

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

**PART II.—MOLLUSCA, WITH NOTES ON ANNELIDA, ECHINODERMATA, ETC., COLLECTED BY THE UNITED STATES FISH COMMISSION.**

**By A. E. VERRILL.**

The species included in the following paper, unless otherwise stated, have been collected by the parties employed by the United States Fish Commission for several years past in exploring the waters and investigating the marine animals of this coast.\* This work has been under the immediate direction of the writer, who has personally taken a part in most of the very numerous dredging excursions. The total number of stations dredged or trawled amounts to over 1,200. Among the large number of persons who have taken a more or less important part in these explorations, in connection with the invertebrate department, I may particularly mention Prof. S. I. Smith, Prof. A. S. Packard, Mr. Sanderson Smith, Mr. Richard Rathbun, Prof. H. E. Webster, Mr. Oscar Harger, Mr. E. B. Wilson, and Mr. S. F. Clark.

During the last three years Mr. Sanderson Smith has given special assistance in caring for the testaceous Mollusca in the dredging season, and has also been engaged with the writer at various other times in the working up of the Mollusca of Northern New England for publication. Owing to the great accumulation of materials, this will necessarily take much time. In the mean time the following catalogue will afford much useful information as to the additions recently made to our molluscan fauna.

This season, the most interesting and prolific region of our coast hitherto explored was discovered upon the outer bank, or slope, situated from 70 to 80 miles south of Martha's Vineyard, and from 90 to 115 miles south of Newport, R. I.

In September and October three very successful trips were made to this region.

The first of these trips was made September 3 to 5, south of Martha's Vineyard, about 70 to 80 miles (stations 865 to 872), where the depth was from 65 to 192 fathoms. The bottom was mostly fine compact sand, with some mud, and with a large percentage of Foraminifera. The

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\* In this article 115 species of Mollusca are recorded as recent additions to the fauna of New England. Of these, 48 species are apparently undescribed (including 23 species just published in the American Journal of Science, for November). The number of species included in this article that are not contained in the last edition of Gould's Invertebrata of Massachusetts is 125. Many other species, not here included, have previously been added by me to those contained in Gould's work. Many of these are enumerated in the author's Preliminary Check List of the Marine Invertebrata of Northern New England, 1879. Many will be found in various articles in the American Journal of Science; others are contained in the Report on Invertebrates of Vineyard Sound, in Part I of the Reports of the United States Fish Commission, 1873.

second trip was made September 12 to 14, nearly south from Newport, 90 to 105 miles, where the depth was from 85 to 325 fathoms (stations 873 to 881). The third trip, October 1 to 3, was to the same region, but somewhat farther west and south, and in deeper water (stations 891 to 895). At all these stations, except 867, a large beam-trawl was used; at 867 a heavy "rake-dredge", of a new form, was used with good success.

All these stations are situated in the region designated on the charts as "Block Island soundings", and nearly all proved to be exceedingly rich in animal life, the vast abundance of individuals of many of the species taken being almost as surprising as the great number and variety of the species themselves.

In this region the slope is exceedingly gradual till the depth of 75 to 100 fathoms is reached, at about 90 miles from the coast; the slope then becomes much more rapid, but yet not steep, and the bottom is of very fine compact sand, mingled with more or less mud, fragments of shells, and sometimes with small stones,\* and generally has a smooth and rather hard surface, well adapted to support a very great variety of animals of nearly all classes. In some places the material is softer mud and sand; in others it is covered with broken shells and great numbers of sponges, hydroids, and worm-tubes.

Many species owe their existence, on these bottoms, to the suitable places of attachment furnished by the large tubes of annelids, which formed a marked feature in many of the localities.

In several localities with muddy bottoms (869,879,880,894), we trawled large quantities (several thousands in all) of very singular, large, round, unattached worm-tubes, occupied by a large, undescribed species of *Hyalinœcia*.† These tubes are firm and translucent, composed of a tough substance resembling the quills of birds. They are open at both ends, but often have internal septa near the larger end; they are often more than a foot long, and about a third of an inch in diameter at the

\* These stones, which were common in nearly every haul of the third trip, are of all sizes, from small pebbles up to bowlders 6 inches or more in diameter. They are of various kinds of rocks, like those found in the drift formation along the opposite shores of the mainland and on the shores of Block Island and the eastern end of Long Island. Their presence, so far from land and beneath the edge of the Gulf Stream, can easily be explained by supposing that they have been carried out to sea by the shore ice that forms along these coasts in winter in vast quantities and of considerable thickness. This ice, when it breaks up in spring, is carried out to sea, with its inclosed stones and gravel, by the tides and currents, till it comes in contact with the warmer waters of the Gulf Stream, where its loads of stones drop to the bottom. We have often met with large, loose, and fresh bowlders, sometimes of large size, in various localities, far from land, on muddy bottoms, off the coasts of Maine and Nova Scotia, where they have doubtless been recently dropped from shore ice.

† *Hyalinœcia artifex* Verrill, sp. nov. Closely related to *H. tubicola* of Europe, but much larger, with the buccal segment as long as the three or four following segments; anterior antennæ small, short, rounded, ovate; three median ones subequal, very long, reaching the 15th segment; eyes rudimentary; branchiæ slender, commencing at about the 28th to 30th segment; bidentate setæ with the hook terminal and less curved. Surface opalescent.

larger end, but taper gradually toward the smaller one, and are nearly straight. They may possibly at times stand erect in the mud, but this is doubtful; in most cases they probably lie free on its surface, and the large and powerful annelid inhabiting them probably has the power of dragging them about; otherwise it would be impossible to account for the numerous hydroids, actinians, sponges, &c., which often cover them.

On the harder bottoms, in the shallower localities, especially at stations 865 to 867, we obtained great quantities of a very different, unattached worm-tube, composed of bivalve shells, entire and broken, arranged so as to form a strong, flattened covering around a thin silken, central tube. These are made by a pale, opalescent species of *Nothria* (near *N. conchylega*), allied to *Hyalinœcia*. In the localities last named we also took large quantities of another very different kind of worm-tube, made by another Annelid of the same family, a large species of *Eunice* or *Leodice*.\* This tube is sometimes half an inch in diameter, more or less attached, irregularly bent, often branched, or with side-openings at the angles. It is composed of a parchment-like material, and is usually covered with hydroids, sponges, actinians, ascidians, &c.

The sand and mud usually contain a large percentage of calcareous Foraminifera, many of which are remarkably large and handsome species, often more than 5<sup>m</sup> or 6<sup>m</sup> in diameter. In some of the localities (as at stations 869, 894, and 895) there were, in the mud, very large quantities of large sand-covered Rhizopods (*Astrorhiza*, *Rhabdammina*, &c.), which assume a variety of irregularly branched and often rudely stellate forms, but many of them are rod-like, and nearly an inch in length.

Fishes, Crustacea, Annelids, Anthozoa, and Echinoderms, as well as Mollusca, abounded in new and strange forms. Of many of these species, previously unknown in our waters, thousands of specimens were obtained. At several of the stations, especially at 880, 881, 893, and 894, large numbers of the handsome Mopsea-like coral, *Acanella Normani* V., were taken; to these many fine specimens of the rare *Pecten vitreus* were attached, and also several species of Actinians and Annelids. In many of the localities vast numbers of hermit-crabs (*Paguridae*), of several species, occurred, inhabiting cases consisting of groups of the compound, sand-coated Actinians, mostly *Epizoanthus Americanus* V. The bases of these originally covered dead shells of Gastropods or Pteropods, occupied by the crabs, but by some chemical process they have, in most cases, wholly removed the substance of the shell, so that the polyp constitutes the entire residence of the crab. Large numbers of huge Actinians, such as *Bolocera Tuedie*, *Urticina nodosa*, &c., oc-

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\* *Leodice polybranchia* Verrill, sp. nov. A stout species, resembling *L. virida* (St.) = *L. Norvegica* (L.), but the branchiæ commence on the seventh or eighth segment, and continue to near the end of the body, on at least 120 segments; they have four to six branches; eyes large, round; three median antennæ, long, the middle one longest; tentacles long, reaching beyond the edge of the buccal segment, which is as long as the three following ones; ventral cirri at first conical, those beyond the fourth, short, with large swollen bases.

curring in most of the deeper dredgings. Large quantities of a large, handsome, but very fragile, cup-coral (*Flabellum Goodei* V.) occurred in the deeper localities, especially at stations 880, 894, 895, but most of the specimens were ruined by being crushed by the great weight of the contents of the trawl. The animal of this coral is bright orange, with a purple center.

While many of the species of every class obtained here are arctic, or belong to the cold waters found at similar or greater depths on the coasts of Europe and in the Mediterranean, a few genera, like *Aricula*, *Solarium*, and *Marginella*, are related to southern or West Indian forms. A number of the most abundant species of Crustacea and Echinoderms\* had already been described from the collections made by Pourtales, off Florida.

Many free-swimming species, belonging to the Pteropoda and Heteropoda, of which we dredged the dead but perfectly fresh shells, were not previously known to occur so far north. They were associated with others of the same groups which had previously been taken living at the surface along our shores, but they all belong properly to the Gulf Stream fauna.

The frequent occurrence of nearly fresh shells of *Argonauta Argo* was also a matter of surprise to us, and indicates that this species must often be very common near our coast.

The very large collections of specimens obtained on these three trips have, as yet, been only partially examined, but enough has already been done to prove this region to be altogether the richest and most remarkable dredging ground ever discovered on our coast. The large number of new forms, combined with others previously known only from remote regions, constitute a very distinct fauna, hitherto almost wholly unknown.

A considerable number of undetermined, and perhaps undescribed, shells from these localities are not included in this article.

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\* A brief account of the Echinoderms obtained by us, with descriptions of several of the new species discovered, has been published by me in the American Journal of Science for November, 1880.

It is only necessary to say here that several of the star-fishes, Ophiurans, and Crinoids occurred in such large numbers as to constitute one of the most conspicuous features of the fauna. The most abundant species were *Archaster Americanus* V., *A. Agassizii* V., *A. Flora* V., *Luidia elegans* Perriér, *Ophiocnida olivacea* Lym., *Ophiocolex glacialis* M. & Tr., *Ophioglypha Sarsii* Lym., *Antedon Sarsii* (D. & Koren).

All these species, except the last two, are orange-colored, varying to orange-red. The same is true of *Acanella Normani*, of most of the Actinians, and of the majority of the crabs and shrimps, as well as of some of the fishes. It seems probable that the prevalence of orange and red colors among the deep-water animals is due to the fact that the luminous rays of those colors are completely absorbed by the thick, overlying stratum of sea-water, and consequently these animals, not being capable of reflecting such bluish and greenish rays as do reach them, would be nearly invisible at those depths beyond which white light penetrates. If this be true, such colors, being protective, may be due to the operation of natural selection, according to the principle so often exemplified in shallow-water animals having colors like their surroundings.

*Dredging stations on the outer bank in 1880.*

Number.	Locality.						Depth.	Nature of bottom.		
	Latitude.			Longitude.			Fathoms.			
	°	'	"	°	'	"				
865.....	40	05	00	N.	70	23	00	W.	65	Fine compact sand, with some mud.
866.....	40	05	18	N.	70	22	18	W.	65	Do.
867.....	40	05	42	N.	70	22	06	W.	64	Do.
868.....	40	01	42	N.	70	22	30	W.	162	Do.
869.....	40	02	18	N.	70	23	06	W.	192	Mud and fine sand, soft.
870.....	40	02	36	N.	70	22	58	W.	155	Fine sand, with some mud.
871.....	40	02	54	N.	70	23	40	W.	115	Do.
872.....	40	05	39	N.	70	23	52	W.	86	Shells and sponges.
873.....	40	02	00	N.	70	57	00	W.	109	Fine sand and mud.
874.....	40	00	00	N.	70	57	00	W.	85	Do.
875.....	39	57	00	N.	70	57	30	W.	126	Do.
876.....	39	57	00	N.	70	56	00	W.	120	Do.
877.....	39	56	00	N.	70	54	18	W.	126	Do.
878.....	39	55	00	N.	70	54	15	W.	142 <sup>2</sup>	Do.
879.....	39	49	30	N.	70	54	00	W.	225	Do.
880.....	39	48	30	N.	70	54	00	W.	252	Mud and fine sand.
881.....	39	46	30	N.	70	54	00	W.	325	Mud. Trawl partially fouled.
891.....	39	46	00	N.	71	10	00	W.	± 500	Mud and fine sand.
892.....	39	46	00	N.	71	05	00	W.	487	Mud, fine sand, small stones.
893.....	39	52	20	N.	70	58	00	W.	372	Do.
894.....	39	53	00	N.	70	58	30	W.	365	Do.
895.....	39	56	30	N.	70	59	45	W.	238	Do.

The temperature determinations, owing to the violent motions of the steamer, are unreliable at stations 865 to 872. At stations 873 to 878 the bottom temperature was usually 51° to 53° F.; at 879 to 881 it was 42° to 43° F.; at 893 and 894, it was 40°.

## CEPHALOPODA.

The great abundance of Cephalopods in the deep-water localities explored by us is a very interesting and important discovery. Eight species were taken this season. Some of these occurred in large numbers. This collection adds three genera to the New England fauna, two of them new and very curious.

***Heteroteuthis tenera* Verrill.**

Amer. Journ. Science, xx, p. 392, for Nov., 1880 (published Oct. 25).

