould, Invert., ed. i, p. 131, fig. 87 (*pars*). *Mytilus decussatus* Stimpson, Shells of New England, p. 11, 1851, (*non* Montagu, sp.); Dekay, op. cit., p. 186, Plate 22, fig. 248.

Connecticut to Gulf of Saint Lawrence. Buzzard's Bay and Vineyard Sound, 5 to 15 fathoms, not uncommon; off Gay Head, 19 fathoms, soft mud; off Block Island, 29 fathoms, sandy mud; common in Massachusetts Bay, Casco Bay, and Bay of Fundy, 3 to 60 fathoms. Halifax (Willis). Gulf of Saint Lawrence, at Gaspé (Whiteaves). Gardiner's Bay, Long Island (S. Smith). Stonington (Linsley). Off New London, Connecticut (T. M. Prudden). Sandy Hook, New Jersey (Ferguson). Fossil in the Post-Pliocene at Montreal, Canada (Dawson). A related species, *C. æquilaterata* Conrad (H. C. Lea, sp.) occurs in the Miocene of Virginia.

This species was undoubtedly confounded with *C. decussata* (Montagu, sp.) by both Gould and Stimpson. The genuine *decussata* is quite common in Casco Bay, Bay of Fundy, and Gulf of Saint Lawrence, and is usually associated in those waters with *C. glandula*. It is a northern, and common European species, and is also recorded from the North Pacific coast of America by Dr. P. P. Carpenter. It also occurs in Greenland (Mörch).

MONOMYARIA.

PECTEN IRRADIANS Lamarek. Plate XXXII, fig. 238. (p. 374.)

Anim. sans Vert., ed. i, 1819; ed. ii, vol. vii, p. 143; Gould, Invert., ed. ii, p. 199, fig. 496. *Pecten concentricus* Say, Journ. Acad. Nat. Sci., Philad., vol. ii, p. 259, 1822; Gould, Invert., ed. i, p. 134, fig. 88; Dekay, op. cit., p. 172, Plate 9, fig. 205.

Florida and the northern shores of the Gulf of Mexico to Cape Cod; rare and local farther north in Massachusetts Bay; and Nova Scotia (Willis). Very common in Vineyard Sound, Buzzard's Bay, shores of Long Island and Connecticut, New Jersey, and southward. Tampa Bay, Florida (Conrad, E. Jewett). Texas (Rømer).

Fossil in the Post-Pliocene of North Carolina and Tampa Bay, Florida; in the Pliocene of South Carolina; and in the Miocene of

Maryland. Dug up from beneath the mud in the harbor of Portland, Maine, in a semi-fossil state by the mud-dredging machines (Fuller).

PECTEN ISLANDICUS Chemnitz.

Conch., vii, p. 304, Plate 65, figs. 615, 616, 1784, (t. Gould); Lamarck, op. cit., ed. ii, vol. vii, p. 145; Gould, Invert., ed. i, p. 133, fig. 87; ed. ii, p. 198, fig. 495. *Ostrea Islandica* Müller, Zoöl. Dan. Prod., No. 2990, 1776; Fabricius, Fauna, Grünl., p. 415, 1780. *Pecten Pealii* Conrad, Amer. Mar. Conch., p. 12, Plate 2, fig. 2, 1831.

Arctic Ocean south to Cape Cod, local and rare farther south; on the northern European coasts, south to Bergen, Norway, and Great Britain. Not uncommon and of good size in Casco Bay, 20 to 70 fathoms; common in the Bay of Fundy, low-water to 100 fathoms. Saint George's Bank, 40 to 65 fathoms, (S. I. Smith). More common farther north. Stonington, Connecticut, in an eel-pot, (Linsley). I am not aware that any one except Linsley has recorded it from the southern coast of New England.

Fossil in the Post-Pliocene of Maine (abundant), New Brunswick, Canada, Labrador, Greenland, Scandinavia, Denmark, Scotland, etc. Naples (Jeffreys). Mr. Sanderson Smith reports fragments from Gardiner's Island.

PECTEN TENUICOSTATUS Mighels. (p. 509.)

Mighels and Adams, Proceedings Boston Soc. Nat. Hist., vol. i, p. 49, 1841; Boston Journal of Natural History, vol. iv, p. 41, Plate 4, fig. 7, 1842 (young); Gould, Invert., ed. ii, p. 196, fig. 494. *Pecten Magellanicus* Lamarck, Anim. sans Vert., ed. ii, vol. vii, p. 134 (? non Gmelin, sp.); Hanley, Recent Shells, p. 274; Gould, Invert., ed. i, p. 132. *Pecten fuscus* Linsley, Amer. Jour. Sci., ser. i, vol. xlvi, p. 278, 1845; Gould, ser. ii, vol. vi, p. 235, fig. 6, 1848 (young). *Pecten brunneus* Stimpson, Shells of New England, in errata, 1851.

New Jersey to Labrador. Rare and local south of Cape Cod. Not uncommon in Massachusetts Bay and Casco Bay, 4 to 80 fathoms; abundant in Frenchman's Bay, Mount Desert, Maine, in 3 to 10 fathoms; common in Passamaquoddy Bay and Bay of Fundy, 1 to 109 fathoms. Saint George's Bank, 45 fathoms, (S. I. Smith). Nova Scotia (Willis). Labrador, 2 to 15 fathoms, (Packard). Off Block Island (Gould). Stonington, Connecticut, in cod stomachs, (Linsley, as *P. fuscus*). Coney Island and Sandy Hook, New York (S. Smith).

Fossil in the Post-Pliocene near Saint John, New Brunswick, and Gardiner's Island, New York. A closely related species occurs in the Miocene of Virginia.

ANOMIA GLABRA Verrill. Plate XXXII, figs. 241, 242, 242^a. (p. 311.)

American Jour. Science, vol. iii, p. 213, 1872. *Anomia ephippium* (pars) Linné, Syst. Nat., ed. xii, p. 1150; Gould, Invert., ed. i, p. 138; ed. ii, p. 204, fig. 497. *Anomia electrica* Gould, Invert., ed. i, p. 140; ed. ii, p. 205, fig. 499, adult, (non Linné.) *Anomia squamula* Gould, Invert., ed. i, p. 140; ed. ii, p. 206, young, (non Linné.)

Florida to Cape Cod; rare and local farther north, in Massachusetts Bay, Casco Bay, and on the southern coast of Nova Scotia, off Cape

Sable, 8 fathoms. Not observed on the eastern part of the coast of Maine, nor in the Bay of Fundy. Very common in Long Island Sound, Buzzard's Bay, Vineyard Sound; along both shores of Long Island; New Jersey, and southward; low-water to 12 fathoms. Southern part of Saint George's Bank, 20 fathoms, (S. I. Smith).

Fossil in the Post-Pliocene of North and South Carolina; and in the Pliocene of South Carolina.

Linné gave "Pennsylvania" as one of the localities for his *A. ephippium*, and, therefore, probably confounded our shell with the European species, as most subsequent writers have done. Gould has well described our species in its different states, under the names quoted above, figures 499 of the second edition (our figures 241, 242), represent the ordinary adult form, which is everywhere abundant on the southern shores of New England. The specimens from Eastport, Maine, referred to *A. ephippium* by Gould, were undoubtedly the smooth or squamose variety of the following species.

ANOMIA ACULEATA Gmelin. Plate XXXII, figs. 239, 240, 240^a. (p. 495.)

Syst. Nat., p. 3346, 1790; Gould, Invert., ed. i, p. 139, fig. 90; ed. ii, p. 204, fig. 498.

Long Island to Labrador, and northern coasts of Europe. Off Stonington, Connecticut, 4 to 5 fathoms rocky; off Gay Head, 10 fathoms, scarce; very common in Casco Bay, Bay of Fundy, and northward, low-water to 80 fathoms. Greenport and Montauk, Long Island (S. Smith).

Varieties of this species occur frequently in the Bay of Fundy and Casco Bay, in which the aculeate scales are more or less abortive, or even entirely absent, leaving the surface either nearly smooth or irregularly squamose, but such varieties are easily distinguished from the young of the preceding species.

This may possibly be a variety of the true *ephippium* of Europe, as supposed by many writers, but I believe it to be perfectly distinct from *A. glabra*.

OSTREA VIRGINIANA Lister. (pp. 310, 472.)

Favanne, Conch., Plate 41, fig C 2, 1780 (t. Gould); Gould, Invert., ed. i, p. 136; ed. ii, p. 202; Verrill, Amer. Jour. Science, vol. iii, p. 213, 1872. *Ostrea Virginica* Gmelin, Syst. Nat., p. 3336, 1790; Lamarek, Anim. sans Vert., ed. ii, vol. vii, p. 225. *Ostrea borealis* Lamarek, op. cit., p. 220; Gould, Invert., ed. i, p. 137; ed. ii, p. 203; DeKay, op. cit., p. 169, Plate 10, figs. 203, 204. *Ostrea Canadensis* Bruguière, Encycl. Meth., Plate 180, figs. 1-3; Lamarek, op. cit., p. 226; Hanley, Recent Shells, p. 299.

Florida and the northern shores of the Gulf of Mexico to Massachusetts Bay; local farther north, off Damariscotta, Maine, and in the southern part of the Gulf of Saint Lawrence, at Prince Edward Island, in Northumberland Straits, and Bay of Chaleur. Not found along the eastern shores of Maine, nor in the Bay of Fundy. Abundant

in the ancient Indian shell-heaps on the coast of Massachusetts, on the islands in Casco Bay, and at Damariscotta. The shells, in a semi-fossil state, have been dug up from deep beneath the mud in the harbor of Portland, Maine, in large quantities, but native oysters appear to be entirely extinct in Casco Bay. Very abundant in Long Island Sound; in the upper part of Buzzard's Bay; rare and local in Vineyard Sound; very abundant on the shores of Maryland and Virginia. Mouth of Saint John's River, and in Tampa Bay, Florida (Conrad). Texas (Rømer).

Fossil in the Post-Pliocene at Point Shirley, Massachusetts, Nantucket Island (abundant), Gardiner's Island; in the Pliocene of South Carolina; and in the Miocene of Virginia and South Carolina.

The occurrence of large quantities of oyster-shells beneath the harbor mud at Portland, associated with *Venus mercenaria*, *Pecten irradians*, *Turbonilla interrupta*, and other southern species, now extinct in that locality, and the occurrence of the first two species in the ancient Indian shell-heaps, on some of the islands in Casco Bay, though not now found living among the islands, indicates that the temperature of those waters was higher at a former period than at present. These facts also point to the most satisfactory explanation of the existence of numerous southern shells, associated with the oyster and *Venus mercenaria* in the southern part of the Gulf of Saint Lawrence, though not now found in the intermediate waters, along the coast of Maine, nor in the Bay of Fundy.

All the various forms of this species, upon which the several nominal species, united above, have been based by Lamarck and others, often occur together in the same beds in Long Island Sound, and may easily be connected together by all sorts of intermediate forms. Even the same specimen will often have the form of *borealis* in one stage of its growth, and then will suddenly change to the *Virginiana* style, and, perhaps, later still, will return to the form of *borealis*. Or these different forms may be assumed in reverse order. Great variations in the number and size of the costæ and undulations of the lower valve occur, both in different specimens from the same locality, and even in the same specimen, at different stages of growth. All these variations occur in precisely the same way in the shells taken from the ancient Indian shell-heaps along our entire coast, from Florida to Maine.

TUN CATA.

SACCOBRANCHIA.

CIONA TENELLA Verrill. (p. 419.)

American Journal Science, ser. iii, vol. i, p. 99, figs. 12, 13, 1871. *Ascidia tenella* Stimpson, Proc. Bost. Soc. Nat. Hist., iv, p. 228, 1853; Inv. of Grand Manan, p. 20, 1853; Binney, in Gould, Invert., ed. ii, p. 24, 1870. ?*Ascidia ocellata* Ag., Proc. Amer. Assoc. for Adv. Sci., ii, p. 159, 1850 (description insufficient); Binney, in Gould, Invert., ed. ii, p. 24, Plate 24, fig. 332, 1870.

^Cape Cod to Gulf of Saint Lawrence; rare and local south of Cape

Cod. Common in Casco Bay and Bay of Fundy, low-water to 100 fathoms. New Bedford, Massachusetts (L. Agassiz).

MOLGULA MANHATTENSIS Verrill. Plate XXXIII, fig. 250. (pp. 311, 445.)

Amer. Jour. Science, vol. i, p. 54, Jan., 1871; Tellkamp, Annals Lyc. Nat. Hist., New York, vol. x, p. 83, 1872. *Ascidia Manhattensis* DeKay, Report on the Natural History of New York, Mollusca, p. 259, 1843; Binney, in Gould's Invertebrata of Massachusetts, ed. ii, p. 25, 1870 (copied from DeKay). *Ascidia amphora* Ag., MSS.; Binney, op. cit., p. 25, Plate 24, fig. 333.

North Carolina to Casco Bay, Maine. Very common in Great Egg Harbor, New Jersey, Long Island Sound, Buzzard's Bay, Vineyard Sound, and Massachusetts Bay. Less common in Casco Bay. Great South Bay, Long Island, abundant, (S. I. Smith).

MOLGULA PELLUCIDA Verrill. (p. 426.)

Amer. Jour. Science, vol. iii, p. 289, Plate 8, fig. 2, 1872.

Body subglobular with a smooth, thin, pellucid test. Tubes terminal, contiguous, much swollen at base, long, divergent, tapering, reticulated within by longitudinal and circular white lines (muscular fibers). Branchial aperture with six papillæ. Intestine conspicuously visible through the test; stomach covered by deep orange-colored hepatic glands. Ovaries large, whitish. Color of test, pale hyaline bluish; tubes toward the ends, dull neutral tint.

Diameter of the largest specimens about 25^{mm}.

North Carolina to Massachusetts Bay. Massachusetts Bay (L. Agassiz). Long Island (Coll. Peabody Academy of Science). Bird Shoal near Beaufort, North Carolina (Dr. H. C. Yarrow).

Mr. Binney has published (Plate 22, figs. 315, 316) characteristic colored figures of this species under the name of *M. producta* (Stimpson), which is a very different, sand-covered species.

MOLGULA PRODUCTA Stimpson. (p. 502.)

Proc. Boston Society Natural History, vol. iv, p. 229, 1852; Verrill, op. cit., p. 239, Plate 8, fig. 6, 1872; Binney, in Gould, p. 21 (not the figures, which are *M. pellucida*).

Off Buzzard's Bay, 25 fathoms, sandy. Massachusetts Bay, low-water to 6 fathoms, (Stimpson).

MOLGULA ARENATA Stimpson. Plate XXXIII, fig. 251. (p. 419.)

Proc. Boston Soc. Nat. Hist., vol. iv, p. 230, 1852; Binney, in Gould, Invert., ed. ii, p. 21; Verrill, Amer. Jour. Sci., vol. iii, Plate 8, fig. 5, 1872.

Long Island Sound, near New Haven, 3 fathoms, sand; Vineyard Sound and Buzzard's Bay, 5 to 15 fathoms, sand and gravel. Nantucket (Stimpson).

MOLGULA PAPILOSA Verrill. (p. 495.)

Amer. Jour. Science, vol. i, p. 57, fig. 4, b, 1871; op. cit., vol. iii, p. 211, Plate 8, fig. 4, 1872.

Body free, nearly globular, or transversely suboval, usually slightly

compressed laterally. Integument rather thin, translucent, the surface, both of the tubes and body, entirely covered by particles of sand, broken shells, foraminifera, etc., which adhere firmly. When cleaned the whole surface is thickly covered with prominent granule-like papillæ and numerous slender fibrous processes; the granules are most conspicuous on the tubes, where they usually have a rusty color. The tubes are long, subequal, and their bases are separated by a space usually greater than their diameters; they are quite divergent, both of them curving outward, the anal tube most abruptly. The branchial tube is cylindrical, somewhat longer than the anal, equal to or exceeding the diameter of the body, the orifice surrounded by six rather long and slender, conical, divergent papillæ. The anal tube often bends suddenly outward, tapers slightly, and has a small square aperture, surrounded by a circle of dull reddish brown. In contraction the tubes are not retracted, but are usually shortened to about one-half their length. In life the body, when cleaned, is pale grayish, with an almost transparent integument, through which the convolutions of the dark intestine are conspicuous.

The largest specimens are about 10^{mm} in diameter.

Off Martha's Vineyard, 10 fathoms, stony; Casco Bay and Bay of Fundy, 10 to 20 fathoms.

EUGYRA PILULÆRIS Verrill. Plate XXXIII, fig. 249. (p. 509.)

Amer. Jour. Science, vol. iii, p. 211, Plate 8, fig. 3, 1872. *Molgula pilularis* Verrill, op. cit., vol. i, p. 56, fig. 4, c, 1871.

Body unattached, globular, covered with a thin layer of mud, and, when the tubes are retracted, looking like a small soft ball. Integument of the body, when cleaned, very thin, soft, nearly transparent, thickly covered with minute granules, and minutely fibrous, usually concealed by the adhering particles of mud and fine sand, but this can be easily removed. The tubes are naked, smooth, nearly transparent, subconical, slender, as long as the diameter of the body, originating close together, and but slightly divergent, both of them nearly straight; they can be wholly retracted, and their bases are surrounded and connected by a narrow, naked, oval or oblong band, which is usually conspicuous when the tubes are withdrawn; in partial contraction, the tubes are conical, subpellucid, reticulated with white lines. The branchial tube is a little shorter than the anal, the aperture surrounded by six acute, conical papillæ, and twelve small, dark, brownish spots. Anal tube a little smaller, slightly longer, a little tapering, with a small square aperture, surrounded by four small lobes and four small, reddish brown eye-spots.

In life the body, when cleaned, is transparent grayish, the dark intestine showing through very distinctly; tubes greenish at base.

Diameter usually about 5^{mm}, seldom more than 6^{mm} or 8^{mm}.

Off Gay Head, Martha's Vineyard, 19 fathoms, soft mud; Casco Bay,

10 to 20 fathoms; Bay of Fundy, off Grand Menan, Eastport Harbor, and South Bay, 6 to 20 fathoms, soft mud. Gulf of Saint Lawrence (Whiteaves).

GLANDULA ARENICOLA Verrill. (p. 502.)

Amer. Jour. Science, ser. iii, vol. iii, pp. 211, 288, 1872.

Body subglobular, rather higher than broad, the whole surface covered with grains of sand, forming a continuous layer. When the sand is removed the surface of the test is reticulately wrinkled and pitted, not furnished with fibers, except at base, where there are a few long, slender, thread-like white ones. Tubes terminal, near together, in the alcoholic specimens short, forming low verrucæ, swollen at base, the ends a little prominent and naked. Apertures square, with four small lobes. The test is tough and opaque. Height, about 12^{mm}; breadth, 10^{mm}; often larger.

Murray Bay, Gulf of Saint Lawrence (Dr. J. W. Dawson). Saint George's Bank, 28 fathoms, sand, abundant, (S. I. Smith). Off Cuttyhunk Island and Buzzard's Bay (T. H. Prudden).

GLANDULA. Species undetermined. (p. 502.)

Vineyard Sound and off Martha's Vineyard, 10 to 20 fathoms, sand.

CYNTHIA PARTITA Stimpson. Plate XXXIII, fig. 246. (p. 311.)

Proc. Bost. Soc. Nat. History, vol. iv, p. 231, 1852; Binney, op. cit., p. 18; Verrill, Amer. Jour. Science, vol. iii, p. 213, 1872. (?) *Cynthia rugosa* Agassiz, Proc. Amer. Assoc., vol. ii, p. 159, 1850 (description inadequate); Binney, op. cit., p. 20 (copied from the preceding). *Cynthia stellifera* Verrill (var.), Amer. Jour. Science, vol. i, p. 93, figs. 5, 6, a, b, 1871.

North Carolina to Massachusetts Bay. Common in Long Island Sound, Vineyard Sound, and Buzzard's Bay, low-water to 15 fathoms. Boston Harbor, 4 fathoms (Stimpson). Off New London, Connecticut (T. M. Prudden).

CYNTHIA CARNEA Verrill. Plate XXXIII, figs. 247, 248. (p. 495.)

American Jour. Science, ser. iii, vol. i, p. 94, figs. 7, 8, 9, 1871. *Ascidia carnea* Agassiz, Proc. American Assoc. for Adv. Sci., ii, p. 159, 1850 (description insufficient); Binney, in Gould's Invertebrata of Mass., ed. ii, p. 25, Plate 24, figs. 334, 335, 1870 (young). (?) *Cynthia gutta* Stimpson, Proc. Boston Soc. Nat. Hist., vol. iv, p. 231, 1852 (young); Binney, op. cit., p. 19, 1870. *Cynthia placenta* (pars) Packard, Mem. Boston Soc. Nat. Hist., vol. i, p. 277, 1867; Binney, op. cit., p. 19, Plate 23, figs. 322, 1870; Verrill, Amer. Jour. Sci., vol. xlix, p. 424, 1870.

Martha's Vineyard to Labrador. Off Gay Head, 10 fathoms, stony; common in Eastport Harbor and Bay of Fundy, low-water to 109 fathoms; Casco Bay, less common, 10 to 40 fathoms. Massachusetts Bay (Stimpson). Labrador (Packard).

This species is closely allied to *C. rustica* (Linné, sp.) from Iceland, and may eventually prove to be identical.

CYNTHIA ECHINATA Stimpson. (p. 495.)

Invert. of Grand Menan, p. 20, 1854; Binney, op. cit., p. 18, Plate 23, fig. 323; Verrill, Amer. Jour. Science, vol. i, p. 96, 1871; vol. iii, p. 213, 1872. *Cynthia hirsuta* (young) Agassiz, op. cit., 1850; Binney, in Gould, Invert., ed. ii, p. 20, Plate 24, fig. 336. *Ascidia echinata* Linné, Syst. Nat., ed. xii, p. 1037, 1767. *Ascidia echinata* Fabr., Fauna Grœnl., p. 331, 1780; Rathke, Zoologica Danica, vol. iv, p. 10, Plate 130, fig. i, 1806; Möller, Index Mollusc. Grœnl., in Kroyer's Nat. Tidsskrift, vol. iv, p. 95.

Martha's Vineyard to Greenland, Iceland, and northern coasts of Europe. Off Martha's Vineyard, 10 fathoms, stony, rare; common in Casco Bay and Bay of Fundy, low-water to 109 fathoms, attached to stones, shells, and other ascidians. Saint George's Bank (S. I. Smith). Banks of Newfoundland (T. M. Coffin). Labrador (Packard).

BOLTENIA. Species undetermined.

Boltenia reniformis Dekay, Nat. Hist. New York, Mollusca, p. 260, Plate 34, fig. 324 (non Macleay).

New York Harbor (t. Dekay.)

The description and figure of the single poor specimen seen by Dekay are insufficient for its determination. I have not met with the genus south of Cape Cod, and the locality given may possibly be incorrect.

PEROPHORA VIRIDIS Verrill. (p. 388.)

American Jour. Science, ser. iii, vol. ii, p. 359, 1871.

Colonies composed of numerous nearly sessile individuals, which are small, about 2.5^{mm} to 3^{mm} high, connected by slender stolons, and thickly covering the surfaces over which they creep. Test compressed, seen from the side, scarcely higher than broad, oval, elliptical, or sub-circular, often one-sided or distorted, with a short pedicle, or subsessile at base. Branchial orifice large, terminal; anal lateral or subterminal, both a little prominent, with about 16 angular lobes, alternately larger and smaller. Test transparent; mantle beautifully reticulated with bright yellowish green; intestine yellow.

Vineyard Sound, 2 to 12 fathoms, on algæ and ascidians, common; Little Harbor, Wood's Hole, on piles of wharves, at and below low-water mark, very abundant.

BOTRYLLUS GOULDII Verrill. Plate XXXIII, figs. 252, 253. (p. 375.)

Amer. Jour. Science, ser. iii, vol. i, figs. 14, 19, 1871. *Botryllus stellatus* Gould, Rep. on Inv. of Mass., 1st ed., p. 320, 1841 (non Pallas). *Botryllus Schlosseri* Binney, in Gould, Inv. Mass., ed. ii, p. 3, Plate 23, fig. 319, 1870 (non Pallas); Dall, Proc. Bost. Soc. Nat. Hist., xiii, p. 255, 1870.

This species commonly forms thick, fleshy, translucent incrustations on sea-weeds and zoöphytes, the form which it assumes depending upon the shape of the object. The masses are often several inches in length and half an inch or more in width. The animals are short oval, as seen at the surface, and form circular or elliptical groups, of from five to sixteen or more, surrounding circular or elliptical cloacal orifices. The "marginal tubes" or buds are numerous in all parts of the common

tissue, the enlarged ends appearing as oval or pyriform spots, lighter than the ground-color. The branchial openings are small and circular, surrounded by a light halo. The animals differ considerably in form, according to the state of contraction.

The color is extremely variable; several of the color-varieties have been named and described on pages 375, 376.

Brooklyn, New York, to Boston, Massachusetts. Very abundant at Wood's Hole, Waquoit Pond, and other similar localities along the shores of Vineyard Sound and Buzzard's Bay; abundant at the mouth of Charles River, near Boston. Watch Hill, Rhode Island, and Brooklyn, New York (D. C. Eaton).

AMARŒCIUM PELLUCIDUM Verrill. (p. 401.)

Amouroucium pellucidum Verrill, Amer. Jour. Science, ser. iii, vol. i, p. 290, 1871; vol. iii, p. 211. *Alcyonidium ? pellucidum* Leidy, Jour. Acad. Nat. Science, Philad., ser. ii, vol. iii, 1855, p. 142, Plate 10, fig. 25, (mutilated zooid).

Colonies large, complex, consisting of a large number of small, elongated, clavate colonies, arising from a common base, and more or less separate laterally and at summit, thus forming large aggregated hemispherical or irregular masses, often six inches in diameter, the surface generally covered thickly with adhering sand, but frequently naked over the summits of the colonies, or even over large surfaces of the masses, when, as often happens, the central colonies coalesce; when naked, the tissue is smooth, translucent, gelatinous-looking, and soft. The small side-colonies are long, with a slender stolon-like base, curving outward and ascending, enlarging gradually to the summit, which is more or less convex, usually with a single central cloacal orifice, surrounded by an irregular circle of individual zooids, varying in number according to the size or age of the colony to which they belong. The zooids, when mature, are long and slender, varying greatly in length in each colony, according to the state of development of the post-abdomen; the largest are often 20^{mm} to 25^{mm} in length. The stomach is bright orange-red, and quite conspicuous; the slender post-abdomen exceeds in length the rest of the body, but is not more than half the diameter of the thorax, and is slightly constricted at base. In young individuals, not half grown, the post-abdomen forms nearly half the whole length, and is very slender. The branchial aperture has six, short, round papillæ; the anal is situated a short distance from the end of the body, and has short inconspicuous lower lobes, with an elongated, pointed lobe above. The branchial sac is oblong, with numerous longitudinal and transverse vessels and a broad ventral duct. The stomach is about as broad as long, subglobular, with the ends truncated and the surface covered with numerous, interrupted, longitudinal, glandular ridges. The post-abdomen is nearly filled by the large, elongated ovary, which extends nearly to the posterior end on the dorsal or atrial side, and contains numerous closely-packed ovules of comparatively large size, and

the conspicuous male organs, extending through the whole length on the ventral or branchial side, in the form of a slightly-convoluted duct. The posterior end terminates in a small, obtuse papilla. The atrium, or cloacal cavity, often contain eggs in which the embryos are well developed, and, in some cases, the free, tadpole-shaped larvæ. The tunic is specked with numerous, minute, purplish brown pigment-cells.

One of the zoöids measured 7.5^{mm} in length; thorax, 2^{mm}; abdomen, 1.5^{mm}; post-abdomen, 4^{mm}; diameter of thorax, .8^{mm} to .9^{mm}; of abdomen, about the same; of post-abdomen, .375^{mm} to .5^{mm}.

North Carolina to Vineyard Sound. Very abundant in Vineyard Sound, in 6 to 12 fathoms.

AMARCECIUM STELLATUM Verrill. (p. 402.)

Amouroucium stellatum Verrill, Amer. Journal of Science, ser. iii, vol. i, p. 291, 1871.

Masses large, variable in form, often in the form of thick vertical plates, or erect crest-like lobes, frequently irregular; surface nearly smooth, naked; tissue firm and cartilage-like externally, somewhat translucent, generally pale yellow or flesh-color by transmitted light. The fronds are often six inches or more in breadth and height, and from half an inch to an inch thick. The zoöids are grouped in more or less regular, and generally simple, circular, stellate clusters, scattered over the whole surface, and usually containing from six to twenty individuals, arranged around a central, sub-circular cloacal orifice; in contraction the position of each individual is indicated by an oval spot, more transparent than the common tissue, with a small flake-white spot around the branchial orifice. The individual zoöids are elongated and slender; the post-abdomen more slender, usually considerably exceeding in length the rest of the body, and but slightly constricted proximally; the thorax and abdomen are shorter and stouter than in the preceding species; branchial sac with about twelve transverse vessels; stomach oblong-oval, with numerous longitudinal glandular folds, which are bright orange-red in life; intestine large, light orange or yellow. Branchial tube elongated, bright orange; the orifice with six prominent rounded lobes. Anal orifice subterminal, with a prominent ligulate process above, and several small lobes below.

North Carolina to Cape Cod. Very abundant in Vineyard Sound, in 5 to 15 fathoms, on gravelly and shelly bottoms. Fort Macon, North Carolina (Dr. Yarrow).

AMARCECIUM CONSTELLATUM Verrill. (pp. 388, 403.)

American Journal of Science, ser. iii, vol. ii, p. 359, 1871 (*Amouroucium*).

Masses thick, turbinate, often incrusting, surface usually convex, smooth; substance firm, gelatinous, translucent, but softer than in *A. stellatum*. Groups stellate, circular, oval or elliptical, often narrow and elongated, or irregular and complex; zoöids much elongated, slender; the branchial tube short, with six rounded lobes. Branchial sac elong-

ated. Color of the masses usually light orange-red, varying to yellowish and pale flesh-color; the branchial orifices with six radiating white lines. Anal orifices often surrounded by a pale or whitish border; zoöids generally orange-yellow; the orifices and tubes with upper part of the mantle bright orange, or lemon-yellow; branchial sac usually flesh-color or pale yellow, sometimes bright orange; stomach with bright orange-red longitudinal glandular ribs; intestine light orange; mantle with minute opaque white specks. In some specimens the cloacal chamber or "atrium" contained three or four bright purple tadpole-shaped larvæ.

Vineyard Sound, 4 to 12 fathoms, frequent; Wood's Hole, on piles of wharf; off Stonington, Connecticut, 4-5 fathoms.

AMARŒCIUM PALLIDUM Verrill. (p. 496.)

American Journal of Science, ser. iii, vol. i, p. 239, 1871 (*Amouroucium*).

Masses sessile, hemispherical or sub-globular, usually attached by a large base. Surface generally evenly rounded, sometimes irregular in large specimens, smoothish, but thinly covered with minute, firmly adherent particles of fine sand, which are imbedded in the surface of the common tissue and scattered throughout its substance. The cloacal openings are few in number and irregularly placed, except in small specimens, which usually have but one large central opening. The animals are much smaller and more numerous than in the preceding species, often forming somewhat circular groups of six or eight individuals around the cloacal openings; outside of the circular groups they are usually irregularly scattered, but sometimes form linear series of eight or ten, and in young specimens with but one central opening they often form a larger outer circle, which is near the margin, more or less irregular, and composed of numerous individuals. The post-abdomen, in all the numerous examples examined, was small, thick, obtuse, and decidedly shorter than the abdomen and thorax taken together; it often terminates in two slender papillæ. Color of the masses pale yellowish or grayish; stomach dull orange-yellow; ovaries yellowish white.

The larger specimens of this species are 15^{mm} to 25^{mm} in diameter; the largest zoöids are 3^{mm} to 4^{mm} long, by .75^{mm} to 1.25^{mm} in diameter; but many are much smaller.

Martha's Vineyard to Gulf of Saint Lawrence. Off Buzzard's Bay, 25 fathoms, gravel; south of Gay Head, 10 fathoms, stony; Casco Bay, 8 to 40 fathoms; Eastport Harbor and Bay of Fundy, low-water to 80 fathoms.

LEPTOCLINUM ALBIDUM Verrill. (p. 403.)

American Journal of Science, ser. iii, vol. i, p. 446, 1872.

Colonies incrusting stones, dead shells, ascidians, etc., forming broad, thin, irregular, coriaceous crusts, with an uneven surface, filled with minute, white, spherical, calcareous grains or corpuscles, which, under

the microscope, have the surface covered with projecting points. Surface of the crusts covered with small, irregular, scattered prominences, in which the branchial orifices are situated. Cloacal orifices few and distantly scattered. Systems irregular, the zoöids scattered, but often arranged in rather indistinct concentric groups around the cloacal openings, and connected with them by cloacal ducts, which are variously branched, often showing through the integument as dark dendritic lines, converging toward the cloacal orifices from different directions.

Color white, the zoöids light yellowish.

The colonies often become 200^{mm} to 300^{mm} across; thickness seldom more than 2.5^{mm}, commonly about 1.25^{mm}; zoöids .5^{mm} to .75^{mm} long; diameter .25^{mm} to .30^{mm}.

Long Island Sound to Labrador. Thimble Islands, near New Haven, 4 to 6 fathoms, rocky; off Stonington, 4 fathoms, rocky; common in Vineyard Sound, 8 to 15 fathoms; abundant in Casco Bay, 6 to 40 fathoms; abundant in the Bay of Fundy, low-water to 80 fathoms. Banks of Newfoundland (T. M. Coffin). Mingan Islands, 10 fathoms (A. E. V.). Saint George's Bank (S. I. Smith).

LEPTOCLINUM LUTEOLUM Verrill. (p. 403.)

American Jour. Science, loc. cit., p. 446, 1872.

This species forms thin, coriaceous crusts, like the preceding, filled in the same way with similar spherical corpuscles. The branchial orifices open at the summits of low verrucæ. The cloacal orifices are small, with four to six lobes, and distantly scattered. Color deep salmon, or somewhat rosy.

The crusts are of all sizes up to 300^{mm} or more in diameter, and are usually somewhat thicker than in the preceding species, with larger and darker colored zoöids.

Connecticut to Bay of Fundy; off Stonington, Connecticut, 4 fathoms, rocky; Vineyard Sound, 6 to 14 fathoms, common; Casco Bay, 10 to 40 fathoms, common; Bay of Fundy, low-water to 80 fathoms, common.

TÆNIOBRANCHIA.

SALPA CABOTI Desor. Plate XXXIII, figs. 254, 255. (p. 445.)

Proc. Boston Soc. Nat. History, vol. iii, p. 75, 1848 (not described); A. Agassiz, op. cit., vol. xi, p. 17, figs. 1 to 5, 1866; Binney, in Gould, Invert., ed. ii, p. 6, figs. 350 to 354, 1870 (description and figures copied from A. Agassiz).

In the typical variety, as described by Mr. Agassiz, the color is pale pink or rosy; the nucleus deep chestnut. Long Island Sound to Saint George's Bank. Common in Buzzard's Bay and Vineyard Sound. Off Saint George's Bank (S. I. Smith).

Var. *cyanea*. (p. 446.)

Nucleus and the borders of the mantle are bright Prussian-blue; surface of the latter delicately reticulated with fine blue lines.

Vineyard Sound, especially off Gay Head, in September.

DOLIOLUM (species undetermined). (p. 446.)

Vineyard Sound (A. Agassiz).

LARVALIA.

APPENDICULARIA (species undetermined, ^a). (p. 446.)

Allied to *A. longicauda* (t. A. Agassiz), op. cit., p. 23, 1866; Binney, op. cit., p. 13 (copied from A. Agassiz).