A small and delicate species, very soft and translucent when living. Body shortish, cylindrical, scarcely twice as long as broad, posteriorly usually round, but in strongly contracted, preserved specimens often narrowed and even obtusely pointed; front edge of mantle with a dorsal angle extending somewhat forward over the neck. Fins very large, thin, longer than broad; the outer edge broadly rounded; the anterior edge extending forward quite as far as the edge of the mantle and considerably beyond the insertion of the fin, which is itself placed well forward. The length of the fin is about two-thirds that of the body; the base or insertion of the fin is equal to about one-half the body length; the breadth of the fin is greater than one-half the breadth of the body. Head large, rounded, with large and prominent eyes; lower eye-lid slightly thickened. Arms rather small, unequal, the dorsal ones considerably shorter and smaller than the others. In the male the left dorsal arm is

greatly modified and very different from its mate. Lateral and ventral arms subequal. In both sexes, and even in the young, the suckers along the middle of the four lateral and two ventral arms are distinctly larger than the rest, but in the larger males this disparity becomes very remarkable, the middle suckers becoming greatly enlarged and swollen, so that eight to ten of the largest are often six or eight times as broad as the proximal and distal ones; they are deep, laterally attached, with a raised band around the middle and a very small, round aperture, furnished with a smooth rim. In the female the corresponding suckers are about twice as broad as the rest on the lateral arms. The suckers are in two regular rows on the lateral and ventral arms, in both sexes. In the male the left dorsal arm becomes thickened and larger from front to back, and usually is curled backward; its suckers become smaller and much more numerous than on the right arm, being arranged in four crowded rows, except near the base, where there are but two; the sucker-stalks also become stout and cylindrical or tapered, their diameter equaling that of the suckers. The right arm remains normal, with two alternating rows of suckers, regularly decreasing to the tip, as in both the dorsal arms of the female. Tentacular arms long, slender, extensible; club distinctly enlarged, usually curled in preserved examples. The suckers on the club are numerous, unequal, arranged in about eight close rows; those forming the two or three rows next the upper margin are much larger than the rest, being three or four times as broad, and have denticulated rims. Color, in life, pale and translucent, with scattered chromatophores. In the alcoholic specimens the general color of body, head, and arms is reddish, thickly spotted with rather large chromatophores, which also exist on the inner surface of the arms, between the suckers, and to some extent on the tentacular arms and bases of the fins; outer part of fins translucent white; anterior edge of mantle with a white border. Length of body 25<sup>mm</sup> to 40<sup>mm</sup>. Pen small and very thin, soft and delicate. It is angularly pointed or pen-shaped anteriorly, the shaft narrowing backward; a thin, lanceolate expansion or web extends along nearly the posterior half. Upper jaw with a strongly incurved, sharp beak, without a notch at its base. Lower jaw with the tip of the beak strongly incurved, and with a broad but prominent rounded lobe on the middle of its cutting edges.

Odontophore with simple, acute-triangular, median teeth; inner laterals simple, nearly of the same size and shape as the median, except at base; outer laterals much longer, strongly curved forward.

Over 150 specimens of this interesting species were secured by the writer and others of the dredging party on the United States Fish Commission steamer "Fish Hawk", September 4, 1880. It was particularly abundant at stations 870 and 871, in about 125 to 150 fathoms, on the rapidly sloping outer bank of the coast, under the inner edge of the Gulf Stream. Both sexes occurred in about equal numbers, and also the young, of various sizes. It was also taken in considerable numbers

at stations 865 to 867, in 65 fathoms; 872 to 880, in 86 to 252 fathoms. It was also obtained by Mr. A. Agassiz, at similar depths, in the same region, as well as farther south, earlier in the season, while dredging on the Coast Survey steamer "Blake".

This species was associated, at station 869, in 192 fathoms, mud, with *Octopus Bairdii* and *Rossia subleris*. It can easily be distinguished from the latter and other species of *Rossia*, not only by the large suckers of the lateral arms, but still better by the inequality of the suckers on the tentacular club. The latter character is obvious in specimens of both sexes and of all ages.

**Gonatus amœnus** (Möller) Gray.

G. O. Sars, Mollusca Regionis Arcticæ Norvegiæ, p. 336, pl. 31; pl. xvii, fig. 2 (figures excellent).

A good specimen of this species, in nearly perfect preservation, was recently presented to the United States Fish Commission by Capt. William Demsey and crew, of the schooner "Clara F. Friend". It was taken from the stomach of a cod, off Seal Island, Nova Scotia.

**Calliteuthis** Verrill.

Amer. Journ. Sci., xx, p. 393, for Nov., 1880 (published Oct. 25).

Form much as in *Histioteuthis*, but without any web between the arms. Body short, tapering to a small free tip; fins small, united behind the tip of the body. Siphon united to the head by two dorsal bands; an internal valve. Mantle connected to the sides of the siphon by lateral elongated cartilages and corresponding grooves on the sides of the siphon. Arms long, free; suckers in two rows, largest on the middle of the lateral and dorsal arms. Eyes large, with oval openings. Buccal membrane simple, sack-like.

**Calliteuthis reversa** Verrill.

Loc. cit., p. 393.

Arms long, tapering, the lateral pairs equal; the dorsal and ventral about equal, somewhat shorter than laterals; tentacular arms slender, compressed (the ends absent). Fins small, thin, transversely rhomboidal, white. Color reddish brown. The ventral surface of the body, head, and arms is more ornamented than the dorsal surface, being covered with large, rounded verrucæ, their center or anterior half pale, the border or posterior half dark purplish brown; upper surface of body with much fewer and smaller scattered verrucæ; a circle of the same around the eyes; inner surfaces of arms and buccal membranes chocolate-brown. Total length, 133<sup>mm</sup>; to base of arms, 67<sup>mm</sup>; mantle, 51<sup>mm</sup>; of fin, 17<sup>mm</sup>; breadth of fins, 24<sup>mm</sup>; of body, 20<sup>mm</sup>; diameter of eye-ball, 16<sup>mm</sup>.

Station 894, 365 fathoms.

**Alloposus** Verrill.

Amer. Journ. Sci., xx, p. 393 (published Oct., 1880).

Allied to *Philonexis* and *Tremoctopus*. Body thick and soft, smooth; arms all (in the male only seven) united by a web extending nearly to

the ends, the length of the arms decreasing from the dorsal to the ventral ones; suckers sessile, simple, in two rows; mantle united firmly to the head by a broad dorsal band and by a ventral and two lateral *commis-sures*, the former placed in the median line, at the base of the siphon; free end of the siphon short, well forward. In the male the right arm of the third pair is hectocotylized and developed in a sack in front of the right eye; as found in the sack it is curled up and has two rows of suckers; the groove along its edge is fringed; near the end the groove connects with a rounded, obliquely placed, lateral, concave lobe, with interior plications. The terminal portion of the arm is a lanceolate thickened process, with ridges on the inner surface.

The permanent attachment of the mantle and neck, by means of commissures, is a very distinctive character.

**Alloposus mollis** Verrill.

Loc. cit., p. 394.

Body stout, ovate, very soft and flabby. Head large, as broad as the body; eyes large, their openings small. Arms rather stout, not very long, webbed nearly to the ends, the dorsal 60<sup>mm</sup> longer than the ventral arms; suckers large, simple, in two alternating rows. Color deep purplish brown, with a more or less distinctly spotted appearance. Length, total, 160<sup>mm</sup>; of body to base of arms, 90<sup>mm</sup>; of mantle, beneath, 50<sup>mm</sup>; of dorsal arms, 70<sup>mm</sup>; breadth of body, 70<sup>mm</sup>. Seven specimens were taken. The sexes scarcely differ in size. Station 880, in 225 fathoms (2 ♂, 1 ♀); 892, 487 fathoms; 893, 372 fathoms; 895, 238 fathoms.

**Argonauta Argo** Linné.

The capture of a living specimen, probably of this species, on the coast of New Jersey, has been recorded by Rev. Samuel Lockwood.\* It was, nevertheless, very surprising to us to find its shells, or fragments of them, very common in nearly all our deeper dredgings, 70 to 100 miles off the southern coast of New England. At station 894 two entire and nearly fresh shells were taken, and another nearly complete. They belong to the common Mediterranean variety.

## GASTROPODA.

**Bela** (Leach) H. & A. Adams; G. O. Sars, &c.

*Pleurotoma* (*pars*) Jeffreys and many earlier authors.

The species of this genus are numerous on our coast, but their identification is difficult, owing to the very poor and insufficient descriptions of many European writers.† Möller's Greenland species, especially, are

\*Amer. Naturalist, xi, p. 243, 1877.

† In Binney's edition of Gould's Invert. of Mass. there are included seven northern species of *Bela*. Of these the figures are mostly inadequate, and some are entirely erroneous. Fig. 620, given for *B. turricula*; Fig. 621, intended for *B. harpularia*; and Fig. 624, for *B. cancellata*, do not really represent those species. Fig. 620 represents *B. harpularia* better than "*B. turricula*", for which it was intended.

badly described. The publication of the excellent work of G. O. Sars has at length rendered it possible to identify many species, hitherto doubtful, with his Norwegian forms, though there may still be doubt as to the proper application of the names given by earlier writers, and even as to the actual specific distinctness of all the forms that he has described. The sexual variations he has not taken into account. During numerous dredging expeditions made in the past twenty years, the writer has obtained a large series of specimens of *Bela*, which he has reserved for a more complete revision hereafter; but some of the more conspicuous forms not yet recorded from New England, and in part not known as American species, are here mentioned. Figures of all these and others have been engraved for a more detailed paper and will, it is hoped, soon be published.

*Bela Pingelii* (Möller, 1842) H. & A. Adams, i, p. 92, 1858.

G. O. Sars, Moll. Reg. Aret. Norv., p. 2-3, pl. 16, fig. 5, 1878.

This very distinct species has been repeatedly dredged by me at Eastport, Me., and by the United States Fish Commission parties in Casco Bay, Massachusetts Bay, on George's Bank, and off Nova Scotia. It has not unfrequently been confounded by authors with *B. cancellata*. It is our most slender and elongated species, with evenly rounded whorls, strongly cancellated, over the whole surface, by numerous slender, longitudinal ribs and revolving raised lines or cinguli, which are about equally prominent, and form small, round nodules where they cross the ribs.

*Bela Sarsii* Verrill, sp. nov.

*Bela cancellata* G. O. Sars, op. cit., p. 224, pl. 23, fig. 31; pl. viii, fig. 9 (not of Couthouy).

This name is proposed for the species described and figured by G. O. Sars as *B. cancellata*. The same species was formerly collected by Dr. A. S. Packard at Labrador, and sent to us by him under the name of *B. exarata*. It is a small, strongly sculptured species, with obtuse, angular-shouldered whorls, and is especially distinguished by its few broad and strong ribs, crossed by rather distant revolving lines, giving it a coarsely cancellated surface.

*Bela cancellata* (Mighels) Stimpson, Check List.

*Fusus cancellatus* Mighels, Proc. Boston Soc. Nat. Hist., i, p. 50, 1841; Boston Journ. Nat. Hist., iv, p. 52, pl. 4, fig. 18, Jan., 1842.

*Bela cancellata* Gould, Invert. Mass., ed. ii, p. 355, description (not the figure. 624).

The true *Bela cancellata* (Mighels) is a common shell on the New England coast, in 20 to 60 fathoms. It is an elongated species, with long, acute spire, and with the whorls moderately and obtusely shouldered at some distance below the suture, the flattened portion above the shoulder being destitute of revolving lines, but crossed by the numerous oblique ribs, which are strongly bent at the shoulder and take a sigmoid form.

Below the shoulder the cinguli are numerous and prominent, crossing the prominent narrow ribs so as to produce a distinct, but not coarse, cancellation. It most resembles the figures of *B. elegans* and *B. angulosa* of Sars. It is perhaps the original *B. declivis* (Lovén), but does not agree with Sars's figure.

***Bela tenuicostata* M. Sars.**

G. O. Sars, op. cit., p. 237, pl. 17, figs. 1 *a, b*; pl. ix, fig. 6 (dentition).

Specimens apparently identical with this species were dredged by me, in moderate depths, at Eastport, Me., in 1864, 1868, and 1870. It was also taken this season at stations 893 and 894, in 365 to 372 fathoms. It is closely related to *B. decussata* Couth., but has smaller and more numerous ribs, and is, therefore, more finely cancellated. It may be only a variety of *B. decussata*. The latter is easily distinguished from all our other species by its oval form, rounded, scarcely shouldered whorls, crossed by very numerous small, narrow, flexuous, sigmoid ribs, which are strongly bent backward near the suture, in conformity with the very distinct, rounded sinus of the lip. The whole surface, except close to the deep suture, is covered with numerous rather fine, close, raised, revolving cinguli, giving the surface a rather finely and regularly cancellated structure.

***Bela Trevelyana* (Turton) H. & A. Adams.**

This has been recorded by Jeffreys from the Gulf of Saint Lawrence. He formerly united *B. decussata* with it, but has subsequently (in Mollusca of Valorous Expedition) distinguished them. I have myself seen no American shells agreeing clearly with English specimens of *B. Trevelyana*. The latter resembles *B. decussata* in form and size, but has the ribs nearly straight and the cancellation coarser than in our shell.

***Bela impressa* ? (Beck) Mörch, Catal. Moll. Spitzberg, p. 17, 1869.**

*Pleurotoma impressa* Leche, Kongl. Svenska Vet.-Akad. Handl., Bd. 16, p. 54, pl. 1, fig. 16, 1878 (author's separate copy).

I refer doubtfully to this species a small but very distinct shell frequently dredged by us, in 10 to 70 fathoms, all along the coast, from off Cape Cod to Nova Scotia. It was also dredged this season at stations 812 to 815, in 27 fathoms, off Block Island.

The shell is greenish white, short-oval, with about five whorls, which are distinctly flattened and angularly shouldered near the deep suture. There are on the last whorl about twenty rather broad, flat ribs, which are a little prominent and usually slightly nodose at the shoulder, but they disappear a short distance below. The most characteristic feature is that the surface is marked by rather fine, but regular and distinct, revolving *grooves* or *sulci*, which are rather distant, with flat intervals. Of these there are usually about three or four on the penultimate whorl, and about twenty on the last, the greater number being below the middle, on the siphon, where they become closer; one of the sulci, just below

the shoulder, is more distinct, and crosses the ribs so as to give their upper ends a subnodulous appearance; below this there is usually a rather wide, smooth zone; no revolving lines above the shoulder. Aperture about half the length of the shell, rather wide, angular; canal short. There is a very distinct, moderately deep, posterior sinus; the middle of the outer lip projects forward strongly. Ordinary specimens are about 6.5<sup>mm</sup> long; 3.5<sup>mm</sup> broad; aperture, .3<sup>mm</sup> long.

Our shell is not so stout as that represented in the figure of Leche, but it agrees very well in other respects.

*Bela exarata* (Möller) H. & A. Ad., Genera, i, p. 92, 1858.

G. O. Sars, op. cit., p. 232, pl. 16, fig. 18; pl. ix, figs. 1 a, b (dentition, &c.).—  
Verrill, Trans. Conn. Acad., v. pl. 43, fig. 15.