Long Island Sound to Massachusetts Bay (A. Agassiz).

APPENDICULARIA (species undetermined, ^b). (p. 446.)

Allied to *A. fureata* (t. A. Agassiz), op. cit., p. 23, 1866; Binney, op. cit., p. 13 (copied).

Long Island Sound to Massachusetts Bay (A. Agassiz).

BRYOZOA OR POLYZOA.

PHYLACTOLÆMATA.

PEDICELLINA AMERICANA Leidy. (p. 405.)

Journal Acad. Nat. Sciences, Philadelphia, ser. ii, vol. iii, p. 143, Plate X, fig. 25, 1855.

New Haven, Connecticut, to Vineyard Sound. Point Judith, Rhode Island (Leidy).

GYMNOLEMATA.

CYCLOSTOMATA.

CRISIA EBURNEA Lamouroux. Plate XXXIV, figs. 260, 261. (p. 311.)

Polyp. flex., p. 138, 1816; Exp. methodique, p. 6; Johnston, British Zoophytes, ed. i, p. 262, Plate 30, figs. 3, 4; ed. ii, p. 283, fig. 62, and Plate 50, figs. 3, 4; Smitt, Kritisk fört. öfver Skandinavians Hafs-Bryozoer, in Öfvers. af Kongl. Vet.-Akad. Förhandl., 1865, p. 117, Plate 16, figs. 7 to 19. *Sertularia eburnea* Linné, Syst. Nat., ed. x, p. 810; ed. xii, p. 1316.

Long Island Sound to the Arctic Ocean; Spitzbergen to the Mediterranean (t. Smitt); California (t. Johnston). Common near New Haven, and at Thimble Islands, 1 to 6 fathoms, rocky, and in tide-pools; off Watch Hill, Rhode Island, 4 to 5 fathoms, on algæ; common in Vineyard Sound, 4 to 15 fathoms; very common in Casco Bay and Bay of Fundy, low-water to 80 fathoms.

DIASTOPORA PATINA Smitt. (p. 405.)

Smitt, op. cit., p. 397, Plate 8, figs. 13 to 15. *Tubulipora patina* Lamarek, Animaux sans Vert., ed. i, vol. ii, p. 163; ed. ii, vol. ii, p. 244; Johnston, Brit. Zoöph., ed. ii, p. 266, Plate 47, figs. 1 to 3.

Long Island Sound to the Arctic Ocean; northern coast of Europe, from Finmark to Great Britain. Near New Haven, at Thimble Islands, 1 to 5 fathoms; Watch Hill, Rhode Island, 4 to 5 fathoms; Vineyard Sound, off Holmes' Hole, 3 to 4 fathoms; very common in Casco Bay, Bay of Fundy, and northward.

TUBULIPORA FLABELLARIS Smitt. (p. 405.)

Op. cit., p. 401, Plate 9, figs. 6 to 8. *Tubipora flabellaris* Fabricius, Fauna Grœnl., p. 430, 1780 (*non* Johnston, sp.). *Tubulipora phalangea* Johnston, Brit. Zoöph., ed. ii, p. 273, Plate 46, figs. 1, 2.

Long Island Sound to Greenland; northern coasts of Europe to Great Britain. Common at Thimble Islands, 1 to 5 fathoms, on algæ, hydroids, etc.; Watch Hill, Rhode Island; Vineyard Sound; Casco Bay; Bay of Fundy, and northward.

CTENOSTOMATA.

ALCYONIDIUM RAMOSUM Verrill. Plate XXXIV, fig. 257. (p. 404.)

American Journal of Science, vol. iii, p. 289, Plate 8, fig. 10, 1872.

Much branched, when full-grown; the branches round, irregularly dichotomous, usually crooked. Surface glabrous, smooth, or nearly so, the cells rather small and crowded, their margins not elevated; zoöids with sixteen slender tentacles. Color ashy brown, or dull rusty brown.

Diameter of branches, mostly 5^{mm} to 6.5^{mm}. Height, .250^{mm} to .375^{mm}.

Great Egg Harbor, New Jersey, to Vineyard Sound; common in Long Island Sound, near New Haven, in 1 to 5 fathoms; Thimble Islands; Watch Hill, Rhode Island, etc.

ALCYONIDIUM HIRSUTUM Johnston. (p. 404.)

British Zoöph., ed. i, p. 303, Plate 42, figs. 1, 2; ed. ii, p. 360, Plate 69, figs. 1, 2; Smitt, op. cit., p. 496, Plate 12, figs. 3 to 8. *Alcyonium hirsutum* Fleming, Brit. Anim., p. 517.

Long Island Sound to the Arctic Ocean; Spitzbergen; northern coasts of Europe to Great Britain. Savin Rock, near New Haven, low-water; Thimble Islands, in tide-pools, on *Fucus*, *Phyllophora*, etc.; Vineyard Sound; and Casco Bay.

ALCYONIDIUM HISPIDUM Smitt. (p. 404.)

Op. cit., p. 499, Plate 12, figs. 22 to 27, 1866. *Flustra hispida* Fabricius, Fauna Grœnl., p. 438, 1780; Johnston, Brit. Zoöph., ed. ii., p. 363, Plate 66, fig. 5. *Flustrella hispida* Gray, Brit. Mus. Catal., part i, p. 108.

Long Island Sound to Greenland; Finmark to Great Britain. Very common at Savin Rock, near New Haven, at low-water, encrusting stones, *Fucus*, etc.; Thimble Islands; Watch Hill, Rhode Island; Vineyard Sound; Casco Bay; Bay of Fundy, etc.

ALCYONIDIUM PARASITICUM Johnston. (p. 404.)

British Zoöph., ed. i, p. 304, Plate 41, figs. 4, 5; ed. ii, p. 362, Plate 63, figs. 4, 5; Smitt, op. cit., p. 499, Plate 12, figs. 14-19. *Alcyonium parasiticum* Fleming, Brit. Anim., p. 518.

Rhode Island to Arctic Ocean; northern coasts of Europe to Great Britain. Vineyard Sound, on *Phyllophora*.

(?) *ALCYONIDIUM GELATINOSUM* Johnston. (p. 496.)

Brit. Zoöph., ed. i, p. 300, Plate 41, figs. 1-3; ed. ii, p. 358, Plate 63, figs. 1-3; Smitt, op. cit., p. 497, Plate 12, figs. 9-13. *Alcyonium gelatinosum* Linné, Fauna Suec., ed. ii, p. 538; Syst. Nat., ed. xii, p. 1295.

Gulf of Saint Lawrence; Spitzbergen to Great Britain. A few small specimens, apparently belonging to this species, were dredged in the deeper parts of Vineyard Sound.

VESICULARIA CUSCUTA Thompson. (p. 404.)

Zoöl. Res., mem. v, p. 97, Plate 2, figs. 1-4; Smitt, op. cit., p. 501, Plate 13, figs. 28, 34, 35. *Sertularia cuscuta* Linné, ed. xii, p. 1311. *Valkeria cuscuta* Fleming, Brit. Anim., p. 550; Johnston, Brit. Zoöph., ed. i, p. 252; ed. ii, p. 374.

New Jersey, northward; northern coasts of Europe to Great Britain. In Vineyard Sound it was found on hydroids attached to floating eel-grass, and was also dredged in 6 to 8 fathoms, on algæ, *Sertularia argentea*, and other hydroids; Great Egg Harbor, New Jersey, low water, on *Sertularia pumila*; Casco Bay, on piles of wharf.

VESICULARIA GRACILIS Verrill. (p. 389.)

Bowerbankia gracilis Leidy, Journal Acad. Nat. Sciences, Philad., ser. ii, vol. iii, p. 142, Plate 11, fig. 38, 1855.

Great Egg Harbor, New Jersey, to Vineyard Sound. Point Judith, Rhode Island (Leidy). Vineyard Sound, 6 to 8 fathoms, on hydroids.

VESICULARIA DICHOTOMA Verrill, new sp. (p. 404.)

Stems clustered, cæspitose, usually one or two inches high, slender, flexible, white, and repeatedly forking. The branches stand in different planes, so as often to produce miniature tree-like or shrub-like forms, many of which generally arise close together, forming crowded tufts upon rocks, oyster-shells, or algæ. When the stem or a branch divides, there is a joint formed at the base of each of the forks, by the interposition of a very short segment of a dark brownish, opaque substance, which contrasts strongly with the white translucent substance of the rest of the stem. Zoöids arranged closely in two subspiral rows of six to twelve each, just below each fork of the stem and branches, and not occupying half the length of the internodes, which are naked and smooth below the crowded clusters of the zoöids; these are smooth, greenish brown, broad oval or obovate in contraction, subcylindrical or elliptical in expansion, entirely sessile, and but little narrowed at the base, and so crowded as to appear imbricated. The tentacles are eight, long and slender, in expansion usually more than half the length of the cell.

Great Egg Harbor, New Jersey, on oysters; Savin Rock, at low-water; off New Haven Light, 4 to 6 fathoms, shelly and rocky; Thimble Islands, in rocky tide-pools; Norwalk, Connecticut, on oysters. This is probably the species recorded by Dr. Leidy from Great Egg Harbor under the name of *Valkeria pustulosa*, which is an allied European species.

VESICULARIA ARMATA Verrill, new sp. (p. 405.)

Cells stout, oval, broad at base, with a short and narrow pedicel, attached either singly or in pairs along slender, filiform, creeping stems, which often anastomose, the branches being mostly opposite. Distal end of cells prolonged into four conical processes, each of which, when perfect, supports a long slender spinule, nearly half as long as the cell. Tentacles not seen. Cells yellowish horn-color, with an oval, dark brown internal organ, visible in most of the cells.

Vineyard Sound, on floating sea-weeds attached to *Sertularia*, *Halecium gracile*, etc.; also in 6 to 10 fathoms, rocky, on *Sertularia argentea*.

VESICULARIA FUSCA Smitt. (p. 420.)

Op. cit., p. 502, Plate 13, figs. 37-39, 1866. *Avenella fusca* (?) Dalyell, Rare and Rem. Anim. of Scotland, vol. ii, p. 65; vol. i, Plate 12, fig. 11, (t. Smitt).

Long Island Sound northward; northern coasts of Europe to Great Britain. Off South End, near New Haven, 3 to 5 fathoms, on *Alcyonium ramosum*.

FARRELLA FAMILIARIS. (p. 487.)

Vesicularia (Farrella) familiaris Smitt, op. cit., p. 502, Plate 13, fig. 36, 1866. *Plumatella familiaris* Gros, Bulletin Soc. Imp. Mascou, vol. xxii, p. 567, Plate 6, G. figs. 1-10 (t. Smitt). *Farrella pedicellata* Alder, Catal., p. 68, Plate 6, figs. 1-3; Quart. Jour. Microsc. Soc., vol. v, p. 24, Plate 14, figs. 1-3.

Long Island Sound to Vineyard Sound and northward; coasts of Scandinavia and Great Britain. Thimble Islands, near New Haven, in tide-pools, on algæ; Casco Bay. Saint George's Bank (S. I. Smith).

CHILOSTOMATA.

Cellularina.

ÆTEA ANGUINA Lamouroux. (p. 405.)

Soc. Phil., 1812, p. 184 (t. Smitt); Polyp. flex., p. 153, Plate 3, fig. 6; Expos. Methodique, p. 9, Plate 65, fig. 15; Smitt, op. cit., p. 280, Plate 16, figs. 2-4, 1867. *Sertularia anguina* Linné, Syst. Nat., ed. xii, p. 1317. *Anguinaria spatulata* Johnston, Brit. Zoöph., ed. ii, p. 290, Plate 50, figs. 7, 8.

Long Island Sound, northward; coasts of Scandinavia and Great Britain. In Vineyard Sound it was common at low-water mark and in 6 to 14 fathoms, on *Phyllophora* and hydroids. Off New Haven, 4 to 6 fathoms, on *Halecium gracile*.

EUCRATEA CHELATA Lamouroux. (p. 405.)

Polyp. Corall. flex., p. 149, Plate 3, fig. 5, 1816; Expos. Meth., p. 8, Plate 65, fig. 10; Smitt, op. cit., 1865, Plate 5, fig. 3; 1867, p. 281, Plate 16, figs. 7-9; Johnston, Brit. Zoöph., ed. ii, p. 288, fig. 64. *Sertularia chelata* Linné, Systema Nat., ed. x, p. 816. *Cellularia chelata* Pallas, Elench. Zoöph., p. 25, 1766.

Martha's Vineyard northward; northern coasts of Europe to Great Britain. Off Gay Head, 10 fathoms, on hydroids and ascidians. Our specimens differ somewhat from the figures of the European form; the

cells are simple, more slender, and more elongated; aperture of primary cells somewhat bilabiate; of lateral cells simple and scarcely raised; no processes were observed on the front of any of the cells; the primary cells taper below into a slender, often crooked pedicel, which is about one-third as long as the cell.

(?) **CELLULARIA TERNATA** Johnston. (p. 496.)

British Zoöph., ed. ii, p. 335, Plate 59, 1848; Smitt, op. cit., 1867, p. 282, Plate 16, figs. 10 to 26. *Cellularia ternata* Ellis and Solander, Zoöph., p. 30. *Menipca ternata* Busk, op. cit., p. 21, Plate 20, figs. 3 to 5. (?) *Cellularia densa* Desor, Proc. Boston Soc. Nat. Hist., vol. iii, p. 66, 1848 (description inadequate).

Cape Cod to the Arctic Ocean; northern coasts of Europe to Great Britain. Off Gay Head, 10 to 20 fathoms; common in Casco Bay, Bay of Fundy, and at Saint George's Bank, 6 to 100 fathoms. South Shoals, 22 fathoms, (Desor).

CABEREA ELLISII Smitt. (p. 420.)

Op. cit., 1867, p. 287, Plate 17, figs. 55, 56. *Flustra Ellisii* Fleming, Mem. Wern. Soc., vol. ii, p. 251, Plate 17, figs. 1 to 3 (t. Smitt). *Flustra setacea* Fleming, Brit. Anim., p. 536; Johnston, Brit. Zoöph., ed. ii, p. 346. *Cellularia Hookeri* Johnston, Brit. Zoöph., ed. ii, p. 333, Plate 60, figs. 1, 2. *Caberea Hookeri* Busk, op. cit., p. 39, Plate 37, fig. 2.

Martha's Vineyard, northward to the Arctic Ocean; northern coasts of Europe, from Finmark to Great Britain. Mouth of Vineyard Sound, off Gay Head, 8 to 12 fathoms; off Buzzard's Bay, 25 fathoms; very common in Casco Bay, Bay of Fundy, and Saint George's Bank, 6 to 100 fathoms. Labrador (Packard).

BUGULA MURRAYANA Busk. (p. 496.)

Catal. Mar. Polyzoa, Brit. Mus., part i, p. 46, Plate 59; Smitt, op. cit., 1867, p. 292, Plate 18, figs. 19 to 27. *Flustra Murrayana* Bean Mss., Johnston, Brit. Zoöph., ed. i, p. 347, Plate 63, figs. 5, 6. *Flustra truncata* Desor, Proc. Boston Soc. Nat. Hist., vol. iii, p. 66 (*non* Linné).

Martha's Vineyard to Spitzbergen; northern coasts of Europe to Great Britain. Off Gay Head, 10 to 20 fathoms; very common in Casco Bay, Bay of Fundy, and Gulf of Saint Lawrence, 1 to 100 fathoms. Saint George's Bank, 20 to 65 fathoms, (S. I. Smith). Labrador (Packard).

BUGULA FLABELLATA Busk. (p. 389.)

Catal. Marine Polyzoa, Brit. Mus., part i, p. 43, Plates 51, 52. *Bugula aricularia*, forma *flabellata*, Smitt, op. cit., 1867, p. 290, Plate 18, fig. 11. *Flustra aricularia* Johnston, Brit. Zoöph., ed. i, p. 286, Plate 36, figs. 3, 4; ed. ii, p. 346, Plate 63, figs. 3, 4.

Vineyard Sound, 6 to 8 fathoms; Wood's Hole, abundant on the piles of wharves. Coasts of Great Britain and Belgium.

BUGULA TURRITA Verrill. Plate XXXIV, figs. 258, 259. (p. 311.)

Cellularia turrita Desor, Proc. Boston Soc. Nat. Hist., vol. iii, p. 66, 1848. *Cellularia fastigiata* Leidy, op. cit., p. 142 (*non* Linné, sp.).

North Carolina to Casco Bay. Very abundant in Great Egg Harbor, New Jersey; Long Island Sound; Buzzard's Bay; and Vineyard Sound, low-water to 15 fathoms; Portland, Maine, on piles of wharf.

Flustrina.

MEMBRANIPORA PILOSA Farre. Plate XXXIV, figs. 262, 263. (p. 496.)

Phil. Trans., 1837, p. 412, Plate 27, figs. 1 to 5; Johnston, Brit. Zoöph., ed. i, p. 280, Plate 34, figs. 10, 12, 1838; ed. ii, p. 327, Plate 56, fig. 6, 1847; Smitt, op. cit., 1867, p. 368, Plate 20, fig. 49. *Flustra pilosa* Linné, Fauna Suec., ed. ii, p. 539 (t. Smitt). *Eschara pilosa* Pallas, Elench, Zoöph., p. 50, 1766. *Hippothoa rugosa* Stimpson, Invert. Grand Manan p. 18 (variety *catenularia*). *Tubipora catenularia* Jameson, Wern. Mem., vol. i, p. 561 (t. Smitt).

Long Island Sound to the Arctic Ocean; Finmark to the Mediterranean. Very abundant near New Haven, at Savin Rock, Thimble Islands, etc., in 1 to 6 fathoms, and in tide-pools, on *Chondrus crispus*, *Phyllophora* and other algæ, stones, etc.; Watch Hill, Rhode Island, 4 to 5 fathoms, on algæ, abundant; Vineyard Sound; Massachusetts Bay; Casco Bay; Bay of Fundy, and northward. The variety *catenularia* is common in Casco Bay and Bay of Fundy, from above low-water mark to 50 fathoms. It occurs on the coasts of Northern Europe at various depths down to 300 fathoms. Fossil in the Post-Pliocene of Canada and Labrador (Dawson).

MEMBRANIPORA LINEATA Busk. (p. 406.)

Catal. Mar. Polyzoa, part ii, p. 58, Plate 61, fig. 1; Smitt, op. cit., 1867, p. 363, Plate 20, figs. 23 to 31. *Flustra lineata* Linné, Systema Nat., ed. xii, p. 1301; Johnston, Brit. Zoöph., ed. ii, p. 349, Plate 66, fig. 4. *Escharina lineata* Leidy, Journ. Acad. Nat. Sciences, Philad., ser. ii, vol. iii, p. 141, Plate 10, fig. 22, 1855.

Great Egg Harbor, New Jersey, to the Arctic Ocean; Spitzbergen to Great Britain, low-water mark to 50 fathoms. Common near New Haven, from low-water mark to 6 fathoms, on stones, oysters, algæ, etc.; Watch Hill; Rhode Island; Vineyard Sound; Casco Bay; Bay of Fundy, and northward.

Fossil in the Post-Pliocene of Canada.

MEMBRANIPORA TENUIS Desor. (p. 420.)

Proc. Boston Soc. Nat. Hist., vol. iii, p. 66, 1848.

Long Island Sound to Cape Cod. Common near New Haven and in Vineyard Sound, low-water to 10 fathoms. Muskeget Channel, in 5 fathoms, (Desor).

Escharina.

ESCHARIPOREA PUNCTATA Smitt. (p. 424.)

Op. cit., for 1867, Appendix, p. 4, (separate copies, p. 4), Plate 24, figs. 4-7, 1868. *Lepralia punctata* Hassal, Mag. Nat. Hist., vol. vii, p. 368, Plate 9, fig. 7; vol. ix, p. 407; Johnston, Brit. Zoöph., ed. ii, pp. 312 and 473, Plate 55, fig. 1.

Vineyard Sound, northward; northern coasts of Europe to Southern Norway and Great Britain. Vineyard Sound, 6 to 12 fathoms, on shells, etc., common. Saint George's Bank (S. I. Smith). (?) Fossil in the Post-Pliocene of Canada (Dawson).

ESCHARELLA VARIABILIS Verrill. Plate XXXIII, fig. 256. (p. 419.)

Escharina variabilis Leidy, Jour. Acad. Nat. Sci., Philadelphia, ser. ii, vol. iii, p. 142, Plate 11, fig. 37. *Lepralia variolosa* Desor, op. cit., p. 66, 1848 (not of Johnston).

South Carolina to Cape Cod and Massachusetts Bay. Very abundant in Great Egg Harbor; Long Island Sound; Buzzard's Bay; Vineyard Sound; Nantucket Harbor; low-water to 25 fathoms. Saint George's Bank, 20 fathoms, (S. I. Smith). Fort Macon, North Carolina (coll. Dr. Yarrow).

MOLLIA HYALINA Smitt. Plate XXXIV, fig. 264. (p. 420.)

Op. cit., for 1867, Ap., p. 16, (separate copies, p. 16), Plate 25, figs. 84-87, 1868. *Cellepora hyalina* Linné, Syst. Nat., ed. xii, p. 1286. *Lepralia hyalina* Johnston, Brit. Zoöph., ed. ii, p. 301, Plate 54, fig. 1. *Cellepora nitida* Fabricius, Fauna Grœn., p. 435, 1780.

Long Island Sound to Greenland; Spitzbergen to Great Britain. Common near New Haven and at Thimble Island, in tide-pools and from 1 to 6 fathoms, on algæ; Watch Hill, Rhode Island, 4 to 5 fathoms; Buzzard's Bay and Vineyard Sound, abundant; Casco Bay; Bay of Fundy, and northward. Fossil in the Post-Pliocene of Canada (Dawson).

(?) LEPRALIA PALLASIANA Busk. (p. 496.)

Catal. Mar. Polyzoa, Brit. Mus., part ii, p. 81, Plate 83, figs. 1, 2; Smitt, op. cit., for 1867, Ap., p. 19, (separate copies, p. 19), Plate 26, fig. 93, 1868. *Eschara Pallasiana* Moll, die Seerinde, p. 64, Plate 3, fig. 13 (t. Smitt). *Lepralia pediosstoma* Hassal, Ann. and Mag. Nat. Hist., vol. vii, p. 368, Plate 9, fig. 4; vol. ix, p. 407; Johnston, Brit. Zoöph., ed. ii, p. 315, Plate 55, fig. 7. *Escharina pediosstoma* Leidy, op. cit., p. 141, Plate 10, fig. 23, 1855.

Rhode Island, northward; northern coasts of Europe to Southern Norway and Great Britain. Watch Hill, Rhode Island, 4 to 5 fathoms, on algæ; Vineyard Sound, 6 to 14 fathoms, on *Phyllophora* and other algæ, shells, etc.

Our specimens do not agree perfectly with the European form. Close to the proximal border of the aperture there is a large, but not very prominent, broad-based spine, or subconical process, which is not conspicuous in a view from above, but is prominent in a side-view. In

some specimens a few of the cells have several slender spines around the margin of the aperture.

This may prove to be a species distinct from *S. Pallasiana*, but at present I regard it as a variety.

(?) DISCOPORA COCCINEA Smitt. (p. 496.)

Op. cit., for 1867, Ap., p. 26, (separate copies, p. 26), Plate 27, figs. 162-176. (?) *Cellepora coccinea* Abildgard, Zoöl. Dan., vol. iv, p. 30, Plate 146, figs. 1, 2 (t. Smitt).
Lepralia Peachii Johnston, Brit. Zoöph., ed. ii, p. 315, Plate 55, figs. 5, 6.

Long Island Sound, northward; northern coasts of Europe to Great Britain. Watch Hill, Rhode Island, 4 to 5 fathoms, on red algæ; Vineyard Sound and Quick's Hole, on algæ, etc., in 4 to 12 fathoms.

Fossil in the Post-Pliocene of Canada (Dawson as *L. Peachii*).

The specimens from our coast, referred to the above species, differ considerably from the typical European forms, and may eventually prove to be a distinct species when a careful direct-comparison with a large series of European specimens can be made.

The aperture is usually surrounded by a circle of stout, conical or elongated spinules, variable in number, the one nearest the angle of the aperture, on each side, often stouter; but the spines are often absent. A small semicircular avicularium is often seen near one side of the cell, and distant from the aperture. The tooth or spine at the proximal edge of the cell is elongated and more or less bifid at the end.

Celleporina.

CELLEPORA SCABRA Smitt. (p. 419.)

Op. cit., for 1867, Ap., p. 30, (separate copies, p. 30), Plate 28, figs. 183 to 197, 1868.
Eschara scabra Fabricius, Nye Zoöl. Bidr., Vid. Selsk. Phys. Skr., Hauniæ, vol. i, p. 29 (t. Smitt). *Millepora reticulata* Fabricius, Fauna Grænl., p. 433, 1780 (*non* Linné).

Vineyard Sound to Greenland; Spitzbergen; northern coasts of Europe. Vineyard Sound and Quick's Hole, 5 to 10 fathoms, on *Phyllophora*, etc., not uncommon.

CELLEPORA RAMULOSA Linné. (p. 312.)

Syst. Naturæ, ed. xii, p. 1285, 1767; Johnston, Brit. Zoöph., ed. ii, p. 296, Plate 52, figs. 4, 5; Smitt, op. cit., for 1867, Ap., p. 31, (separate copies, p. 31), Plate 28, figs. 198-210. *Cellepora verrucosa* Fabricius, Fauna Grænl., p. 434 (variety) *Cellepora pumicosa* (*pars*) Linné, Syst. Nat., ed. xii, p. 1286; (?) Johnston, Brit. Zoöph., ed. ii, p. 295, Plate 52, figs. 1-3 (variety).

Long Island Sound to Greenland; Spitzbergen; northern coasts of Europe to Great Britain. Very common near New Haven, off South End, at Thimble Islands, and Faulkner's Island, in large tide-pools, low-water to 8 fathoms, chiefly on *Sertulariæ* and other hydroids, and slender red algæ, (mostly the variety *tuberosa*, or *verrucosa*); Watch Hill, Rhode Island, 4 to 5 fathoms; Buzzard's Bay and Vineyard Sound, 1 to 15 fathoms, on hydroids, common; abundant in Casco Bay; Bay of Fundy; and at Saint George's Bank; low-water to 145 fathoms.

RADIATA.

ECHINODERMATA.

HOLOTHURIOIDEA.

THYONE BRIAREUS Selenka. (p. 362.)

Zeitschrift für Wissenschaftliche Zoologie, vol. xvii, p. 353, 1867. *Holothuria Briareus* Lesueur, Journ. Acad. Nat. Sciences, Philadelphia, ser. i, vol. iv, p. 161, 1824. *Sclerodactyla Briareus* Ayres, Proc. Boston Soc. Nat. Hist., vol. iv, pp. 6, 7, 101-3, 1851; Verrill, Proc. Boston Soc. Nat. Hist., vol. x, p. 342, 1866. *Anaperus Bryareus* Pourtales, Proceedings American Assoc. for Adv. of Science, for 1851, p. 10, 1852. *Anaperus Carolinus* Troschel, Müller's Arch. für Anat., 1846, p. 62; Pourtales, op. cit., p. 10.

Texas to Cape Cod. Long Island Sound, at West Haven, Connecticut, Thimble Islands, etc., not common; Vineyard Sound and Buzzard's Bay, 1 to 10 fathoms, not uncommon; Gardiner's Bay, Long Island; Great Egg Harbor, New Jersey; Fort Macon, North Carolina, common (coll. Dr. Yarrow); West Florida (coll. E. Jewett).

STEREODERMA UNISEMITA Ayres. (p. 503.)

Proc. Boston Soc. Nat. Hist., vol. iv, p. 46, 1851; Selenka, op. cit., p. 344, Plate 19, figs. 96, 97. *Anaperus unisemita* Stimpson, Proc. Boston Soc. Nat. Hist., vol. iv, p. 8, 1851; Verrill, op. cit., vol. x, p. 357, 1866. *Cucumaria fusiformis* Desor, Proc. Boston Soc. Nat. Hist., vol. iii, p. 67 (*non* Forbes).

Off Martha's Vineyard, 22 fathoms, sand; Banks of Newfoundland (Stimpson). South Shoals of Nantucket, 22 fathoms, (Desor).

PENTAMERA PULCHERRIMA Ayres. (p. 420.)

Proc. Boston Soc. Nat. Hist., vol. iv, p. 207, 1852; Selenka, op. cit., p. 346.

South Carolina to Vineyard Sound. Off Holmes's Hole, 4 to 5 fathoms; Nobsca Beach, after storms, abundant; Fort Macon, North Carolina (coll. Dr. Yarrow). Fort Johnson, South Carolina (Stimpson).

? MOLPADIA OÖLITICA Selenka. (p. 510.)

Op. cit., p. 257 (in part), 1867. *Chirodota oölitica* Pourtales, Proc. Amer. Assoc. for 1851, p. 13, 1852. *Embolus pauper* Selenka, op. cit., p. 359, Plate 20, fig. 132 1867.

Off Block Island, 29 fathoms, sandy mud; off Boon Island, 95 fathoms, muddy, (A. S. Packard). Massachusetts Bay, in fish stomachs, (Pourtales). Selenka gives "Cape Palmas (?)" as the locality for his "*Embolus pauper*," which was based on specimens sent from the Museum of Comparative Zoölogy—perhaps the original ones described by Pourtales; the locality given is evidently erroneous.

The single specimen from off Block Island is small and imperfect, and may not be this species.

CAUDINA ARENATA Stimpson. (p. 362.)

Marine Invert. of Grand Manan, p. 17, 1853; Selenka, op. cit., p. 358, Plate 20, figs. 129-131; Clark, Mind in Nature, p. 187, figs. 114-116; A. and E. C. Agassiz.

Sea-Side Studies, p. 97, fig. 126. *Chirodota arenata* Gould, Invert. of Mass., ed. i, p. 346, (figure), 1841; Ayres, op. cit., p. 143; Pourtales, op. cit., p. 13. *Caudina* (*Molpadia*) *arenata* Verrill, Proc. Boston Soc. Nat. Hist., vol. x, p. 345, 1866.

Vineyard Sound to Chelsea, Massachusetts. Sometimes abundant on Chelsea Beach, after storms. Wood's Hole (H. E. Webster). Selenka gives "Grand Manan" (? from specimens in Mus. Comp. Zoöl.), but after very careful search during several excursions to that island, I have never been able to find it there, and believe this to be an error. Stimpson knew it only from Massachusetts Bay.

LEPTOSYNAPTA GIRARDII Verrill. Plate XXXV, figs. 265, 266. (p. 361.)

Synapta Girardii Pourtales, Proc. Amer. Assoc. Adv. Science, for 1851, p. 14. *Leptosynapta tenuis* Verrill, Trans. Conn. Acad., vol. i, p. 325. *Synapta tenuis* Ayres, op. cit., p. 11, 1851, (*non* Quoy and Gaimard); A. and E. C. Agassiz, Sea-Side Studies, p. 95, figs. 124, 125; Verrill, Proc. Boston Soc. Nat. Hist., vol. x, p. 342. *Synapta Ayresii* Selenka, op. cit., p. 362, 1867. (?) *Synapta gracilis* Selenka, op. cit., p. 363, Plate 20, figs. 123, 124.

New Jersey to Massachusetts Bay. Common in Long Island Sound, at Savin Rock, and other localities near New Haven, in sand at low-water; abundant in Vineyard Sound, on Naushon Island, etc.; Cape Cod; Chelsea Beach, Massachusetts. Sag Harbor, Long Island, (Ayres). Selenka erroneously gives "Cape Florida" as the locality for *S. Girardii*. It was based on Massachusetts specimens.

LEPTOSYNAPTA ROSEOLA Verrill, sp. nov. (p. 362.)

Body long, slender; integument translucent, filled with numerous minute, scattered, opaque, light-red spots, oval or sub-circular in form; perforated plates smaller than in the preceding species; anchors relatively much longer, with a very slender, elongated shank. General color, rosy or pale red, due to the minute red spots. Length 100^{mm} to 150^{mm}; diameter about 5^{mm} to 6^{mm}.

Long Island Sound, at Savin Rock, near New Haven; Vineyard Sound, at Naushon Island; in sand at low-water mark.

ECHINOIDEA.

STRONGYLOCENTROTUS DRÖBACHIENSIS A. Agassiz. Plate XXXV, figs. 368. (p. 406.)

Revision of the Echini, Parts I and II, pp. 162, 277, Plate 4^a, figs. 2-4, Plate 9, Plate 10, 1872. *Echinus Dröbachiensis* Müller, Zoöl. Dan. Prod., p. 235, 1776, *Toxopneustes Dröbachiensis* Agassiz, Catal. Rais., in Annal. des Sci. Nat., vol. vi. p. 367, 1846. *Euryechinus Dröbachiensis* Verrill, Proc. Boston Soc. Nat. Hist. vol. x, pp. 341, 352, 1866; Trans. Conn. Acad., vol. i, p. 304, 1867; American, Jour. Science, vol. xlix, p. 101. *Echinus neglectus* Lamarek, Anim. sans vert., p. 49, 1816. *Echinus granularis* Say, Journ. Acad. Nat. Sci., Philad., vol. v, p. 225, 1827 (*non* Lamarek). *Echinus granulatus* Gould, Invert., ed. i, p. 344, 1841. *Euryechinus granulatus* Verrill, Proc. Boston Soc., vol. x, pp. 340, 352. *Strongylocentrotus chlorocentrotus* Brandt, Prodr., p. 264, 1835.

Circumpolar: New Jersey to the Arctic Ocean; Spitzbergen to Great

Britain; Behring Straits to Gulf of Georgia; Northern Siberia to Okhotsk Sea and De Castrie's Bay. Very abundant in the Bay of Fundy, from low-water to 109 fathoms; Casco Bay; Massachusetts Bay; mouth of Vineyard Sound and off Gay Head, 10 to 20 fathoms, common; off Holmes's Hole; off Watch Hill, Rhode Island, 4 to 5 fathoms, not uncommon; off New London, Connecticut, plenty, (coll. Prudden); Faulkner's Island, Thimble Islands, and near New Haven, 4 to 8 fathoms, uncommon and small. Off New Jersey, on a bank, in 32 fathoms, (Captain Gedney). Off Saint George's Bank, 430 fathoms, (S. I. Smith).

Fossil in the Post-Pliocene of Portland, Maine; New Brunswick; Canada; and Labrador.

ARBACIA PUNCTULATA Gray. (p. 406.)

Proc. Zool. Soc. of London, 1835, p. 58; A. Agassiz, Revision of the Echini, Parts I and II, pp. 91, 263, Plate 2, fig. 4, Plate 5, figs. 1 to 18, 1872. *Echinus punctulatus* Lamarck, Anim. sans vert., p. 47, 1816. *Echinocidaris punctulata* Desmoulin, Syn., p. 306, 1837. *Echinocidaris Davisii* A. Agassiz, Bulletin Mus. Comp. Zoology, vol. i, p. 20, 1863; Verrill, Proc. Boston Soc. Nat. Hist., vol. x, p. 340, 1866.

Vineyard Sound to the West Indies and Gulf of Mexico. Common at Wood's Hole, and in Vineyard Sound and Buzzard's Bay, 1 to 12 fathoms; off Watch Hill, Rhode Island, 4 to 5 fathoms; Long Island Sound, near New Haven, and at Charles Island, not common; Fort Macon, North Carolina (coll. Dr. Yarrow). Off Tortugas, 13 to 125 fathoms, (Pourtals). West Florida (E. Jewett).

ECHINARACHNIUS PARMA Gray. Plate XXXV, fig. 267. (p. 362.)