A regularly cancellated species of *Bela*, agreeing with Greenland specimens sent under this name from the University Museum of Copenhagen, is not uncommon, ranging from off Massachusetts Bay to the Bay of Fundy and Nova Scotia. It does not agree perfectly, however, with G. O. Sars's figure of the shell, but its dentition agrees well with his figure and seems to be characteristic. The color of the shell is usually pale greenish or greenish white; texture thin; size medium; whorls turreted, flattened, angularly shouldered close to the suture, with the angle of the shoulder rather sharply nodose. Ribs numerous, regular, nearly straight, narrow but rounded, separated by concave intervals of equal or greater width. Whole surface covered with regular and rather strong, elevated, revolving cinguli, which cross the ribs and produce on them small, rounded nodes, and give a very regularly and strongly cancellated appearance to the whole surface. On the penultimate whorl there are about four cinguli below the angle. The flattened space above the shoulder is crossed by the ribs and covered with numerous fine revolving lines. Length, 10<sup>mm</sup>; breadth, 4.5<sup>mm</sup>; length of aperture, 5.5<sup>mm</sup>. A more elongated form, similar to the above, but with the angle of the whorls still more sharply nodose, also frequently occurs. This I have supposed to be the male of the same species, but it agrees closely with Sars's figure of *Bela mitrula* (Lövén). The dentition of *B. exarata* closely resembles that of the latter, as figured by Sars. The teeth are unusually long and large for the size of the shell, rather slender, somewhat curved, acute, with one side excavated to near the tip; basal part short, a little thickened, notched deeply on one side, obtuse.

Living specimens were also dredged this year at stations 880, 892, and 894, in 252 to 487 fathoms.

*Bela rugulata* (Möller) H. & A. Ad., Genera, i, p. 92, 1858.

G. O. Sars, op. cit., p. 230, pl. 23, fig. 6; pl. viii, figs. 13 a-c (dentition).

This is one of the several species that have commonly been confounded under the name of "*Bela turricula*".

Our shell agrees well with the figures and description given by G. O. Sars, both as to its external characters and dentition. The sculpture

is rather coarse, the ribs being strong, with wider and concave intervals; the whorls are strongly angularly shouldered, each of the ribs ending in a distinct nodule, formed by the first spiral groove below the shoulder, which is stronger than the rest; the flattened subsutural area is nearly or quite destitute of spiral lines, but is crossed by slight flexuous extensions of the ribs; the whole surface below the shoulder is covered with strong spiral lines, between the ribs. On the upper whorls a few of the revolving lines are stronger than the rest, forming with the ribs a coarsely cancellated structure.

The dentition is very characteristic, and entirely different from *B. exarata*, *B. harpularia*, and other allied forms. The uncini are broad, flat, lanceolate, with a sharp, slightly barbed tip, and with a broad bilobed base.

This species has frequently been dredged by us in Massachusetts Bay, Bay of Fundy, &c., in 5 to 50 fathoms.

**Bela simplex** (Middend.).

G. O. Sars, Moll. Reg. Arct. Norv., p. 239, pl. 17, fig. 4; pl. 23, fig. 11; pl. ix, fig. 9 (dentition).

*Bela lavigata* Dall (teste G. O. Sars).

One dead, but fresh, small specimen, from station 894. The whorls are very convex and evenly rounded, nearly smooth, but covered with fine and close spiral lines, crossed by still finer lines of growth; subsutural zone smooth. The apex of the spire is acute. The three apical whorls are chestnut-brown; their surface is finely decussated by equal lines running in opposite directions.

**Bela hebes** Verrill, sp. nov.

Shell short-fusiform or subovate, with a short, blunt spire and five well-rounded, slightly turreted whorls: suture impressed. Sculpture numerous small, regular, raised, spiral ridges, with wider interspaces, those just below the suture stronger and more distant; lines of growth faint. Aperture narrow-ovate. Outer lip expanded below the suture, then regularly rounded, thin; the posterior sinus is broad and shallow; canal short and broad, straight; columella regularly incurved. Epidermis thin, greenish white. Length, 8<sup>mm</sup>; breadth, 5<sup>mm</sup>; length of aperture, 5<sup>mm</sup>; its breadth, 1.80<sup>mm</sup>; length of body-whorl, front side, 6.35<sup>mm</sup>.

Stations 891 and 892, in 500 and 487 fathoms; four specimens.

**Pleurotoma (Pleurotomella) Agassizii** Verrill & Smith.

Amer. Journ. Sci., xx, p. 394, for Nov., 1880 (published Oct. 25).

This large and elegantly sculptured species occurred sparingly, living, in many of the off-shore localities (869, 871, 874, 877, 880), in 65 to 252 fathoms, but it was taken in larger numbers at stations 891 to 895, in 238 to 500 fathoms. The two nuclear whorls are very small, chestnut-brown, scarcely carinated, rounded, with the surface finely cancellated by lines running obliquely, in two directions, but close to the suture only the transverse lines appear.

**Pleurotoma (Pleurotomella) Pandionis** Verrill, sp. nov.

Shell large, thick, dull brownish yellow, with a very acute, elevated spire; whorls nine, very oblique, moderately convex, concave below the suture; whole surface covered with close lines of growth, which recede in a broad curve on the subsutural band; numerous fine, unequal, raised, spiral lines cover the whole surface, except the subsutural band. The upper whorls are also crossed by sixteen to eighteen blunt, transverse ribs, about as broad as their interspaces, most elevated on the middle of the whorls, fading out above and below. Aperture elongated, narrow; sinus broad and well marked, just below the suture; canal short, nearly straight. Operculum absent. Length, 43<sup>mm</sup>; breadth, 14.5<sup>mm</sup>; length of aperture, 19<sup>mm</sup>; its breadth, 5.5<sup>mm</sup>.

A large specimen was taken alive at station 895, in 238 fathoms.

**Pleurotoma Carpenteri** Verrill & Smith.

Amer. Journ. Sci., xx, p. 395 (published Oct., 1880).

Only a few specimens were taken, stations 871 to 873, in 86 to 115 fathoms.

This species very likely belongs to *Mangelia*, but I have had for examination no specimens with the animal.

**Taranis Morchii** ? (Malm) Jeffreys, Annals and Mag., v, 1870.

G. O. Sars, Moll. Reg. Arct. Norv., p. 220, pl. 17, fig. 8.

Two good examples of a prettily sculptured shell, which I refer doubtfully to this species, were taken at station 894, in 365 fathoms, off Newport, R. I. They do not agree fully with Sars's figure and description.

Whorls six, the lower ones sharply angulated and carinated. There are five revolving, nodulous carinæ on the body-whorl, one close to the suture; the second and most prominent surrounds the periphery; the other three are on the anterior half; some faint additional ones appear on the canal; the three preceding whorls have the subsutural and the sharp central carina, and usually the third carina is more or less exposed at the suture. Between the first and second carinæ the surface is flat or slightly concave. The whorls are crossed by numerous thin, delicate, flexuous, regularly spaced, raised ribs, which are conspicuous between the carinæ, and produce sharp nodules where they cross them. The nucleus is small, rounded, light chestnut-brown, minutely cancellated with microscopic lines running in two directions. Sinus of the lip shallow, rounded. Length, 4<sup>mm</sup>; breadth, 2<sup>mm</sup>.

The principal difference between our specimens and the form figured by Sars is that in the latter there are more carinæ, two of which surround the periphery, instead of one.

**Taranis pulchella** Verrill, sp. nov.

A smaller and more slender species than the preceding, with a more acute spire, and with the carinæ sharp, but not nodulous. Whorls seven, angular, the lower ones carinated and shouldered. Body-whorl

with six revolving carinæ, besides one or two on the canal; one is just below the suture; the three largest surround the periphery, the median one most prominent. Between the subsutural and second carinæ the surface is concave and crossed by numerous elevated, thin, curved riblets, corresponding to the labial sinus; similar but less prominent and less curved riblets cross the interspaces between the other carinæ, but do not cross the carinæ themselves. Penultimate whorl with the subsutural and two peripheral carinæ. Preceding whorls without distinct carinæ, except the subsutural one, but with the curved, transverse, raised riblets well developed. Nuclear whorls very small (surface eroded). Aperture narrow, angular; canal short, slightly turned to the left; outer lip with a distinct, evenly rounded sinus below the subsutural carina. Columella slightly incurved and flattened. Length, 2.20<sup>mm</sup>; breadth, .90<sup>mm</sup>; length of body-whorl, 1.40<sup>mm</sup>; of aperture, .95<sup>mm</sup>.

Station 892, in 487 fathoms; one specimen.

**Marginella roscida** (?) Ravenel.

A single dead specimen, closely resembling this species, was taken at station 865, in 65 fathoms.

**Tritonofusus latericeus** (Möll.) Mörech.

*Sipho latericeus* G. O. Sars, Moll. Reg. Arct. Norv., p. 276, pl. 15, fig. 8; pl. x, fig. 24 (dentition).

Several specimens, apparently of this species, were taken at stations 894 and 895, in 238 to 365 fathoms, off Newport. It had previously been dredged in the Gulf of Saint Lawrence by Dr. J. W. Dawson.

Our shell is long-fusiform, with an elevated, acute spire; whorls eight, moderately convex, crossed by strong, prominent, rounded ribs (about eighteen on the last whorl), separated by concave interstices, wider than the ribs; whole surface covered with fine and regular spiral grooves, defining raised spiral lines of about double their width; these lines cross the ribs as well as their interspaces. Nuclear whorl small, a little eccentric and incurved. Aperture long-ovate, narrow. Canal somewhat elongated, nearly straight, narrow; the outer lip is contracted or incurved at its base. Length, 20<sup>mm</sup>; breadth, 8<sup>mm</sup>; length of aperture, 10<sup>mm</sup>; its breadth, 3<sup>mm</sup>.

**Neptunea (Sipho) cœlata** Verrill, sp. nov.

Shell resembling the last, small, subfusiform, with an elevated spire, which is less acute than in the preceding, while the aperture is shorter and the canal is shorter and more recurved than in that species. Whorls six, moderately convex, with impressed sutures, the upper whorls decreasing more rapidly. Nuclear whorls very small, regular, smooth, not distinctly incurved. Sculpture broad, rather prominent, rounded ribs, with wider concave interspaces, and over the whole surface numerous small, narrow, unequal, raised spiral lines, separated by wider grooves. The whole surface is also covered with very fine and regular raised lines of growth, which cross and roughen the spiral raised lines, and are more

conspicuous in the grooves, producing a fine decussated structure. On the last whorl are fourteen to sixteen of the transverse ribs or folds; these become obsolete just below the periphery, so that on the base there are only spiral lines and lines of growth. Aperture narrow-ovate. Outer lip evenly rounded in the middle, but contracted at the base of the canal, which is short, rather narrow, and distinctly recurved. Columella decidedly curved. Epidermis thin, yellowish white, closely adherent, with distinct lines of growth. Length, 14.5<sup>mm</sup>; breadth, 7<sup>mm</sup>; length of aperture, with canal, 7<sup>mm</sup>; its breadth, 3<sup>mm</sup>; length of body-whorl, front side, 10<sup>mm</sup>. Stations 891 to 895, 238 to 500 fathoms, with the preceding; several specimens, living.

*Neptunea (Sipho) arata* Verrill, sp. nov.

Stations 869 to 880, 893 to 895; common. Nearly all our deep-water specimens related to *N. Stimpsoni* Mörch (= *Fusus Islandicus* Gould) differ widely from the common shallow-water form, in having the whole surface much more strongly sulcated by broader, deeper, and less numerous spiral grooves. On the upper whorls there are seven or eight of these broad grooves, separating flattened spiral ridges of about the same width; on the last whorls the ridges become broader, and each of them is divided at summit by a smaller secondary groove. The canal is rather long, slightly recurved. Columella twisted, but not much bent. Epidermis not pilose, yellowish brown, often in raised lines along the lines of growth. Color within aperture bluish white, the columella and canal tinged with flesh-color or pale salmon. Length, 80<sup>mm</sup>; breadth, 30<sup>mm</sup>; length of aperture, with canal, 45<sup>mm</sup>; its breadth, 14<sup>mm</sup>.

The typical, nearly smooth variety of *N. Stimpsoni* Mörch is perhaps the same as *N. glabra* Verkrusen, sp. (= *Sipho glaber* G. O. Sars).

*Neptūnea (Sipho) propinqua* (Alder).

*Fusus propinquus* Alder, Catal. Moll. North. & Durh.; Jeffreys, British Conch., iv, p. 332; v, pl. 85, fig. 3.

*Neptunea propinqua* Verrill, Amer. Journ. Sci., xvi, p. 210, 1878.

This shell was first taken by us, in 1877, off Cape Sable, and off Halifax, Nova Scotia, in 88 to 100 fathoms, where it was common. This season it occurred in abundance, living, and of good size, in most of our outer dredgings, being the most common species of this family, except *N. pygmaea*. It occurred at all the stations from 865 to 874, 876 to 880, 893 to 895, ranging in depth from 65 to 487 fathoms. It was most abundant at 869 to 871, 894 and 895, in 115 to 365 fathoms.

Although it does not agree perfectly with the European specimens of *N. propinqua* that I have had for comparison, I have recorded it under this name, largely in deference to the opinion of Mr. W. H. Dall, who has made a special study of this group, and who has had some of our specimens for comparison.

This shell is somewhat stouter and more ventricose than the ordinary forms of *N. Stimpsoni* and *N. arata*, from which it differs, also, in having

an olive-colored, ciliated epidermis; the canal is shorter and more curved and twisted; the suture is slightly channeled, and the aperture is broader than in either of these species. The sculpture consists of regular, narrow, spiral grooves. The aperture is white.

**Buccinum cyaneum** Brug.; Stimpson.

*Buccinum Grönlandicum* G. O. Sars, op. cit., p. 259, pl. 25, fig. 1; pl. x, fig. 11 *a*, *b* (*non* Stimpson).

This species was dredged in the summer of 1879, by the "Speedwell", off Cape Cod, in 90 fathoms. It was dredged by us in 1877, off Cape Sable, Nova Scotia, in 80 to 90 fathoms, compact sand, and off Halifax, in 100 fathoms, and has often been brought in from the banks off Nova Scotia by the Gloucester fishermen, but it was not previously actually known from the New England coast.

**Nassa nigrolabra** Verrill, sp. nov.

Shell minute, long-ovate, nearly smooth, pale olive, with the edges of the lips blackish. Whorls five, slightly rounded, with shallow sutures; spire elevated, not very acute. Surface covered with close, regular, microscopic lines of growth, and with less distinct revolving lines; canal with a few minute, distinct, spiral grooves. Aperture short-ovate; canal wide and very short; outer lip rounded, with edge flaring, thickened and revolute, with a row of minute nodules on the inside; inner lip consisting of a broad, smooth, glossy, brownish-black deposit of enamel on the body-whorl and columella; columella nearly straight; no umbilicus. Length, 2.85<sup>mm</sup>; breadth, 1.40<sup>mm</sup>; length of aperture, 1.20<sup>mm</sup>.

Station 870, in 155 fathoms; one specimen. It is referred to *Nassa* only provisionally. The animal is not known.

**Lunatia nana** (Möller).

G. O. Sars, op. cit., p. 159, pl. 21, figs. 16 *a*, *b*; pl. v, fig. 14 (dentition).—Verrill, Proc. Nat. Mus., ii, p. 197, 1879.