Ann. Phil., p. 6, 1825; A. Agassiz, Revision of Echini, Parts I and II, pp. 107, 316, Plates 11^d, figs. 4, 5, 11^e, figs. 4, 5, 12, figs. 1-13, 1872. *Scutella parma* Lamarck, Anim. sans vert., p. 11, 1816.

New Jersey to Labrador. According to Mr. A. Agassiz, it occurs in the North Pacific, on the west coast of America, from the Aleutian Islands to Vancouver Island, and on the coast of Asia at Kamtchatka, 30 to 70 fathoms; and also at New Holland; India; Indian Ocean; Red Sea, etc. Common along the entire coast of New England and Long Island, from low-water to 100 fathoms, sand. Off New Jersey, on a distant bank, in 32 fathoms, (Captain Gedney). Very abundant at Saint George's Bank and vicinity, 15 to 430 fathoms, (S. I. Smith).

MELLITA PENTAPORA Lütken.

Bidrag til Kundskab om Echiniderne, p. 107, in Vidensk. Middelelser, 1864; Verrill, Trans. Connecticut Academy, vol. i, p. 345, 1867. *Echinus pentaporus* Gmelin, Syst. Nat., p. 3189, 1788. *Encope pentapora* Agassiz, Monog. Scut., Plate 3, 1841. *Scutella quinquefora* Lamarck, Anim. sans vert., p. 9, 1816. *Mellita quinquefora* Agassiz, Mon. Scut., p. 36, 1841; Catal. Rais., in Ann. Sci., vol. vii, p. 138, 1847. *Mellita testudinaria* Gray, Proc. Zool. Soc., London, 1851, p. 36; Verrill, this Report, pp. 427, 429, (see errata). *Mellita testudinata* Agassiz, Mon. Scut., p. 40, Plate 4^a, figs. 7-9, 1841; A. Agassiz, Revision of the Echini,

pp. 141, 322, Plate 11, figs. 13-22, Plate 12^a, Plate 12^c, figs. 1, 2, (name adopted from Klein, 1734, accidentally binomial).

New Jersey to Brazil; very abundant along the whole eastern coast of the United States, south of Cape Hatteras, and along the entire coast of the Gulf of Mexico; rare and local north of Cape Hatteras. Vineyard Sound, 5 to 8 fathoms, rare and dead; outer beach at Great Egg Harbor, New Jersey, dead. Nantucket (Agassiz).

ASTERIOIDEA.

ASTERIAS ARENICOLA Stimpson. Plate XXV, fig. 269. (p. 326.)

Proc. Boston Soc. Nat. Hist., vol. viii, p. 268, 1862; Verrill, vol. x, p. 339, 1866. *Asteracanthion berylinus* Ag. MSS., A. Agassiz, Embryology of Echinod., in Proc. Amer. Acad., 1863; Embryology of the Starfish, in Agassiz Contributions, vol. v, p. 3; Sea-Side Studies, p. 103, figs. 141-145, 1865 (t. Agassiz).

Massachusetts Bay to Northern Florida and the northern shores of the Gulf of Mexico; rare and local, in sheltered localities, north of Massachusetts, as at Quahog Bay, east of Portland, Maine; but not known from the eastern part of the coast of Maine, nor in the Bay of Fundy.

Very common in Long Island Sound; Buzzard's Bay; Vineyard Sound; and along the shores of Long Island, from low-water to 15 fathoms. Not uncommon in Massachusetts Bay, at Nahant, Beverly, &c.

ASTERIAS FORBESII Verrill.

Proc. Boston Soc. Nat. Hist., vol. x, p. 345, 1866. *Asteracanthion Forbesii* Desor, Proc. Boston Soc. N. H., vol. iii, p. 67, 1848.

Buzzard's Bay to Beverly, Massachusetts. Vineyard Sound and off Gay Head, 6 to 14 fathoms; Buzzard's Bay, 6 fathoms; Chelsea and Beverly, Massachusetts, low-water. Vineyard Sound, 8 fathoms, (Desor).

This is probably identical with the preceding species, the differences being, perhaps, chiefly sexual, but I have not yet had opportunities to satisfy myself fully in regard to this point, and, therefore, leave them, for the present, under separate names. Should they be united, the name *Forbesii* has the precedence over all others.

ASTERIAS VULGARIS Stimpson, MSS. (p. 496.)

Packard, in Canadian Naturalist and Geologist, Dec., 1863 (no description); Verrill, Proc. Boston Soc. Nat. Hist., vol. x, p. 347, 1866 (description). *Asteracanthion pallidus* Ag. MSS.; A. Agassiz, Embryology, in Proc. Amer. Acad., 1863 (no description); Embryology of the Starfish, in Agassiz' Contributions, vol. v, p. 3. *Asterias rubens* Gould, Invert., ed. i, p. 345 (*non* Linné).

Long Island Sound to Labrador, and (?) Greenland. Very abundant in Massachusetts Bay, Casco Bay, Bay of Fundy, from above low-water mark to 40 fathoms; in the deeper parts of Vineyard Sound and off Gay Head, in 6 to 25 fathoms, not uncommon; off Watch Hill, Rhode Island, 4 to 5 fathoms, common; Faulkner's Island, Connecticut, low-water, very rare.

LEPTASTERIAS COMPTA Verrill.

Proc. Boston Soc., vol. x, p. 350, 1866. *Asterias compta* Stimpson, Proc. Boston Soc. Nat. Hist., vol. viii, p. 270, 1862; Verrill, op. cit., p. 340.

Off New Jersey, 32 fathoms, (Captain Gedney). Off Martha's Vineyard, 20 to 25 fathoms, rare; off Casco Bay, 30 to 50 fathoms.

CRIBRELLA SANGUINOLENTA Lütken. (p. 407.)

Grœnl. Echinod., p. 31, 1859; Verrill, Proc. Boston Soc. Nat. Hist., vol. x, p. 345, 1866. *Asterias sanguinolenta* Müller, Zoöl. Dan. Prod., 2836, 1776. *Asterias oculata* Pennant, Brit. Zoöl., vol. iv, p. 61, Plate 30, fig. 56, 1777. *Asterias spongiosa* Fabricius, Fauna Grœnl., p. 368, 1780. *Linkia oculata* Forbes, Wern. Mem., vol. viii, p. 120, 1839. *Cribella oculata* Forbes, British Starfishes, p. 100, (figure), 1841. *Echinaster oculatus* Müller and Troschel, Syst. Asterid., p. 24, 1842. *Linkia oculata* Stimpson, Invert. of Grand Manan, p. 14, 1853. *Linkia pertusa* Stimpson, op. cit., p. 14. *Echinaster sanguinolentus* Sars, Fauna Litt. Norveg., i, p. 47, Plate 8, figs. 3-6; Oversigt af Norges Echinodermer, p. 84, 1861.

Connecticut to the Arctic Ocean; northern coasts of Europe to Great Britain and France. Very common in the Bay of Fundy, Casco Bay, and on the entire coast of Maine, from low-water to 100 fathoms; Massachusetts Bay; Vineyard Sound, 5 to 20 fathoms, not uncommon; off Watch Hill, Rhode Island, 3 to 5 fathoms; off New London, Connecticut (coll. T. H. Prudden).

OPHIUROIDEA.

OPHIURA OLIVACEA Lyman. (p. 363.)

Ill. Catal. Mus. Comp. Zoölogy, No. 1, Ophiuridæ and Astrophytidæ, p. 23, 1865; Verrill, Proc. Boston Soc. N. H., vol. x, p. 339. *Ophioderma olivaceum* Ayres, Proc. Boston Soc. Nat. Hist., vol. iv, p. 134, 1852.

Cape Cod to North Carolina. Wood's Hole, Buzzard's Bay, and Vineyard Sound, not common; shores of Long Island, frequent; Fort Macon, North Carolina, common, (Dr. Yarrow).

OPHIOPHOLIS ACULEATA Gray. Plate XXXV, fig. 270. (p. 496.)

List of British Animals in Coll. of Brit. Mus., Part I, Rad. Anim., p. 25, 1848; Lütken Additamenta ad Hist. Ophiuridarum, p. 60, Plate 2, figs. 15, a, b, 16, a, b, 1858; Verrill, op. cit., p. 344, 1866. *Asterias aculeata* Linné (*pars*), Syst. Nat., p. 1101; Retzius Vetersk.-Akad., vol. iv, p. 240, 1783; Müller, Prod., 2841, 1776; Zoöl. Dan., vol. iii, p. 29, Plate 99, 1789. *Ophiura bellis* Fleming, Brit. Anim., p. 488, 1828. *Ophiocoma bellis* Forbes, Wern. Mem., vol. viii, p. 226; Brit. Starfishes, p. 53, figure. *Ophiopholis bellis* Lyman, op. cit., p. 96, Plate 1, figs. 4-6. *Ophioplepis scolopendrica* Müller and Troschel, Syst. Aster., p. 96, 1842. *Ophiopholis scolopendrica* Stimpson, Invert. of Grand Manan, p. 13, 1853.

Rhode Island and New Jersey to the Arctic Ocean; Iceland; Spitzbergen; northern coasts of Europe, to the English Channel, Ireland, etc. Very abundant in the Bay of Fundy, Casco Bay, and along the whole coast of Maine, from low-water to 100 fathoms; Massachusetts Bay; off Gay Head, 6 to 8 fathoms, rare; off Watch Hill, Rhode Island, in 4 to 5 fathoms, rocky. Off New Jersey, 30 to 38 fathoms, N. lat. 39° 54'; W. long. 73° 15', (Josephine Exp., t. Ljungmann). A similar species, perhaps identical, occurs on the northwestern coasts of America.

AMPHIPHOLIS ELEGANS Ljungmann. (p. 429.)

Ophiuroidea vivientia huc usque cognita, Öfvers. Kongl. Vet.-Akad. Förh., 1866, p. 312. *Ophiura elegans* Leach, Zoöl. Miscell., iii, p. 57, 1815. *Amphiura elegans* Norman, Ann. and Mag. Nat. Hist., vol. xv, p. 109, 1865. *Ophiocoma neglecta* Forbes, Brit. Starfishes, p. 30, 1841. *Ophiolepis tenuis* Ayres, Proc. Boston Soc. Nat. Hist., vol. iv, p. 133, 1852. *Amphiura tenuis* Lyman, Proc. B. S. N. H., vol. vii, p. 194, 1860. *Amphipholis tenuis* Ljungmann, Öfvers. af Kongl. Vet.-Akad. Förh., 1871, p. 635. *Amphiura squamata* Lyman, Catalogue Ophiur. and Astroph., p. 121, 1865 (*non Delle Chiage*, t. Ljungmann).

Off New Jersey to the Arctic Ocean; northern coasts of Europe to the English Channel. Common in Vineyard Sound, 4 to 15 fathoms; Massachusetts Bay; Casco Bay; Bay of Fundy, low-water to 60 fathoms. Greenland, 15 fathoms, (Lütken, as *A. neglecta*). Off New Jersey, 36 to 38 fathoms, N. lat. 39° 54', W. long. 73° 15', (Josephine Exp., t. Ljungmann).

Mr. Ljungmann, in his latest paper, regards this species as distinct both from the Mediterranean species (*Amphiura squamata*), and the English and Norwegian species (*Amphipholis elegans*). The former I have here regarded as distinct, but consider the latter identical with the American form, the differences mentioned being slight and apparently inconstant.

AMPHIURA ABDITA Verrill. (p. 433.)

Amphipholis abdita Verrill, Amer. Jour. of Science, ser. iii, vol. ii, p. 132, 1871; this Report, p. 433. (See errata).

Body plump, pentagonal; the interradial margins concave, and the angles, at base of arms, incised; margin thick, rounded; upper surface of disk covered with very numerous, minute, crowded scales, which encroach more or less upon the radial shields and run up between them in a wedge-like area; lower surface thickly covered with still more minute, granule-like scales. Radial shields elongated, three or more times longer than wide, curved; the outer end geniculate or bent downward, forming a prominent angle above; they are divergent, and separate for their whole length, or barely touch at the outer ends, and are more or less concealed laterally and proximally by the encroachment of the small scales. Arms or rays, 16 times as long as the diameter of the body, or even more, slender, flexible, gradually attenuated to the tips.

Six mouth-papillæ in each angle of the mouth, and two to four additional small rounded papillæ, or tentacle-scales, near the extreme outer angle. Two of the mouth-papillæ, on each side, are placed close together, at about the middle of the edge of the jaw; the outer of these, which is about twice as wide as the inner, is flat, scarcely longer than wide, with the end obtusely rounded or truncate; the inner one is scarcely wider than thick, oblong, rounded at the end; in one case these two papillæ are united together. The third mouth-papilla is stout and rounded, obtuse, larger and longer than either of the others, separated from them by a considerable interval, and brought close to the tooth at the end of the jaw, beyond which it projects inwardly and downwardly.

The mouth-shields are long-oval, or somewhat hexagonal, narrowed outwardly, the outer part of the lateral edges being nearly straight, the outer end rounded or sub-truncate, the inner end broadly rounded. Side mouth-shields triangular with the three edges concave, the inner ends not united, the surface finely granulated. The lower arm-plates are separated by the side plates; the first two are longer than broad, pentagonal, the inner end forming an obtuse angle, the outer edge straight; the next two are about as wide as long, squarish, with the corners rounded or truncate; the following ones are broader than long, somewhat octagonal, the outer and inner edges longest and nearly straight; beyond the middle of the arm they are again pentagonal, with an inner angle. On the first five joints of one specimen there is only a single pair of tentacle-scales, which are small and rounded; on the succeeding joints there are generally two pairs, one of them being considerably smaller than the other; the largest specimen has two pairs of tentacle-scales on all the joints.

Arm-spines three, on each side of all the joints, except the first, which has but two; they are thickened at base, gradually tapering, blunt at tip, sub-equal; the lower one a little curved downward; the upper one stoutest, flattened, scarcely tapering, obtuse; the middle one a little longer than the others, the length about equal to width of lower arm-plates. The upper arm-plates are transversely sub-elliptical, with the outer edge well rounded, the inner edge slightly prominent or angular in the middle, and a little concave to either side, so that the lateral portions are somewhat narrowed; the plates generally touch each other.

Color, when living, brown above, the central area dark brown, a radiating band of the same extending to each interradial margin, and bordered like the central area with pale gray; opposite the base of each arm is a squarish area or radial band of olive-brown; radial plates yellowish brown, the space between them bright blue. In the center of the disk is a small darker brown spot, and five similar ones, corresponding to the bases of the arms, form a circle around the center; five others, more distant, correspond to the interradial spaces; other more minute dark spots are scattered over the disk. Upper arm-plates are mostly dark brown, edged with pale brown or whitish; some of the plates are partially or wholly lighter, yellowish brown, and thus form transverse light bands, or mottlings, consisting of one or more plates; toward the tips these light bands become more numerous, and wider; spines bright brown. Lower side of disk yellowish brown, with a tinge of greenish; plates around the mouth whitish; each of the jaws with two brown spots; mouth-tentacles orange-yellow. Under arm-plates yellowish brown, with the edges paler, and with a distal median spot of whitish; lower arm-spines yellowish brown. In some specimens the arms are dull greenish above, instead of brown.

Diameter of the disk, of the largest specimen, 11^{mm}; length of arms, 180^{mm}.

Long Island Sound; off New Haven, in 4 to 6 fathoms, mud; off Thimble Islands, 3 to 8 fathoms, soft mud, rare.

This species is, in some respects, intermediate between *Amphipholis* and *Amphiura*. With the former it agrees best in the number of the arm-spines and general appearance; but in the structure of the mouth-parts it agrees better with the latter. It will, however, not go into any of the sections or sub-sections established by Ljungmann. It appears to be more nearly allied to *A. Eugenia* Ljung., from La Plata, than to any other species hitherto described; the latter has, however, four arm-spines instead of three.

ASTROPHYTON AGASSIZII Stimpson.

Invertebrata of Grand Manan, p. 12, 1853; Lyman, Catalogue, p. 186.

This species was first described from a specimen obtained "not far from the shoals of Nantucket," by Governor John Winthrop, in 1670 and 1671 (Philosophical Transactions), under the name of "Basket-fish" or "Net-fish." Crab Ledge, off Chatham, Massachusetts, (V. N. Edwards.) It occurs on the banks east and north of Cape Cod, and on Saint George's Bank, and is very common in the Bay of Fundy, low-water to 110 fathoms; and is especially abundant in Eastport Harbor, in 10 to 20 fathoms. According to Dr. Lütken it is also found at Greenland and Finmark.

CRINOIDEA.

Antedon dentatus Verrill.

Proc. Boston Soc. Nat. Hist., vol. x, p. 339, 1866. *Alecto dentata* Say, Journ. Acad. Nat. Sci., Philadelphia, vol. v, p. 153, 1825.

This species was described by Say, from a specimen obtained at Great Egg Harbor, New Jersey. It may possibly occur on the southern coast of New England, but I am not aware that it has actually been found so far north.

ACALEPHÆ.

CTENOPHORÆ.

MNEMIOPSIS LEIDYI A. Agassiz. (p. 449.)

Illustr. Catal. Mus. Comp. Zoölogy, North American Acalephæ, p. 20, figs. 22-24, 1865.

Buzzard's Bay and Vineyard Sound; Long Island Sound, off New Haven.

LESUEURIA HYOPTERA A. Agassiz. (p. 454.)

Catal. North American Acalephæ, p. 23, figs. 25-28.

Newport, Rhode Island, to Massachusetts Bay (A. Agassiz).

PLEUROBRACHIA RHODODACTYLA Agassiz. (p. 448.)

Memoirs Amer. Academy, vol. iv, p. 314, Plates 1 to 5, 1849; Contributions to Nat. Hist. U. S., vol. iii, pp. 203, 294, Plate 2^a, 1860; A. Agassiz, Catalogue, p. 30, figs. 38-51, 1865.

Southern side of Long Island, to Greenland. Not uncommon in Long

Island Sound, near New Haven; common in Vineyard Sound and Massachusetts Bay; very abundant in Casco Bay, Bay of Fundy, and Gulf of Saint Lawrence. Off Saint George's Bank (S. I. Smith). Fire Island, Long Island (S. I. Smith).

IDYIA ROSEOLA Agassiz. (p. 451.)

Contributions to Nat. Hist. U. S., vol. iii, pp. 270-296, Plates 1, 2, 1860; A. Agassiz, Catalogue, p. 36, figs. 52-62, 1865.

Vineyard Sound to Labrador. Off Gay Head, not common; common in Massachusetts Bay and Casco Bay; very abundant in Bay of Fundy and Gulf of Saint Lawrence. Labrador (Packard).

? *Cestum Veneris* Lesueur.

Nouv. Bull. Soc. Phil., 1813, p. 281, Plate 5, fig. 1; Lesson, Zoöphytes Acalephes, p. 70, Plate 1, fig. 1.

Mr. S. I. Smith observed a species, apparently identical with this, at Saint George's Banks, and Mr. A. Agassiz has observed fragments of a similar species near Newport, Rhode Island. This is properly a more southern species, found in the warmer parts of the Atlantic and in the Mediterranean Sea.

DISCOPHORÆ.

AURELIA FLAVIDULA Péron and Lesueur. Plate XXXVI, fig. 271. (p. 449.)

Ann. Mus. Hist. Nat., vol. xiv, p. 47, 1809; Lesson, op. cit., p. 376, 1843; Agassiz, Contributions to Nat. Hist. U. S., vol. iii, Plates 6-11^b; vol. iv, pp. 10, 160; A. Agassiz, Catalogue, p. 42, figs. 65, 66. *Aurelia aurita* Stimpson, Invert., of Grand Manan, p. 11, 1853.

Buzzard's Bay to Greenland. Common in the upper part of Buzzard's Bay, in spring; off Gay Head and in Vineyard Sound, in August; abundant in Massachusetts Bay; Casco Bay; Frenchman's Bay; Bay of Fundy; and Gulf of Saint Lawrence.

CYANEA ARCTICA Péron and Lesueur. (p. 449.)

Ann. Mus., vol. xiv, p. 51, 1809; Agassiz, Contributions, vol. iii, Plates 3, 4, 5, 5^a; 10, 10^a; vol. iv, pp. 87, 162; A. Agassiz, Catalogue, p. 44, fig. 67. *Cyanea Pospelii* Gould, Invert., ed. i, p. 347; Stimpson, op. cit., p. 11 (non Brandt).

Long Island Sound to Greenland. Common near New Haven; in Buzzard's Bay; Vineyard Sound; very abundant in Massachusetts Bay; Casco Bay; Bay of Fundy; and Gulf of Saint Lawrence. Fire Island, Long Island (S. I. Smith).

Cyanea fulva Agassiz.

Contributions, vol. iv, pp. 119, 162, 1862; A. Agassiz, Catalogue, p. 46 (no description).

Long Island Sound (L. Agassiz), Vineyard Sound (A. Agassiz).

I have been unable to distinguish more than one species among the *Cyaneæ* of our waters, although they vary considerably in color, just as

they do farther north, as in the Bay of Fundy. This is probably only a color-variety of *C. arctica*.

DACTYLOMETRA QUINQUECIRRA Agassiz. Plate XXXVI, fig. 272. (p. 449.)

Contributions, vol. iv, pp. 125, 166, 1862; A. Agassiz, Catalogue, p. 48, fig. 69.

Pelagia quinquecirra Desor, Proc. Boston Soc. Nat. History, vol. iii, p. 76, 1848.

Bermudas to Cape Cod. Long Island Sound, near New Haven; common in Buzzard's Bay and Vineyard Sound.

Pelagia cyanella Péron and Lesueur.

Ann. du Mus. Hist. Nat., vol. xiv, p. 37, 1809; Agassiz, Contributions, vol. iii, Plates 12, 13, 13^a; vol. iv, pp. 123, 164; A. Agassiz, Catalogue, p. 47, fig. 68.

Off Saint George's Bank (S. I. Smith). This species inhabits the Gulf of Mexico; Caribbean Sea; and coasts of Florida and North Carolina. It is carried northward by the Gulf Stream to the vicinity of Saint George's Bank, and is, therefore, like the two following; likely to occur occasionally at Nantucket and Martha's Vineyard.

Stomolophus meleagris Agassiz.

Contributions, vol. iii, Plate 14, 1860; vol. iv, pp. 138, 151, 1862; A. Agassiz, Catalogue, p. 40.

Coast of Georgia (Agassiz). Off Saint George's Bank (S. I. Smith).

? *Charybdea periphylla* Péron and Lesueur.

Ann. du Mus. Hist. Nat., vol. xiv, p. 332, 1809; Edwards in Cuvier, Règne Anim., Pl. 55, fig. 2 (from Lesueur); Lesson, op. cit., p. 265, 1843; Agassiz, Contributions, vol. iv, p. 173.

This species was originally described and figured from mutilated specimens taken under the equator in the Atlantic Ocean, and seems not to have been seen by later writers. Mr. S. I. Smith has apparently rediscovered this interesting species off Saint George's Bank.

The specimen obtained by him, while on the United States Coast-Survey steamer Bache, in 1872, is not quite perfect, but agrees pretty nearly with the descriptions and figure cited.

The body in the alcoholic specimen is elevated, bell-shaped, rounded above, with a marked constriction toward the border; transparent, the inner cavity showing through as a large, conical, dark reddish brown spot, with the apex slightly truncated. Border deeply divided into sixteen long, flat lobes, which are of nearly uniform breadth throughout, and slightly rounded, or sub-truncate, at the end; the edges and end thin and more or less frilled; the inner side with two sub-marginal carinæ. Eyes inconspicuous, but small bright red specks are scattered over the marginal lobes. The intervals between the lobes are narrow and generally smoothly rounded, without distinct evidence of the existence of tentacles, except that, in one of these intervals, there is a small and short papilliform process, with brown pigment at the base. The

ovaries are mostly wanting, but portions are to be seen as slightly convoluted organs in the marginal region, opposite the intervals between the lobes.

TRACHYNEMA DIGITALE A. Agassiz. (p. 454.)

Catalogue, p. 57, figs. 81-86, 1865. *Medusa digitale* Fabricius, Fauna Grœnl., p. 366, 1780.

Vineyard Sound to Greenland. Wood's Hole, July 1, young specimens. Massachusetts Bay (A. Agassiz).

HYDROIDEA.

Sertularina.

TIAROPSIS DIADEMATA Agassiz. (p. 454.)

Memoirs Amer. Acad., vol. iv, p. 289, Plate 6, 1849; Contributions, vol. iii, p. 354, Plate 31, figs. 9-15; vol. iv, pp. 308, 311, figs. 45-48; A. Agassiz, Catalogue, p. 69, figs. 91-93.

Vineyard Sound to Bay of Fundy. Massachusetts Bay (A. Agassiz). Greenland (Mörch). Wood's Hole, April, 1873.

OCEANIA LANGUIDA A. Agassiz. (p. 454.)

In Agassiz, Contributions, vol. iv, p. 353, 1862; Catalogue, p. 70, figs. 94-102, 1865.

Buzzard's Bay to Bay of Fundy. Common in Vineyard Sound; not uncommon in Eastport Harbor.

EUCHEILOTA VENTRICULARIS McCready. (p. 454.)

Gymnophthalmata of Charleston Harbor, in Proc. of Elliott Society of Nat History, vol. i, p. 187, Plates 11, figs. 1-3, 12, figs. 1, 2, 1857; Agassiz, Contributions, vol. iv, p. 353, 1862; A. Agassiz, Catalogue, p. 74, figs. 104, 105, 1865.

Charleston, South Carolina, to Vineyard Sound.

EUCHEILOTA DUODECIMALIS A. Agassiz. (p. 454.)

In Agassiz, Contributions, vol. iv, p. 353, 1862; Catalogue, p. 75, figs. 106-107^a.

Buzzard's Bay, Naushon Island (A. Agassiz).

CLYTIA JOHNSTONI Hincks. (p. 408.)

Hist. British Hydroid Zoöphytes, p. 143, Plate 24, fig. 1, 1868. *Campanularia Johnstoni* Alder, Northum. and Dur. Catal., in Trans. Tynes. F. C., vol. v, p. 126, Plate 4, fig. 8 (t. Hincks). *Sertularia uniflora* (pars) Pallas, Elench. Zoöph., p. 121, 1766. *Campanularia volubilis* Johnston, Brit. Zoöph., ed. ii, pp. 107, 108, fig. 18 (not of Linné and Pallas). *Clytia volubilis* Lamouroux, Expos. Meth., p. 15, Plate 4, figs. E, f, F, 1821. *Clytia bicophora* Agassiz, Contributions, vol. iv, pp. 304, 354, Plate 27, figs. 8, 9; Plate 29, figs. 6-9, 1862; A. Agassiz, Catalogue, p. 78, figs. 103-111.

Long Island Sound to the Arctic Ocean; northern coasts of Europe to Great Britain and France. Common near New Haven and at Thimble Islands, in tide-pools and 2 to 6 fathoms; Watch Hill, Rhode

Island, 3 to 5 fathoms; Buzzard's Bay; Vineyard Sound, 1 to 14 fathoms, common; off Block Island, 29 fathoms; abundant in Casco Bay and Bay of Fundy, low-water to 40 fathoms. Saint George's Bank (S. I. Smith).

This species is undoubtedly the one described by Pallas, and according to the strict rules of priority it should be called *Clytia uniflora*.

CLYTIA INTERMEDIA Agassiz. (p. 408.)

Contributions, vol. iv, p. 305, Plate 29, figs. 10, 11, 1862; A. Agassiz, Catalogue, p. 77 (no description).

Vineyard Sound, 6 to 8 fathoms, on *Phyllophora*. Massachusetts Bay (Agassiz).

PLATYPYXIS CYLINDRICA Agassiz. (p. 408.)

Clytia (*Platypyxis*) *cylindrica* Agassiz, Contributions, vol. iv, pp. 306, 354, figs. 42-44 (not 41, nor Plate 27, figs. 8, 9), 1862. *Platypyxis cylindrica* A. Agassiz, Catalogue, p. 80, figs. 112-114. *Campanularia volubilis* Leidy, Jour. Phil. Acad. Nat. Sciences, ser. ii, vol. iii, p. 138, 1855 (not Linné, sp.).

Long Island Sound to Massachusetts Bay. Near New Haven, 4 to 6 fathoms, on *Halecium*; Thimble Islands; Watch Hill, Rhode Island; Vineyard Sound; off Buzzard's Bay, 25 fathoms.

ORTHOPYXIS CALICULATA Verrill. (p. 408.)

Campanularia caliculata Hincks, in Annals and Mag. Nat. Hist., ser. ii, vol. xi, p. 178, Plate 5, B, 1853; Brit. Hydroid Zoöph., p. 164, Plate 31, figs. 2-2^d. *Clytia* (*Orthopyxis*) *poterium* Agassiz, Contributions, vol. iv, pp. 297, 302, fig. 40, Plate 28, Plate 29, figs. 1-5, 1862. *Orthopyxis poterium* A. Agassiz, Catalogue, p. 81, 1865.

Vineyard Sound to Labrador; northern coasts of Europe to Great Britain. Off Gay Head and in Vineyard Sound, 4 to 15 fathoms; common in Massachusetts Bay; Casco Bay; and Bay of Fundy, low water to 30 fathoms. Mingan Islands, Labrador, 6 fathoms, (A. E. V). Henley Harbor, Labrador, 20 to 30 fathoms (A. S. Packard, as *Clytia volubilis*).

CAMPANULARIA VOLUBILIS Alder. (p. 408.)

Catal. Zoöph. Northumb. and Durham, in Trans. Tynes. F. C., vol. iii, p. 125, Plate 4, fig. 7, 1857 (not of Johnston); Hincks, Brit. Hyd. Zoöph., p. 160, Plate 24, fig. 2. *Sertularia volubilis* Linné (*pars*), Syst. Nat., ed. x, sp. 19; ed. xii, p. 1311; Pallas, Elench. Zoöph., p. 122, 1766. *Clytia volubilis* A. Agassiz, Catalogue, p. 77 (not of Lamouroux).

Vineyard Sound to Greenland and Iceland; northern coasts of Europe to Great Britain; low-water to 100 fathoms. Common in the Bay of Fundy, low-water to 60 fathoms.

CAMPANULARIA FLEXUOSA Hincks. (p. 327.)

Brit. Hyd. Zoöph., p. 168, Plate 33. *Laomedea flexuosa* Hincks, Devon. and Cornwall Catalogue, in Ann. and Mag. Nat. Hist., ser. iii, vol. viii, p. 260, 1861.

Laomedea amphora Agassiz, Contributions, vol. iv, pp. 311, 314, fig. 50, p. 352, Plate 30, Plate 31, figs. 1-8, 1862; A. Agassiz, Catalogue, p. 93.

Long Island Sound to Gulf of Saint Lawrence; northern coasts of Europe, Isle of Man. New Haven, on piles of Long Wharf; Thimble Islands, near New Haven; Vineyard Sound, off Gay Head; abundant on the timbers of the wharves at Eastport, Maine.

OBELIA DIAPHANA Verrill. (p. 327.)

Thaumantias diaphana Agassiz, Mem. Amer. Acad., vol. iv, p. 300, figs. 1, 2, 1849 (? non Mörch). *Eucope diaphana (pars)* Agassiz, Contributions, vol. iv, Plate 33, fig. 2, 1862; A. Agassiz, Catalogue, p. 83, figs. 115-125.

Long Island Sound to Massachusetts Bay. Abundant in New Haven Harbor and Vineyard Sound, on *Zostera*, *Fucus*, etc.

OBELIA GENICULATA Allman. (p. 407.)

Annals and Mag. Nat. Hist., vol. xiii, May, 1864 (t. Hincks); Hincks, Brit. Hyd. Zoöphytes, p. 149, Plate 25, fig. 1, 1868. *Sertularia geniculata* Linné, Syst. Nat., ed. x, sp. 23; ed. xii, sp. 21, p. 1312; Pallas, Elench. Zooph., p. 117, 1766. *Laomedea geniculata* Lamouroux, Pol. Flex., p. 208; Johnston, Brit. Zoöph., ed. ii, p. 103, Plate 25, figs. 1, 2. *Eucope diaphana (pars)* Agassiz, Contributions, vol. iv, p. 322, Plate 34, figs. 1-9, 1862. *Eucope alternata* A. Agassiz, Catalogue, p. 86, 1865.

Long Island Sound to Labrador. Northern Europe, from North Cape to Great Britain. Common near New Haven; at Thimble Islands; Watch Hill, Rhode Island; Vineyard Sound, 4 to 15 fathoms; Massachusetts Bay; Casco Bay; Bay of Fundy, and northward, low-water to 40 fathoms, on *Laminaria*, *Rhodymenia*, etc.

OBELIA POLYGENA Verrill.

Eucope polygena A. Agassiz, Catalogue, p. 86, fig. 126, 1865.

Off Gay Head, 4 to 5 fathoms, not common. Nahant, Massachusetts (A. Agassiz).

OBELIA DIVARICATA Verrill.

Laomedea divaricata McCready, op. cit., p. 195, 1859. *Eucope ? divaricata* A. Agassiz, Catalogue, p. 91, 1865.

Charleston, South Carolina (McCready, Agassiz). A few specimens were found on floating algæ in Vineyard Sound, which appear to belong to this species. It is closely allied to *O. fusiformis* (A. Agassiz, sp.).

OBELIA PYRIFORMIS Verrill. (p. 390.)

Catalogue, p. 83, figs. 127-129, 1865. *Laomedea gelatinosa* Leidy, Journ. Acad. Nat. Sci., Philad., ser. ii, vol. iii, p. 138, 1855 (not Pallas, sp.).

Long Island Sound to Bay of Fundy. Very abundant on piles of wharves, etc., at Wood's Hole.

This species is closely allied to the following; in the latter the young medusæ have sixteen tentacles when set free, and the reproductive capsules differ slightly in form.

OBELIA DICHOTOMA Hincks. (p. 407.)

Brit. Hydroid Zoöphytes, p. 156, Plate 28, fig. 1, 1863. *Sertularia dichotoma* Linné, Syst. Nat., ed. x, sp. 24; ed. xii, sp. 22, p. 1312. *Laomedea dichotoma*, var. *a*, Johnston, Brit. Zoöph., ed. ii, p. 102, Plate 26, figs. 1, 2.

Vineyard Sound, northward; northern coasts of Europe to Great Britain. Off Gay Head, 8 to 10 fathoms, on ascidians; Eastport, Maine.

OBELIA LONGISSIMA Hincks.

Brit. Hydroid Zoöph., p. 154, Plate 27, 1868. *Sertularia longissima* Pallas, Elench. Zoöph., p. 119, 1766 (excl. synonymy). *Laomedea longissima* Alder, Trans. Tynes. F. C., vol. iii, p. 121 (t. Hincks). *Laomedea dichotoma*, var. *b*, Johnston, Brit. Zoöph., ed. ii, p. 102. *Campanularia gelatinosa* Van Beneden, Mém. sur le Campan., p. 33, Plates 1, 2 (t. Hincks).

Gay Head; Cape Ann, Massachusetts; Bay of Fundy. Coasts of Belgium and Great Britain.

OBELIA FLABELLATA Hincks. (p. 390.)

Brit. Hydroid Zoöph., p. 157, Plate 29, 1868. *Campanularia flabellata* Hincks, Ann. and Mag. Nat. Hist., ser. iii, vol. xviii, p. 297.

Off Thimble Islands, 4 to 5 fathoms, on *Astrangia*; Watch Hill, Rhode Island, on *Laminaria*; Wood's Hole, on old wreck, in the passage. Coasts of Great Britain.

The hydrarium of this species very closely resembles the *Obelia commissuralis* of Agassiz, and may prove to be identical with it. But the original *O. commissuralis* of McCready, from Charleston, South Carolina, is, perhaps, distinct from that described by Agassiz.

OBELIA COMMISSURALIS McCready. Plate XXXVII, fig. 281. (p. 327.)