In addition to the localities off Cape Cod and on Le Have Bank, previously cited by me, this species has been taken at other localities on our coast. It was taken by Prof. S. I. Smith and myself at Eastport, in 1864; by Prof. H. E. Webster at Seal Cove, Grand Menan, in 1872; by Mr. J. F. Whiteaves in the Gulf of Saint Lawrence; and by our party in 1880, twenty miles south of Block Island, in 28 fathoms.

**Lunatia levicula** Verrill, sp. nov.

Shell light, thin, and rather delicate, broad-ovate; spire moderately elevated, subacute. Whorls five, evenly rounded; suture distinct. Aperture ovate, well rounded below. Outer lip short, sinuous along the edge, the upper portion considerably advancing where it joins the body-whorl. Inner lip partially reflexed over a rather small, deep umbilicus, but not thickened, and forming a mere film on the body-whorl, above the umbilicus. Surface covered with distinct and rather coarse, sinuous lines of growth, parallel with the edge of the lip, and, like it, advancing as they approach the suture. Color (of a dead but fresh

shell) pale brownish yellow; the spire, when worn, and the interior, yellowish brown. Other specimens are white or yellowish white. Length, 32<sup>mm</sup>; breadth, 25<sup>mm</sup>; length of aperture, 27<sup>mm</sup>; its breadth, 15<sup>mm</sup>.

This shell was first dredged by me near Eastport, Me., in 1870. It has since been dredged by the United States Fish Commission parties in Casco Bay, Me., and also off Block Island, stations 812 to 814, in 26 to 28 fathoms. It is still a very rare species. It has some resemblance to *Acrybia flava*, on account of the lightness and thinness of the shell, as well as in form, but the shape of the aperture is different, and there is a distinct umbilicus. The columella is also much less incurved.

#### *Lamellaria pellucida* Verrill.

Amer. Journ. Sci., xx, p. 395, for Nov. (published Oct. 25, 1880).

Animal broad-elliptical, well rounded, both anteriorly and posteriorly; back convex or somewhat swollen, smooth, without tubercles; branchial sinus, in anterior edge of mantle, shallow but distinct; tentacles slender, tapered; eyes small, black, on the outer basal portion of the tentacles; foot oblong, well developed, reaching nearly to the posterior end of the mantle when extended. Color of the mantle yellowish brown, blotched irregularly with dark brown; some specimens were paler, others darker brown.

Odontophore long and narrow, with three rows of teeth; central tooth much smaller than the lateral, its basal part oblong, with nearly parallel sides and squarely truncate at the end; tip acute-triangular, strongly curved forward, with a prominent, sharp, median denticle, and a row of four or five much smaller denticles on each side. Lateral teeth very large, strongly incurved, and hollowed out on the concave surface, with both edges serrate; the inner edge has the serrations coarser, not reaching the tip, which is smooth, stout, acute. The basal portion of the lateral teeth is furnished with a broad, sinuous, aliform lobe on the outer edge; the basal end is slightly expanded and obtusely round or subtruncate.

The most important difference between the dentition of this species and that of *L. perspicua* and *L. latens* (Müll.) is in the form of the basal portion of the median teeth; in both the European species this is divided into two divergent lobes, separated by a deep notch.

Shell ovate, with a well-formed spire, very thin and delicate, smooth, lustrous, and transparent. Aperture broad-ovate, much larger than the body of the shell, but not so large and open as in *L. latens*. The interior of the spire cannot be seen in a ventral view, but is visible in an end view from the front. The spire is oblique, somewhat elevated, and slightly pointed, with a minute nucleus. Whorls three, well rounded; sutures impressed. Outer lip very thin, sloping or somewhat flattened posteriorly, somewhat expanded and well rounded anteriorly; inner lip receding in a deep, regular incurvature of the body-whorl, which has a sharp, thin edge that winds spirally into the interior of the spire. Sculp-

ture none, except indistinct lines of growth; surface smooth and shining throughout.

Length of the animal in life about 15<sup>mm</sup> to 20<sup>mm</sup>; length of shell, 12.5<sup>mm</sup>; breadth, 10<sup>mm</sup>.

Stations 870 to 872, south of Martha's Vineyard, in 86 to 155 fathoms, fine sand (16 specimens, living).

The shell of this species, in form, closely resembles that of the European *L. perspicua* (not of Gould), but the differences in the mantle and dentition will clearly separate it. Specimens of both sexes occurred, and they had the same form and color externally.

The "*Lamellaria perspicua*" of Gould was based, in part at least, upon *Marsenina glabra*. A species of *Lamellaria* occurs at Eastport, Me., which may be distinct from the preceding.

**Marsenina prodita** (Lovén) Bergh.

G. O. Sars, Moll. Reg. Arct. Norv., p. 151, pl. 12, figs. 5 *a-c*; pl. v, figs. 7 *a, b* (dentition).—Verrill, Trans. Conn. Acad., v, pl. 42, figs. 2, 2 *a*.

This species was taken, living, at Eastport, Me., by Prof. S. I. Smith and myself, in 1864 and 1868. It is easily recognized by its comparatively prominent, acute spire, turned to one side, by its obliquely elongated aperture, and by the margin of the outer lip being slightly inflexed near the suture. It has not been previously recorded from the American coast, south of Greenland.

**Marsenina glabra** Verrill.

*Oxinoë glabra* Couthouy, Boston Journ. Nat. Hist., ii, p. 90, pl. 3, fig. 16, 1838.

*Lamellaria perspicua* (*pars*) Gould, Binney's ed., p. 337, fig. 607 (?).

*Marsenina micromphala* Bergh.—G. O. Sars, op. cit., p. 151, pl. 21, figs. 10 *a-d*.—Verrill, Trans. Conn. Acad., v, pl. 42, figs. 1, 1 *a*.

This species is not uncommon at Eastport, Me., where I collected it in 1859, 1861, 1863, 1864, 1868, 1870, and 1872. It was dredged last year by our party, on the "Speedwell", off Cape Cod, in 34 fathoms. It has a much smaller and less prominent spire than the preceding, and a more regularly oblong-oval aperture. The shell is smooth, white, thin, and delicate in both species, but more translucent in the present one.

There can be no doubt, from the description and figure, that the *Oxinoë glabra* of Couthouy was a *Marsenina* indistinguishable from this species, which is the commonest of the group on our coast. The *M. micromphala*, well described and figured by Sars, appears to agree perfectly with our form, both in the animal and shell.

Gould appears to have confounded two or more species under his *L. perspicua*. His figure (158) in the first edition does not represent this species; the figure 607 of Binney's edition is different, and may be this shell. As a genuine *Lamellaria*, having its shell entirely inclosed in the mantle, also occurs on our coast, not rarely at Eastport, Me., it is not improbable that Gould may have had its shell among those examined by him. Its identity with *L. perspicua* of Europe is very doubtful, however.

**Marsenina ampla** Verrill, sp. nov.

Trans. Conn. Acad., v, pl. 42, figs. 3, 3a.

Shell broad-oval, white, nearly opaque, fragile, with conspicuous lines of growth, but otherwise smooth; whorls scarcely two; last whorl very large, constituting nearly the entire shell, and nearly concealing the first whorl, which appears only as a minute incurved nucleus, situated in an apical depression. Aperture broad, oblong-oval, showing the interior of the spire to the apex. Outer lip thin, distinctly expanded and slightly shouldered near the suture, somewhat straight along the right and left sides, regularly rounded in front, slightly excurved where it joins the inner lip, which consists of a narrow and thin coating, conformable to the columella surface, but with a distinct, narrow groove, and with the edge slightly raised as a narrow lamina in the umbilical region. The columella-edge is sigmoid and very much incurved in the umbilical region.

Length, 11<sup>mm</sup>; breadth, 8<sup>mm</sup>; depth of last whorl, 5<sup>mm</sup>.

Eastport, Me. Dredged in 1868, by the writer.

**Velutella cryptospira** (Middend.).

G. O. Sars, Moll. Reg. Arct. Norv., p. 149, pl. 21, figs 9 a-c.

A good living example of this shell was taken by us in 1877, off Halifax, Nova Scotia, in 57 fathoms (station 82).

The shell is very thin, translucent, yellowish horn-color, flexible, and but slightly calcified, with no sculpture except fine lines of growth. The spire is small, incurved, and depressed, so that the apical whorl is not visible in a front view. The aperture is elongated. The outer lip expands rather abruptly posteriorly, and is prolonged anteriorly.

Length, 8<sup>mm</sup>; breadth, 5<sup>mm</sup>; length of aperture, 6.5<sup>mm</sup>.

**Trichotropis conica** Möller.

Krøyer's Tidss., iv, p. 85, 1842.—G. O. Sars, op. cit., p. 163, pl. 13, fig. 3.

A single dead, but large and characteristic, specimen of this very distinct species was taken in the Gulf of Maine, off Cape Sable, Nova Scotia, in 75 fathoms, by the United States Fish Commission party, on the "Speedwell", in 1877. It is easily recognized by its conical spire and its flattened base, covered with revolving grooves and ridges. The revolving ribs on the spire are stronger than those on the base, and unequal.

**Rissoa (Cingula) harpa** Verrill, sp. nov.

Shell small, white, translucent, acute-conical, with five very convex, rounded whorls and deeply impressed sutures; body-whorl large; apical whorl very small, smooth, regular. Sculpture very regular, well-raised, rounded, transverse ribs, about twenty-six on the last whorl, separated by spaces rather wider than the ribs; and fine, close, microscopic spiral lines, which cover the interspaces. Aperture nearly circular, slightly effuse in front. Outer lip thin, regularly rounded; inner lip reflexed in the umbilical region, and continued on the body-whorl only

as a thin layer of enamel. Umbilicus a small but distinct chink. Length, 2.75<sup>mm</sup>; breadth, 1.80<sup>mm</sup>. Animal unknown.

Dredged by us off Massachusetts Bay, 1877, station 34, in 160 fathoms; and off Newport, at stations 892 and 894, in 487 and 365 fathoms.

**Cingula turgida** (Jeff.) Verrill.

*Rissoa turgida* Jeffreys.—G. O. Sars, Moll. Reg. Aret. Norv., p. 183, pl.10, figs. 12 a, b.

A very small, white species, with smooth, rounded whorls and distinct umbilicus. Station 892, in 487 fathoms.

**Cingula Jan-Mayeni** (Friele) Verrill.

*Rissoa Jan-Mayeni* Friele, Nyt. Mag. Naturv., 1877 (anth. cop., p. 4, fig. 4).  
*Cingula Jan-Mayeni* Verrill, Amer. Journ. Sci., xvii, p. 311, Apr., 1879.

This species was common at stations 891 to 894, in 238 to 500 fathoms. A single specimen occurred at station 880. It was originally from off Greenland, 70 to 300 fathoms. Whiteaves has dredged it in the Gulf of Saint Lawrence, 200 fathoms, but it had not hitherto been taken on the New England coast.

**Lepetella** Verrill.

Amer. Journ. Sci., xx, p. 396, Nov., 1880.

Shell small, smooth, oval or oblong, limpet-shaped, conical, with a simple subcentral apex, not spiral. Animal much as in *Lepeta*, but with distinct eyes. Odontophore faniglossate, with seven regular rows of teeth; median tooth a rather broad, thin plate, with incurved, smooth, convex edge, narrower than the base; inner lateral tooth stout, with a broad base and a single incurved, terminal denticle; second lateral tooth larger, with a broader flat base and two terminal incurved denticles; outer laterals smaller, flattened, subtriangular plates.

**Lepetella tubicola** Verrill & Smith.

Loc. cit., p. 396, 1880.

Shell thin, white, smooth, conical, with the apex acute and nearly central; aperture broad-elliptical, oblong, or subcircular, usually more or less warped, owing to its habitat; edge thin and simple. Sculpture none, lines of growth slight, outer surface dull white; inner surface smooth, with the pallial markings faint. Length of largest specimens, 3.75<sup>mm</sup>; breadth, 3<sup>mm</sup>; height, 2<sup>mm</sup>. On inside of old tubes of *Hyalinœcia artifex* V.; twenty-seven were taken from one tube. Stations 869, 192 fathoms, and 894, 365 fathoms.

**Lovenella Whiteavesii** Verrill, loc. cit., p. 396, 1880.

*Cerithiopsis costulatus* Whiteaves (*non* Möller).

A small and elegant species, allied to *L. metula* (Lovén). Elongated, subulate; spire regularly tapering to the acute apex; whorls nine, slightly convex, with a prominent, nodulous, revolving carina below the middle, and a smaller one just below the suture; on the body-whorl another less elevated and scarcely nodose carina revolves in line with

the edge of the lip; below this the base is smooth. Whorls crossed by numerous transverse, curved, elevated, rounded costæ, which are about as wide as their intervals, and in crossing the two upper cingulæ form small rounded nodes at their intersections. Aperture broad; columella much incurved above; canal distinctly excurved and twisted; outer lip with three angles corresponding with the three carinæ. Length, 4.5<sup>mm</sup>; breadth, 1.5<sup>mm</sup>. The largest specimen measures, in length, 6.25<sup>mm</sup>; in breadth, 2<sup>mm</sup>. Stations 891, 892, and 894, in 365 to 500 fathoms; Gulf of Saint Lawrence, 200 fathoms, J. F. Whiteaves.

**Truncatella truncatula** (Drap.).

Jeffrey's British Conch., iv, p. 85, pl. iv, fig. 1.—Verrill, Amer. Journ. Sci., xx, p. 250, Sept., 1880.

This species was found by the writer, living in considerable numbers, and of all ages, among the docks at Newport, R. I., July, 1880. It occurred among decaying sea-weeds thrown up at high-water mark, both among the vegetable matter and on the under sides of stones. It was associated with *Alexia myosotis*, *Assiminea Grayana*, *Anurida maritima*, *Orchestia agilis*, &c.

It may possibly have been introduced in recent times by commerce, like the *Littorina littorea*, now so common on our shores; but if so, it has, like the latter, become thoroughly naturalized. This is the first time that it has been observed on our coast, so far as known to me.

**Solarium boreale** Verrill & Smith, sp. nov.

A small, pretty, pale yellowish brown species, with a strong carina-like, rounded, nodulous rib around the periphery. Height, 2.5<sup>mm</sup>; breadth, 5<sup>mm</sup>.