Proc. Elliott Soc., vol. i, p. 197, Plate 11, figs. 5-7, 1859; (?) Agassiz, Contributions, vol. iv, pp. 315, 351, Plate 33 (except fig. 2), Plate 34, figs. 10-21, 1862; (?) A. Agassiz, Catalogue, p. 91, fig. 134. *Laomedea dichotoma* Leidy, op. cit., p. 138, Plate 11, fig. 36 (not Linné, sp.). ? *Laomedea gelatinosa* Stimpson, Invert. of Grand Manan, p. 8, 1853 (not Pallas, sp.).

Charleston, South Carolina (McCready). New Jersey (Leidy). Newport, Rhode Island, and Nahant, Massachusetts (A. Agassiz). New Haven Harbor, on piles; Vineyard Sound, on floating algæ. Grand Manan (Mills, t. A. Agassiz).

The northern specimens possibly belong to the preceding species.

OBELIA GELATINOSA Hincks. (p. 391.)

British Hydroid Zoöphytes, p. 151, Plate 26, fig. 1, 1868. *Sertularia gelatinosa* Pallas, Elench. Zoöph., p. 116, 1766. *Laomedea gelatinosa* Lamouroux, Polyp Flex., p. 92; Johnston, Brit. Zoöph., ed. ii, p. 104, Plate 27, fig. 1 (var. *b*). *Campanularia gelatinosa* Lamarck, Anim. sans Vert., ed. ii, p. 134 (t. Hincks). *Laomedea gigantea* A. Agassiz, Catalogue, p. 86, 1865.

New Jersey to Massachusetts Bay; northern coasts of Europe, from North Cape to Belgium and Great Britain; low-water to 20 fathoms. Great Egg Harbor, New Jersey, on oysters; New Haven, on piles of Long Wharf, abundant. Mouth of Charles River, near Boston (H. J. Clark, t. A. Agassiz).

RHEGMATODES TENUIS A. Agassiz. (p. 454.)

In Agassiz, Contributions, vol. iv, p. 361, 1862; Catalogue, p. 95, figs. 136-133.

Buzzard's Bay and Vineyard Sound.

ZYGODACTYLA GRÆNLANDICA Agassiz. Plate XXXVII, fig. 275. (p. 449.)

Contributions, vol. iv, p. 360, 1862; A. Agassiz, Catalogue, p. 103, figs. 153-156.

Æquorea Grænlandica Péron and Lesueur, Ann. du Mus., vol. xiv, p. 27, 1809 (t. A. Agassiz).

Buzzard's Bay to Greenland. Common in Vineyard Sound, in June and July.

ÆQUOREA ALBIDA A. Agassiz. (p. 454.)

In Agassiz, Contributions, vol. iv, p. 359, 1862; Catalogue, p. 110, figs. 160-162.

Buzzard's Bay (A. Agassiz).

TIMA FORMOSA Agassiz. (p. 449.)

Contributions, vol. iv, p. 362, 1862; A. Agassiz, Catalogue, p. 113, figs. 164-172.

Vineyard Sound, February and April. Massachusetts Bay (A. Agassiz).

EUTIMA LIMPIDA A. Agassiz. (p. 454.)

In Agassiz, Contributions, vol. iv, p. 363, 1862; Catalogue, p. 116, figs. 173-173.

Buzzard's Bay, Naushon (A. Agassiz).

LAFOËA CALCARATA A. Agassiz. (p. 408.)

Catalogue, p. 122, figs. 184-194. *Lafœa cornuta* Agassiz, Contr., vol. iv, p. 351 (not of Lamouroux). *Laodicea calcarata* A. Agassiz, in Agassiz, Contributions, vol. iv, p. 350, 1862. *Campanularia dumosa* Leidy, op. cit., p. 138, 1855 (not of Fleming).

South Carolina to Vineyard Sound; Buzzard's Bay and Vineyard Sound. The hydrarium was abundant on floating *Zostera* and algæ in Vineyard Sound, creeping over *Sertularia cornicina*; also at low-water, and in 6 to 8 fathoms on *Phyllophora*; Thimble Islands, in tide-pool, on *Vesicularia*. Charleston, South Carolina (McCready, described as a constituent part of his *Dynamena cornicina*).

HALECIUM GRACILE Verrill, sp. nov. (p. 328.)

Stems slender, flexible, clustered, compound, consisting of many very slender, united tubes, light brown or yellowish, pinnately much branched; branches alternate, ascending, long, slender, tapering, similar to the main stem, and usually similarly subdivided; the branches and branchlets mostly arise from opposite sides of the stem, so that they stand nearly in one plane; ends of branches and the branchlets simple, very slender, translucent, whitish, divided into rather long segments; the articulations not very conspicuous, somewhat oblique; each segment usually with a prominent cylindrical process, arising from near the upper end, which, on the older branches, bears the hydroid cell, but on the young branchlets are themselves hydroid cells; furnished with a thin, slightly

expanded border, having a circle of dots near the edge; the older or secondary cells, arising from these, are rather elongated, narrow, cylindrical, with slightly expanded rim, more or less bent and crooked or geniculate at base, and usually with one or two irregular constrictions. Many of the older cells are much elongated, and have two or three old rims below, separated by distances equal to two or three times the diameter. The hydroids are long, slender, with numerous long tentacles, much exsert from the cells. The branchlets and gonothecæ (reproductive capsules) arise in the axils of the hydroid cells, and, like the latter, the gonothecæ are often secund on the branchlets. The male and female capsules are different in form. The male gonothecæ are oblong, subfusiform, about three times as long as broad, obtusely rounded at the end, more gradually tapered to the base; the female gonothecæ are broader, somewhat flattened, usually a little shorter, gradually expanding from the narrow base to near the distal end, which is emarginate; the outer angle broadly rounded and slightly produced; the inner angle prolonged into a short cylindrical hydroid cell, with the edge slightly everted, from which two hydroids usually protrude. Height, 75^{mm} to 150^{mm}; diameter of stems, seldom more than 1^{mm}; length of female gonothecæ, about 1^{mm}; breadth, 0.40^{mm} to 0.45^{mm}; length of male gonothecæ, 1^{mm} to 1.10^{mm}; breadth, 0.30^{mm} to 0.40^{mm}; diameter of hydrothecæ, about 0.12^{mm}.

Great Egg Harbor, New Jersey, on oysters, just below low-water mark; Long Island Sound, near New Haven, in 2 to 6 fathoms, abundant, and also in brackish water on floating timber; Thimble Islands, 2 to 6 fathoms; Buzzard's Bay and Vineyard Sound.

This species is more nearly allied to *H. halecinum* of Europe and Northern New England than to any other described species. It is a much more slender and delicate species, with longer joints, and narrower and more elongated hydrothecæ and polyps. The female gonothecæ, although similar, differ in having the distal ends decidedly emarginate, with the outer angle somewhat produced, though much less so than in those of *H. Beanii*.

ANTENNULARIA ANTENNINA Fleming. (p. 497.)

Brit. Anim., p. 546; Johnston, Brit. Zoöph., ed. ii, p. 86, Plate 19, figs. 1-3; Hincks, Brit. Hydr. Zoöph., p. 280, Plate 61. *Sertularia antennina* Linné, Syst. Nat., ed. x, 1758; ed. xii, p. 1310. *Antennularia indivisa* Lamarck, Anim. sans Vert., ed. ii, vol. ii, p. 156.

Martha's Vineyard to Bay of Fundy; northern coasts of Europe to Great Britain and France. Off Gay Head, 8 fathoms; Casco Bay, 6 to 30 fathoms; Bay of Fundy, 10 to 60 fathoms, not uncommon.

AGLAOPHENIA ARBOREA Verrill.

Plumularia arborea Desor, Proc. Boston Soc. Nat. Hist., vol. iii, p. 65, 1848; A. Agassiz, Catalogue, p. 140.

The original specimen of this species is still preserved in the collection

of the Boston Society. It consists of a large number of long, mostly simple, but occasionally forked stems, forming a dense plume-like cluster, united at base by an intricate mass of creeping stolons, which cover what looks like the dead axis of a *Gorgonia*, but is most probably a dried-up black alga, and is certainly not, as Desor supposed, a part of the hydroid. The stems are mostly 4 to 6 inches long, more or less recurved, composed of short joints, and densely covered with the second pinnæ, which increase in length from the base toward the tips; the pinnæ arise from every joint, and form two close alternating rows along the inner side of the stems; they are directed upward, and more or less curved inward, toward each other, near the tips, and mostly 5^{mm} to 8^{mm} in length, composed of short, stout, oblique joints, not twice as long as broad. Hydra-cells deep, slightly flaring, rising at an angle of about 45°, attached only at base, the upper side less than half as high as the lower, border strongly dentate; one slender median denticle on the upper edge; four lateral ones on each side, of which three are subequal, triangular, rather wide, obtuse, with rounded intervals; the lower or outer lateral one is twice as long, rather acute; the single odd median one, on the outer margin, is equally long and more slender, and usually bent upward. A single large tubular median nematophore is attached to the outer side of the cell, along most of its length, but separated at the end, which is obliquely truncate, with the aperture on the inner side, its tip nor extending beyond the long lateral denticles of the hydra-cell. Lateral nematophores small, sessile, not so long as the upper or inner side of the cells. The large, closed, oblong corbulæ are irregularly scattered among the other pinnæ; they occupy the terminal part of the modified pinnæ, but there are usually three or four unaltered hydra-cells on the basal portion, below the corbula; the pinnæ bearing corbulæ are somewhat shorter than the others.

Shoals of Nantucket, ten miles east of Sancati Head, 14 fathoms, (Desor).

PLUMULARIA TENELLA Verrill, sp. nov. (p. 407.)

Stems clustered, simple, slender, 1 to 2 inches high, horn-colored; branches alternate, very slender, not very long, mostly unbranched, placed toward one face of the stem, inclining forward, and ascending at an angle of about 45°, and originating from the alternate joints of the stem, the internodes being longer than the joints that bear branches; at one side of the base of each branch there is a hydrotheca and accompanying nematophores; the internodes of the stem also bear one or two nematophores. The basal segment of each branch is short; the rest are of three kinds; every third one is usually stouter, and bears a hydrotheca; just in front of each hydrotheca there is usually a very short segment, scarcely longer than broad, and sometimes indistinct, destitute of nematophores; then follows a much longer, slender segment, five or six times as long as broad, articulated by a very oblique joint at its dis-

tal end with the thicker and shorter polypiferous segment, and bearing one or two nematophores on the median line, which may be either near the middle or toward the proximal end. Hydrothecæ broad, sub-cylindrical, a little longer than broad, with a slightly flaring, even rim; the axis forms an angle of about 45° with the branches; the free part of the distal side is about half the length of the proximal side. Nematophores relatively large, usually three with each hydrotheca: one on each side, shorter than the hydrotheca, trumpet-shaped, with a round, cup-like opening, narrowed below, nearly sessile; another, similar in form, placed toward the proximal end of the segment, inclined forward, and nearly reaching the base of the hydrotheca. Gonothecæ not observed.

Off Gay Head, 8 to 10 fathoms, among ascidians; Vineyard Sound, 8 fathoms.

This species is related to *P. Catharinæ* Johnston and *P. cornucopiæ* Hincks, from the English coast. The former differs in having opposite branches, smaller and more elongated nematophores, etc.; the latter agrees in having alternate branches, but the nematophores are smaller, longer, and more slender, and the joints of the branches are different.

This is the first genuine species of *Plumularia* that has been discovered on the New England coast.

SERTULARIA ARGENTEA Ellis and Solander. Plate XXXVII, fig. 280. (p. 408.)

Zoöphytes, p. 38; Johnston, Brit. Zoöph., ed. ii, p. 79, Plate 14, fig. 3, Plate 15, figs. 1-3; Hincks, Brit. Hydr. Zoöph., p. 263, Plate 56; A. Agassiz, Catalogue, p. 144.

New Jersey to the Arctic Ocean; northern shores of Europe to Great Britain and France; low-water to 110 fathoms. Great Egg Harbor, New Jersey, in April; common and of large size in Long Island Sound, near New Haven, Thimble Islands, and at Faulkner's Island, 1 to 8 fathoms; Watch Hill, Rhode Island; Vineyard Sound, 1 to 15 fathoms, very common; abundant in Casco Bay; Bay of Fundy; Nova Scotia coast; and Gulf of Saint Lawrence, low-water to 110 fathoms. Saint George's Bank (S. I. Smith).

SERTULARIA CUPRESSINA Linné. (p. 408.)

Syst. Naturæ, ed. x, 1758; ed. xii, p. 1308; Pallas, Elench. Zooph., p. 142, 1766; Johnston, op. cit., p. 80, Plate 16, figs. 1, 2; Hincks, op. cit., p. 270, Plate 57; A. Agassiz, Catalogue, p. 143.

New Jersey to the Arctic Ocean; northern coasts of Europe to Great Britain and France. Great Egg Harbor, New Jersey, with reproductive capsules, in April; Vineyard Sound, not common; Massachusetts Bay; Casco Bay; Bay of Fundy, in tide-pools and from 1 to 110 fathoms, common. Saint George's Bank (S. I. Smith). Absecom Beach, New Jersey (Leidy).

SERTULARIA PUMILA Linné. Plate XXXVII, fig. 279. (p. 327.)

Syst. Naturæ, ed. x, 1758; ed. xii, p. 1306; Pallas, Elench. Zooph., p. 130; Johnston, op. cit., p. 66, Plate 11, figs. 3, 4; Hincks, Brit. Hydr. Zoöph., p. 260, Plate 53,

fig. 1. *Dynamena pumila* Lamouroux, Bulletin Soc. Phil., vol. iii, p. 184, 1812; Agassiz, Contributions, vol. iv, pp. 326, 355, Plate 32, 1862; A. Agassiz, Catalogue, p. 141, figs. 225, 226.

New Jersey to the Arctic Ocean; Finmark to Great Britain and France. Great Egg Harbor, New Jersey, on *Fucus*; abundant on the shores of Long Island Sound, Vineyard Sound, and northward, between tides.

SERTULARIA CORNICINA Verrill. (p. 408.)

Dynamena cornicina (pars) McCreedy, op. cit., p. 204, 1859; A. Agassiz, Catalogue, p. 142, 1865.

Charleston, South Carolina, to Vineyard Sound. Not uncommon in Vineyard Sound, 1 to 8 fathoms, often on *Halecium gracile*; also on floating *Zostera*, etc., and covered with *Lafoëa calcarata*.

This species somewhat resembles the preceding, but the hydra-cells are more distant, longer, more prominent, and freer, while the end is distinctly bent outward, making the lower side concave in the middle; aperture strongly bilabiate, often appearing tridentate.

HYDRALLMANIA FALCATA Hincks. (p. 408.)

Brit. Hyd. Zoöph., p. 273, Plate 58, 1868. *Sertularia falcata* Linné, Syst. Nat., ed. x, 1758; ed. xii, p. 1309; *Plumularia falcata* Lamarek, Anim. sans Vert., ed. ii, p. 160; Johnston, Brit. Zoöph., p. 90, Plate 21, figs. 1, 2. *Sertularia tenerissima* Stimpson, Mar. Invert. Grand Manan, p. 8, 1853.

Long Island Sound to the Arctic Ocean; northern shores of Europe to the British Channel. Common near New Haven, and off Thimble Islands, 4 to 8 fathoms; Watch Hill, Rhode Island; Vineyard Sound, and off Gay Head, 6 to 20 fathoms; Massachusetts Bay, abundant; very abundant in Casco Bay and Bay of Fundy, low-water to 110 fathoms; Mingan Islands, Labrador. Saint George's Bank, very abundant, 20 to 150 fathoms, (S. I. Smith, A. S. Packard).

Tubularina.

NEMOPSIS BACHEI Agassiz. (p. 454.)

Mem. Amer. Acad., vol. iv, p. 289, figure, 1849; Contributions, vol. iv, p. 345; A. Agassiz, Catalogue, p. 149, figs. 227-231. *Nemopsis Gibbesi* McCreedy, op. cit., p. 58, Plate 10, figs. 1-7, 1859.

Charleston, South Carolina, to Nantucket.

BOUGAINVILLIA SUPERCILIARIS Agassiz. Plate XXXVII, fig. 276. (p. 328.)

Contributions, vol. iv, pp. 239, 291, figs. 37-39, Plate 27, figs. 1-7, 1862; A. Agassiz, Catalogue, p. 153, figs. 232-240. *Hippocrene superciliaris* Agassiz, Mem. Amer. Acad., vol. iv, p. 250, Plates 1-3, 1849.

Newport, Rhode Island, to Bay of Fundy; ? Greenland.

MARGELIS CAROLINENSIS Agassiz. (p. 450.)

Contributions, vol. iv, p. 344, 1862; A. Agassiz, Catalogue, p. 156, figs. 241-248. *Hippocrene Carolinensis* McCreedy, op. cit., p. 164 (separate copies, p. 62), Plate 10, figs. 8-10.

Charleston, South Carolina, to Vineyard Sound. Wood's Hole, at surface, evening.

EUDENDRIUM DISPAR Agassiz. (p. 408.)

Contributions, vol. iv, pp. 285, 289, 342, fig. 36, Plate 27, figs. 10-21, 1862; A. Agassiz, Catalogue, p. 159, fig. 249.

Vineyard Sound to Bay of Fundy; 1 to 20 fathoms.

EUDENDRIUM TENUE A. Agassiz.

Catalogue, p. 160, fig. 250, 1865.

Buzzard's Bay to Bay of Fundy, low-water to 15 fathoms. This is closely allied to the English *E. capillare* Alder, but the latter seems to be a smaller and more delicate species.

EUDENDRIUM RAMOSUM Ehrenberg. (p. 408.)

Corall. roth. Meer, p. 72, 1834; Johnston, Brit. Zoöph., ed. ii, p. 46, Plate 6, figs. 1-3; Hincks, Brit. Hydr. Zoöph., p. 82, Plate 13; ? A. Agassiz, Catalogue, p. 160. *Tubularia ramosa* Linné, Syst. Nat., ed. xii, p. 1302.

Martha's Vineyard to Labrador; northern coasts of Europe to Great Britain. Off Gay Head, 8 to 20 fathoms; Casco Bay, 10 to 60 fathoms; Bay of Fundy, 6 to 100 fathoms. Off Saint George's Bank, 430 fathoms, (S. I. Smith).

DYSMORPHOSA FULGURANS A. Agassiz. (p. 448.)

Catalogue, p. 163, figs. 259, 260, 1865.

Buzzard's Bay, Naushon, and Massachusetts Bay (A. Agassiz).

TURRITOPSIS NUTRICULA McCready. (p. 454.)

Op. cit., pp. 55, 86, 127, Plates 4, 5, 8, fig. 1, 1857-9; Agassiz, Contributions, vol. iv, p. 347; A. Agassiz, Catalogue, p. 167, figs. 269, 270.

Charleston, South Carolina, to Vineyard Sound.

STOMOTOCA APICATA Agassiz. (p. 455.)

Contributions, vol. iv, p. 347, 1862; A. Agassiz, Catalogue, p. 168. *Saphenia apicata* McCready, op. cit., p. 129, Plate 8, figs. 2, 3, 1859.

Charleston, South Carolina (McCready); Newport, Rhode Island (A. Agassiz).

CLAVA LEPTOSTYLA Agassiz. (p. 328.)

Contributions, vol. iv, pp. 218, 222, fig. 32, Plate 20, figs. 11-16^a, Plate 21, figs. 1-10^a, 1862; A. Agassiz, Catalogue, p. 170, fig. 274; Hincks, op. cit., p. 6, Plate 2, fig. 1, 1868. *Clava multicornis* Stimpson, Invert. Grand Manan, p. 11, 1853; Leidy, Journ. Acad. Nat. Sciences, Philad., vol. iii, p. 135, Plate 11, figs. 33, 34, 1855 (not of Johnston).

Long Island Sound to Labrador; coasts of Great Britain. Near New Haven Light; Thimble Islands, in tide-pools; Beverly, Massachusetts; Casco Bay, on rocks and *Fucus*, abundant; Eastport, Maine, on piles. Point Judith, Rhode Island (Leidy). Nahant, Massachusetts (Agassiz). Morecombe Bay (Hincks).

CORDYLOPHORA, species undetermined.

Syncoryna, sp., Agassiz, Contributions, vol. iv, p. 339 (no description).

Newport Harbor, Rhode Island (Leidy, t. Agassiz). In 1860 I obtained a species of this genus from the vicinity of Cambridge, Massa-

chusetts, in water that was fresh, or nearly so. It grew to the height of two inches or more, with long slender branches.

WILLIA ORNATA McCready. (p. 455.)

Op. cit., p. 149 (separate copies, p. 47), Plate 9, figs. 9-11, 1859 (Willsia); Agassiz, Contributions, vol. iv, p. 346, 1862; A. Agassiz, Catalogue, p. 171, figs. 274^a, 275.

Charleston, South Carolina (McCready). Buzzard's Bay (A. Agassiz).

CORYNE MIRABILIS Agassiz.

Contributions, vol. iii, Plate 11^c, figs. 14, 15, Plates 17-19; vol. iv, pp. 185-217, figs. 9-31, Plate 20, figs. 1-9, Plate 23^a, fig. 12; A. Agassiz, Catalogue, p. 175, figs. 283-287. *Sarsia mirabilis* Agassiz, Mem. Amer. Acad., vol. iv, p. 224, Plates 4, 5, 1849. ? *Tubularia stellifera* Couthouy, Boston Jour. Nat. Hist., vol. ii, p. 56, 1839. *Coryne gravata* Wright, Edinb. New Phil. Jour., Apr., 1858, Plate 7, fig. 5 (t. Hincks). *Syncoryne gravata* Hincks, Brit. Hydr. Zoöph., p. 53, Plate 10, fig. 1.

The species described by Couthouy may, possibly, have been this; but his species was described as unbranched, and as if it had two distinct circles of tentacles. Martha's Vineyard to Greenland. Common in Massachusetts Bay; Casco Bay; and Bay of Fundy. Scotland (Hincks).

DIPURENA CONICA A. Agassiz. (p. 455.)

In Agassiz, Contributions, vol. iv, p. 341, 1862; A. Agassiz, Catalogue, p. 181, figs. 301-305.

Buzzard's Bay, Naushon (A. Agassiz).

GEMMARIA GEMMOSA McCready. (p. 455.)

Op. cit., p. 151, Plate 8, figs. 4, 5, 1859; A. Agassiz, Catalogue, p. 184, fig. 306. *Zanclaea gemmosa* McCready, op. cit., p. 151, 1849; Agassiz, Contributions, vol. iv, p. 344.

Charleston, South Carolina (McCready). Buzzard's Bay (A. Agassiz).

PENNARIA TIARELLA McCready. Plate XXXVII, figs. 277, 278. (p. 327.)

Op. cit., p. 153, 1859; A. Agassiz, Catalogue, p. 187, figs. 311-315. *Globiceps tiarella* Ayres, Proc. Boston Soc. Nat. Hist., vol. iv, p. 193, 1852. *Eucoryne elegans* Leidy, op. cit., p. 136, Plate 10, figs. 1-5, 1855. *Globiceps tiarella* Agassiz, Contributions, vol. iv, p. 344, 1862.

Charleston, South Carolina, to Massachusetts Bay. Great Egg Harbor, New Jersey; near New Haven; Vineyard Sound, common, low-water to 10 fathoms, and on floating algæ.

ECTOPLEURA OCHRACEA Agassiz. (p. 455.)

In Agassiz, Contributions, vol. iv, p. 343, 1862; Catalogue, p. 191, figs. 320-323.

Buzzard's Bay, Naushon (A. Agassiz).

CORYMORPHA PENDULA Agassiz. Plate XXXVI, fig. 273. (p. 510.)

Contributions, vol. iv, pp. 276, 343, Plate 26, figs. 7-17, 1862; A. Agassiz, Catalogue, p. 192, fig. 324. *Corymorpha nutans* Stimpson, Invert. of Grand Manan, p. 9, 1853.

Block Island to Gulf of Saint Lawrence. Common in Casco Bay and Bay of Fundy, 8 to 30 fathoms; off Block Island, 29 fathoms. Off Cape Cod (A. S. Bickmore).

HYBOCODON PROLIFER Agassiz. Plate XXXVIII, fig. 282. (p. 328.)

Contributions, vol. iv, pp. 243, 343, Plate 23^a, figs. 10, 11, Plate 25, figs. 1-15, 1862; A. Agassiz, Catalogue, p. 193, figs. 325-328.

Vineyard Sound to Massachusetts Bay.

PARYPHA CROCEA Agassiz. Plate XXXVI, fig. 274. (p. 390.)

Contributions, vol. iv, pp. 249, 342, Plates 23, 23^a, figs. 1-7, 1862; A. Agassiz, Catalogue, p. 195. ? *Tubularia cristata* McCready, op. cit., p. 156, 1859=*Parypha cristata* Ag., op. cit., p. 342.

Brooklyn, New York, to Boston, Massachusetts. Very abundant near New Haven, on piles in harbor, and in 2 to 6 fathoms, off Thimble Islands; Wood's Hole, on piles, abundant. Warren Bridge, Boston (Agassiz).

This is probably not distinct from *P. cristata*, which is abundant at Charleston, South Carolina, and Fort Macon, North Carolina.

THAMNOCNIDIA TENELLA Agassiz. (p. 407.)

Contributions, vol. iv, pp. 275, 342, Plate 22, figs. 21-30, 1862; A. Agassiz, Catalogue, p. 195.

Rhode Island to Bay of Fundy. Off Watch Hill, 4 to 5 fathoms; Vineyard Sound, 6 to 10 fathoms; common in Casco Bay and Bay of Fundy, low-water to 40 fathoms.

HYDRACTINIA POLYCLINA Agassiz. (p. 407.)

Contributions, vol. iii, Plate 16; vol. iv, pp. 227, 339, figs. 33-35, Plate 26, fig. 18, 1862; A. Agassiz, Catalogue, p. 193, figs. 329, 330. *Hydractinia echinata* Leidy, op. cit., p. 135, Plate xi, fig. 35, 1855 (? not of Johnston).

New Jersey to Labrador. Very abundant in Long Island Sound, Vineyard Sound, Casco Bay, and Bay of Fundy, low-water to 60 fathoms. Saint George's Bank (S. I. Smith). Labrador (Packard). Greenland (Mörch). ? Charleston, South Carolina (McCready).

The identity of this with the European species is somewhat doubtful, though united by Hincks and others. The latter extends southward on the European coasts to Great Britain and France.

Physophoræ.

NANOMIA CARA A. Agassiz. (p. 455.)

Proc. Boston Soc. Nat. Hist., vol. ix, p. 181, 1863; Catalogue, p. 200, figs. 332-350.

Newport, Rhode Island; Massachusetts Bay; Nahant (A. Agassiz).

Porpita.

PHYSALIA PELAGICA Lamarck. (p. 450.)

Syst. des Anim. sans Vert., p. 356, 1801; Lesson, Acalèphes, p. 545, 1843. *Physalis pelagica* Osbeck, Itin., p. 284, Plate 12, fig. 1, 1757 (t. Lesson). *Holothuria physalis* Linné, Syst. Nat., ed. xii, p. 1090, 1767. *Medusa caravelle* Müller, Besch. der Berl. Naturf., vol. ii, p. 190, Plate 9, fig. 2 (t. Lesson); Gmelin, Syst. Nat., p. 3139, 1789. *Physalia caravelle* Eschscholtz; Lesson, Hist. Nat. des Zooph. Acalèphes, Plate 11 (explanation). *Physalia arethusa* Tilesius, in Krusensterns Reise, vol. iii, p. 91, Plate 23, figs. 1-6, 1813 (t. Lesson); Agassiz, Contributions, vol. iv, pp. 335, 367, Plate 35, 1862; A. Agassiz, Catalogue, p. 214, figs. 351-354; this Report, p. 450. *Physalia aurigera* McCready, op. cit., p. 176, 1859.

Warmer parts of the Atlantic Ocean and Gulf of Mexico, coming northward in the Gulf Stream to the southern coast of New England and Long Island; and off Saint George's Bank and Nova Scotia. Not uncommon, in good condition, in Vineyard Sound and Buzzard's Bay. Watch Hill, Rhode Island (D. C. Eaton). East of Saint George's Bank (S. I. Smith). Fort Macon, North Carolina (coll. Dr. Yarrow).

VELELLA MUTICA Lamarck. (p. 455.)

Syst. des Anim. sans Vert., p. 355, 1801; Bose, Hist. Nat. des Vers., vol. ii, p. 158; Lesson, Voy. de la Coquille, Zool., vol. ii, pp. 2, 52, Plate 6, figs. 1, 2; Acalèphes, p. 571, Plate 12, figs. 1, 2; A. Agassiz, Catalogue, p. 216, figs. 355-357. *Medusa velella* Linné, Syst. Nat., ed. xii, p. 1093.

Tropical parts of the Atlantic and Gulf of Mexico, coming northward in the Gulf Stream as far as Nantucket and off Saint George's Bank. Aspinwall (coll. F. H. Bradley); coasts of Florida (Agassiz); Long Island Sound (A. Agassiz).

POLYPI or ANTHOZOA.

ALCYONARIA.

ALCYONIUM CARNEUM Agassiz. Plate XXXVIII, fig. 283. (p. 497.)

Proc. American Association for Adv. of Science, 1850, p. 209; Verrill, Revision of Polyps of Eastern Coast U. S., in Memoirs Boston Soc. Nat. Hist., vol. i, p. 4, 1864; Verrill, Proc. Boston Soc. Nat. Hist., vol. x, p. 343, 1866. *Halcyonium carneum* A. and E. C. Agassiz, Sea-Side Studies, p. 19, figs. 21-23, 1865.

Rhode Island to Gulf of Saint Lawrence. Off Watch Hill, Rhode Island, 4 to 5 fathoms; off Cuttyhunk Island, 10 to 15 fathoms; off Gay Head, 8 to 10 fathoms; common in Massachusetts Bay, Casco Bay, Bay of Fundy, and coast of Nova Scotia, low-water to 80 fathoms. Gulf of Saint Lawrence (Whiteaves). Saint George's Bank (S. I. Smith).

Leptogorgia tenuis Verrill.

Memoirs Boston Soc. Nat. Hist., vol. i, p. 8, 1864. *Gorgonia tenuis* Verrill, Proc. Boston Soc. N. H., vol. x, p. 339, 1866. *Leptogorgia teres* (error typ.) Verrill, Amer. Jour. Science, vol. xlviii, p. 420, 1869.

"Bay of New York." Specimens in the museum of Yale College are supposed to have come from Long Island Sound, but the exact locality is not known.

ACTINARIA.

METRIDIUM MARGINATUM Milne-Edwards. (p. 329.)

Hist. Nat. des Coralliaires, vol. i, p. 254, 1857; Verrill, Revision of Polyyps., in Mem. Boston Soc. Nat. Hist., vol. i, p. 22, 1864; Proc. Boston Soc. Nat. Hist., vol. x, p. 337, 1866; American Naturalist, vol. ii, p. 252; Tenney, Natural History, p. 523, figs. 515-517, 1865; A. and Mrs. E. C. Agassiz, Sea-Side Studies, p. 7, figs. 2-7, 1865. *Actinia marginata* Lesueur, Journal Acad. Nat. Sciences, Philad., vol. i, p. 172, 1817; Gould, Invert. Mass., ed. i, p. 349, 1841; Leidy, Journ. Acad. N. S., Philad., ser. ii, vol. iii, p. 140, 1855; Agassiz, Contributions, vol. iii, p. 39, fig. 8, 1860. *Actinia dianthus* Dawson, Canadian Naturalist and Geologist, vol. iii, p. 402, figs. 1, 2, 1858.

New Jersey to Labrador. Common in Long Island Sound, Buzzard's Bay, and Vineyard Sound, but mostly smaller than farther north; abundant in Massachusetts Bay, Casco Bay, and Bay of Fundy, low-water to 90 fathoms.

SAGARTIA LEUCOLENA Verrill. Plate XXXVIII, fig. 284. (p. 329.)

Proc. Boston Soc. Nat. Hist., vol. x, p. 336, 1866; American Naturalist, vol. ii, p. 261.

North Carolina to Cape Cod. Common in Long Island Sound, Buzzard's Bay, and Vineyard Sound; Great Egg Harbor, New Jersey. Fort Macon, North Carolina (coll. Dr. Yarrow).

SAGARTIA MODESTA Verrill. (p. 330.)

Proc. Boston Soc. Nat. Hist., vol. x, p. 337, 1866.

Long Island Sound to Vineyard Sound. Savin Rock, near New Haven; Goose Island; Stony Creek; Naushon Island; low-water, buried in sand or gravel.

PARACTIS RAPIFORMIS Milne-Edwards. (p. 363.)

Hist. Nat. des Coralliaires, vol. i, p. 249, 1857; Verrill, American Journal of Science, vol. iii, p. 436, 1872; Dana, Corals and Coral Islands, p. 23, figure, (in ed. i, as *Sagartia modesta* V.). *Actinia rapiformis* Lesueur, Journ. Acad. Nat. Sciences, Philad., vol. i, p. 171, 1817; Verrill, Memoirs Boston Soc. Nat. Hist., vol. i, p. 35, 1864; Proc. Boston Soc. N. H., vol. x, p. 338.

North Carolina to Long Island Sound. Fort Macon (coll. Dr. Yarrow); New Jersey (Lesueur); near New Haven (Dana).

HALOCAMPA PRODUCTA Stimpson, MSS. Plate XXXVIII, fig. 285. (p. 330.)

Verrill, Revision, in Memoirs Boston Soc. Nat. Hist., vol. i, p. 30, Plate 1, figs. 10, 11, 1864. *Actinia producta* Stimpson, Proc. Boston Soc. Nat. Hist., vol. v, p. 110, 1856. *Corynactis albida* Agassiz, Proc. Bost. Soc. Nat. Hist., vol. vii, p. 24, 1859. *Halcampa albida* Verrill, Memoirs Boston Soc. Nat. Hist., vol. i, p. 29, 1864; A. and E. C. Agassiz, Sea-Side Studies, p. 16, fig. 15, 1865; Verrill, Proc. Bost. Soc. Nat. Hist., vol. x, p. 338, 1870 (*Halocampa*).

South Carolina to Cape Cod. Shores of Long Island Sound, at Stony Creek, etc.; Naushon Island; Martha's Vineyard; Nantucket; Cape Cod. Charleston, South Carolina (Stimpson).

EDWARDSIA FARINACEA Verrill. (p. 510.)

American Journal of Science, vol. xlii, p. 118, 1866.

Off Gay Head, 19 fathoms; Casco Bay, 10 to 70 fathoms; Bay of Fundy, 8 to 90 fathoms.

EDWARDSIA LINEATA Verrill, sp. nov. (p. 497.)

Body cylindrical, elongated, covered over the base and sides with a dirty, brownish, slightly rough and wrinkled epidermis, except anteriorly, below the tentacles, where it is smooth, translucent, and usually with eight impressed, longitudinal, flake-white lines, showing through. Tentacles, 24 to 30, or more, in the larger specimens, slender, tapering, obtuse, white or pale flesh-color, each with a flake-white, longitudinal line along the inner side. Disk, with a white circle around the mouth, and often with 8, or more, radiating, white lines, extending to the base of the inner tentacles; border of the mouth sometimes pale red; naked part of column pale flesh-color, often with a circle of white below the bases of the tentacles, and usually with eight oblong or fusiform flake-white spots between the longitudinal impressed lines.

Length, 25^{mm} to 35^{mm}; diameter, 2.5^{mm} to 3^{mm}. A very young specimen had 18 slender, equal, long tentacles, each with a median longitudinal line of white on the inside; disk with 6 radiating lines of white; naked part of the column with 6 impressed white lines, and with 6 oblong, flake-white spots between them. Breadth across the expanded tentacles, 3^{mm}.