Two living specimens from station 871, 115 fathoms. The spire is low and flattened; nuclear whorl smooth, obliquely incurved, reddish; body-whorl strongly keeled, triangular; above the keel, flattened, and near it, are about six small spiral ribs, separated by impressed lines; upper surface of whorls also crossed by numerous flexuous, transverse, low ribs, with shorter ones interpolated toward the periphery. Base a little convex, about as much so as the spire; toward the periphery covered with numerous fine spiral lines; also covered with many low ribs radiating from the umbilicus, around which they are nodulous. Aperture triangular, with a notch corresponding to the keel.

**Scalaria Pourtalesii** Verrill & Smith.

Amer. Journ. Sci., xx, p. 395, Nov., 1880.

Three fine specimens, one of them living, from stations 871, 873, and 874, in 85 to 115 fathoms.

**Scalaria**, sp.

An undetermined *Scalaria*, having the sculpture much as in *S. Grönlundica*, but more slender in form, was taken at station 873. The spiral lines are very distinct between the ribs, and also extend over them.

**Scalaria Dalliana** Verrill & Smith.

Amer. Journ. Sci., xx, p. 395, Nov., 1880.

Several specimens, living, from stations 869, 870, 871, and 874, in 65 to 155 fathoms.

**Acirsa gracilis** Verrill, sp. nov.

Shell white, with a long, slender, regularly tapered, rather acute spire and deeply impressed sutures. Whorls eight, evenly rounded, all except the last crossed by slightly raised but distinct rounded ribs, separated by wider interspaces; the ribs are most elevated just below the sutures and on the upper whorls. Lower whorls with numerous (eight or more) fine, slightly impressed spiral lines, producing narrow spiral cinguli, of which the lowest on the last whorl is strongest and borders the base of the shell, which is convex and smooth. The spiral lines are absent near the sutures. Mouth round-ovate, slightly effuse in front. Inner lip slightly reflected. No umbilicus.

Stations 873 and 894, in 100 to 365 fathoms.

This species is much more slender than *Acirsa costulata* Migh., sp., 1841 (= *A. borealis* and *A. Eschrichtii* of authors), and its ribs are more regular and distinct. *A. praelonga* Jeffreys has much finer sculpture.

**Aclis Walleri** Jeffreys.

G. O. Sars, Moll. Reg. Arct. Norv., p. 196, pl. 11, fig. 18.

Three living specimens were taken at stations 892 and 894, in 487 and 365 fathoms.

**Aclis striata** Verrill, sp. nov.

Shell small, white, somewhat lustrous, fragile, with moderately elevated spire; whorls six, well rounded, with deep sutures, the last one ventricose. Sculpture numerous fine, close, spiral grooves, covering the whole surface. Aperture simple, ovate. Outer lip thin, with a wide and rather deep sinus below the suture, but projecting strongly forward in the middle, where it is regularly rounded, then recedes somewhat anteriorly, joining the inner lip in an even curve. Inner lip discontinuous, slightly concave and reflected in the umbilical region, where it joins the body-whorl. Umbilicus narrow, but deep. Nuclear whorl small, regular, smooth. Length, 4<sup>mm</sup>; breadth, 2<sup>mm</sup>.

One specimen was dredged by me in the Bay of Fundy, near Eastport, Me., in 1868; another was dredged in deep water off Newport, R. I., this season, by the United States Fish Commission.

This species is provisionally referred to *Aclis* because of its general resemblance to known species of that genus. Both my specimens were dead, and I have, therefore, no means of knowing the structure of the animal. Its regular apical whorl shows that it is not an *Olostomia*. The marked sinus of the outer lip and the distinct umbilicus are features not found in any other shell of our coast of similar size and appearance. Dead and broken specimens might be taken for bleached *Cingula aculeus*,

but the latter has a different aperture, continuous lip, and no umbilicus, and its sculpture is coarser.

**Calliostoma Bairdii** Verrill & Smith.

Amer. Journ. Sci., xx, p. 396, for Nov., 1880 (published Oct. 25).

Stations 865 to 874, in 65 to 192 fathoms; many living specimens. Most common at stations 869 and 871, in 192 and 115 fathoms.

**Margarita regalis** Verrill & Smith.

Amer. Journ. Sci., xx, p. 397, for Nov., 1880 (published Oct. 25).

Stations 870, 871, 880 to 895, from 115 to 500 fathoms. Most abundant at stations 892 to 894, in 365 to 487 fathoms.

**Margarita lamellosa** Verrill & Smith.

Amer. Journ. Sci., xx, p. 397, for Nov., 1880 (published Oct. 25).

Stations 869 and 871, 115 to 192 fathoms. Only two specimens obtained.

**Margarita**, sp. nov.

A small, elevated, conical, nearly smooth, white, and iridescent species, with a small, narrow umbilicus, was dredged by us off Halifax, Nova Scotia, in 1877. The specimen is not now at hand for accurate description.

**Machæroplax bella** (Verk.).

G. O. Sars, op. cit., p. 137, pl. 9, figs. 5 a-c.

An elegant species, allied to *M. varicosa*, but with more elaborate sculpture. As in the latter, the whorls are crossed by oblique, flexuous, rounded, transverse folds, but there are, in addition, in *M. bella* four conspicuous revolving ribs on the last whorl; the upper one is large and nodulous, giving the whorls an angular or somewhat carinated form; the two lower ribs are smaller and close together, the third one at, and the fourth just below the basal angle of the whorl. On the other whorls only the two upper ribs are visible. Base with curved transverse ridges, crossed by fine revolving lines. Umbilicus moderately large and deep, with very distinct spiral lines within it.

Off Cape Sable, Nova Scotia (loc. 47), 90 fathoms, fine, compact sand, United States Fish Commission, 1877. One living and one dead specimen. New to the American coast.

**Cyclostrema trochoides** (Jeff. MSS.) Friele.

Arch. Math. Naturv., 1876, p. 308, pl. 4, figs. 2 a, b—G. O. Sars, op. cit., p. 131, pl. 8, figs. 9 a-c.

A few specimens of this little shell were trawled at stations 892 and 894, in 487 and 365 fathoms. In our specimens the umbilicus is, in most cases, a narrow chink, but in one it is closed. There are distinct spiral lines immediately around the umbilicus. It is new to the American waters.

**Assiminea Grayana** Leach.

Jeffrey's British Conch., v, p. 99, pl. 4, fig. 1; pl. 97, fig. 5.—Verrill, Amer. Journ. Sci., xx, p. 250, Sept., 1880.

This was found in July of this year, by the writer, living among decaying sea-weeds, at high-water mark, between the docks at Newport, R. I. It was associated with *Alexia myosotis* and *Truncatella truncatula*, and was rather more abundant than either of the latter. Drawings of the animal of this and the two species last named were made by Mr. J. H. Emerton. The animal agrees well with the figures and descriptions of the European examples. It has not been recognized as American before.

**Eulima intermedia** Cantraine.

G. O. Sars, op. cit., p. 210, pl. 11, fig. 20; pl. xviii, fig. 41.

Several living specimens were taken at stations 870, 871, 874, 876, and 877, in 85 to 155 fathoms. It has previously been known from deep water in the Mediterranean, and off the Canary Islands, Lofoden Islands, and Finmark (200 to 300 fathoms).

This shell is more slender than *E. oleacea*. The sutures are not at all impressed; the whorls are flattened so that the spire has a regular, long-conical form. Aperture regularly ovate. The surface is smooth, polished, and shining. Color of shell pure white, translucent; in life the animal shows through, giving it a pale orange or salmon color. Length, 5.6<sup>mm</sup>; breadth, 1.6<sup>mm</sup>.

**Eulima distorta** Deshayes.

G. O. Sars, op. cit., p. 210, pl. 11, fig. 23.

A single living specimen of this curious little shell was obtained at station 871, in 115 fathoms.

**Turbonilla nivea** Stimpson, Check List.

*Chemnitzia nivea* Stimpson, Proc. Boston Soc. Nat. Hist., iv, p. 114, 1851; Invert. Grand Manan, p. 23, 1853.

One perfect specimen of this very rare shell was dredged at station 871, in 115 fathoms.

It is distinguished by its very slender, elongated form, with twelve flattened, closely coiled whorls and slightly marked sutures. The sculpture consists of well-marked, regular, transverse, rounded ribs, with smooth interstices; no spiral lines. Color white; surface shining. Apical whorl small, incurved, and reversed. Length, 6.5<sup>mm</sup>; breadth, 1.5<sup>mm</sup>.

**Turbonilla Rathbuni** Verrill & Smith.

Amer. Journ. Sci., xx, p. 398, Nov., 1880.

Several fine living specimens were taken at stations 865 to 867, in 64 and 65 fathoms, and at stations 893 to 895, in 238 to 365 fathoms.

Dedicated to Mr. Richard Rathbun, of the United States Fish Commission.

**Turbonilla formosa** Verrill & Smith.

Amer. Journ. Sci., xx, p. 398, Nov., 1880.

A few living examples of this elegant shell occurred at stations 891 and 892, in 487 to 500 fathoms.

**Turbonilla Smithii** Verrill, sp. nov.

Shell long and slender, smooth, polished, white, with a narrow spiral band of light yellowish brown or red just above the suture. Whorls up to twelve, much flattened, little oblique, closely coiled, with the sutures only slightly impressed; apical whorl small, incurved. Sculpture none. Aperture irregular oblong-ovate; outer lip nearly straight for about half its length, rounded and slightly prominent anteriorly. Columella lip nearly straight anteriorly, but curved inward and twisted posteriorly, with a slight spiral fold that winds into the shell. Length, 7.5<sup>mm</sup>; breadth, 1.5<sup>mm</sup>.

Stations 871, 873, and 876, in 100 to 120 fathoms.

This elegant and very distinct species I have dedicated to Mr. Sanderson Smith, of the United States Fish Commission party.

**Eulimella ventricosa** (Forbes).

G. O. Sars, op. cit., p. 209, pl. 11, fig. 19; pl. 22, fig. 16.

A single dead specimen, not in good condition, but apparently belonging to this species, was dredged by us at Eastport, Me., in 1868. A perfect specimen was dredged by us this season, at station 873, in 100 fathoms. This last has a distinctly incurved, small, nuclear whorl; whorls nine, smooth, polished, white, well rounded, with deep sutures. Aperture broad-ovate, slightly effuse in front. Outer lip broad, well rounded in the middle and projecting well forward. Length, 3.6<sup>mm</sup>.

**Odostomia unidentata** (Mont.).

G. O. Sars, op. cit., p. 201, pl. 11, figs. 6-8.

*Odostomia modesta* Stimpson.—Gould, Invert. Mass., ed. ii, p. 327, fig. 596.

A single specimen occurred at station 871, in 115 fathoms. This shell appears to be much more rare on the American than on the European coasts.

**Odostomia (Menestho) sulcata** Verrill, sp. nov.

Shell small, white, long-ovate; spire regularly tapered, acute; whorls about six, moderately convex, covered with many regular, rather strong, revolving grooves. Nuclear whorl strongly inflexed and reversed. Aperture regularly ovate. No tooth on the columella. Length, 2.80<sup>mm</sup>; of body-whorl, 1.80<sup>mm</sup>; breadth, 1.40<sup>mm</sup>; length of aperture, 1.10<sup>mm</sup>; its breadth, .70<sup>mm</sup>.

Stations 871 and 894, in 115 and 365 fathoms.

This differs from all other related species of our coast, except *O. striatula* Coult. (= *Menestho albyla* Gould, non Fabr.), in being strongly grooved spirally; from the latter it differs in having fewer whorls and a regularly tapered, acute spire, and in having the spiral lines coarser and fewer. Perhaps it is more closely related to the real *Menestho*

*albula* of Greenland, which, according to Jeffreys, is distinct from our shell, so named by Gould. These three forms all belong to *Menestho* Möller (= *Liostomia* G. O. Sars).

*Auriculina insculpta* ? (Mont.).

G. O. Sars, op. cit., p. 204, pl. 11, figs. 11, 12; pl. xviii, fig. 3<sup>8</sup> (operculum).

A single dead and probably immature specimen, which I refer doubtfully to this species, was taken at station 892, in 487 fathoms. It agrees nearly, in form and sculpture, with the figure (12) given by Sars, but our shell is shorter, ovate-fusiform. There are five slightly convex whorls; the anterior half of the body-whorl is covered with distinct, fine, spiral grooves; nuclear whorl rounded, rather large, partially incurved. Aperture narrow-ovate; a slight fold on the columella; no umbilicus.

*Diaphana* Brown, 1827 (restricted); H. & A. Adams.

*Utriculus (pars)* Brown, Ill. Brit. Conch., 1844 (*non* Schumacher, 1817).

*Utriculus* G. O. Sars, Moll. Reg. Arct. Norv., p. 235.

In 1827 Brown proposed the name *Diaphana* for certain species of shells figured by him (but not described), which now are known to belong partly to the restricted modern genus *Utriculus* and partly to *Amphisphyra* Lovén, 1846. But he did not then define the genus, and in a later edition of his work (1844) he discarded the name and substituted *Utriculus* for it.\* But *Utriculus* had been used by Schumacher, in 1817, for a different genus (*Conidae*). Lovén's name (*Amphisphyra*), established by him for Brown's second section of *Utriculus*, should, therefore, be retained for that group, which is a good genus. *Diaphana* and *Utriculus*, as used by Brown, were absolutely synonymous, but *Diaphana*, as used by G. O. Sars, is a synonym of *Amphisphyra*. In its original sense, *Diaphana* might be rejected, because undefined. But since *Utriculus* had been preoccupied, it seems necessary to retain *Diaphana* for the first section of Brown's genus, corresponding nearly with *Utriculus* of G. O. Sars. This is also in accordance with the nomenclature in H. & A. Adams's Genera of Shells.

The absence of an odontophore in *Diaphana* H. & A. Adams = *Utriculus* Sars, is certainly a very important character by which the genus can easily be distinguished from *Cylichna* and *Amphisphyra*. But this genus cannot always be distinguished from *Cylichna* by the shell alone. On that account Lovén, Jeffreys, and other able conchologists have referred some of the species of "*Utriculus*" to *Cylichna*.

*Diaphana nitidula* (Lovén) Verrill.

*Cylichna nitidula* Lovén, op. cit., p. 142, 1846.

*Utriculus nitidulus* G. O. Sars, op. cit., p. 236, pl. 17, fig. 13; pl. 26, fig. 3; pl. xi, figs. 6 a, 6 b (gizzard, &c.).

This shell has been dredged by us in several localities in deep water off the coast of New England and Nova Scotia, and by Mr. Whiteaves in the Gulf of Saint Lawrence. This season it was taken at stations 891, 892, and 894, in 365 to 500 fathoms.

\* This change was probably first made in the edition of 1834, which I am unable to consult.

It is a small, very smooth, white shell, in form closely resembling young specimens of *Cylichna alba*, for which it may easily be mistaken. It lacks the fine spiral lines usually seen on the latter, and is rather more narrowed posteriorly. The apex of the spire is occupied by a shallow depression, and there is no umbilicus.

**Diaphana gemma** Verrill.

Amer. Journ. Sci., xx, p. 399, Nov., 1880.

Shell oblong, suboval, widest a little in front of the middle, truncate posteriorly and obliquely rounded anteriorly, with a distinct umbilicus, and also with a narrow, deep pit at the apex. Texture of shell rather solid, somewhat thickened. Outer lip rising somewhat above the spire, forming a rounded posterior angle; throughout most of its length only slightly convex, often nearly straight; anteriorly, a little expanded and produced, well rounded, thickened. Inner lip more thickened, with the edge a little revolute, but leaving a small and regular umbilicus. Aperture narrow posteriorly, ovate anteriorly. Surface smooth and glossy, without any sculpture over the middle region, but with several well-defined, not crowded, but fine spiral grooves at each end, visible with a lens. Color grayish white. Length, 4.2<sup>mm</sup>; breadth, 2.5<sup>mm</sup>.

Stations 871 and 873, 100 to 115 fathoms, fine sand, south of Martha's Vineyard and Newport, R. I.

I have had no opportunity to examine the animal of this species, and refer it to *Diaphana*, provisionally, because of its resemblance to *D. umbilicata*. It may prove to be a *Cylichna*. It has some resemblance to *C. occulta* Mighels (= *C. propinqua* Sars). The latter is, however, destitute both of the pit at the summit of the spire and of the umbilicus, and its surface is everywhere covered with distinct spiral lines. Our shell is shorter and stouter than *D. umbilicata*.

**Diaphana conulus** (Desh.).

*Utriculus conulus* G. O. Sars, op. cit., p. 287, pl. 17, figs. 17 a-c.

A perfect living specimen of this very distinct species was taken at station 870, in 155 fathoms. It has not been recorded hitherto from the American coast.

**Amphisphyræ globosa** Lovén, 1846.

*Diaphana globosa* G. O. Sars, op. cit., p. 290, pl. 18, figs. 3 c, 4; pl. xi, fig. 12 (dentition).

Specimens agreeing in all respects with Sars's figures, referred to above, were dredged at stations 870, 871, and 894, in 115 to 365 fathoms, south of Martha's Vineyard and Newport.

**Amphisphyræ pellucida** (Brown) Lovén, 1846.

*Diaphana pellucida* Brown, Ill. Recent Conch., pl. 19, figs. 10, 11, 1827.

*Bulla hyalina* Turton, Mag. Nat. Hist., vii, p. 353, 1834 (non Gmelin).

*Bulla debilis* Gould, Invert. Mass., ed. i, p. 164, fig. 95, 1841.

*Utriculus hyalinus* Jeffreys, Brit. Conch., iv, p. 427; v, pl. 94, fig. 7.

*Diaphana hyalina* G. O. Sars, op. cit., p. 289, pl. 18, figs. 1 a, b; pl. xi, fig. 10 (dentition).

*Diaphana debilis* Gould, Invert. Mass., ed. ii, p. 216, fig. 507.

This species occurred at stations 876 and 894, in 120 and 365 fathoms.

The name *pellucida* clearly has priority for this species, and should be adopted; moreover, *hyalina* had been previously used. Jeffreys, although he admits the priority of Brown's name, claims that it is "obsolete" because no one has used it, "except its author". But Lovén, A. Adams and others have correctly adopted it. Moreover, Jeffreys himself does not apply this idea in regard to "obsolete" names in many other cases, as, for example, in the case of *Margarita olivacea* (Brown), an "obsolete" name revived by him to replace *argentata* Gould.

**Cylichna Gouldii** (Couth.) Verrill.

*Bulla Gouldii* Conthouy, Bost. Journ. Nat. Hist., ii, p. 181, pl. 4, fig. 6, 1838.

*Utriculus Gouldii* Stimpson.—Gould, Invert. Mass. (second ed.), p. 217, fig. 508.

Living specimens of this species, of large size and in considerable numbers, were dredged by us in 1879, off Cape Cod, and especially on the sandy portions of Stellwagen's Bank, Massachusetts Bay, in 15 to 25 fathoms.

An examination of the animal shows that it has a gizzard, with calcareous plates, while its dentition agrees with *Cylichna*, to which it should be referred, notwithstanding the character of the spire of the shell. The median teeth are deeply bilobed; the inner lateral ones large and hooked; outer laterals four on each side, slender, spiniform.

This species is very distinct from *Diaphana pertenuis* (= *Bulla pertenuis* Migh.), with which it has sometimes been confounded. The latter occurred at station 894.

**Philine amabilis** Verrill.

Amer. Journ. Sci., xx, p. 398, Nov., 1880.

Animal large, about an inch long, even in alcoholic specimens. In preserved specimens the anterior lobe is large, oblong, truncate behind, obtusely pointed in front, slightly narrowed backward; lateral lobes large; posteriorly the thin membrane covering the shell projects backwards beyond it, and its free edge is divided into several wide, but short, lobes; foot large.

Odontophore with a large inner lateral, hook-shaped tooth on each side, having its inner edge very finely serrulate and each of its lateral edges bordered by a sharp ridge; outside of these there is on each side a single, very much smaller, slender, spiniform, very sharp, slightly bent tooth.

Shell large, but exceedingly thin and delicate, diaphanous, lustrous, and iridescent, with a very wide aperture. The outline is broad-oblong, rounded at both ends; the outer lip, forming the greater part of the shell, is evenly rounded posteriorly, and scarcely projects beyond the level of the spire; in the middle it projects forward in a regular curve, and recedes rapidly in front, where it also becomes slightly broader, and forms a very obtuse, rounded angle; the anterior end is broadly rounded and very much cut away, so that in an end view, from the front, the whole interior of the spire is visible. The inner lip is thin and sharp-

edged, and recedes in a broad curve anteriorly, so that the body of the shell is relatively very small. There is a small, shallow pit in the place of the spire. Sculpture inconspicuous; many lines of growth, and very fine, wavy, spiral striae, visible with a lens, cover the whole surface, which has a glistening and opalescent or pearly luster.

Length of the entire animal, 25<sup>mm</sup> or more; length of shell, 15<sup>mm</sup>; breadth of shell, 10<sup>mm</sup>.

Several living specimens from station 876, about 100 miles south of Newport, R. I., in 120 fathoms.

This is one of the largest species of the genus, and one of the most beautiful and delicate.

***Philine Finmarchica* M. Sars.**

G. O. Sars, op. cit., p. 295, pl. 18, figs. 10 *a-d*; pl. xii, fig. 1 *a, b* (dentition).

Off Cape Sable, Nova Scotia, 90 fathoms, fine sand, 1877; 70 to 75 miles south of Martha's Vineyard, 65 to 192 fathoms.

***Philine fragilis* G. O. Sars.**

G. O. Sars, op. cit., p. 296, pl. 18, figs. 11 *a-c*; pl. xii, fig. 2 (dentition).

Off Cape Sable, Nova Scotia, 90 fathoms, fine, compact sand, 1877; Jeffrey's Ledge, Gulf of Maine, 88 to 92 fathoms, 1874, several large living specimens.

***Philine cingulata* G. O. Sars.**

G. O. Sars, op. cit., p. 297, pl. 26, figs. 7 *a-c*; pl. xii, fig. 3.

Off Cape Sable, Nova Scotia, 90 fathoms, with the preceding. Taken this season at stations 892 and 894, in 487 and 365 fathoms.

These four species of *Philine* are new to the American coast. Probably additional species of this genus will be detected when all our collections shall have been fully examined.

***Pleurobranchæa tarda* Verrill.**

Amer. Journ. Sci., xx, p. 398, Nov., 1880.

Body subovate, stout, thick, often nearly half as broad as long, usually less, tapering backward and blunt posteriorly; front broad, convex or subtruncate; back more or less convex or swollen in the middle, with the surface wrinkled or irregularly reticulated, with the sunken lines brown, the reticulations smaller posteriorly. Dorsal tentacles short, stout, wide apart, ear-like, subtubular, having a slit on the outer side, with the edges often rolled in. Gill rather large, well exposed in a dorsal view, situated on the right side, behind the middle, and equal in length to nearly one-fourth the body, plumose, bipinnate, with 15 or 16 pinnæ on the upper side. Foot broad, often nearly as wide as the mantle, subtruncate or rounded in front, narrowed and obtuse posteriorly, ordinarily not extending beyond the mantle. The mantle edge is but little prominent, except along the right side. Proboscis protruded in most of the specimens, large, thick, obtusely tapered close to the end, which is emarginate, showing the large odontophore in a

broad, vertical notch. Reproductive organs large and prominent; the two orifices are situated on a large tubercle in front of the gill. The male organ, in extension, is long, slender, usually curled, truncate, about equal in length to half the breadth of the body; it is a tubular organ, with a slit along the lower side, formed by the rolling up of a long, thin, membranous process. At the posterior edge of the tubercle there is a shorter, flat-pointed process, connected with the female organs. Color of dorsal surface yellowish brown, lighter or darker, and reticulated with dark brown, often specked with flake-white; gill and proboscis dark purplish brown; the proboscis with a darker dorsal patch; tentacles sometimes crossed by dark brown bands. Foot salmon-color. Odontophore very large and broad, with 150 to 170 rows of teeth; no median teeth; all the teeth are similar in structure, and show only a gradual change in form and size from the inner to the outer ones. The inner ones are elongated, slightly curved, narrow-lanceolate, with a very acute point and with a smaller, narrow, sharp denticle on the inner edge, parallel to but shorter than the main point; the outer teeth gradually become shorter, blunter, with a smaller denticle, which finally nearly disappears. Length, usually 30<sup>mm</sup> to 40<sup>mm</sup>; breadth, 10<sup>mm</sup> to 14<sup>mm</sup>.

About 20 miles south of Block Island (stations 814 to 817), in 38 fathoms; about 70 to 74 miles south of Martha's Vineyard (stations 865 to 872), in 65 to 192 fathoms, fine, compact sand, very abundant (140 specimens). Also 90 to 100 miles south of Newport, R. I., in 85 to 225 fathoms (stations 873 to 879). Closely resembles *Pleurobranchia Novæ-Zelandiæ* in form and color. The latter is a littoral species.

*Dendronotus elegans* Verrill, sp. nov.

Form and general appearance nearly as in *D. arborescens*, but rather more slender. Branchiæ with rather longer stems and less numerous branches than in the latter, but similarly arranged. Tentacle sheaths with the terminal lobes not so finely divided, and with a smaller branch on the outer side, near the base. Frontal processes of the head numerous, large, with elongated stems, and not so much branched as in *D. arborescens*. Color everywhere nearly uniform pale salmon; tentacles more yellowish. The dentition is peculiar and distinguishes it easily from both our other species. Median tooth stout, smooth, entirely destitute of lateral denticles; its free portion, in a dorsal view, is broad-triangular, almost as broad as long, acute at tip; base transversely elliptical, a little broader than the free portion. Lateral teeth about ten on each side, slender, the outer two or three shorter, blunt or subacute; the others are successively longer and larger, and each has a more acute and more oblique tip than those that precede it, except the inner one, which has a shorter tip, with longer spinules. These lateral teeth are rather suddenly curved inward where they begin to taper, and beyond the curve the tip becomes nearly straight again, and very acute, while the anterior edge of the curvature is covered with slender, sharp spinules.

The dentition of this species is very different from that of *D. robustus* and *D. arborescens*. Both of these have the median teeth serrated, and different in form; the latter has broader and less acute lateral teeth.

Off Cape Cod (station 330), 26 fathoms, September 6, 1879.

**Doris complanata** Verrill.

Amer. Journ. Sci., xx, p. 399, Nov., 1880.

Body depressed, broad-elliptical, well rounded, both in front and behind, the mantle extending much beyond the foot all around, its edge usually undulated. The lower side of the mantle is stiffened with spicules; upper surface slightly convex, nearly smooth, but covered with small, rather distant, and but slightly prominent, conical elevations. Dorsal tentacles large, stout, subclavate (not seen in full extension), with very numerous, crowded, thin, high, lamelliform plications or folds over the entire upper portion; retractile into cavities having plain, sharp edges. Gills large, the two lower, on each side, partially confluent at base, bipinnately and tripinnately divided, retractile into a large common cavity, which has plain edges. Anal papilla a prominent, cylindrical tube in the center of the branchial wreath. Foot relatively small, obtusely rounded posteriorly, emarginate in front, and with a transverse sulcus on the front edge. Head small, rounded in front, with a free, short, thick, ovate tentacle on each side. Odontophore broad, with about seventy to eighty rows of teeth; no median teeth; about twenty-two to twenty-four lateral teeth, on each side, are stout, hook-shaped, with sharp points, and a slight lobe on the outer curvature and another on the inner side; outside of these there are twelve or more shorter, flattened teeth, with obtuse or rounded, incurved, and sharply denticulated or spinulated ends; the outermost teeth are smallest. Length, 50<sup>mm</sup>; breadth, 25<sup>mm</sup>.

Color, above, dull yellowish brown to dusky brown, irregularly finely speckled and blotched with dark brown; gills dark brown.

About 70 miles south of Martha's Vineyard, station 872, in 85 fathoms, among sponges (eleven specimens).

This large species is closely related to *D. Johnstoni* and *D. planata* of Europe. It differs from both in its dentition, in having stouter and blunter dorsal tentacles, with more numerous lamellæ, and in having shorter and blunter oral tentacles.

**Polycerella** Verrill, gen. nov.

Body elongated-ovate, having the same form as *Polycera*. Mantle little developed. Dorsal tentacles (rhinophores) not laminated and not retractile, without sheaths. A row of papillæ along each side of the back, extending beyond the gills. Gills three, pinnate, situated in the middle of the back, nearly as in *Polycera*. Foot auricled. Odontophore with six rows of teeth; median row absent; inner laterals large, curved, with three denticles; two outer rows much smaller, simple, hook-shaped.

*Polycerella Emertoni* Verrill, sp. nov.