This species is remarkable for not having, in any of the specimens found, a naked basal area, nor any true disk for attachment, thus differing both from *Phellia* and the other species of *Edwardsia*. This may be due to its peculiar habit of nestling in the crevices and interstices between rocks, ascidians, worm-tubes, etc.

Off Watch Hill, Rhode Island, 4 to 5 fathoms, in cavities in and beneath *Astrangia*, etc.; Vineyard Sound and off Gay Head, 6 to 12 fathoms, among ascidians, annelid-tubes, etc., abundant.

Arachnaetis brachiolata A. Agassiz. (p. 451.)

Proc. Boston Soc. Nat. Hist., vol. ix, p. 159, 1862; Boston Journal of Nat. Hist., vol. vii, p. 525, 1863; Verrill, Memoirs Boston Soc. N. H., p. 33; Proceedings, vol. x, p. 343.

Mr. A. Agassiz has recently ascertained that this is only a larval form of some species of *Edwardsia*. As it had already developed 16 tentacles, it must belong to one of the species having numerous tentacles when adult.

Peachia parasitica Verrill.

Proc. Boston Soc. Nat. Hist., vol. x, p. 338, 1866; *Bicidium parasiticum* Agassiz, Proc. Boston S. N. H., vol. vii, p. 24, 1859; Verrill, Revision of Polyyps, in Memoirs Boston S. N. H., vol. i, p. 31, Plate 1, figs. 14, 15, 1864; A. and Mrs. E. C. Agassiz, Sea-Side Studies, p. 15, fig. 14, 1865.

Cape Cod to Bay of Fundy, on *Cyanea arctica*; Eastport, Maine, buried in gravel at low-water mark (two specimens, of very large size). I am

not aware that this species has been found south of Cape Cod, but it will probably be found hereafter, since the *Cyanea* is common.

EPIZOANTHUS AMERICANUS Verrill. Plate XXXVIII, figs. 286, 287. (p. 510.)

American Journal of Science, vol. ii, p. 361, 1871; Dana, Corals and Coral Islands, ed. i, p. 62, figs 1, 2, 1872. *Zoanthus parasiticus* Verrill, Revision of Polyyps, in Mem. Boston Soc. N. H., vol. i, p. 34, 1864, (not of Duch. and Mich., 1860.) *Zoanthus Americanus* Verrill, op. cit., p. 45; Proc. Boston Soc. Nat. Hist., vol. x, p. 335, 1865. *Gemmaria Americana* Verrill, American Naturalist, vol. ii, p. 9, fig. 42.

Off New Jersey to Gulf of Saint Lawrence, in deep water. Off Block Island, 29 fathoms, on shells occupied by *Eupagurus*; off Grand Manan, in 40 to 50 fathoms, on shells covering *Eupagurus*, and in 109 fathoms, on rocks; off Saint George's Bank, 430 fathoms, on rocks, (S. I. Smith and O. Harger); Saint George's Bank, 60 fathoms, on shells occupied by *Eupagurus* (Smith and Harger); Gulf of Saint Lawrence, on rocks, (Whiteaves); Massachusetts Bay (J. E. Gray). Off New Jersey, N. lat. 40°, W. long. 73°, 32 fathoms, on shells inhabited by *Eupagurus pubescens*, (coll. Captain Gedney).

MADREPORARIA.

ASTRANGIA DANÆ Agassiz. (p. 408.)

Proc. American Assoc., vol. ii, p. 63, 1849 (not of Edw. and Haime, 1850); Verrill, Revision Polyyps, p. 40, 1864; A. and Mrs. E. C. Agassiz, Sea-Side Studies, p. 16, figs. 16-20, 1865; Verrill, Proc. Boston Soc. Nat. Hist., vol. x, p. 335, 1866; Dana, Corals and Coral Islands, p. 68, figures, 1872. *Astrangia astrœiformis* Edw. and Haime, Ann. des. Sci. Nat., vol. xii, p. 181, 1850; Coralliaires, vol. ii, p. 614, 1857; Leidy, Journ. Acad. Nat. Sciences, Philad., vol. iii, p. 139, Plate x, figs. 9-16, 1855; Verrill, Revision of Polyyps, p. 39, 1864.

North Florida and west Florida to Cape Cod. Common in Long Island Sound, near New Haven, at Savin Rock, off Thimble Islands, etc., 1 to 6 fathoms, rocks; Watch Hill, Rhode Island, 4 to 5 fathoms; Vineyard Sound and Buzzard's Bay, 2 to 15 fathoms; Fort Macon, North Carolina (coll. Dr. Yarrow). Charleston, South Carolina (Agassiz). West Florida (E. Jewett).

PROTOZOA.

PORIFERA or SPONGIÆ.

CALCAREA.

GRANTIA CILIATA Fleming. (p. 330.)

British Anim., p. 325; Johnston, Brit. Sponges and Lithophytes, p. 176, Plate 20, figs. 4, 5, Plate 21, figs. 6, 7, 1842; Bowerbank, Monog. British Spongiadae, vol. i, Plate 26, figs. 345, 346; vol. ii, p. 19, 1866. *Spongia ciliata* Fabricius, Fauna Grœnlandica, p. 448, 1780. *Sycandra ciliata* Heckel, Die Kalkschwämme,

vol. ii, p. 296, [Plate 51, figs. 1^a-1^t, Plate 58, fig. 9, 1872. *Spongia coronata* Ellis and Solander, Zoöphytes, p. 190, Plate 58, figs. 8, 9. *Grantia coronata* Hassall, Ann. and Mag. Nat. Hist., vol. vi, p. 174.

Rhode Island to Greenland; northern coasts of Europe. Common in Casco Bay and Bay of Fundy, low-water to 60 fathoms; Vineyard Sound, not uncommon. Point Judith, Rhode Island (Leidy).

? LEUCOSOLENIA BOTRYOIDES Bowerbank. (p. 500.)

Brit. Spong., vol. ii, p. 28, 1866. *Spongia botryoides* Ellis and Solander, Zoöph., p. 190, Plate 58, figs. 1-4, 1786. *Grantia botryoides* Fleming, Brit. Anim., p. 525; Johnston, op. cit., p. 178, Plate 21, figs. 1-5. *Ascallis botryoides* Hæckel, op. cit., vol. ii, p. 65, Plate 9, fig. 10, Plate 10, figs. 7^a-7^e.

Martha's Vineyard to Gulf of Saint Lawrence; northern coasts of Europe to England and France.

I refer some of our larger specimens to this species with considerable doubt. They appear to be distinct from the following species, with which they have formerly been confounded.

ASCORTIS FRAGILIS Hæckel.

Op. cit., vol. ii, p. 74, Plate 11, figs. 5-9, Plate 12, figs. 5^a-5ⁱ, 1872. *Leucosolenia thamnoides* Hæckel, Prodröm., p. 243, spec. 70. *Leucosolenia botryoides* H. J. Clark, Mem. Boston Soc. Nat. Hist., vol. i, part 3, p. 323, (sep. copies, p. 19), Plate 9, figs. 40-44, Plate 10, fig. 64, 1866 (not of Bowerbank); this Report, pp. 334, 391. *Grantia botryoides* Leidy, op. cit., p. 135, 1855.

Long Island Sound to Gulf of Saint Lawrence. Western coast of Norway, at Bergen, etc. (Hæckel). Common in Long Island Sound, near New Haven, at Thimble Islands, etc.; Watch Hill, Rhode Island; Vineyard Sound; Casco Bay, etc. Massachusetts Bay (H. J. Clark).

Hæckel names the form figured by Clark var. *bifida*.

SILICEA.

MICROCIONA PROLIFERA Verrill.

Spongia prolifera Ellis and Solander, Zoöphytes, p. 189, Plate 58, fig. 5, 1786; Lamouroux, Expos. Méthodique, p. 31, Plate 58, fig. 5. Red sponge, this Report, pp. 330, 409, 476.

This species, when young, forms broad, thin, bright red incrustations over the surfaces of stones and shells. In this stage it agrees well with the British species of *Microciona* described by Bowerbank, all of which are said to be incrusting forms. Our species, at a later period, rises up into irregular lobes and tubercular prominences, which eventually become elongated and subdivided into slender branches, until they often form a profusely and intricately branched sponge, frequently six inches high and as much in diameter. The branches are repeatedly dichotomous, more or less flattened, and often digitate or palmate at the ends. They also frequently anastomose irregularly. The branches, when dry, are brittle and hispid. They consist of stout, horny fibers, which radiate outward and upward from the axis to the periphery, terminating in

more or less irregular, slender, blunt papillæ, each of which bears a tuft of numerous slender, acute, more or less bent spicules, arising from its lateral and terminal surfaces. At the tips of the branches the papillæ are more slender and divergent, and the texture is more open and loose. During life these papillæ are connected together by a thin dermal membrane, through which the spicules project but little. The oscules are small and scattered over the surface. Color, when living, dark red to orange-red; when dried, generally dark grayish brown or umber-colored, fading to dull yellowish brown and gray. Diameter of branches mostly 2^{mm} to 5^{mm}.

South Carolina to Cape Cod. Very abundant in Long Island Sound and Vineyard Sound, low-water to 10 fathoms, on oysters and other shells, stones, etc.; Great Egg Harbor, New Jersey; Fort Macon, North Carolina (coll. Dr. Yarrow).

ISODICTYA, species undetermined.

Watch Hill, Rhode Island; Vineyard Sound and Nantucket, washed ashore after storms in winter; Casco Bay; Bay of Fundy.

The specimens from Watch Hill have few broad, thick, palmate branches, with large oscules and an open texture, with multispiculose fibers. They resemble *Isodictya palmata* Bowerbank.

CHALINA OCULATA Bowerbank. (p. 497.)

British Spongiadæ, vol. i, p. 208, Plate 13, fig. 262; vol. ii, p. 361. *Spongia oculata* Linné, Syst. Nat., ed. x, sp. 2; ed. xii, p. 1299; Pallas, Elench. Zooph., p. 390, 1766. *Halichondria oculata* Johnston, op. cit., p. 94, Plate 3.

Rhode Island to Labrador; northern coast of Europe to Great Britain. Off Watch Hill, Rhode Island, 4 to 5 fathoms; off Gay Head, 4 to 15 fathoms; very common in Massachusetts Bay, Casco Bay, and Bay of Fundy; low-water to 80 fathoms.

CHALINA ARBUSCULA Verill, sp. nov. (p. 409.)

Sponge profusely branched, from close to the thick base; branches repeatedly dichotomous, slender, round or somewhat compressed, seldom broad or palmate. Oscules small, round, irregularly scattered. Texture of the surface finely reticulated when dry, with very delicate fibers, which usually have but a single row of very slender fusiform spicules, covered by a thin layer of horny matter; the reticulations do not usually exceed the length of a single spicule. Primary longitudinal fibers of the larger branches strong, horny, with several lines of spicules; secondary fibers at right angles to the primary ones, much smaller, with fewer spicules. The spicules are slender, fusiform ("acerate"), much smaller and more slender than in the preceding species. Color, when living, dull gray; when dried, brownish, yellowish, or white. The largest specimens are about one foot high; more commonly 6 to 8 inches (150^{mm} to 200^{mm}); breadth often nearly as much; diameter of branches,

4^{mm} to 10^{mm}, mostly about 5^{mm} to 6^{mm}; diameter of the oscules, in dry specimens, about 1^{mm}.

North Carolina to Cape Cod. Very common in Long Island Sound and Vineyard Sound, 1 to 8 fathoms; Watch Hill, Rhode Island; Great Egg Harbor, New Jersey.

This species has a much finer and more delicate texture than *C. oculata*, due to the smaller fibers and spicules, as well as to the smaller meshes of the skeleton. The branches are also smaller and much more numerous than they usually are in that species.

HALICHONDRIA PANICEA Johnston.

Brit. Sponges, p. 114, Plate 10, Plate 11, fig. 5, 1842; Bowerbank, British Spongiadae, vol. i, p. 195, Plate 19, figs. 300, 303; vol. ii, p. 229, 1836. *Spongia panicea* Pallas, Elench. Zooph., p. 383, 1766. *Tedania* (?), this Report, p. 493.

Rhode Island to the Arctic Ocean; northern coasts of Europe to Great Britain. Abundant at Watch Hill, Rhode Island, on algæ, in 4 to 8 fathoms; off Gay Head; Casco Bay; Bay of Fundy.

HALICHONDRIA, species undetermined, a.

Watch Hill, Rhode Island, associated with the preceding.

Grows in large tuberous masses, on algæ, like the last, but has a smoother surface and finer and firmer texture. (See p. 498.)

HALICHONDRIA ?, species undetermined, b. (p. 334.)

Long Island Sound near New Haven; Vineyard Sound.

Forms broad, uneven incrustations on the under side of stones, at low-water mark. Color when living, bright yellow. Oscules rather large, conspicuous.

HALICHONDRIA ?, species undetermined, c.

Vineyard Sound, on the under side of overhanging banks, on the salt marshes near Waquoit; on the piles of wharves at Wood's Hole.

Forms large, irregular, thick masses, often containing much foreign matter; surface uneven, rising into irregular prominences. Soft and brittle.

This is, perhaps, a species of *Reniera* Schmidt (*Hymeniacion* Bowerbank).*

RENIERA ?, species undetermined, a. (p. 334.)

Vineyard Sound, 1 to 10 fathoms. Forms large, irregular, soft masses, 3 to 5 inches in diameter, of a light yellow color when living.

RENIERA ?, species undetermined, b.

Vineyard Sound, 3 to 10 fathoms. Forms large, irregular, thick masses, with numerous acute, irregular, often ragged, conical prominences, rising from its upper surface.

* It was not studied carefully when recent; and I have no specimens of this and several of the other species at hand, for most of the sponges were sent elsewhere for comparison with named types, and have not yet been returned.

HALISARCA?, Species undetermined, *a*.

Watch Hill, Rhode Island, 4 to 5 fathoms. Forms small, soft, somewhat gelatinous masses, on red algæ. (See p. 498.)

SUBERITES COMPACTA Verrill, sp. nov.

This species is remarkable for the compactness of its tissues and the smallness of the canals and pores permeating its substance, as well as for the large size of the plates and crest-like lobes in which it grows. A transverse section of the dried sponge shows very numerous irregular canals, most of them not larger than pin-holes (or less than 0.15^{mm} in diameter). The tissue is very compact throughout, but is more dense close to the surface, which is nearly smooth, the oscules being small and inconspicuous. The spicules are very abundant, crowded, very slender, mostly pin-shaped (spinulate), with the point very acute and the "head" but little enlarged, and often largest a slight distance from the end, so as to give the head a slightly ovate form. Color, when living, bright yellow.

Off Martha's Vineyard, 10 fathoms, sand; Nantucket; Eastern Shore of Virginia.

This is the species described as a "firm siliceous sponge," on page 503. In general appearance it somewhat resembles *Suberites suberea* Gray (*Hymeniacion suberea* Bowerbank).

CLIONA SULPHUREA Verrill. (p. 421.)

Spongia sulphurea Desor, Proc. Boston Soc. Nat. Hist., vol. iii, p. 68, 1848.

South Carolina to Cape Cod; local farther north. Great Egg Harbor, New Jersey; very abundant in Long Island Sound and Vineyard Sound, on oysters and various other shells, 1 to 15 fathoms. Portland Harbor, Maine, in sheltered localities (C. B. Fuller).

? *POLYMASTIA ROBUSTA* Bowerbank. (p. 497.)

British Spongiadæ; vol. i, p. 178, Plate 29, fig. 358; vol. ii, p. 62, 1866.

Off Gay Head, 18 to 20 fathoms; common in Casco Bay and Bay of Fundy, 8 to 70 fathoms. Coast of Great Britain (Bowerbank).

The American specimens do not agree in all respects with the description, and may prove to be distinct when a direct comparison can be made. In our specimens the surface is finely hispid; the dermal tissue is firm, and filled with small, slender, often curved, needle-shaped ("acute"), and pin-shaped ("spinulate") spicules, which project from the surface. The latter form is the predominant one, but the "head" is very small, and they pass gradually into the former kind, in which the "head" is obsolete, or not larger than the shaft. The spicules of the large, radiating fascicles in the body of the sponge are long and large, needle-shaped, with the central portion thickest ("fusiformi-acute"). The large spicules in the longitudinal fascicles of the cloacal fistulæ are of the same form; the secondary fascicles of the body and the transverse secondary spicules of the fistulæ also have the same form, though much

smaller. The "cloacal fistulæ" are numerous, and, when living, are round and tapering, but when dry become flat and bent, or curved to one side. They are mostly 20^{mm} to 40^{mm} long, and 4^{mm} to 6^{mm} in diameter near the base.

Several other species of sponges were collected, which have not been examined.

I have been unable to identify any of our specimens with the *Spongia urceolata* of Desor (Proceedings Boston Soc. Nat. History, vol. iii, p. 67). Possibly it was based on a peculiarly-shaped young specimen of *Microciona prolifera*.

FORAMINIFERA.

Numerous species were collected, especially in the deeper parts of Vineyard Sound and off Martha's Vineyard, but they have not been identified.

ADDENDA.

Crustacea.

CANCER BOREALIS Stimpson. (p. 546.)

A small specimen of this species was dredged off Watch Hill, Rhode Island, in 4 to 5 fathoms, among rocks and algæ, in April. It was found in abundance, and of large size, at Peak's Island and Pumpkin Knob, in Casco Bay, Maine, in August, clinging to the sea-weeds, and in tide-pools, above low-water mark.

OCYPODA ARENARIA Say. (Megalops stage.). (p. 337.)

The megalops of this species was found in large numbers, swimming at the surface of Vineyard Sound in September, by Mr. Vinal N. Edwards.

HOMARUS AMERICANUS Edw. (Lobster.) (p. 492.)

Subsequent observations have shown that the breeding-season of the lobster extends over a large part of the year. In Casco Bay female lobsters were found carrying eggs in August and September. Mr. Vinal N. Edwards has forwarded two living females, of medium size, taken in Vineyard Sound, December 12th, both carrying an abundance of freshly laid eggs. He states that he finds about "one in twenty" carrying eggs at that season.

THEMISTO, species undetermined.

A species of this genus was taken in large quantities in Vineyard Sound, in September, by Mr. Vinal N. Edwards. It occurred swimming at the surface in vast numbers, and was thrown up by the waves in windrows, extending several miles along the shores of Martha's Vineyard.

CONILERA CONCHARUM Harger. (p. 572.)

This species, previously quite rare, was taken this year in large numbers, in Vineyard Sound, both in spring and autumn, by Mr. Vinal N. Edwards.

Annelida.

PROCERÆA ORNATA Verrill, sp. nov.

Autolytus (?), banded species, this Report, p. 398.

Head short and broad, bluntly rounded or subtruncate above, slightly bilobed or emarginate below. Eyes moderately large; the anterior pair wider apart. Median antenna white, very long, slender, variously curled, reaching to about the twelfth body-segment; posterior tentacles also very long and slender, reaching to about the ninth segment, white at the tips; inner antennæ about one-fourth as long as the median one; the other two pairs of antennæ and tentacles about one-fourth as long as the median one; tentacular cirri of the second (post-buccal) segment short, about equal to the diameter of the body. Dorsal cirri short, about one-third as long as the breadth of the body; setigerous lobe short and broadly rounded; setæ short. Gizzard small, short, elliptical, situated at about the eighth segment. Caudal cirri two, slender, tapering, their length about equal to the diameter of the body. Color of the body white or pale yellowish, annulated with bands of bright red at unequal distances. Length, about 15^{mm}; breadth, 0.5^{mm}.

Long Island Sound, off New Haven; and at Thimble Islands, 1 to 5 fathoms, among hydroids and bryozoa.

ETEONE ROBUSTA Verrill. (p. 588.)

This species, previously known only from a single specimen, was taken at Wood's Hole, in abundance, and of large size, in November, by Mr. Vinal N. Edwards.

Turbellaria.

RHYNCHOSCOLEX PAPILLOSUS Diesing.

Revision der Turbellarien, op. cit., vol. xlv., p. 245, 1862. *Rhynchoprobolus papillosus* Schmarida, Neue wirbell. Thiere, i, p. 1, 11, Plate 2, fig. 25 (t. Diesing). Hoboken, New Jersey, in brackish water, (Schmarida).

POLYCELIS MUTABILIS Verrill; sp. nov.

Body much depressed, thin, changeable in form, often elliptical or oval, frequently broad and emarginate in front, and tapered posteriorly. Marginal ocelli minute, black, forming several rows along the front border, but only one row laterally. Dorsal ocelli larger, forming three pairs of rather ill-defined clusters; the outer clusters are largest, convergent backward; a pair of smaller clusters are situated a little in advance, and nearer together; the third pair is a little farther forward

and closer together, often more or less confused with those next behind them. Color, yellowish brown, darker centrally; or pale yellowish, thickly specked with yellowish brown. Length, about 7^{mm} to 9^{mm}, breadth, 5^{mm} to 6^{mm}.

Thimble Islands, 1 to 2 fathoms, among algæ.

Bryozoa.

GEMELLARIA LORICATA Busk.

Catal. Mar. Polyzoa, Brit. Mus., part i, p. 34; Smitt, op, cit., p. 286, Plate 17, fig.

54. *Sertularia loricata* Linné, Syst. Nat., ed. x, p. 285 (t. Smitt). *Gemellaria loriculata* Johnston, Brit. Zoöph., ed. ii, pp. 293, 477, Plate 47, figs. 12, 13.

Nantucket to the Arctic Ocean; northern coasts of Europe to Great Britain. Very common in Casco Bay and Bay of Fundy, low-water to 110 fathoms.

The specimens from Nantucket differ somewhat from the ordinary form. They consist of rather dense tufts of stout stems, two or three inches high, and rather sparingly branched. The cells are larger than usual, elongated obovate, five or six times as long as broad; those of the same pair are not exactly opposite. Aperture deeply crescent-shaped, facing a little outward. Many of the cells, toward the base of the stems, give rise to one or more curious processes from near the base of the cell; these are, at first, slender tubes, rising from a thin roundish spot on the cell, but soon they divide at the tip into two, three, or four forks, which are at first regularly recurved; later these become much elongated, and are converted into slender rootlets or stolons.

ERRATA.

- Page 307, line 23, for cavaluted, read convoluted.
 Page 310, line 8, page 401, line 12, and elsewhere, for *Ostræa*, read *Ostrea*.
 Page 383, line 23, for *Æolidia*, read *Montagua*.
 Page 383, line 26, for *Cavolina*, read *Coryphella*.
 Page 392, line 23, for micropthalma, read microphthalma.
 Page 393, last line, for *Sargatia*, read *Sagartia*.
 Page 399, line 21, for *Leptochiton*, read *Chætopleura*.
 Page 399, line 32, for *Leptochiton*, read *Trachydermon*.
 Page 405, line 27, for *Eucrate*, read *Eucratea*.
 Page 407, line 38, for reproduesive, read reproductive.
 Page 415 line 25, for *Unicola*, read *Uniola*.
 Page 427, line 15, and page 429, line 28, for *Melitta testudinaria*, read *Melitta pentapora*.
 Page 433, line 34, for *Amphipholis*, read *Amphiura*.
 Page 444, line 12, for *tidentata*, read *tridentata*.
 Page 457, line 39, for *Pandaru*, read *Pandarus*.
 Page 459, line 36, for *Echthrogalus*, read *Echthrogaleus*.
 Page 487, line 10, for *A. planaria*, read *A Planaria*.
 Page 488, line 4, for *cantenna*, read *catenna*.
 Page 496, line 28, for *A. ternata*, read *C. ternata*.
 Page 498, line 5, for *Tedania*, read *Halichondria panicea*.
 Page 498, line 30, for *Augustus*, read *angustus*.
 Page 504, line 41, for page 433, read 432.
 Page 508, line 5, for *Acutum*, read *A. acutum*.
 Page 509, line 18, for *lavigata*, read *discors*.
 Page 509, line 32, for *thraci-formis*, read *thraciformis*.
 Page 509, line 33, for Simpson, read Stimpson.
 Page 547, line 15, for *Panopius*, read *Panopeus*.
 Page 561, line 43, for *pingus*, read *pinguis*.
 Page 619, line 16, for Cosco, read Casco.
 Page 619, last line, for Cisco, read Casco.
 Page 640, first line, for fig. 127, read fig. 124.
 Page 666, line 15, after *Montagua pilata*, insert Plate XXV, fig. 124.
 Page 680, line 18, for 185, B., read 184, B.
 Page 695, line 34, for fig. 233, read 243.
 Page 716, line 35, for fig. 368, read 268.

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ERRATA.

Page 10, for "there is no bottom, read "there is a bottom." Page 261, for "Seabass, 2,500 barrels," read "2,500 pounds;" "flat-fish, 1,000 barrels," read "1,000 pounds;" "tautog, 500 barrels," read 500 pounds;" "bass, 700 barrels," read "700 pounds;" "mackerel, 200 barrels" read "200 pounds."

ALPHABETICAL INDEX TO THE REPORT ON THE INVERTEBRATA OF SOUTHERN NEW ENGLAND.

[In the following index the first reference, for the names of genera and species, is to the systematic catalogue, where the synonymy, descriptions, and references to plates may be found. In many cases references to the nominal lists have been omitted.]

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- Plate XL. Diagram showing the locality of fish-pounds on Lake Michigan in 1871. See p. 274.—J. W. Milner.

MAP.

Map of the coast of Massachusetts and Rhode Island, to accompany the report of the United States Commissioner of Fish and Fisheries; showing the location of traps, and pounds, as also the explorations of the Commission in 1871.

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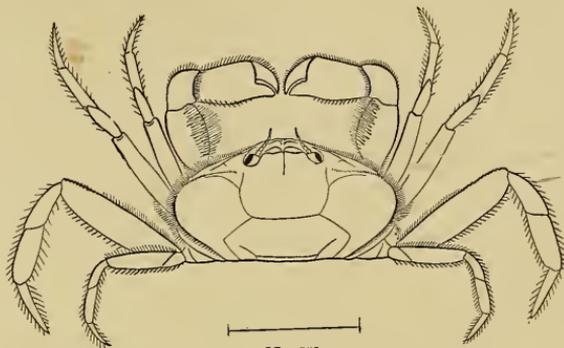
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EXPLANATION OF PLATE I.

- FIGURE 1.—*Pinnixa cylindrica* Say, (p. 546;) male, enlarged four diameters.
2.—*Pinnotheres ostreum* Say, (p. 546;) male, enlarged four diameters.
3.—*Panopeus depressus* Smith, (p. 547;) male, natural size.
4.—*Platyonichus ocellatus* Latreille, (p. 547;) male, slightly reduced in size.

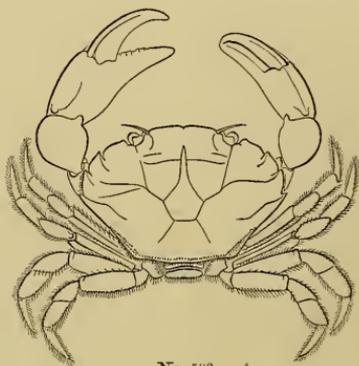
(All the figures were drawn by J. H. Emerton.)

Fig. 1.



No. 501

Fig. 3.



No. 503

Fig. 2.



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Fig. 4.



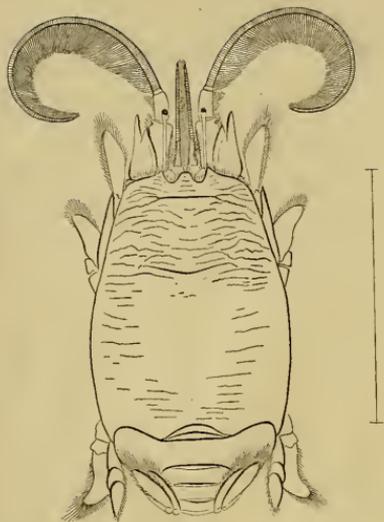
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EXPLANATION OF PLATE II.

- FIGURE 5.—*Hippa talpoida* Say, (p. 548;) dorsal view, enlarged about two diameters.
6.—*Pandalus annulicornis* Leach, (p. 550;) dorsal view, slightly reduced in size.
7.—*Gebia affinis* Say, (p. 549;) female; lateral view, slightly enlarged.
8.—*Callianassa Stimpsoni* Smith, (p. 549;) larger cheliped; outside, natural size.
9.—*Palæmonetes vulgaris* Stimpson, (p. 550;) male; lateral view, enlarged one and one-half diameters.

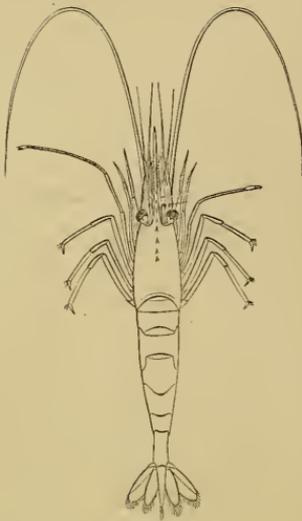
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Fig. 5.



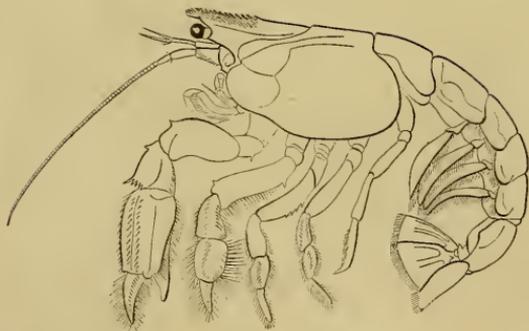
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Fig. 6.



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Fig. 7.



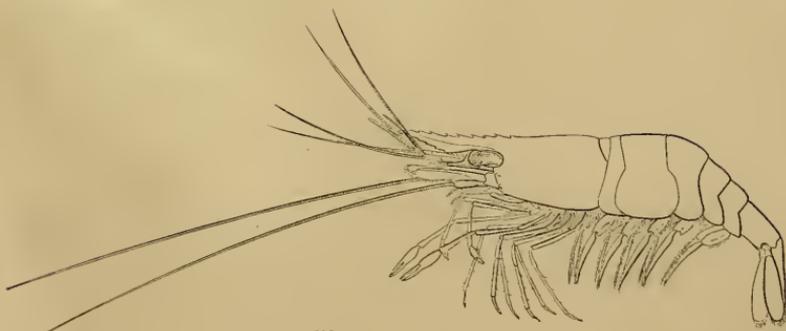
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Fig. 8.



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Fig. 9.



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EXPLANATION OF PLATE III.

- FIGURE 10.—*Crangon vulgaris* Fabr., (p. 550;) male; dorsal view, natural size.
- 11.—*Virbius Zostericola* Smith, (p. 550;) female; lateral view, slightly enlarged.
- 12.—*Mysis stenolepis* Smith, (p. 551;) young female; lateral view, enlarged four diameters. The anterior margin of the carapax is not well represented in this figure; see description.
- 13.—*Diastylis quadrispinosa* G. O. Sars, (p. 554;) lateral view, enlarged seven diameters.

(All the figures were drawn by J. H. Emerton.)

Fig. 10.

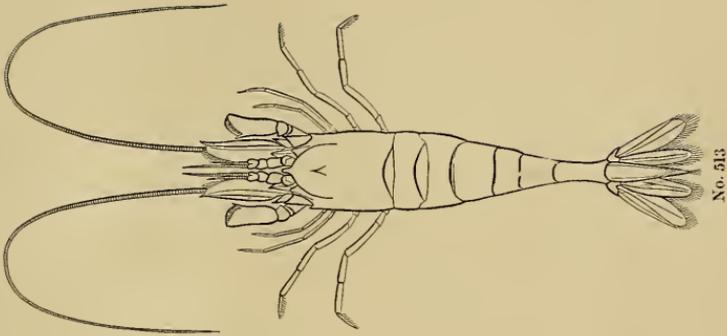


Fig. 11.

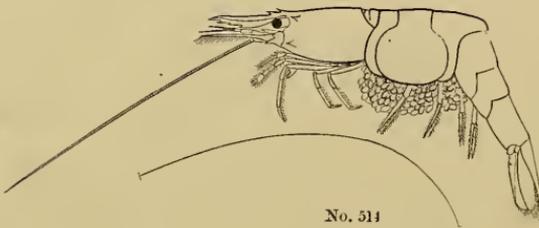


Fig. 12.

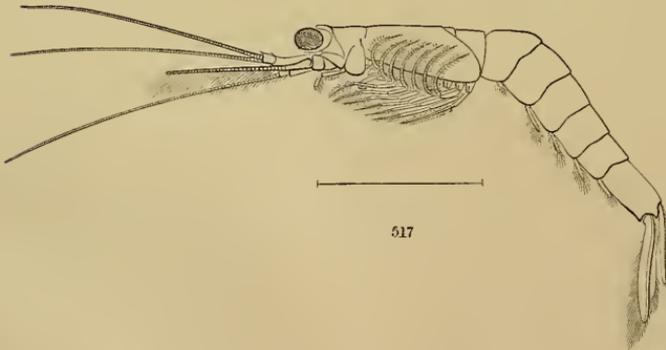
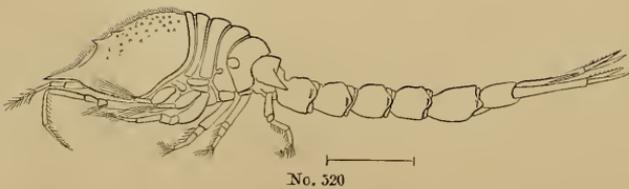


Fig. 13.

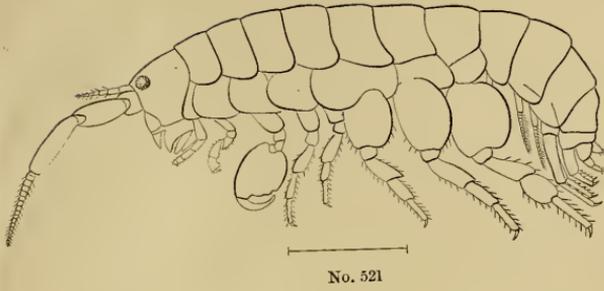


EXPLANATION OF PLATE IV.

- FIGURE 14.—*Orchestia agilis* Smith, (p. 555;) male; lateral view, enlarged five diameters.
- 15.—*Gammarus ornatus* Edwards, (p. 557;) male; lateral view, enlarged two diameters.
- 16.—*Amphithoë maculata* Stimpson, (p. 563;) male; lateral view, enlarged two diameters.
- 17.—*Ampelisca* sp., (p. 561;) lateral view, enlarged five diameters.
- 18.—*Cerapus rubricornis* Stimpson, (p. 565;) female; lateral view, enlarged five diameters; and hand of the second pair of legs of the male, enlarged the same amount.
- 19.—*Unciola irrorata* Say, (p. 567;) male; dorsal view, enlarged six diameters.

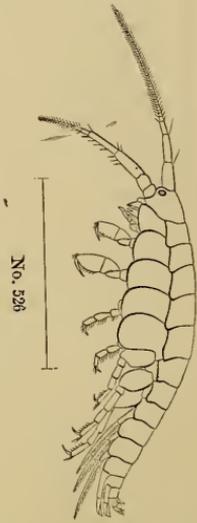
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Fig. 14.



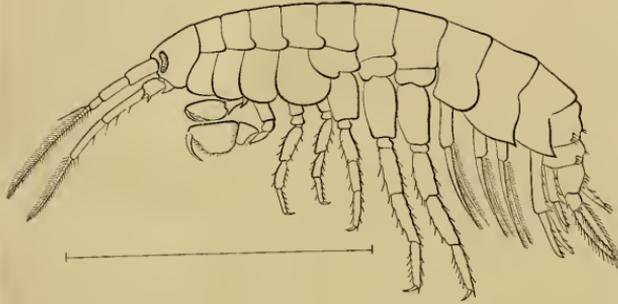
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Fig. 16.