Body small, elongated-ovate, rather narrow, somewhat angular, about as high as broad, sometimes higher than broad, tapered and somewhat acute posteriorly, narrowed a little at the neck. Head high, convex above, sometimes bilobed, but often rounded in front, capable of changing its form to a great extent, the part in front of the dorsal tentacles being capable of considerable elongation and of contracting to a truncate form. Foot high and narrow, obtuse posteriorly, the anterior angles prolonged into short but prominent auricles, often curved backward and pointed, at other times short and blunt. Dorsal tentacles rather long, not retractile, but capable of considerable contraction; in extension their length is often equal to the breadth of the neck; they are fusiform or subelavate, blunt, smooth or showing only slight, transverse, irregular wrinkles, changeable in form, sometimes nearly cylindrical, at other times swollen in the middle or toward the tip. Edge of the mantle indicated only by a slight, often crenulated, ridge along each side and around the head. Above this edge there is a row of small papillæ, of which two on each side are in advance of the dorsal tentacles; two are opposite to them, and four or five on each side occupy the space between the tentacles and gills; a row of five or six, on each side, extends beyond the gills to near the end of the body, the posterior ones becoming very small. Behind the gills there are three or four pairs of larger and longer papillæ, situated more dorsally; of these the two pairs next to the gills are longest, and are often nearly equal to the dorsal tentacles in size and length; they are usually somewhat swollen in the middle and blunt at the tip. Two or three pairs of much smaller papillæ are situated on the back, in front of the gills. Gills three, narrow, elongated, pinnate, subplumose, not finely divided, curved backward, not retractile, about equal in length to the dorsal tentacles; the pinnae are few, alternate, generally incurved, those toward the base more slender.

Color yellowish green to olive-green, varied with lemon-yellow, and blotched and specked with darker green or blackish; foot, tentacles, gills, and dorsal papillæ lighter greenish yellow, sparingly specked with dark green.

Length, 5<sup>mm</sup> to 6<sup>mm</sup>; breadth, 1<sup>mm</sup>; height, 1.12<sup>mm</sup>; length of rhinophores, .88<sup>mm</sup>.

The odontophore is very minute. The teeth of the inner row, on each side, are relatively very large and long, stout, with the shaft bent backward and the end abruptly curved forward and divided into two sharp denticles; another sharp denticle is situated laterally, below the others. The two outer lateral rows of teeth are much smaller and less than half the length of the inner ones, nearly equal in size and form, simple, strongly curved forward, and very acute.

This species was first taken by the writer at Wood's Holl in September, 1875, at the surface, among eel-grass; and on hydroids from the piles of Long Wharf, New Haven, Conn., October, 1875. At Newport, R. I., it has been found several times by Mr. J. H. Emerton and the writer, in

July and August, on filamentous algæ, especially *Ceramium rubrum*, growing on the mooring buoys and piles of wharves in the harbor.

In confinement it often leaves the algæ and creeps at the surface of the water, foot upward.

The eggs of this species were laid in confinement, July 24, at Newport, R. I. They form a long, narrow, oblong or strap-shaped, white mass, attached by one edge to filamentous algæ; the eggs are arranged in numerous rows.

**Coryphella nobilis** Verrill, sp. nov.

A large and elongated species, with stout dorsal tentacles and large, flattened, pale-salmon dorsal papillæ. Foot broad, elongated, tapering and acute posteriorly; anterior angles considerably elongated, in the form of acute tapering processes, having a distinct longitudinal groove or fold. Head rather small, rounded, in front slightly convex or nearly straight, lower side concave. Oral tentacles very stout, flattened, gibbous near the end, with a small, somewhat upturned, round, acute tip. Dorsal tentacles (rhizophores) very large and stout, arising close together, longer than the oral ones, tapered, subacute, thickly covered with small, conical papillæ or warts. No eyes could be detected. Dorsal papillæ arranged in numerous transverse, oblique rows, each of eight to ten or more papillæ (except posteriorly); they are small and much crowded along the sides; the upper ones are much longer, stout, mostly flattened, widest beyond the middle, tapering to the lanceolate tip.

Color of foot and body translucent white; on the back there are visible, through the integument, salmon-colored vessels, running from one group of dorsal papillæ to another and connecting with their nuclei; the dorsal papillæ are pellucid white externally, with a pale-salmon nucleus, becoming paler and whitish near the tip; dorsal tentacles pale yellowish green; oral ones pellucid white.

Length, about 63<sup>mm</sup>, or 2.5 inches; length of dorsal tentacles, 15<sup>mm</sup> (.6 inch); of longest dorsal papillæ, 12<sup>mm</sup> (.5 inch).

The odontophore has a central row of large teeth, with a moderately prominent, acute, central denticle, and usually six smaller denticles on each side; lateral teeth without distinct denticles on the edge, rather large, wide at the base, which is emarginate, the outer lobe extending further back, inner edge slightly wavy and uneven, but not denticulate.

Off Cape Cod, in 75 fathoms, mud and broken shells, 1879. One specimen only.

In form and color this species resembles *C. salmonacea*, but the latter, which occurs at Eastport, Me., has the dorsal papillæ more crowded, and its dentition is very different, for the lateral teeth are strongly denticulated along the edge to near the tip.

**Coryphella Stimpsoni** Verrill.

*Cuthona Stimpsoni* Verrill, Amer. Journ. Sci., xvii, p. 314; Trans. Conn. Acad., v, pl. 42, fig. 14.

The dentition of this species is peculiar, but agrees better with that

of *Coryphella* than with that of any of the related genera. It was originally referred to *Cuthona* on account of the lateral expansions of the head. The odontophore is remarkably high and narrow; the central teeth are dark brown, large, strong, with the median point very large, compressed, and curved forward, projecting far beyond the small, sharp, lateral denticles, of which there are usually eight or nine on each side; lateral teeth thin, pale, comparatively small, narrow, acute, without any denticles, or rarely with some very small ones near the base, which is rounded and but little expanded.

This species occurs from Massachusetts Bay to Halifax, Nova Scotia, and from low-water to 50 fathoms.

***Facelina Bostoniensis*** (Couthouy) Verrill & Emerton.

This species has been very much misunderstood, and totally different species\* have often been confounded with it. It is, however, very easily distinguished from all of our other species. It is the only known species from the New England coast that has the dorsal tentacles distinctly laminated or plicated.

It is a true *Facelina*, having only a single row of teeth, with the central denticle prominent.

It is common from above low-water to 20 fathoms, on *Obelia* and other hydroids, from Massachusetts Bay to Block Island and Newport, R. I. This season it occurred abundantly among *Obelia geniculata*, on *Laminaria*, off Block Island, in 18 to 20 fathoms, associated with large numbers of *Lamellidoris muricata*.

This species is very closely related to the European species, *Facelina Drummondii* (Thomp., 1843) and *F. elegans* (Alder & Hancock).

***Facelina pilata*** (Gould) Verrill & Emerton.

In its dentition this species agrees closely with the preceding, having but a single row of teeth, of nearly the same form. It should be referred properly to *Facelina*, although it does not agree strictly with the diagnoses of that genus, especially in respect to the lamination of the dorsal tentacles, which are, in this species, nearly smooth. This character is, however, variable in this genus, the laminae being very prominent in *F. coronata*, rudimentary in *F. elegans*, and absent in *F. pilata*.

***Cratena Veronicæ*** Verrill, sp. nov.

Size moderate, about 25<sup>mm</sup> in length, rather stout. Dorsal papillæ cylindrical, obtuse, moderately slender, arranged in twelve to fifteen regular transverse series on each side, the middle ones containing eight to ten or more papillæ; anterior groups smaller, situated well forward,

\* The species described by Bergh (Anat. Bid. til Kundskab. om Æolidierne, p. 102, pl. 5 a, 1864) under the name of *Coryphella Bostoniensis* is entirely distinct. It has three rows of teeth, and is closely related to *Coryphella Mananensis* Verrill (Stimpson sp.), common on our northern coasts.

in front of the dorsal tentacles. Oral and dorsal tentacles nearly equal in length, moderately long, tapered, blunt. The dorsal tentacles appear slightly wrinkled transversely. Eyes black, conspicuous, near together, just behind the bases of the dorsal tentacles. Foot narrow, with broad, rounded anterior angles. Head moderately large, its outline nearly semicircular in front, and projecting considerably in advance of the bases of the oral tentacles.

Color variable. In some specimens the nuclei of the dorsal papillæ and the biliary ducts from them are dark green, the nuclei appearing to be lobulated or flocculent; the outer sheath is translucent whitish, with an interrupted streak of flake-white on the distal half, and with unequal specks and spots of the same scattered over the surface, while on the outer side, near the end, there is a patch of orange; tip translucent white. In front of the bases of the dorsal tentacles there is a dark green patch. Tentacles white.

In other specimens, taken at the same time, the nuclei of the dorsal papillæ were salmon-colored, but the subterminal patch of orange and the streak and specks of flake-white were as in the green variety; the body was translucent white; dorsal tentacles white, tinged or faintly reticulated with flake-white; oral tentacles with a streak of flake-white on the posterior side.

Odontophore narrow, with a single row of teeth; these have thirteen sharp denticles, the median one scarcely as long as those next to it; the anterior border of the tooth is nearly semicircular, with a notch on each side near the outer ends, which run backward, as short processes, somewhat enlarged and emarginate at the end.

Off Cape Cod (station 328), in 23 fathoms, among hydroids, September 6, 1879.

This species is nearest allied to *Cratena olivacea* (Alder & Hancock), but differs in the form of its teeth, as well as in its coloration. It is also allied to *Cratena viridis*, of Europe. In case either of the older names (*Carolina* and *Montagua*) be retained for this group, this species should be so named. But both of these names having been previously used for other genera, they should be discarded.

***Cratena gymnota*** (Couthouy) Verrill & Emerton.

*Montagua Gouldii* Verrill, Invert. Viney. Sound, p. 667 (author's copies, p. 373), 1873.

This species, which is common on littoral hydroids, from Massachusetts Bay to New Haven, Conn., is a typical *Cratena* Bergh\* (= *Carolina* Alder & Hancock = *Montagua* auth.), and is very closely allied to *C. aurantiaca* (A. & H.) of Europe, with which its dentition agrees very nearly, even in minute details. In *C. gymnota* the coloration, also, is often similar to that of *C. aurantiaca*, but the dorsal papillæ are fewer

\* In the excellent work of G. O. Sars this generic name has been, by some oversight, misapplied, in place of *Cuthona*, to include *C. nana*, which was the original type of *Cuthona* Alder & Hancock.

and longer, and their clusters are less numerous and less crowded. In case it be thought necessary to unite the two forms, Couthouy's name has priority.

**Tergipes despectus** (Johnst.) Alder & Hancock.

The genuine *despectus* was distinguished from *G. exigua* by Mr. J. H. Emerton, at Salem, Mass., in 1879, when he made characteristic drawings of both and preparations of the odontophores, which I have examined. During the present year he has found the former near Newport, R. I., on hydroids (*Obelia*) at low-water. The species described and figured by Gould (Binney's edition) under this name is really the *Galvinia exigua* Alder & Hancock, differing widely in its dentition, there being three rows of teeth, instead of the single row, seen in *Tergipes*. But the *T. despectus* of my report on Invertebrates of Vineyard Sound, 1873, was correctly named. Both species are found under the same conditions, but, according to Mr. Emerton, *G. exigua* is found in the spring and early summer, while *T. despectus* occurs later in the summer and in autumn.

**Acmaea rubella** ? (Fabr.).

*Tectura rubella* G. O. Sars, Moll. Reg. Arct. Norv., p. 121, pl. 8, figs. 5 *a, b*; pl. ii, fig. 11 (dentition).—Jeffreys, Ann. and Mag. Nat. Hist., for March, 1877, p. 231.

One specimen, without the animal, was dredged at station 894. It appears to agree closely with the species referred to, except that the apex is not obtuse, and its color is pale yellowish white. There is no sculpture except irregular and rather distinct lines of growth. The apex is acute, bent directly backward, and situated at about the posterior fourth. The base is oblong-oval. Length, 5.5<sup>mm</sup>; height, 2.75<sup>mm</sup>.

## HETEROPODA.

**Carinaria Atlantica** Ad. & Reeve (?).

Fragments occurred at station 865. They may have belonged to *C. Mediterranea*.

**Atalanta Peronii** Lesueur.

D'Orbigny, Voy. Amér. Mérid., Moll., p. 171, pl. 12, figs. 1-15; Hist. l'Isle de Cuba, Moll., i, p. 102, 1853.

Near George's Bank, latitude 41° 25' north, longitude 65° 5' to 65° 30' west (Messrs. S. I. Smith and O. Harger, 1872).

## PTEROPODA.

Although the Pteropods are all, properly speaking, oceanic species, it is undoubtedly true that a certain group of species will be found to be characteristic of the waters adjacent to each coast. Hitherto those observed and recorded from near the shores of New England have been chiefly northern or arctic species, which follow the course of the arctic current along our coast. For this reason, in the winter and spring, the beautiful *Clione papilionacea* is frequently found as far south as Vineyard

Sound and the shores of Rhode Island. The *Spirialis Gouldii* Stimp. is probably also an arctic species, and is very closely related to, if not identical with, *S. balea* of the Arctic Ocean.\* There are, however, a few of the more tropical species that have been already recorded as occasionally cast ashore dead, upon the southern shores of New England. Of these *Diacria trispinosa* and *Carolina tridentata* are the most common. Of the former, I have also received numerous examples, with the animal in good condition, obtained by Mr. Samuel Powell, at Newport, R. I., several years ago, from the stomach of a blue-fish. This season two living specimens of it were taken off Block Island by Messrs. V. N. Edwards and N. P. Scudder, of our party. The fresh shells of this species were dredged by us in 1871, near Martha's Vineyard, and this year we found it in abundance and perfectly fresh, in all our outer dredgings, 70 to 100 miles off shore. It was associated with *Diacria trispinosa* Gray and several other species, named below, but was far more numerous than any of the others. The following species are here introduced because of their common occurrence, evidently in large numbers, within a few miles of our coast. Several of them have not been recorded from so far north before, even in mid-ocean.

**Cavolina longirostris** (Les. MSS., Bv.) H. & A. Ad.

*Hyalæa longirostris* Blainv., Diet. Sci. Nat., xxii, p. 81.—Rang, Hist. Nat. Pterop., p. 41, pl. 2, figs. 7-10, 1852.

*Carolina longirostra* Gray, Catal. Moll. Brit. Mus., Pteropoda, p. 8.

This small but elegant species occurred frequently in our dredgings, but not in large numbers (stations 867, 870, 876, 891, 894, &c.).

**Cavolina uncinata** (D'Orb.) Gray, 1850; H. & A. Ad.

*Hyalæa uncinata* D'Orb., 1836.—Rang, Hist. Nat. Pterop., p. 37, pl. 2, figs. 11-14, 1852.

This occurred in many localities, with the last. Our specimens differ from the figures referred to in having the median posterior spine more hooked and more abruptly bent, so as to make nearly a right angle with the shell.

**Cavolina inflexa** (Les.) Gray.

*Hyalæa inflexa* Lesneur; Blainv., Diet. Sci. Nat., xxii, p. 80.