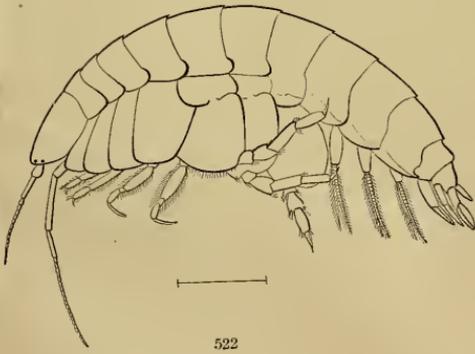
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Fig. 15.



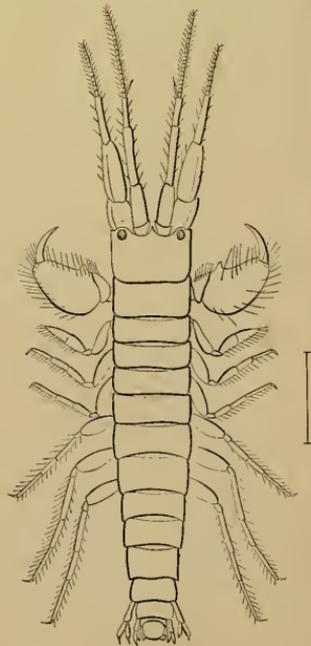
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Fig. 17.



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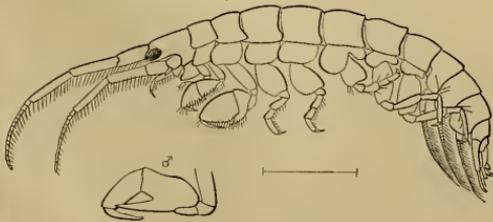
Fig. 19.



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Fig. 18.

♀



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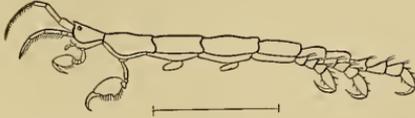
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EXPLANATION OF PLATE V.

- FIGURE 20.—*Caprella geometrica* Say, (p. 567;) lateral view, enlarged about three diameters.
- 21.—*Sphæroma quadridentata* Say, (p. 569;) dorsal view, enlarged five diameters.
- 22.—*Idotea caeca* Say, (p. 569;) male; dorsal view, enlarged three diameters.
- 23.—*Idotea irrorata* Edwards, (p. 569;) male; dorsal view, enlarged two diameters.
- 24.—*Idotea robusta* Kroyer, (p. 569;) male; dorsal view, enlarged two diameters.

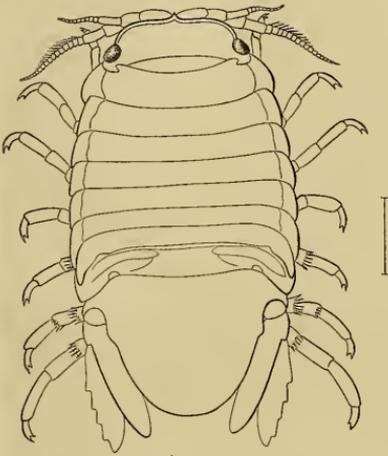
(Figures 20, 21, 23, and 24, were drawn by J. H. Emerton; figure 22 by O. Harger.)

Fig. 20.



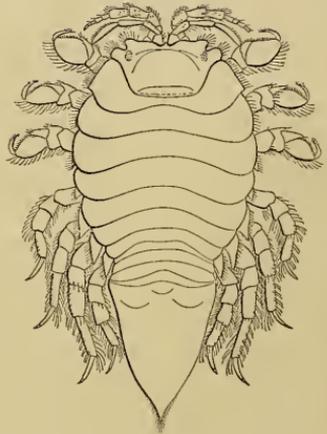
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Fig. 21.



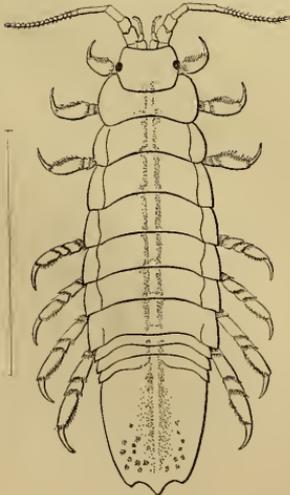
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Fig. 22.



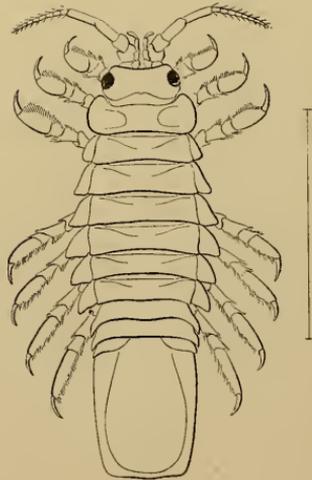
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Fig. 23.



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Fig. 24.



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EXPLANATION OF PLATE VI.

- FIGURE 25.—*Limnoria lignorum* White, (p. 571;) dorsal view, enlarged ten diameters.
26.—*Erichsonia filiformis* Harger, (p. 570;) dorsal view, enlarged five diameters.
27.—*Erichsonia attenuata* Harger, (p. 570;) dorsal view, enlarged three diameters.
28.—*Epelys trilobus* Smith, (p. 571;) dorsal view, enlarged ten diameters.
29.—*Livoneca ovalis* Harger, (p. 572;) dorsal view, enlarged three diameters.
(Figure 25 was drawn by S. I. Smith; 26 and 28 by O. Harger; 27 and 29 by J. H. Eberton.)

Fig. 25.

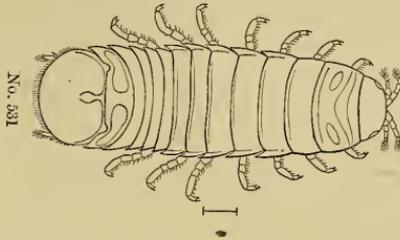


Fig. 26.

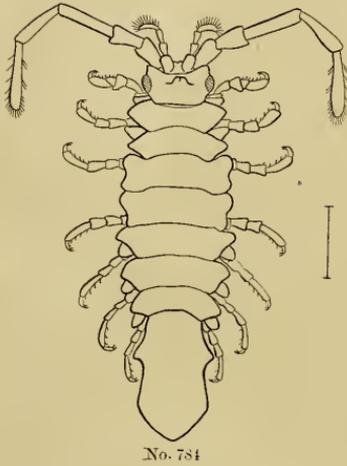


Fig. 27.

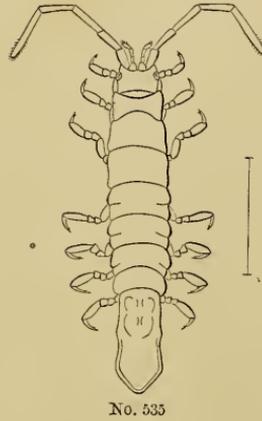


Fig. 28.

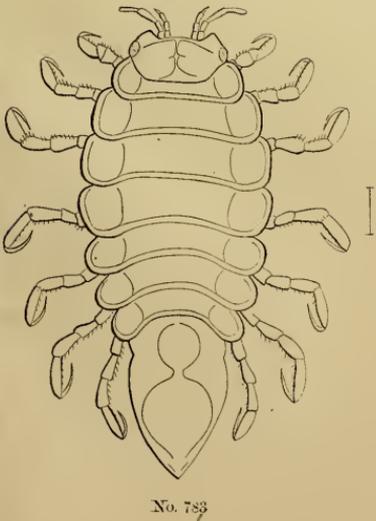
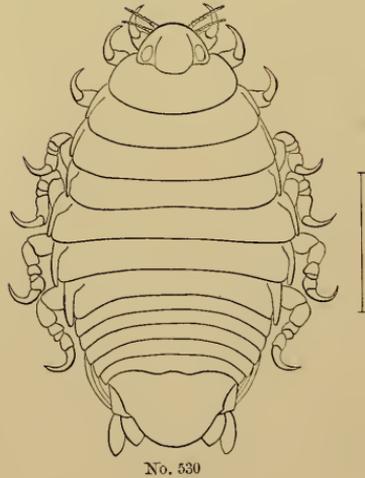


Fig. 29.



EXPLANATION OF PLATE VII.

- FIGURE 30.—*Lerneonema radiata* Steenstrup and Lütken, (p. 578;) female, enlarged two diameters.
- 31.—*Pandarus*, (p. 576;) female; dorsal view, enlarged five diameters.
- 32.—*Nogagus Latreilli*, (p. 576;) male; dorsal view, enlarged five diameters.
- 33.—*Sapphirina*, (p. 573;) male; dorsal view, enlarged ten diameters.
- 34.—*Lepas fascicularis* Ellis and Solander, (p. 579;) lateral view of a single animal from a large cluster, slightly enlarged.
- 35.—*Phoxichilidium maxillare* Stimpson, (p. 544;) male; dorsal view, enlarged two diameters.

(Figure 33 was drawn by S. I. Smith; all the others by J. H. Emerton.)

Fig. 30.

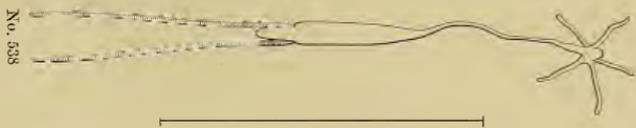


Fig. 31.

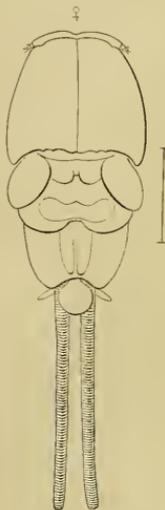


Fig. 32.

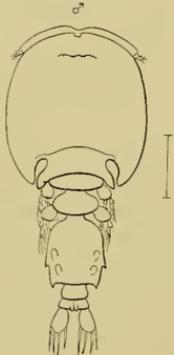
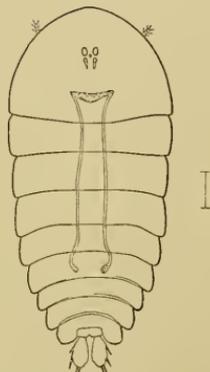


Fig. 33.



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No. 537

Fig. 34.

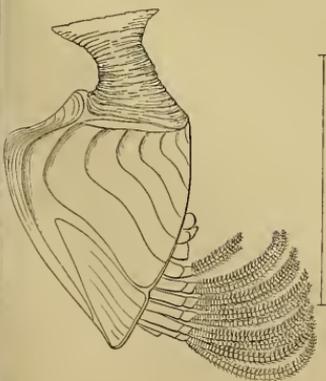
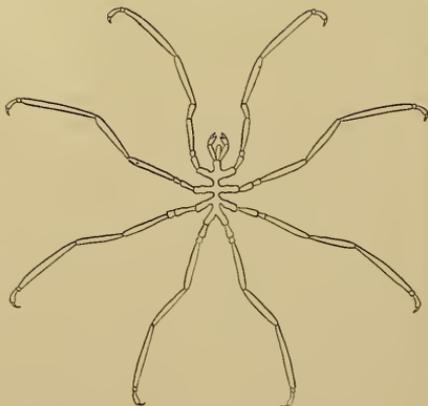


Fig. 35.



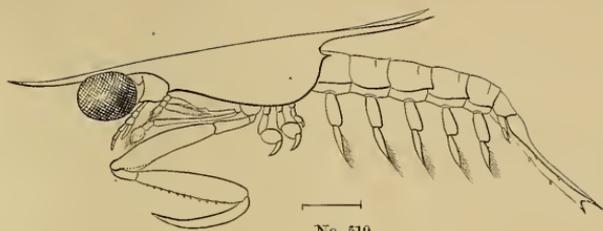
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EXPLANATION OF PLATE VIII.

- FIGURE 36.—*Squilla empusa* Say, (p. 536;) lateral view of the free-swimming larvæ in one of its later stages, enlarged ten diameters.
- 37.—Zoëa of the common crab, *Cancer irroratus*, (p. 530;) in the last stage just before it changes to the megalops condition; lateral view, enlarged seventeen diameters.
- 38.—Megalops stage of the same, just after the change from the zoëa condition; dorsal view, enlarged thirteen diameters.

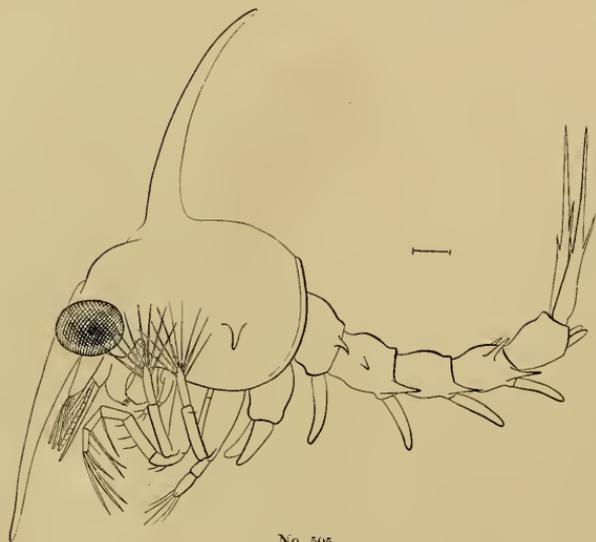
(All the figures were drawn by J. H. Emerton.)

Fig. 36.



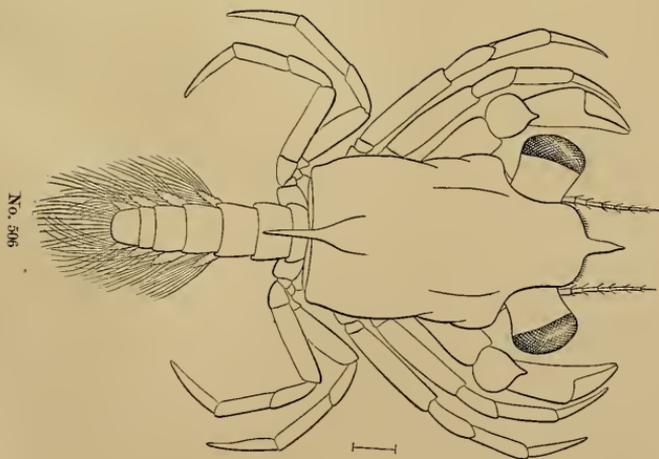
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Fig. 37.



No. 505

Fig. 37 a.



No. 505

EXPLANATION OF PLATE IX.

Larval young of the Lobster, *Homarus Americanus* Edwards, (p. 522.)

FIGURE 38.—*A.* Lateral view of the larval young in the first stage observed, enlarged seven diameters.

B. The same in a dorsal view, the abdomen held horizontally.

C. Antennula, enlarged fourteen diameters.

D. One of the thoracic legs of the second pair, enlarged fourteen diameters; *a*, exopodus; *b*, epipodus; *c*, branchiæ.

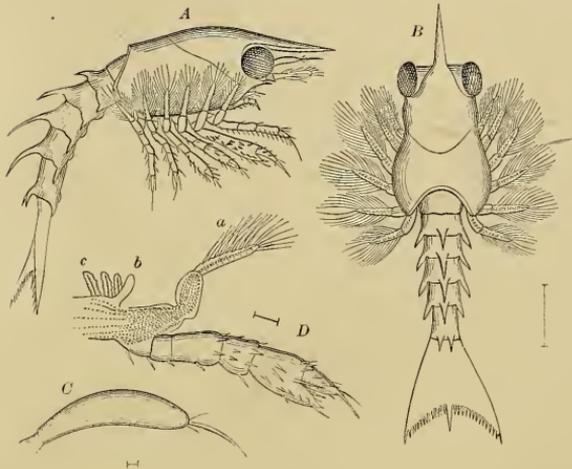
39.—*E.* Lateral view of the larval young in the third stage, enlarged five and one-half diameters.

F. Terminal portion of the abdomen seen from above, enlarged ten diameters; *a*, one of the small spines of the posterior margin of the terminal segment, enlarged fifty diameters.

G. Basal portion of one of the legs of the second pair, showing the epipodus and branchiæ, enlarged fourteen diameters.

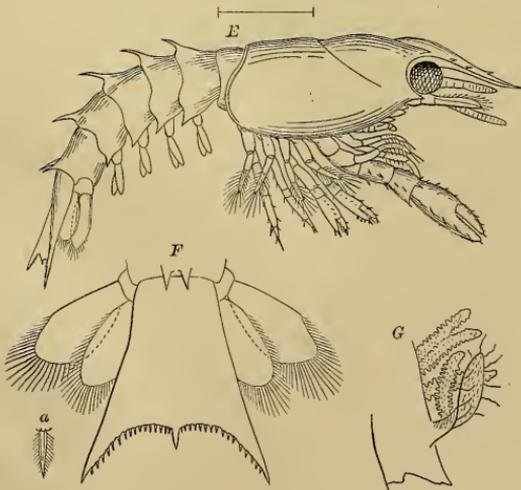
(All the figures were drawn from alcoholic specimens, by S. I. Smith.)

Fig. 38.



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Fig. 39.



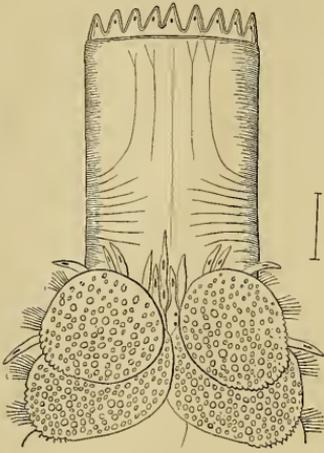
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EXPLANATION OF PLATE X.

- FIGURE 40.—*Lepidonotus squamatus*, (p. 581;) anterior part of the body, head, and proboscis; dorsal view.
- 41.—The same; end of the proboscis; front view, showing the jaws and papillæ.
- 42.—*Lepidonotus sublevis*, (p. 581;) dorsal view.
- 43.—*Rhynchobolus dibranchiatus*, (p. 596;) anterior part of body, mouth and head; lower side.
- 44.—The same; lateral appendage, showing the dorsal cirrus, the upper and lower branchiæ and the setigerous lobes between them.
- 45.—*Rhynchobolus Americanus*, (p. 596;) anterior part of the body and extended proboscis; dorsal view.
- 46.—The same; lateral appendages, showing the dorsal cirrus, the branched gill, the setigerous lobes, and the ventral cirrus.

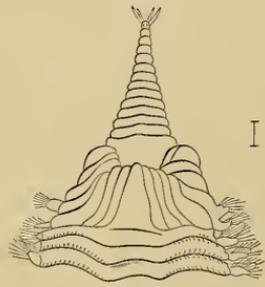
(Figures 40, 41, 42, 45, were drawn from nature by J. H. Emerton; 44 by A. E. Verrill; 43 and 46 were copied from Ehlers.)

Fig. 40.



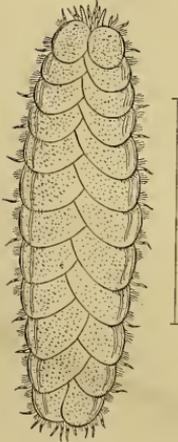
No. 544

Fig. 43.



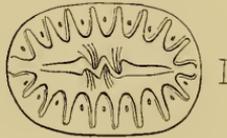
557

Fig. 42.



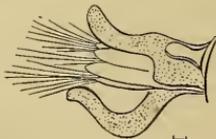
No. 543

Fig. 41.



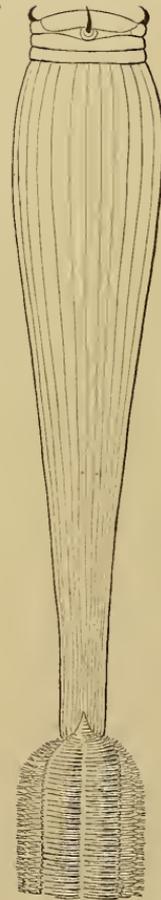
No. 545

Fig. 44.



No. 558

Fig. 45.



No. 559

Fig. 46.



No. 560

EXPLANATION OF PLATE XI.

- FIGURE 47.—*Nereis virens*, (p. 590;) head little more than natural size ; dorsal view.
48.—The same ; extended proboscis ; dorsal view.
49.—The same ; probosci ; sventral view.
50.—The same ; lateral appendage.
51.—*Nereis limbata*, male, (p. 590;) a few segments of the middle region of the body, anterior region, head and extended proboscis ; dorsal view.
52.—*Nereis pelagica*, female, (p. 591;) natural size ; dorsal view.
53.—The same ; male, natural size ; dorsal view.
54.—The same ; head more enlarged ; dorsal view.
55.—The same ; proboscis ; ventral view.
56.—*Phyllodoce gracilis*?, (p. 586;) head ; dorsal view.

(Figure 51 was drawn from nature by J. H. Emerton; 47, 48, 49, 50, 52, 53, were copied from Ehlers; 54, 55, from Malmgren; 56, from A. Agassiz.)

Fig. 47.

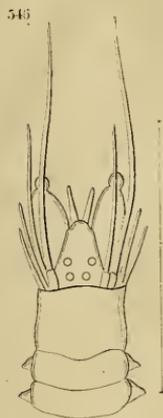
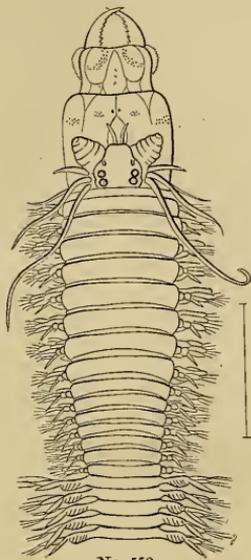
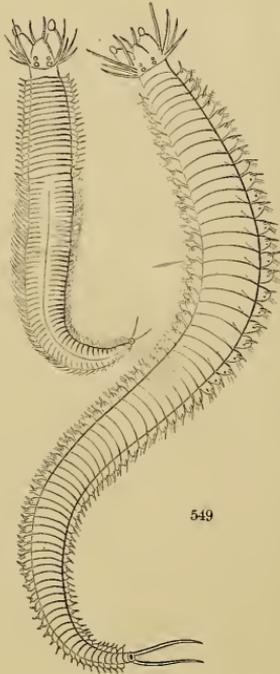


Fig. 51.



No. 552

Fig. 53.



549

Fig. 52.

Fig. 48. Fig. 49.

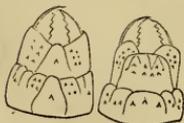
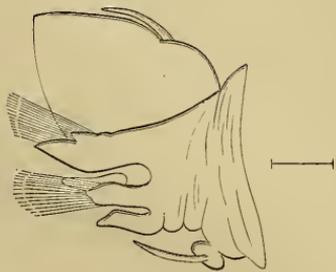
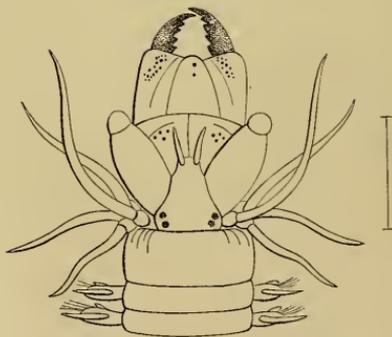


Fig. 50.



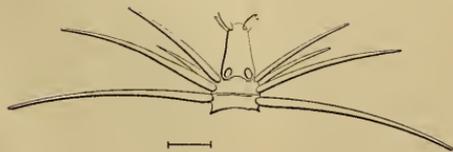
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Fig. 54.



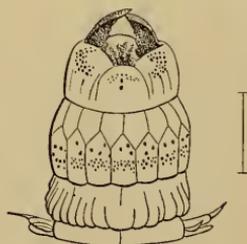
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Fig. 56.



565

Fig. 55.



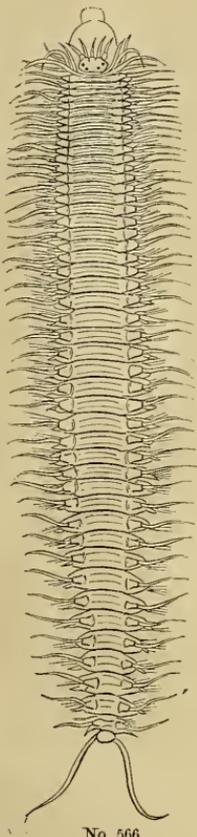
No. 551

EXPLANATION OF PLATE XII.

- FIGURE 57.—*Nephtys picta*, (p. 583;) anterior part of body and head, much enlarged; dorsal view.
- 58.—*Nephtys buccera*, (p. 583;) anterior part of body and head, enlarged; ventral view.
- 59.—*Nephtys ingens*, (p. 583;) anterior part of body and extended proboscis; ventral view.
- 60.—The same; dorsal view.
- 61.—*Podarke obscura*, (p. 589;) dorsal view, from a specimen preserved in alcohol and much contracted in length.
- 62.—*Nectonereis megalops*, (p. 592;) ventral view.
- 63.—The same; anterior region of body and head; dorsal view.
- 64.—*Marphysa Leidyi*, (p. 593;) anterior part of body and head, enlarged about three diameters; dorsal view.

(Figures 57 and 58 were copied from Ehlers; all the rest were drawn from nature by J. H. Emerton)

Fig. 61.

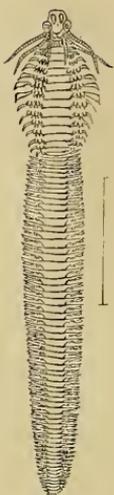


No. 566

Fig. 57.

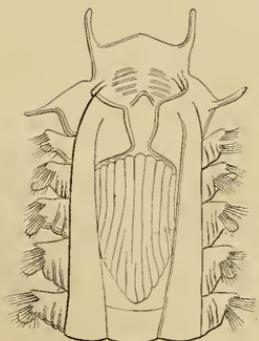


F 62.



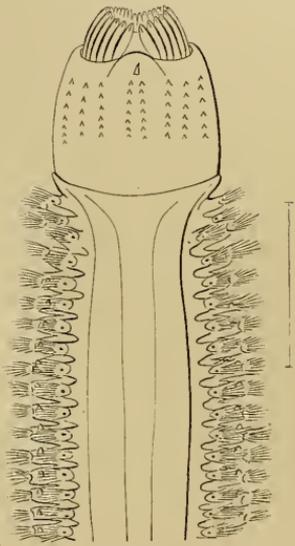
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Fig. 58.



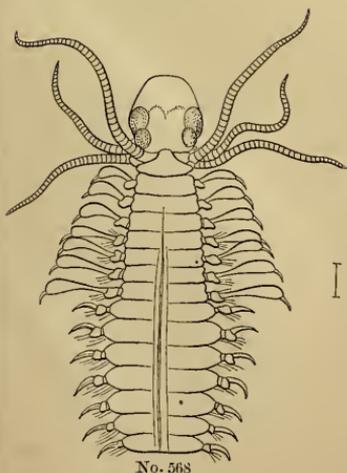
No. 562

Fig. 59.



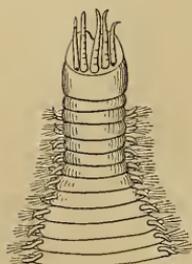
No. 564

Fig. 63.



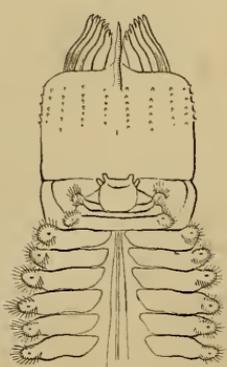
No. 568

Fig. 64.



No. 779

Fig. 60.



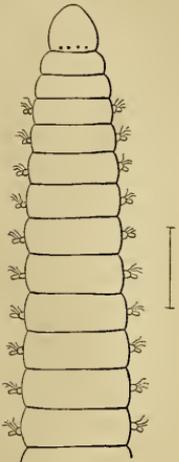
No. 563

EXPLANATION OF PLATE XIII.

- FIGURE 65.—*Autolytus cornutus*, (p. 590;) an asexual individual, from which a male is about to separate; dorsal view, enlarged about six diameters; A, A, A, antennæ of the former; C, C, C, C, two tentacles and one tentacular cirrus on each side, followed by the dorsal cirri; F, the intestine; *d*, the long setæ and dorsal cirri of the male.
- 66.—The same; anterior part of a female, more enlarged; the letters as before; *b*, the eyes; *e*, the eggs; *f*, the intestine; 3, one of the appendages of the anterior region of the body; *c*, the dorsal cirrus; *h*, the setigerous tubercle, supporting hooked setæ.
- 67.—*Diopatra cuprea*, (p. 593;) head and anterior part of body, showing part of the branchiæ; side view.
- 68.—The same; ventral view, showing the mouth open and jaws thrown back.
- 69.—*Lumbriconereis opalina*, (p. 594;) anterior part of body; dorsal view.
- 70.—The same; lateral appendage and setæ.

(Figures 65 and 66 were copied from A. Agassiz; 67, 68, 69 were drawn from nature by J. H. Emerton; 70, by A. E. Verrill.)

Fig. 69.



No. 555

Fig. 65.

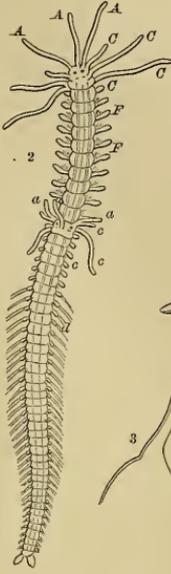
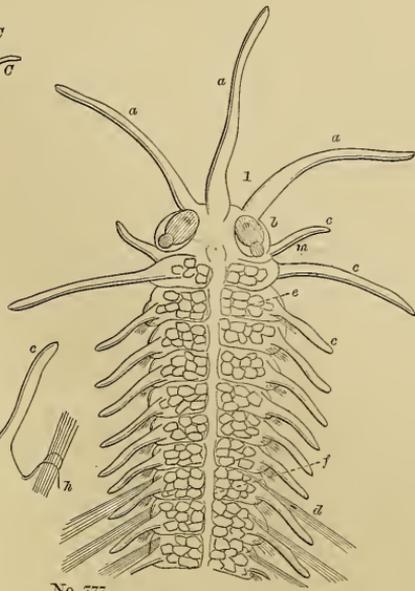
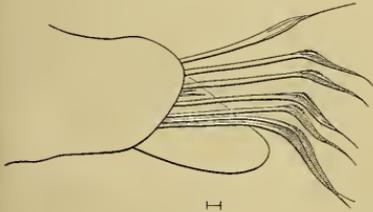


Fig. 66.



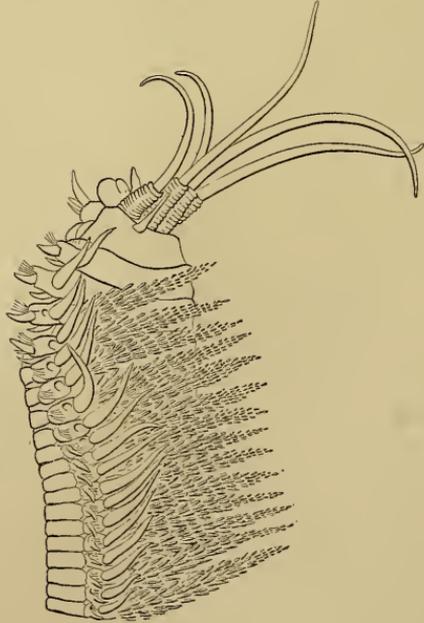
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Fig. 70.



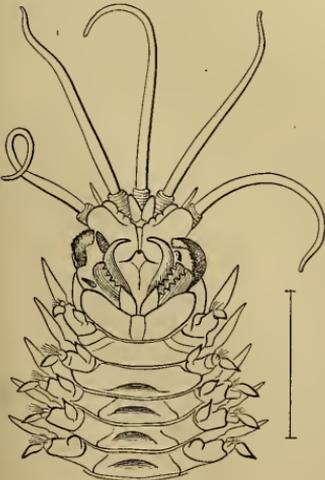
No. 556

Fig. 67.



No. 553

Fig. 68.



No. 554

EXPLANATION OF PLATE XIV.

- FIGURE 71.—*Clymenella torquata*, (p. 608;) natural size; lateral view.
72.—The same; head and extended proboscis; front view.
73.—The same; posterior and caudal segments; dorsal view.
74.—*Sternaspis fossor*, (p. 606;) dorsal view.
75.—*Trophonia affinis*, (p. 605;) anterior portion; dorsal view.
76.—*Anthostoma robustum*, (p. 597;) anterior portion of body, head, and extended proboscis; dorsal view, natural size.
77.—*Spio setosa*, (p. 602;) anterior segments and head; side view; only one of the two large tentacles is represented.
78.—*Polydora ciliatum*, (p. 603;) anterior and posterior parts; dorsal view.

(Figures 71, 72, 73, 75, 76, were drawn from nature by J. H. Emerton; 74, by A. E. Verrill; 77, 78, were copied from A. Agassiz.)

Fig. 71.



Fig. 72.

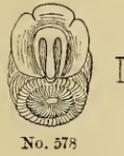


Fig. 73.

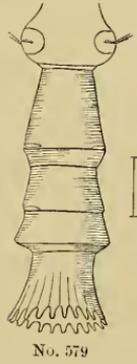


Fig. 74.

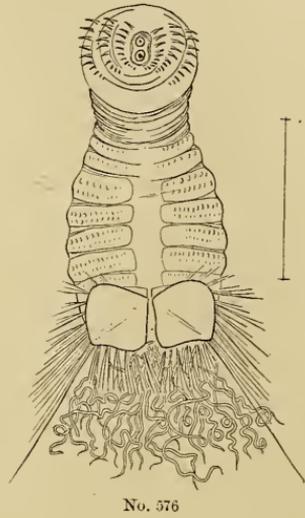


Fig. 77.



Fig. 75.

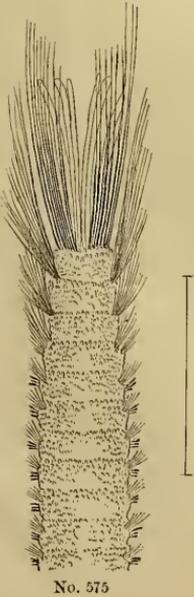


Fig. 76.



Fig. 78.

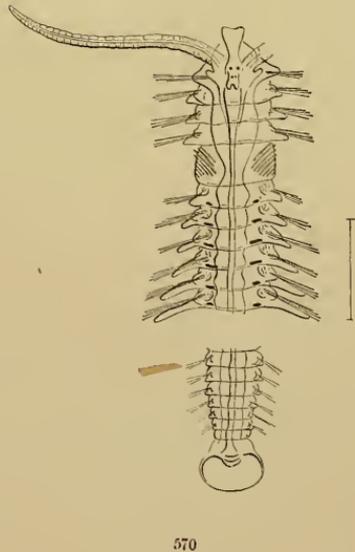


Fig. 79.

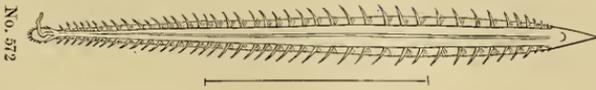
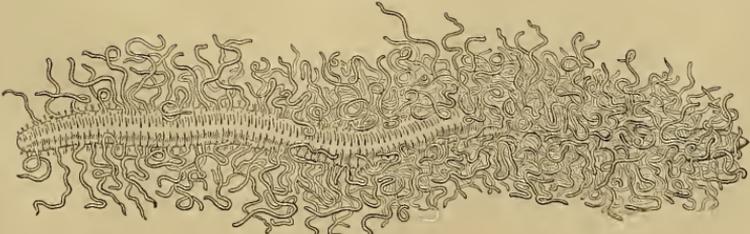


Fig. 80.



Fig. 81.



EXPLANATION OF PLATE XVI.

FIGURE 82.—*Amphitrite ornata*, (p. 613;) lateral view, somewhat reduced, from a living specimen.

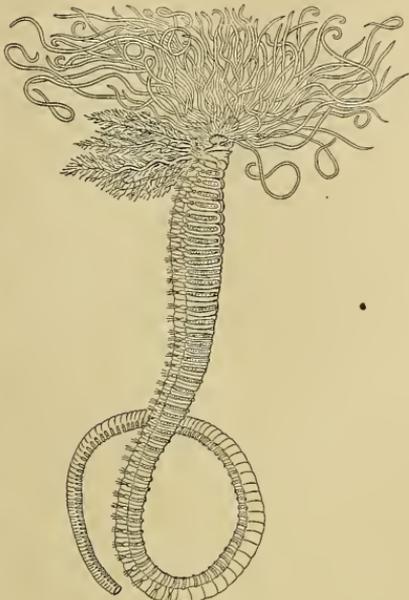
83.—*Ampharete gracilis*, (p. 612;) lateral view.

84.—*Euchone elegans*, (p. 618;) lateral view.

85.—*Polycirrus eximius*, (p. 616;) dorsal view of a living specimen creeping by means of its tentacles; natural size.

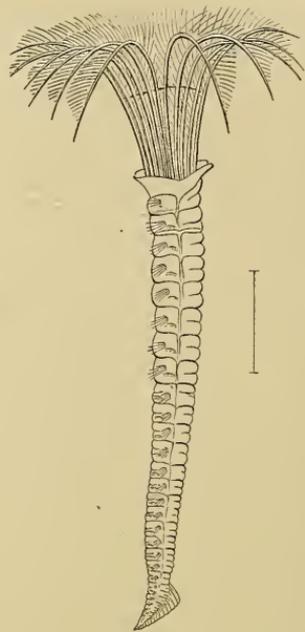
(Figures 82, 84, 85, were drawn from nature by A. E. Verrill; 83, by J. H. Emerton.)

Fig. 82.



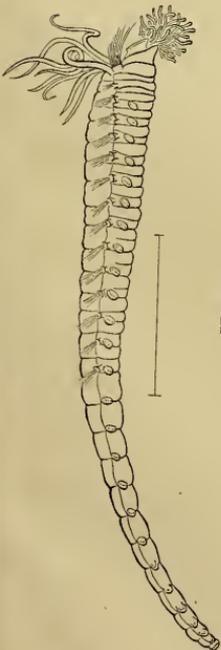
No. 586

Fig. 84.



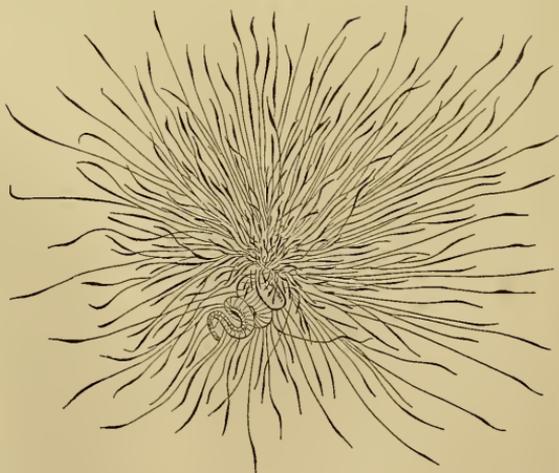
No. 585

Fig. 83.



No. 584

Fig. 85.



No. 587

EXPLANATION OF PLATE XVII.

FIGURE 86.—*Potamilla oculifera*, (p. 617;) in its tube, with branchiæ fully expanded, from a living specimen, found at Eastport, Maine.

87.—*Cistenides Gouldii*, (p. 612;) lateral view.

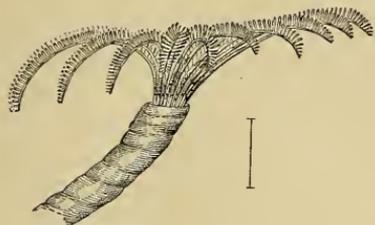
87*a*.—The same; head and branchiæ, dorsal view.

88.—*Sabellaria vulgaris*, (p. 611;) lateral view.

88*a*.—The same; view of the operculum and tentacles, from above.

(Figures 84, 88, 88*a* were drawn from nature, by J. H. Emerton; 87, 87*a* by A. E. Verrill.)

Fig. 86.



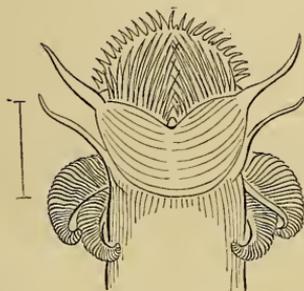
No. 778

Fig. 87.



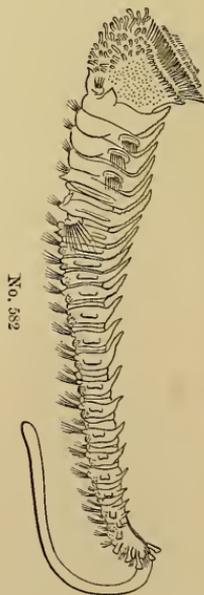
No. 580

Fig. 87a.



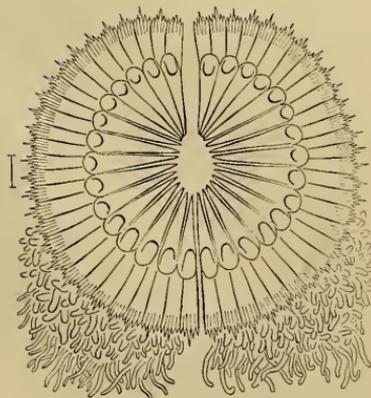
No. 581

Fig. 88.



No. 582

Fig. 88a.



No. 583

EXPLANATION OF PLATE XVIII.

- FIGURE 89.—*Branchiobdella Ravenelii*, (p. 624;) dorsal view, natural size.
90.—*Malacobdella obesa*, (p. 625;) dorsal view.
91.—*Pontobdella rapax*, (p. 625;) dorsal view.
92.—*Phascolosoma cæmentarium*, (p. 627;) lateral view.
93.—*P. Gouldii*, (p. 627;) lateral view, reduced one-half.
94.—*Pontonema marinum*, (p. 634;) female, lateral view, enlarged 15 diameters; *o*, eggs; *v*, genital orifice.

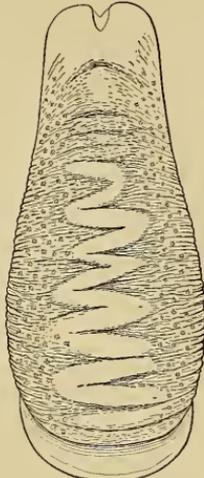
(Figure 94 was drawn from a living specimen, by A. E. Verrill; all the others were drawn from preserved specimens, by J. H. Emerton.)

Fig. 89.



No. 588

Fig. 90.



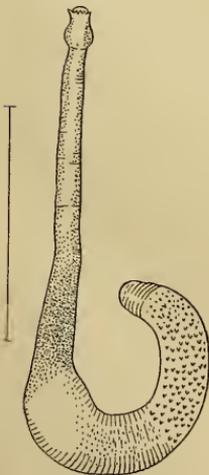
No. 781

Fig. 91.



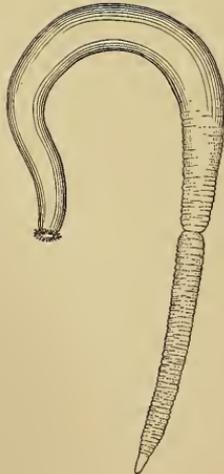
No. 589

Fig. 92.



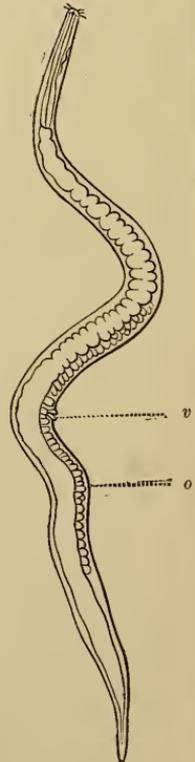
No. 590

Fig. 93.



No. 780

Fig. 94.

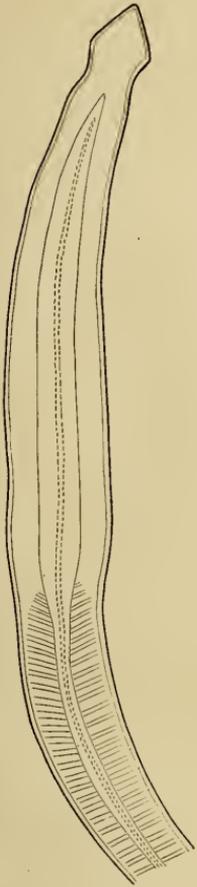


EXPLANATION OF PLATE XIX.

- FIGURE 95.—*Cosmocephala ochracea*, (p. 630;) anterior portion, enlarged nearly three diameters, dorsal view.
- 95a.—The same; ventral view.
- 96.—*Meckelia ingens*, (p. 630;) anterior portion of a specimen not full grown, natural size.
- 96a.—The same; ventral view of the anterior portion and head of a larger specimen, in a different state of contraction, natural size.
- 97.—*Polinia glutinosa*, (p. 631;) dorsal view, enlarged two diameters.
- 98.—*Tetrastemma arenicola*, (p. 629;) dorsal view.
- 99.—*Stylochopsis littoralis*, (p. 632;) dorsal view.
- 100.—*Planocera nebulosa*, (p. 632;) dorsal view.

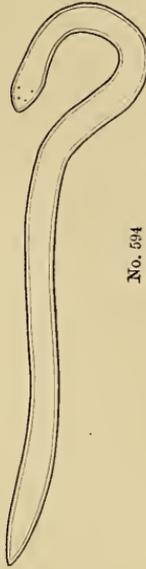
(All the figures were drawn from living specimens, by A. E. Verrill.)

Fig. 96.



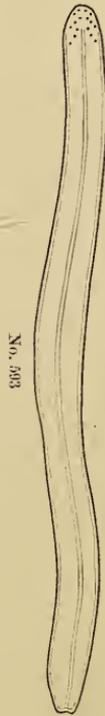
No. 591

Fig. 98.



No. 594

Fig. 97.



No. 593

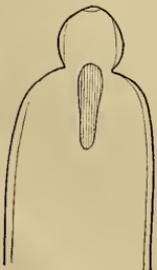
Fig. 95.



Fig. 95a.

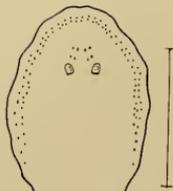


Fig. 96a.



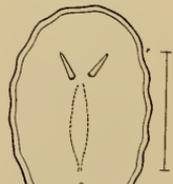
No. 592

Fig. 99.



No. 596

Fig. 100.



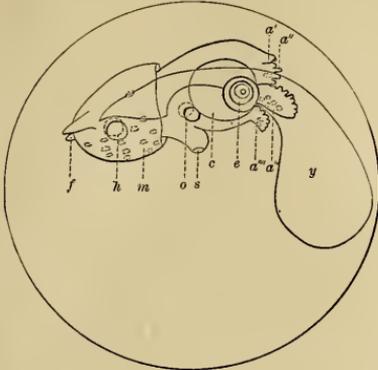
No. 595

EXPLANATION OF PLATE XX.

- FIGURE 101.—*Loligo pallida*, (p. 635;) dorsal view, about one-third natural size.
101*a*.—The same; the "pen" dorsal side.
102.—*Loligo Pealii*?, (p. 635;) a cluster of the eggs.
103.—The same; an embryo just before hatching, much enlarged; *a'*, *a''*, *a'''*, *a''''*, the right "arms" belonging to four pairs; *c*, the side of the head; *e*, the eye; *f*, the caudal fins; *h*, the heart; *n*, the mantle in which color-vesicles are already developed and capable of changing their colors; *o*, the internal cavity of the ears; *s*, the siphon; *y*, the portion of the yolk not yet absorbed.
104.—The same; an embryo in an earlier stage of development, more highly magnified; the letters are the same as before.
105.—The same; a young specimen, recently hatched, found swimming at the surface, dorsal view.

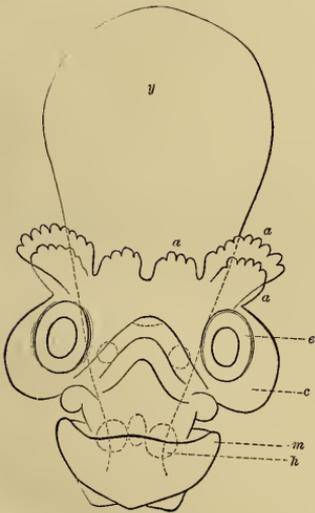
(Figures 103, 104 are camera-lucida drawings made from the living specimens, by A. E. Verrill; all the others were drawn from preserved specimens, by J. H. Emerton.)

Fig. 103.



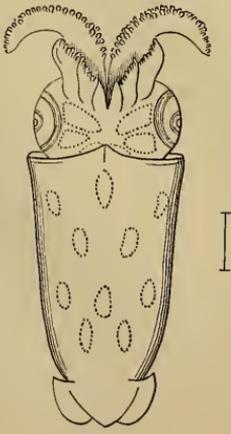
No. 775

Fig. 104.



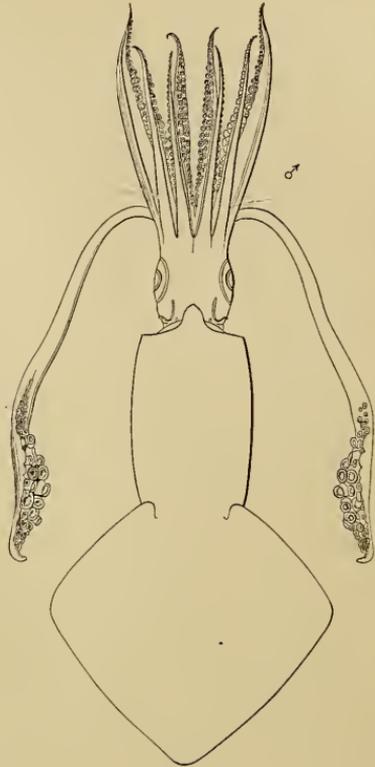
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Fig. 105.



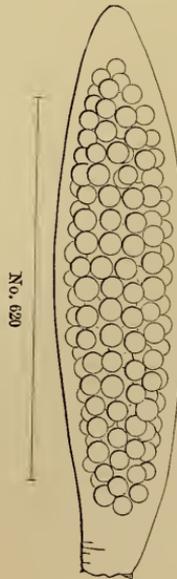
No. 621

Fig. 101.



No. 622

Fig. 102.



No. 623

Fig. 101a.



No. 623

EXPLANATION OF PLATE XXI.

FIGURE 106.—*Pleurotoma bicarinatum*, (p. 638;) natural size.

107.—*Bela plicata*, (p. 637;) natural size.

108.—*Bela harpularia*, (p. 636;) natural size.

109.—*Anachis similis*, (p. 644;) natural size.

110.—*Astyris lunata*, (p. 645;) enlarged.

111.—*Astyris zonalis*, (p. 645;) enlarged.

112.—*Tritia trivittata*, (p. 641;) natural size.

113.—*Ilyanassa obsoleta*, (p. 641;) natural size.

114.—*Nassa vibex*, (p. 640;) natural size.

115.—*Neptunea pygmæa*, (p. 639;) natural size.

116.—*Urosalpinx cinerea*, (p. 641;) natural size.

117.—*Eupleura caudata*, (p. 642;) natural size.

118.—*Purpura lapillus*, (p. 642;) natural size.

119.—The same; banded variety.

120.—The same; egg-capsules, enlarged one-third.

121.—*Buccinum undatum*, (p. 638;) natural size.

122.—*Scalaria multistriata*, (p. 660;) enlarged.

123.—*Scalaria lineata*, (p. 660;) enlarged.

(Figure 120 was drawn from nature by J. H. Emerton; the rest are from Binney's Gould, drawn by E. S. Morse.)

Fig. 107.



Fig. 106.



Fig. 109.



Fig. 111.



Fig. 110.

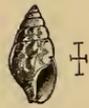


Fig. 108.



Fig. 112.



Fig. 114.



Fig. 113.



Fig. 118.



Fig. 119.



Fig. 120.

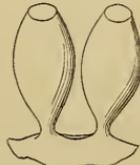


Fig. 115.



No. 785

Fig. 117.



Fig. 121.

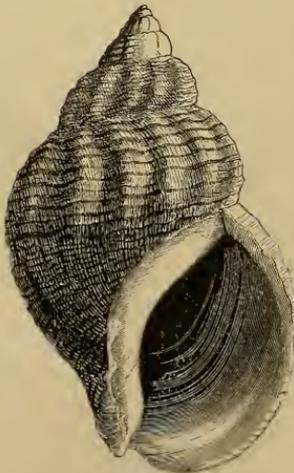


Fig. 122.



Fig. 116.



Fig. 123.



Fig. 124.



EXPLANATION OF PLATE XXIII.

- FIGURE 125.—*Crucibulum striatum*, (p. 651;) natural size.
126.—The same; side view.
127.—*Crepidula plana*, (p. 650;) natural size.
128.—*C. convexa*, (p. 650;) natural size.
129.—*C. fornicata*, (p. 649;) natural size.
129*a*.—The same; young specimen.
130.—*Neverita duplicata*, (p. 646;) natural size.
131.—*Lunatia immaculata*, (p. 646;) natural size.
132.—*Natica pusilla*, (p. 647;) slightly enlarged.
133.—*Lunatia heros*, (p. 646;) natural size.
134.—The same; with the animal extended, as in crawling; dorsal view.
135.—The same, variety *triseriata*, (p. 354;) young, natural size.
136.—The same variety; natural size, lower side.

(From Binney's Gould, drawn by E. S. Morse.)

Fig. 125.



Fig. 127.



Fig. 128.



Fig. 129.

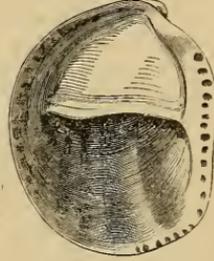


Fig. 126.



Fig. 129a.



Fig. 130.

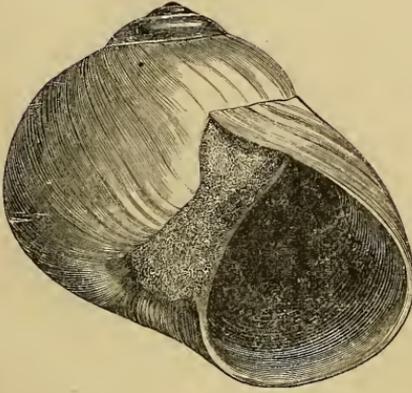


Fig. 131.



Fig. 132.



Fig. 135. Fig. 136.

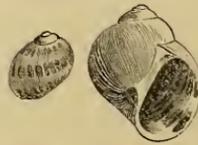


Fig. 133.

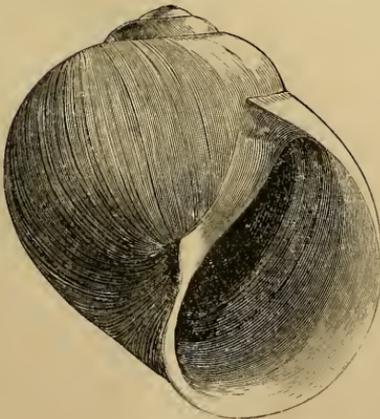


Fig. 134.



EXPLANATION OF PLATE XXIV.

- FIGURE 137.—*Littorina rudis*, (p. 651;) natural size.
138.—*Littorina palliata*, (p. 652;) natural size.
139.—*Lacuna vineta*, (p. 652;) enlarged.
140.—*Littorinella minuta*, (p. 653;) enlarged.
141.—*Rissoa aculeus*, (p. 654;) enlarged.
142.—*Skenia planorbis*, (p. 655;) enlarged.
143.—*Odostomia producta*, (p. 656;) enlarged.
144.—*O. fusca*, (p. 656;) enlarged.
145.—*O. trifida*, (p. 656;) enlarged.
146.—*O. trifida*, var., (p. 656;) enlarged.
147.—*O. impressa*, (p. 656;) enlarged.
148.—*O. seminuda*, (p. 657;) enlarged.
149.—*Eulima oleacea*, (p. 655;) natural size.
150.—*Cerithiopsis terebralis*, (p. 648;) enlarged.
151.—*C. Emersonii*, (p. 648;) enlarged.
152.—*Triforis nigrocinctus*, (p. 648;) enlarged.
153.—*Cerithiopsis Greenii*, (p. 647;) enlarged.
154.—*Bittium nigrum*, (p. 648;) enlarged.
155.—*Turbonilla elegans*, (p. 657;) much enlarged.
156.—*Margarita obscura*, (p. 661;) natural size.
157.—*Vermetus radícula*, (p. 649;) natural size.
158.—*Cæcum pulchellum*, (p. 649;) natural size and enlarged.
159.—*Acmæa testudinalis*, (p. 661;) natural size.
159*a*.—The same; lower side.
159*b*.—The same, variety *alveus*; natural size.

(Figure 155 was drawn from nature, by A. E. Verrill; the others are from Binney's Gould, mostly drawn by E. S. Morse.)

Fig. 137.



Fig. 138.



Fig. 139.



Fig. 140.



Fig. 141.



Fig. 142.



Fig. 143.



Fig. 144.



Fig. 145.



Fig. 146.



Fig. 147.



Fig. 148.



Fig. 149.



Fig. 150.



Fig. 151.



Fig. 152.



Fig. 153.



Fig. 154.



Fig. 155.



Fig. 156.



Fig. 157.



Fig. 158.



Fig. 159.



Fig. 159b.



EXPLANATION OF PLATE XXV.

- FIGURE 160.—*Utrienulus canaliculatus*, (p. 663;) enlarged.
161.—*Bulla solitaria*, (p. 662;) natural size.
162.—*Amphisphyra debilis*, (p. 663;) enlarged.
163.—*Cylichna alba*, (p. 664;) natural size.
164.—*Cylichna oryza*, (p. 664;) enlarged.
165.—*Aetæon puneto-striata*, (p. 664;) enlarged.
166.—*Traehydermon ruber*, (p. 662;) natural size.
167.—*Chætopleura apiculata*, (p. 661;) natural size.
168.—*Alexia myosotis*, (p. 662;) natural size.
169.—*Melampus bidentatus*, (p. 662;) natural size.
169*a*.—The same; banded variety, (p. 662;) natural size.
170.—*Doto coronata*, (p. 665;) *a*, dorsal view, enlarged; *b*, head, from above; *c*, one of the branchiæ.
171.—*Elysiella eatulus*, (p. 668;) enlarged three diameters.
172.—*Elysia chlorotica*, (p. 667;) enlarged two diameters.
173.—*Doridella obscura*, (p. 664;) *a*, dorsal view; *b*, ventral view, enlarged.
174.—*Montagna pilata*, (p. 666;) natural size.
175.—*Hermæa eruciata*, (p. 667;) enlarged.
176.—*Doris bifida*, (p. 664;) enlarged three diameters.
177.—*Cavolina tridentata*, (p. 669;) natural size.
178.—*Styliola vitrea*, (p. 668;) enlarged three diameters.

(Figures 171, 172, 173, 174, 178 were drawn from nature, by A. E. Verrill; 169*a*, 170 by E. S. Morse; 175 by A. Agassiz; 176, by J. H. Emerton; 177 was copied from Cuvier, (last ill. ed.) The rest are from Binney's Gould, mostly by E. S. Morse.)

Fig. 160.



Fig. 161.



Fig. 162.



Fig. 163.



Fig. 164.



Fig. 165.



Fig. 166.



Fig. 170.

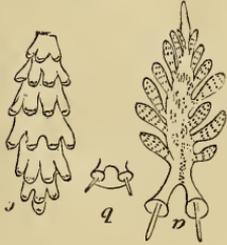


Fig. 168.



ig. 169.



Fig. 169a.



Fig. 167.



Fig. 177.

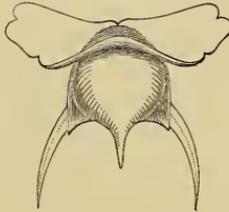


Fig. 178.

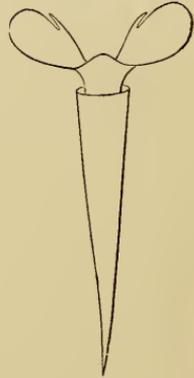
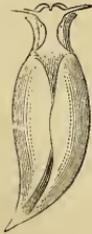


Fig. 172.



Fig. 171.



a Fig. 173. b

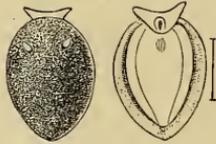
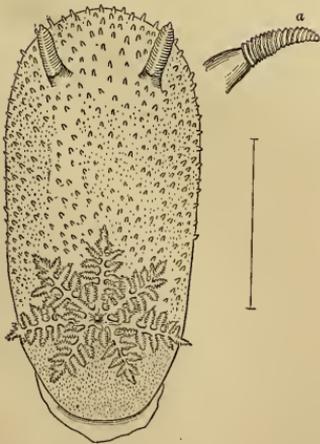


Fig. 176.

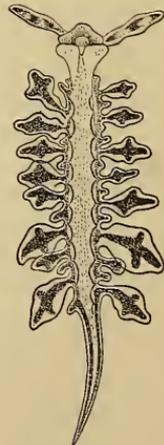


No. 766

Fig. 174.



Fig. 175.



No. 770

EXPLANATION OF PLATE XXVI.

- FIGURE 179.—*Mya arenaria*, (p. 672;) with animal in extension, reduced to one-half the natural size.
- 180.—*Angulus tener*, (p. 677;) animal reduced one-half.
- 181.—*Tagelus gibbus*, (p. 675;) with animal, the siphons not fully extended, one-half natural size.
- 182.—*Ensatella Americana*, (p. 674;) with animal extended, one-half natural size. The figure at the right shows some of the terminal papillæ enlarged.
- 183.—*Teredo navalis*, (p. 669;) enlarged two diameters.
- 184, A.—*Venus mercenaria*, (p. 681;) natural size.
- 184, B.—*Mulinia lateralis*, (p. 680;) natural size.

(The figures were all drawn from nature, by A. E. Verrill.)

Fig. 179.

Fig. 180.

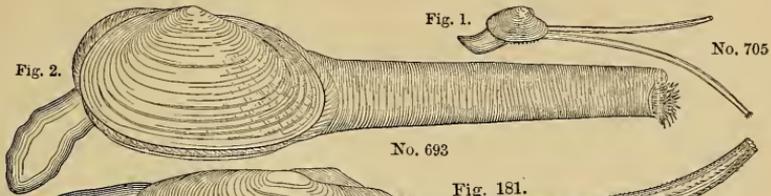


Fig. 2.

Fig. 1.

No. 705

No. 693

Fig. 181.

Fig. 3.

Fig. 182.

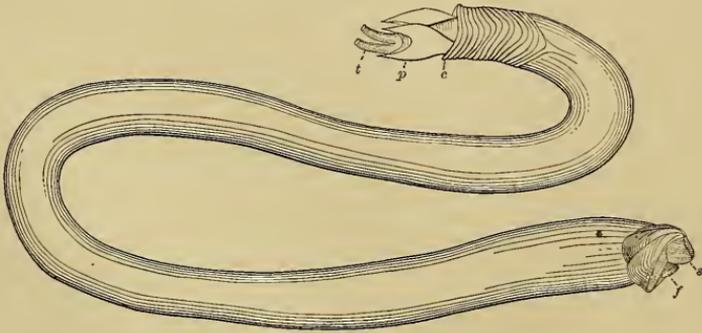


Fig. 4.

Fig. 5.

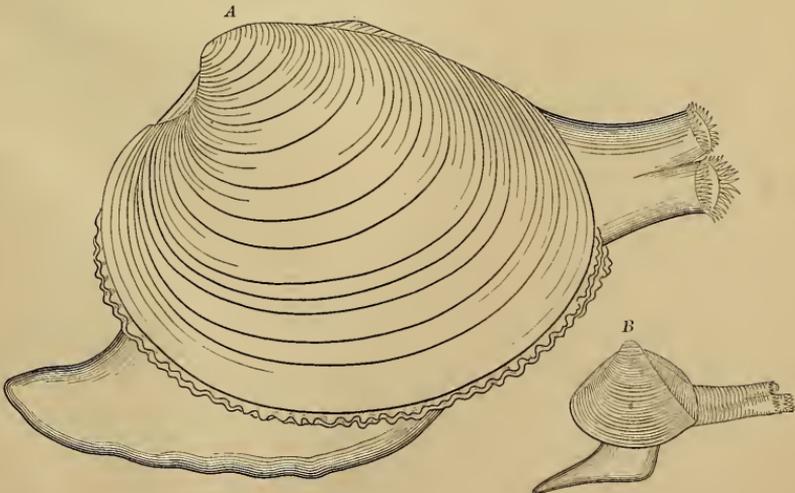
No. 688

Fig. 183.



No. 686

Fig. 184.



710

EXPLANATION OF PLATE XXVII.

- FIGURE 186.—*Teredo navalis*, (p. 669;) shell and pallets.
187.—*Teredo Thomsoni*, (p. 670;) shell and pallets.
188.—*Teredo megotara*, (p. 670;) shell and pallets.
189.—*Xylotrya fimbriata*, (p. 670;) shell and pallets.
190.—*Gastranella tumida*, (p. 678;) shell, enlarged six diameters.
191.—*Corbula contracta*, (p. 672;) natural size.
192.—*Saxicava arctica*, (p. 671;) natural size.
183.—*Clidiophora trilineata*, (p. 673;) natural size, with animal.
194.—*Lyonsia hyalina*, (p. 672;) natural size.
195.—*Thracia truncata*, (p. 674;) natural size.
196.—*Thracia myopsis*, (p. 673;) natural size.
197.—*Periploma papyracea*, (p. 673;) natural size.
198.—*Cochlodesma leanum*, (p. 673;) natural size.
189.—*Petricola pholadiformis*, (p. 680;) natural size.
200.—*Pholas truncata*, (p. 670;) natural size.

(Figure 190 was drawn by A. E. Verrill; all the rest are from Binney's Gould, mostly drawn by E. S. Morse.)

Fig. 186.

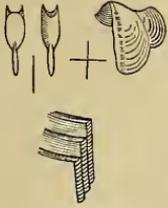


Fig. 187.

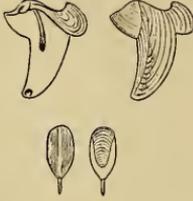


Fig. 189.

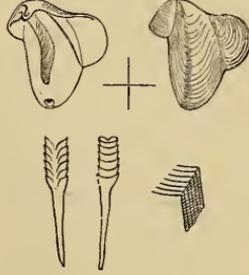


Fig. 188.

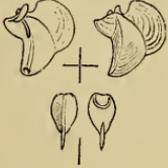


Fig. 190.



Fig. 192.



Fig. 191.



Fig. 195.



Fig. 193.

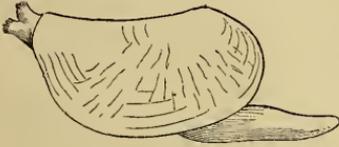


Fig. 194.



Fig. 196.



Fig. 199.



Fig. 197.

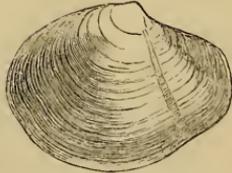


Fig. 200.

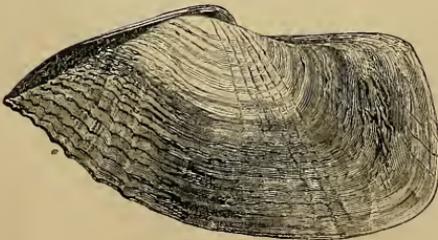
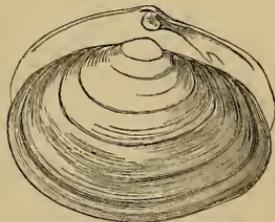


Fig. 198.



EXPLANATION OF PLATE XXVIII.

FIGURE 201.—*Cyprina Islandica*, (p. 683;) natural size.

202.—*Mactra solidissima*, (p. 680;) natural size.

(The figures are both from Binney's Gould, drawn by E. S. Merse.)

Fig 201.

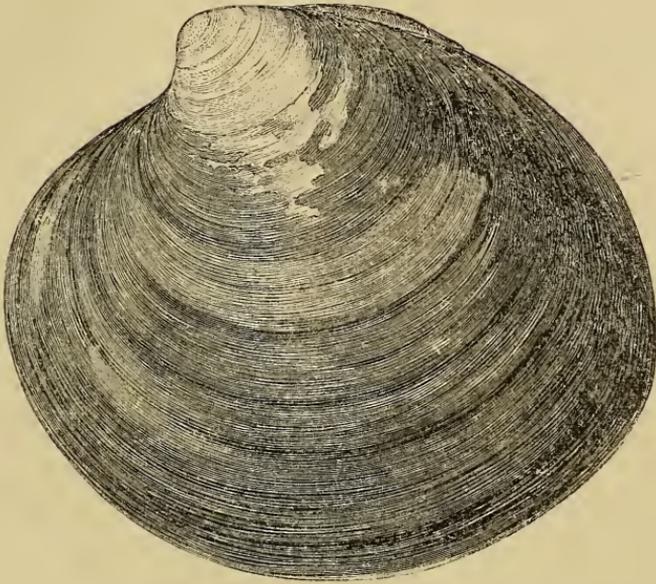
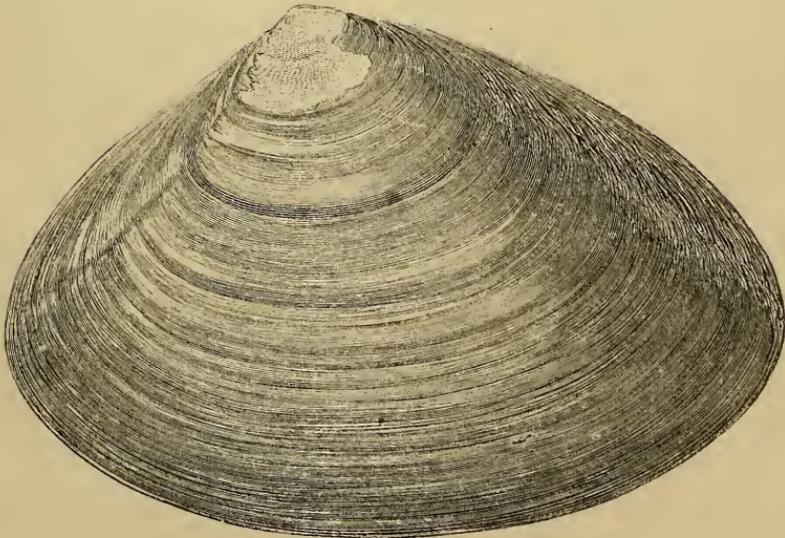


Fig 202



EXPLANATION OF PLATE XXIX.

- FIGURE 203.—*Astarte undata*, (p. 684;) somewhat reduced.
204.—*Astarte castanea*, (p. 685;) natural size.
205.—*Astarte quadrans*, (p. 685;) natural size.
206.—*Gouldia mactracea*, (p. 685;) natural size.
207.—The same, inside of one valve, enlarged.
208.—*Lævicardium Mortoni*, (p. 683;) natural size, with animal.
209.—*Cardium pinnulatum*, (p. 683;) natural size.
210.—*Solenomya velum*, (p. 688;) natural size.
211.—*Cyclas dentata*, (p. 686;) natural size.
212.—*Lucina filosa*, (p. 686;) natural size.
213.—*Cryptodon Gouldii*, (p. 686;) enlarged two diameters.
214.—*Cryptodon obesus*, (p. 687;) enlarged three diameters.
215.—*Cyclocardia Novangliæ*, (p. 684;) natural size.
216.—*Cyclocardia borealis*, (p. 683;) natural size.

(Figures 203, 207, 214 were drawn by A. E. Verrill; 215 by E. S. Morse; the rest from Binney's Gould, and mostly drawn by E. S. Morse.)

Fig. 203.



Fig. 208.

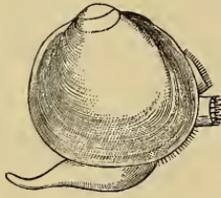


Fig. 210.



Fig. 204.

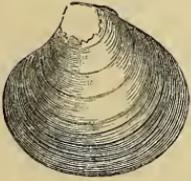


Fig. 205.



Fig. 209.



Fig. 211.

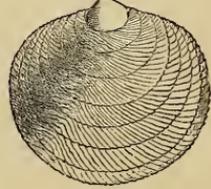


Fig. 207.

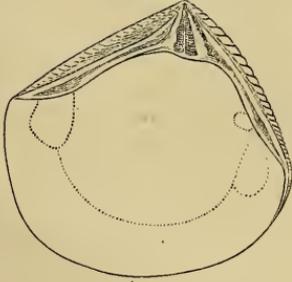


Fig. 206.



Fig. 212.

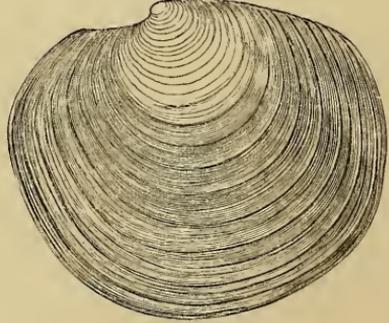


Fig. 215.

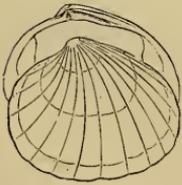


Fig. 213.



Fig. 214.

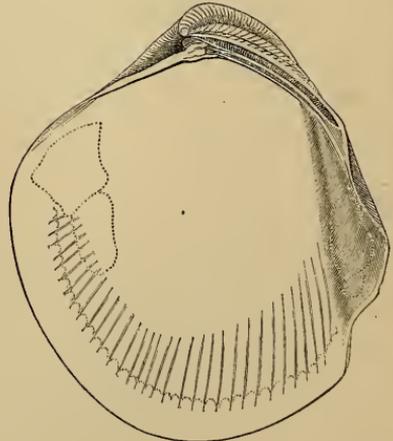
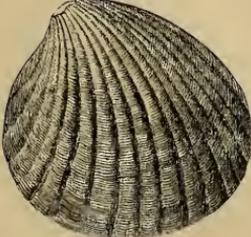


Fig. 216.



EXPLANATION OF PLATE XXX.

- FIGURE 217.—*Tagelus gibbus*, (p. 675;) natural size.
218.—*Tegelus divisus*, (p. 676;) natural size.
219.—*Callista convexa*, (p. 681;) natural size.
220.—*Tottenia genma*, (p. 682;) enlarged.
221.—*Cumingia tellinoides*, (p. 679;) natural size.
222.—*Macoma fragilis*, var. *fusca*, (p. 676;) natural size.
223.—*Angulus tener*, (p. 677;) natural size.
224.—*Angulus tenellus*, (p. 677;) natural size.
225.—*Tellina tenta*, (p. 678;) natural size.
226.—*Kellia planulata*, (p. 688;) enlarged.
227.—*Argina pexata*, (p. 692;) natural size.
228.—*Scapharca transversa*, (p. 691;) natural size.
229.—*Nucula delphinodonta*, (p. 691;) enlarged.
230.—*Nucula proxima*, (p. 691;) natural size.
231.—*Yoldia sapotilla*, (p. 689;) natural size.
232.—*Yoldia limatula*, (p. 689;) natural size.

(Figure 224 was drawn by A. E. Verrill; the rest are from Binney's Gould, by E. S. Morse.)

Fig 217.



Fig. 218.



Fig. 219.

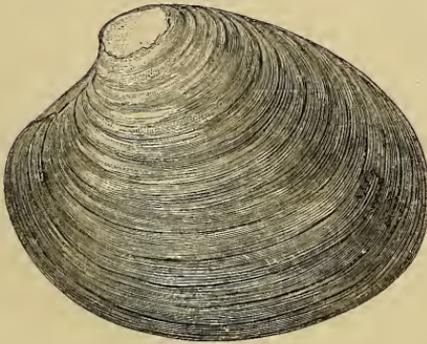


Fig. 220.



Fig. 221.



Fig. 222.



Fig. 227.

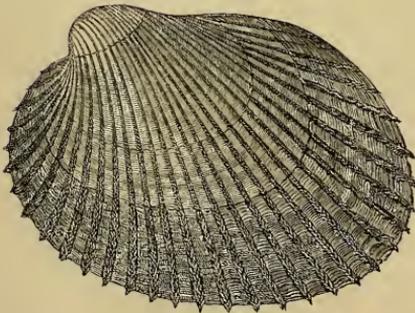


Fig. 224.



Fig. 223.



Fig. 229.



Fig. 230.



Fig. 225.



Fig. 231.



Fig. 226.



Fig. 228.

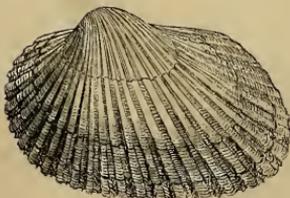


Fig. 232.



EXPLANATION OF PLATE XXXI.

- FIGURE 233.—*Crenella glandula*, (p. 695.)
234.—*Mytilus edulis*, (p. 692.)
235.—*Modiolaria corrugata*, (p. 694.)
236.—*Modiolaria nigra*, (p. 694.)
237.—*Modiola modiolus*, (p. 693.)
238.—*Modiola plicatula*, (p. 693.)

(All the figures are of natural size, and from Binney's Gould, drawn by E. S. Morse.)

Fig. 233.



Fig 234.

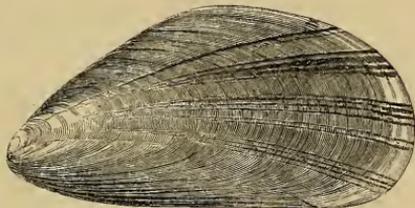


Fig. 235.



Fig. 236.

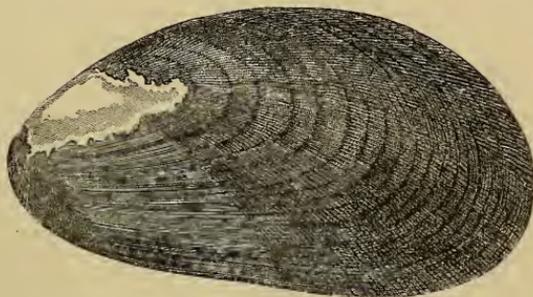


Fig. 237.

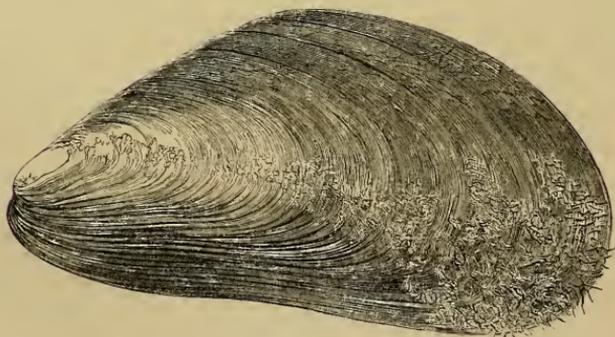
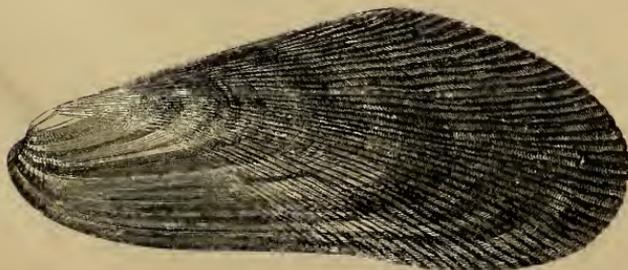


Fig. 238.



EXPLANATION OF PLATE XXXII.

- FIGURE 239.—*Anomia aculeata*, (p. 697;) lower side, natural size.
240.—The same, upper side.
240*a*.—The same, portions of the upper side magnified.
241.—*Anomia glabra*, (p. 696;) profile view, natural size.
242.—The same, (p. 696;) lower side
242*a*.—The same, (p. 696;) young, natural size.
243.—*Peeten irradians*, (p. 695;) natural size.
244.—*Siliqua costata*, (p. 675;) natural size.
245.—*Ensatella Americana*, (p. 674;) natural size.

(The figures are from Binney's Gould, drawn by E. S. Morse.)

Fig. 239.



Fig. 240.



Fig. 244.

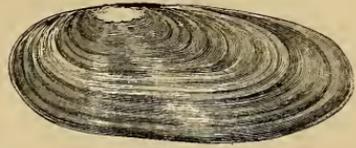


Fig. 241.



Fig. 242a.



Fig. 240a.



Fig. 242.

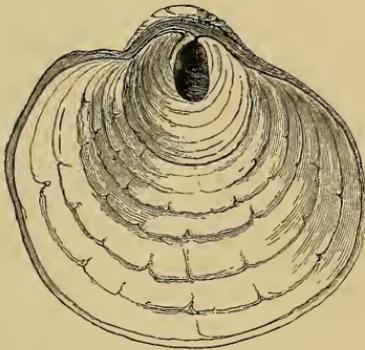
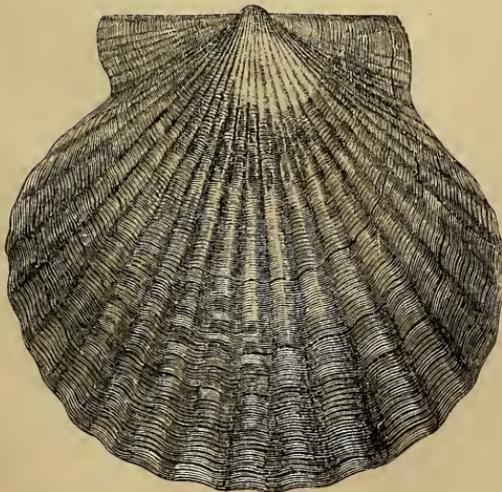


Fig. 245.



Fig. 243.



EXPLANATION OF PLATE XXXIII.

- FIGURE 246.—*Cynthia partita*, variety *stellifera*, (p. 701;) natural size.
247.—*Cynthia carnea*, (p. 701;) natural size.
248.—The same, (p. 701;) younger specimens, natural size.
249.—*Eugyra pilularis*, (p. 700;) natural size.
250.—*Molgula Manhattensis*, (p. 699;) smooth variety, natural size.
251.—*Molgula arenata*, (p. 699;) natural size.
252.—*Botryllus Gouldii*, (p. 702;) colony incrusting the stem of *Tubularia*, somewhat enlarged.
253.—The same; one of the zooids, enlarged ten diameters; *a*, anal tube and orifice; *s*, stomach; *g*, groove and vessels along the edge of the branchial sac, inside; *o*, left ovary; *b*, bud, attached by a slender stolon.
254.—*Salpa Cabotti*, (p. 706;) solitary individual, from the dorsal side, enlarged; *h*, heart; *s*, small chain of salpæ budding within the old one.
255.—The same; one of the individuals from a mature chain, three-quarter view enlarged; *a*, posterior or anal opening; *b*, anterior or branchial opening; *c*, processes by which the individuals of the chain were united; *h*, heart; *n*, nervous ganglion; *o*, nucleus; *r*, gill.
256.—*Escharella variabilis*, (p. 713;) few of the cells, much enlarged.

(Figure 256 was drawn by A. Hyatt; 254 and 255 were copied from A. Agassiz; the others were drawn by A. E. Verrill.)

Fig. 246.



Fig. 247.



Fig. 248.

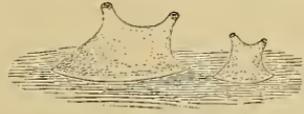
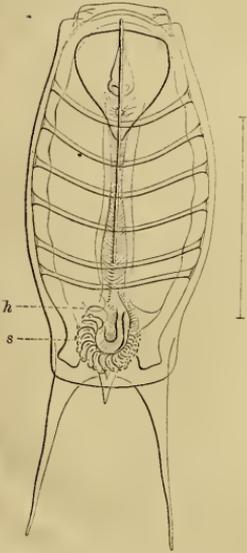


Fig. 254.



750

Fig. 249.



Eugyra
749

Fig. 251.



748

Fig. 253.

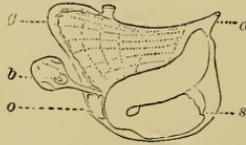


Fig. 250.

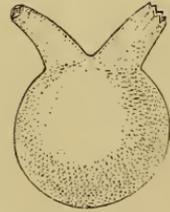
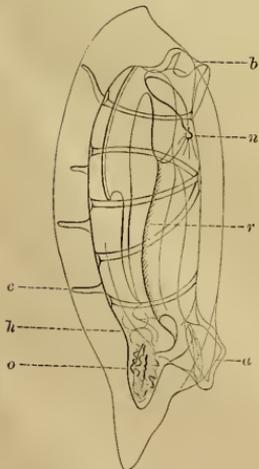


Fig. 255.

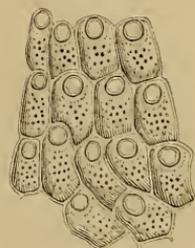


751

Fig. 252.



Fig. 256.



No. 765

EXPLANATION OF PLATE XXXIV.

- FIGURE 257.—*Aleyonidium ramosum*, (p. 708;) a young unbranched specimen, enlarged two diameters.
- 258.—*Bugula turrata*, (p. 712;) extremity of a branch, enlarged.
- 259.—The same; a branchlet more highly magnified.
- 259*a*.—The same; a branchlet bearing ovicells.
- 260.—*Crisia eburnea*, (p. 707;) a cluster of branches, enlarged.
- 261.—The same; a branch bearing an ovicell, more highly magnified.
- 262.—*Membranipora pilosa*, (p. 712;) a few of the cells, seen from above, magnified.
- 362*a*.—The same; a single cell, seen in profile.
- 263.—The same; one of the zoöids expanded.
- 264.—*Mollia hyalina*, (p. 713;) one of the zoöids in expansion, highly magnified.

(Figures 257, 259, 259*a* were drawn by A. E. Verrill; the rest were furnished by A. Hyatt.)

Fig. 258.



Fig. 259.



Fig. 259a.



Fig. 261.

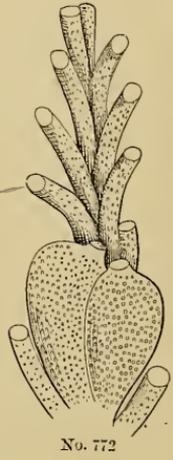


Fig. 263.

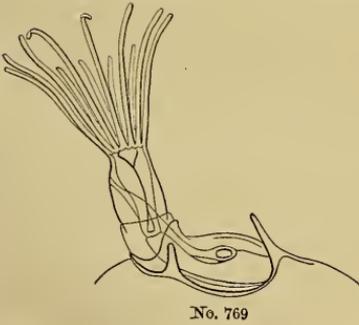


Fig. 260

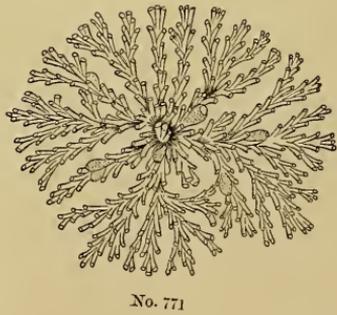


Fig. 257.

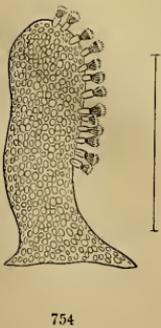


Fig. 262.

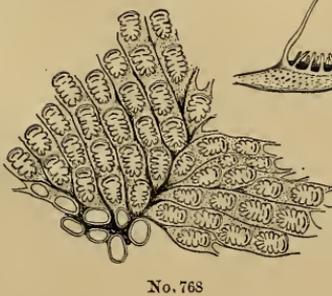
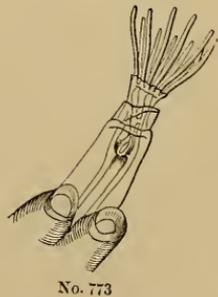


Fig. 262a.



Fig. 264.

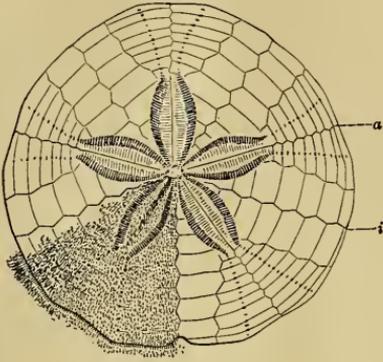


EXPLANATION OF PLATE XXXV.

- FIGURE 265.—*Leptosynapta Girardii*, (p. 716;) anterior part of the body, enlarged one-half.
- 266.—The same; perforated plates from the skin, and the "anchors," highly magnified.
- 267.—*Echinarachnius parma*, (p. 717;) upper surface with the spines partly removed, natural size; *a*, ambulacral zones; *b*, interambulacral zones.
- 268.—*Strongylocentrotus Dröbachiensis*, (p. 716;) side view, natural size.
- 269.—*Asterias arenicola*, (p. 718;) dorsal view, somewhat reduced.
- 270.—*Ophiopholis aculeata*, (p. 719;) dorsal view, about one-half natural size.

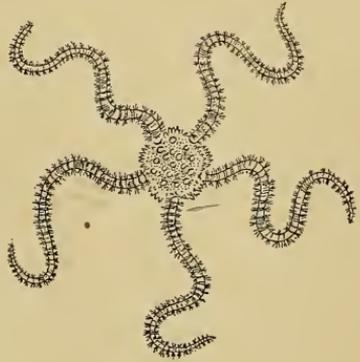
(Figures 265, 266 were drawn by A. E. Verrill; 267, 269 were copied from A. Agassiz; 268, 270 were drawn by E. S. Morse.)

Fig. 267.



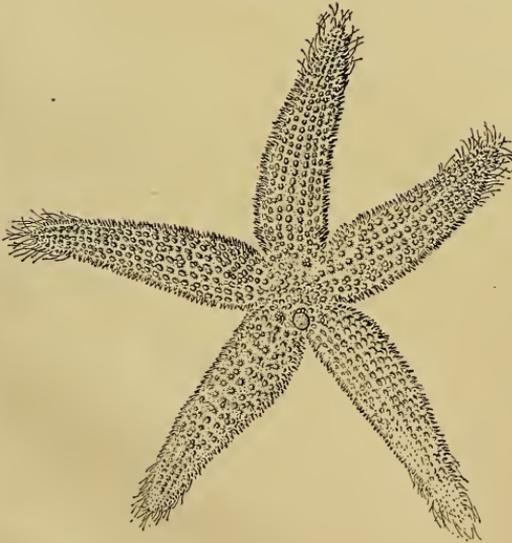
617

Fig. 270.



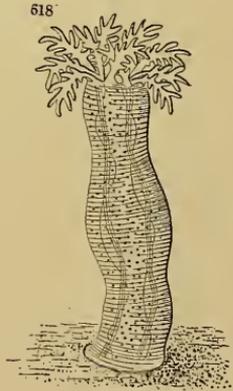
No. 615

Fig. 269.



616

Fig. 265.



618

Fig. 268.

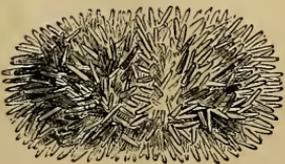
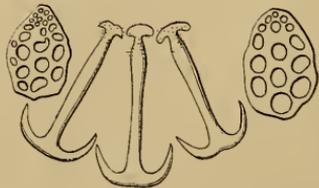


Fig. 266.



EXPLANATION OF PLATE XXXVI.

FIGURE 271.—*Aurelia flavidula*, (p. 723;) upper side, about one-fourth the natural size.

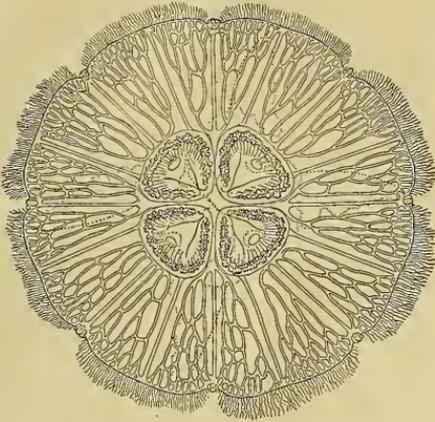
272.—*Dactylometra quinquecirra*, (p. 724;) lateral view, one-fourth the natural size.

273.—*Corymorpha pendula*, (p. 736;) natural size.

274.—*Parypha crocea*, (p. 736;) natural size.

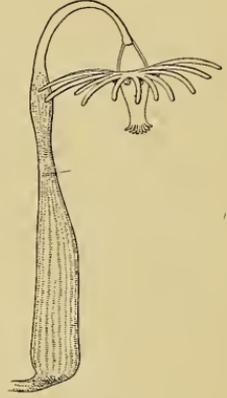
(Figure 272 was copied from A. Agassiz, Catalogue Acalephs; the others were copied from L. Agassiz, Contributions to Natural History of United States.)

Fig. 271.



No. 613

Fig. 273.



No. 608

Fig. 272.



No. 614

Fig. 274.



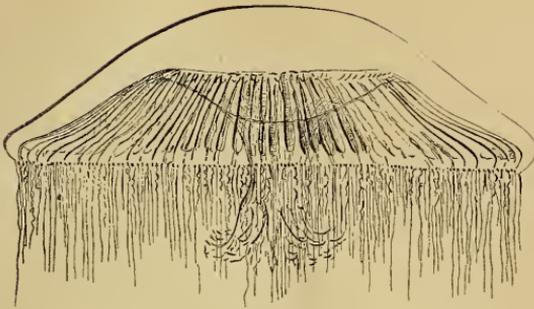
No. 607

EXPLANATION OF PLATE XXXVII.

- FIGURE 275.—*Zygodactyla Grœnlandica*, (p. 729;) profile view, one-half natural size.
276.—*Bougainvillia superciliaris*, (p. 733;) a branch, much enlarged.
277.—*Pennaria tiarella*, (p. 735;) a branch, natural size.
278.—The same; one of the hydroids, with medusæ, buds developing at the base of the proboscis.
279.—*Sertularia pumila*, (p. 732;) part of a colony on a frond of sea-weed, natural size.
280.—*Sertularia argentea*, (p. 732;) a branch bearing reproductive capsules, (gonothecæ,) with the soft parts removed, much enlarged.
281.—*Obelia commissuralis*, (p. 728;) a branch bearing hydroids and one female gonotheca, much enlarged.

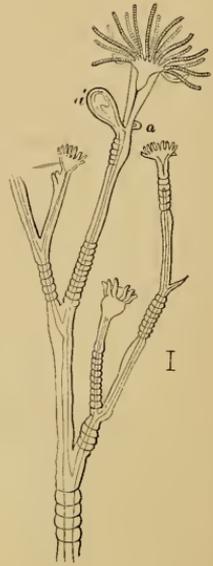
(Figures 275 and 279 were copied from A. Agassiz; 276 and 281 from L. Agassiz; 278 from J. Leidy; 277 and 280 were drawn by A. E. Verrill.)

Fig. 275.



No. 612

Fig. 276.



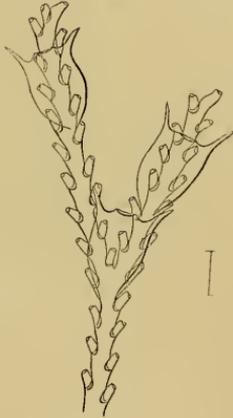
No. 606

Fig. 279.



No. 603

Fig. 280.



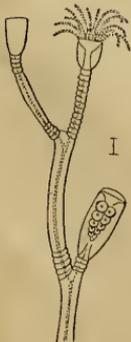
No. 604

Fig. 277.



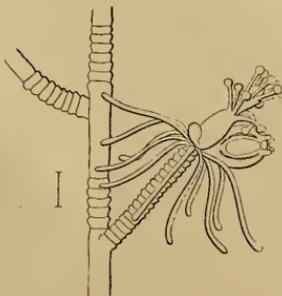
No. 610

Fig. 281.



No. 605

Fig. 278.



611

EXPLANATION OF PLATE XXXVIII.

- FIGURE 282.—*Hybocodon prolifer*, (p. 736;) natural size, the head seen from the back side.
- 283.—*Alcyonium carneum*, (p. 737;) three of the polyps fully expanded, much enlarged.
- 284.—*Sagartia leucolea*, (p. 738;) natural size, in expansion, but the tentacles are not fully extended; the * indicates the long odd tentacle.
- 285.—*Halocampa producta*, (p. 738;) natural size, well expanded, but the body may be much more elongated.
- 286.—*Epizoanthus Americanus*, (p. 740;) a colony which had completely covered and absorbed a shell occupied by a hermit-crab, (*Eupagurus pubescens*,) which still lived within the cavity; the polyps are not expanded, natural size.
- 287.—The same; one of the polyps in full expansion, natural size.

(Figure 282 was copied from L. Agassiz; 286 is from the American Naturalist, drawn by E. S. Morse; the rest were drawn by A. E. Verrill.)

Fig. 283.



No. 598

Fig. 282.



No. 609

Fig. 284.

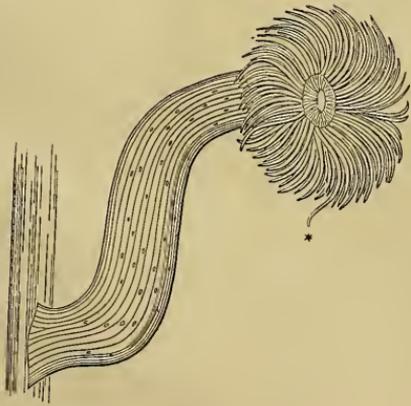
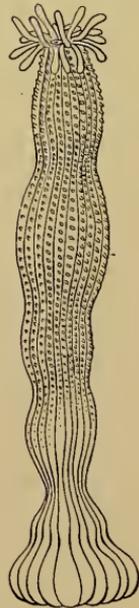


Fig. 285.



No. 600

Fig. 286.

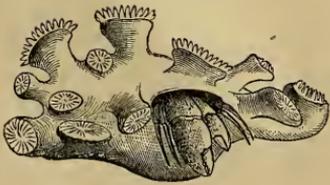


Fig. 287.



Fig. 20.

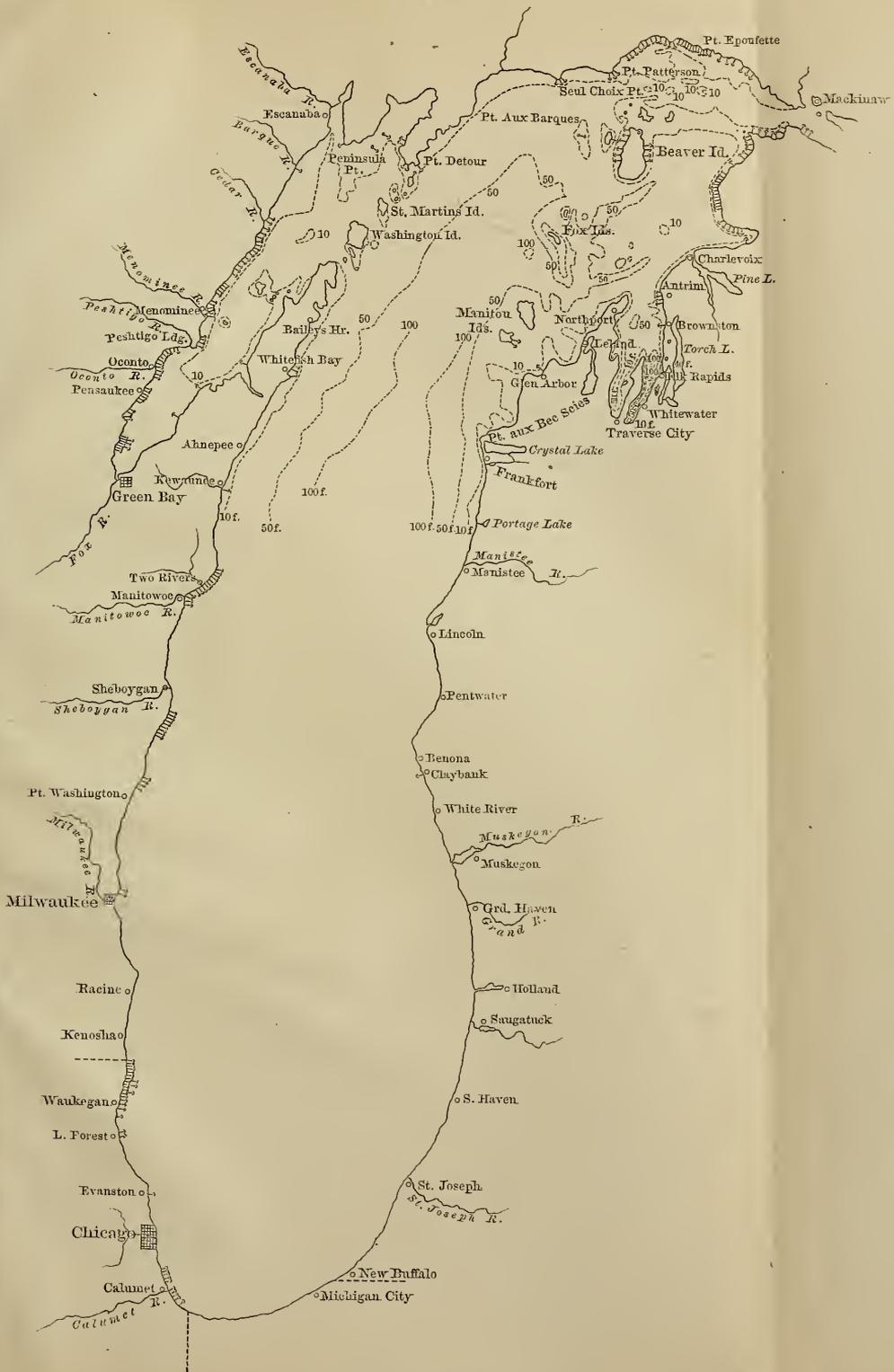


DIAGRAM SHOWING THE LOCATION OF FISH-PONDS ON LAKE MICHIGAN IN 1871. (See page 271.)

MAP OF THE COAST OF MASSACHUSETTS AND RHODE ISLAND

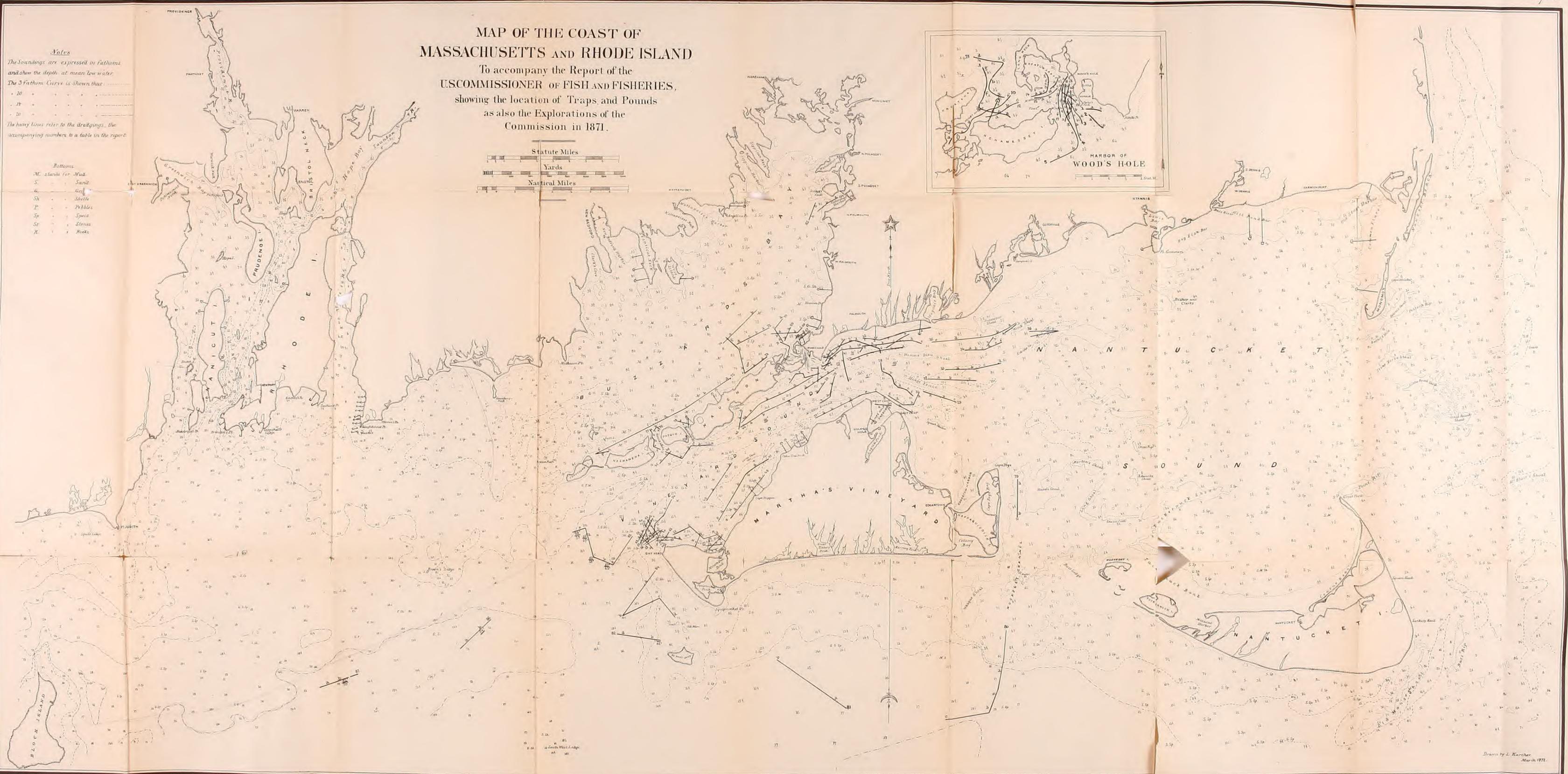
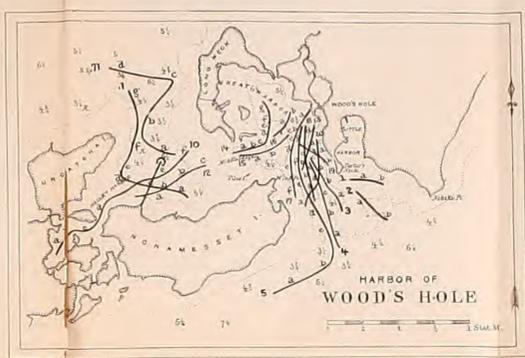
To accompany the Report of the
USCOMMISSIONER OF FISH AND FISHERIES,
showing the location of Traps and Pounds
as also the Explorations of the
Commission in 1871.

Notes
The Soundings are expressed in fathoms
and show the depth at mean low water.
The 3 Fathom Curve is shown thus: - - - - -
- 10 - - - - -
- 14 - - - - -
- 20 - - - - -
The heavy lines refer to the dredgings, the
accompanying numbers to a table in the report.



Bottoms

M.	Mud
S.	Sand
G.	Gravel
Sh.	Shells
P.	Pebbles
Sp.	Specs
St.	Stones
R.	Rocks



Drawn by L. Kauter
March 1872.