One perfect and full-grown specimen from station 894.

**Clio pyramidata** Browne; Linné; Gmelin.

*Cleodora pyramidata* Peron & Les.; Lamarek.

*Cleodora laucolata* Rang, Ann. des Sci. Nat., xvi, p. 497, pl. 19, fig. 1.

*Clio pyramidata* Gray, Catal. Moll. Brit. Mus., Pteropoda, p. 12, 1850.

Several fresh but somewhat broken specimens of this species occurred at stations 865, 891 to 894.

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\* It is very distinct from *S. retroversus*, to which Jeffreys has formerly referred it. Both the figure and description give it spiral lines, while the latter is very smooth. G. O. Sars identifies it with *S. balea*.

**Balantium recurvum** Children.

Journ. Roy. Inst., xv, p. 220, pl. 7, fig. 107, 1829.—Gray, Catal. Moll. Brit. Mus., Pteropoda, p. 14, 1850.

*Cleodora balantium* Rang, Mag. Zool., 1834; Hist. Nat. Pterop., p. 52, pl. 5, fig. 12; pl. x, fig. 7, 1852.

Fragments occurred at stations 865 and 869.

**Styliola recta** (Lesneur, MSS.) Blainv., Man. Mal., 1825.

*Crescis acicula* Rang, Ann. des Sci. Nat., I, xiii, p. 318, pl. 17, fig. 6, 1828.

*Crescis clara* Rang, Ann. des Sci. Nat., I, xiii, p. 317, pl. 17, fig. 5, 1828.

*Crescis aeus* Esch., Zool. Atlas, iii, pl. 15, fig. 2, 1831.

*Cleodora acicula* Rang, Hist. Nat. Pterop., p. 56, pl. 7, figs. 5, 7, 1852.

Near George's Bank, latitude  $41^{\circ} 25'$ , longitude  $65^{\circ} 5'$  to  $65^{\circ} 30'$ , September, 1872, at surface (Messrs. S. I. Smith and O. Harger).

**Styliola virgula** (Rang) Gray.

*Crescis virgula* Rang, Ann. des Sci. Nat., I, xiii, p. 316, pl. 17, fig. 2, 1828.

*Cleodora virgula* Rang, Hist. Nat. Pterop., p. 57, pl. 13, figs. 20-24, 1852.

Near George's Bank, with the preceding.

**Spirialis MacAndrei** Forbes & Hanley, ii, p. 384.

*Spirialis retroversus* (Flem.), variety ? *MacAndrei*, Jeffreys, Brit. Conch., v, p. 115, pl. 4, fig. 4; pl. 98, fig. 5.—G. O. Sars, Moll. Reg. Aret. Norv., p. 330, pl. 29, figs. 3 a-f; pl. xvi, fig. 19 (dentition).

Several entire and perfectly fresh specimens occurred at station 894. They agree with the form called var. *MacAndrei* by Jeffreys.

**Cymbulia calceolus** Verrill.

Amer. Journ. Sci., xx, p. 394, Nov., 1880.

Test thick, transparent, broad-ovate or elliptical, rounded at both ends, covered, above and below, with low, rounded verrucae; aperture large, occupying more than half the length of the test, broad-ovate, posterior margin nearly straight; edges simple, unarmed. Animal pale pink, with a brown nucleus; fins very large, connate, broadly rounded; their outline taken together forms a long ellipse, considerably longer and somewhat broader than the test. Length of test of a medium-sized specimen, in alcohol, 19<sup>mm</sup>; breadth, 11<sup>mm</sup>; expanse of fins, 23<sup>mm</sup>; their breadth, 12<sup>mm</sup>. The largest specimens have the test about 40<sup>mm</sup> long, 20<sup>mm</sup> broad. Stations 865 to 872 (near the surface), common; about 30 miles east-southeast of Block Island, at surface, October 2, 1880 (Messrs. Scudder and Edwards).

**Halopsyche** Verrill, nom. nov.

*Psyche* Rang, 1825 (*non Psyche* Linné, 1735, *neo Psyche* Schrank, 1801).

The name *Psyche* having been twice used before it was employed by Rang, it will be necessary to substitute another name for this genus of Pteropods. I therefore propose *Halopsyche*.

The type, and only known species, *Halopsyche globulosa* (Rang), inhabits the waters of Newfoundland and Nova Scotia.

## SOLENOCONCHA.

**Dentalium<sup>o</sup> occidentale** Stimp.

Shells of New England, 1851 (based on *D. dentale* Gould, 1st ed., p. 155, fig. 5, not of European authors).

*Dentalium dentale* Gould, Invert. of Mass., 2d ed., p. 266.

*Dentalium abyssorum* M. Sars, 1858.

*Dentalium striolatum* Jeffreys (non Stimpson).

*Antalis striolata* G. O. Sars, Moll. Reg. Arct. Norv., p. 101, pl. 7, fig. 1; pl. 20, figs. 10 a, b; pl. i, figs. 1 a-c, dentition (non Stimpson sp.).

This species is abundant on muddy bottoms, in 50 to 300 fathoms, all along the coast of New England and Nova Scotia.

Mr. Jeffreys, misled by a singular and unaccountable mistake, has constantly applied to this sulcated species the name given by Stimpson to our common, shallow-water, *nearly smooth form*. In this mistake G. O. Sars and others have followed him.

The question as to the *specific* distinctness of these two forms I do not propose to discuss at this time, but it is equally desirable that the respective *names* should be correctly applied, whether we regard the forms as varieties or species. Of *D. striolatum*, I have dredged thousands of specimens in shallow water in the Bay of Fundy, in the same region where Stimpson's original specimens were taken, and among them no specimens of "*D. occidentale*" are to be found. In other localities, however, both species occur together. Both were taken this season on the outer banks, off Newport. But *D. occidentale* was by far the most common, and was abundant in the deeper stations, where *D. striolatum* did not occur at all.

Among the specimens taken by us there are many that are more strongly ribbed and sulcated than usual, the ribs being more or less angular and elevated. In some of these, which are slender and about an inch long, the internal surface of the shell has grooves corresponding to the external ribs, the shell being thin, but of uniform thickness, so that the two surfaces are parallel. In others of the same size the bore of the shell is smooth and round, the shell being thickened opposite the ribs. I am not prepared, however, to say that this is anything more than a varietal difference.

The form of the posterior notch varies in all our species (or varieties) from a shallow notch to a triangular cut, and even to a deep slit.

**Siphonodentalium vitreum** Sars.

G. O. Sars, op. cit., p. 103, pl. 7, figs. 2 a-c; pl. i, figs. 2 a-f (dentition).—Verrill, Trans. Conn. Acad., v, pl. 42, fig. 19.

A fine, large specimen, probably belonging to this species, was dredged by the party on the "Bache", in 1873, in the Gulf of Maine (station 12 B), in 60 fathoms, mud.

The shell is smooth, round, very thin, transparent, and lustrous. It is slightly curved and expands gradually to the anterior end. The posterior opening is small and round, without lobes, but it probably has

been broken off squarely. Length, 12<sup>mm</sup>; diameter of larger end, 2.5<sup>mm</sup>; of small end, .5<sup>mm</sup>.

Another specimen of similar character, 10<sup>mm</sup> long and 2.5<sup>mm</sup> broad, was dredged in the Gulf of Maine, 107 fathoms (station 9 B), 1873. With the last-named specimen there was, however, a perfect living specimen, 7<sup>mm</sup> long and 2<sup>mm</sup> broad, having the posterior end perfect and provided with the characteristic digitations around the opening.

**Siphonentalis affinis** (Sars).

G. O. Sars, op. cit., p. 104, pl. 20, fig. 12.—Verrill, Trans. Conn. Acad., v, pl. 42, figs. 20 a-b.

A specimen smaller and more slender than the preceding species, and which I refer to *S. affinis*, was dredged by us, in 1877, in Bedford Basin, near Halifax, Nova Scotia, 35 fathoms, soft mud. It is 6<sup>mm</sup> in length, 1<sup>mm</sup> in breadth, slightly curved, round, smooth, glossy, and translucent. The posterior opening is small and appears to be perfect; it shows only a faint indication of a notch on the convex side.

**Siphonentalis Lofotensis** (M. Sars).

G. O. Sars, Moll. Reg. Aret. Norv., p. 104, pl. 20, figs. 11 a, b; pl. i, fig. 3.

A few specimens that agree well with the figures and description of this species were taken at station 891, in 500 fathoms.

It is longer and more tapered than the last, and much less translucent.

**Cadulus propinquus** G. O. Sars.

Moll. Reg. Aret. Norv., p. 106, pl. 20, figs. 15 a, b; pl. i, fig. 5 (dentition).

This shell occurred in considerable numbers, living, at station 871, in 115 fathoms. It is a small, polished species, rather stouter and more swollen than the next.

**Cadulus Jeffreysii** Monterosato.

*Cadulus subfusiformis*? Jeffreys, British Conch., v, p. 196, pl. 101, fig. 3 (*non* Sars, teste Monter.).

Several specimens of a small *Cadulus*, somewhat swollen in the middle and rather strongly bent, I refer to the above species. The posterior aperture is simple in most of them, but slightly notched in others.

Station 871.

**Cadulus Pandionis** Verrill & Smith.

Amer. Journ. Sci., xx, p. 397, Nov., 1880.

A very much larger, highly polished species occurred at many of the stations, but most abundantly at 869 to 871 and 873 to 877, in 85 to 192 fathoms. It is swollen on the convex side, in the middle, and slightly angulated or gibbous at about the anterior third. It is transversely elliptical in section; the anterior end decreases to the aperture, which is oblique, the lip being prolonged on the concave side. Posterior aperture small, with a semicircular notch above and below. Length, 10<sup>mm</sup>; breadth, 2.25<sup>mm</sup>; of mouth, 1.75<sup>mm</sup>; of posterior aperture, .40<sup>mm</sup>.

## LAMELLIBRANCHIATA.

**Poromya granulata** (Nyst) Forbes & Hanley.

G. O. Sars, op. cit., p. 90, figs. 6 *a, b*.—Verrill, Trans. Conn. Acad., v, pl. 44, figs. 3, 4.

Several adult living examples of this shell were dredged in 1872 by Dr. A. S. Packard and Mr. C. Cooke, on the Coast Survey steamer "Bache", in the Gulf of Maine, in 150 fathoms, mud. This season it was taken at station 865, in 65 fathoms. It has not previously been recorded as American.

In form and size it somewhat resembles *Thracia myopsis*, but is easily distinguished by the small granules scattered over the exterior, and by the peculiar hinge, very different from that of *Thracia*. The right valve has a prominent, recurved, cardinal tooth. On the European coast it ranges from the Lofoden Islands to the Mediterranean, in deep water.

**Poromya rotundata** Jeffreys.

Annals and Mag. Nat. Hist., Dec., 1876, p. 494 (Valorous Expedition, Mollusca).

Shell rounded, thin, translucent, pearly within. External surface closely covered with small, rounded, obtuse granules, arranged mostly in close quincunx, and distinctly forming radiating lines, but in some parts appearing to be also in concentric lines. The narrow intervals between these lines of granules show the iridescent surface of the shell. These granules give a shagreen-like appearance to the shell. The granules show through on the inside, giving a finely tessellated appearance. The shell is but little longer than broad, convex; ventral and anterior edges evenly rounded; posterior dorsal edge a little sloping, and forming an obtusely rounded angle where it meets the curvature of the posterior end. Hinge of right valve with a prominent conical tooth, fitting into a corresponding pit in the left valve.

South of Martha's Vineyard, stations 865 and 871, 65 to 115 fathoms, living; North Atlantic, 1,450 fathoms (Jeffreys).

**Lyonsiella abyssicola** M. Sars; Friele.

*Pecchiolia abyssicola* G. O. Sars, Remarkable Forms Anim. Life, i, p. 25, pl. 3, figs. 21-43; Moll. Reg. Arct. Norv., p. 103, pl. 20, figs. 5 *a-d*.

A few good living specimens of this interesting addition to the American fauna were dredged by our party this season, south of Martha's Vineyard and Newport, in 192 to 500 fathoms, fine, compact sand and mud (stations 869, 880, 891, 892, 894).

**Lyonsiella gemma** Verrill, sp. nov.

Shell small, iridescent, white, with raised radii, broad-oval, widest and broadly rounded anteriorly, expanded and broadly rounded ventrally, posterior end short, narrowed, and tapered to an obtuse point. The beak is subcentral, but a little nearer the anterior end, prominent, inflated, strongly curved inward and forward. Dorsal margin abruptly incurved opposite the beaks and decidedly expanded and excurved in

front of them, so as to rise nearly to a level with the umbos; internally, opposite the tips of the beaks, there is a smooth swelling within the margin. Hinge margin thin, toothless, but with an internal scar behind the beaks, where the ligament and ossicle were attached (the ligament is gone). Palial sinus very small, angular. Shell less thin than in the preceding species. Sculpture numerous, very delicate, slightly raised lines, which radiate from the beaks over the whole surface; they are separated by much wider interspaces, which are smooth and iridescent, and not at all excavated. Length, 4.5<sup>mm</sup>; height (beak to ventral margin), 4<sup>mm</sup>.

One perfect specimen, station 892, 487 fathoms, associated with *L. abyssicola*.

From the latter it differs widely in shape, having nothing of the rectangular form so characteristic of that species; the latter is also much less expanded anteriorly and much more so posteriorly, being far more inequilateral and more elongated.

**Kennerlia glacialis** (Leach) Carpenter.

*Pandora glacialis* Leach, Rosse's Voyage, appendix, p. 174.—Leche, Kongl. Vetensk.-Akad. Handl., Band 16, p. 11, pl. 1, figs. 1 a, b, 1878 (author's copy).

Living specimens of this arctic shell were dredged at station 873, in 100 fathoms. It had previously been recorded from the Gulf of Saint Lawrence by Whiteaves, but was not known to occur on the New England coast. It differs widely from the common *Clidiophora trilineata* Cpr. (= *Pandora trilineata* Say), in the absence of the internal radiating ridges, in its more inequilateral and irregular form, and in the greater convexity of the upper valve. The lower valve is very flat, or even concave, and is marked externally with several distinct radiating lines.

**Neæra glacialis**.

G. O. Sars, op. cit., p. 88, pl. 6, figs. 8 a-c.—Verrill, Trans. Conn. Acad., v., pl. 44, fig. 10 b.

A form of *Neæra*, agreeing perfectly with this, is common on muddy bottoms, in 50 to 192 fathoms, off the coasts of New England and Nova Scotia. We have dredged it off Cape Cod, off Cape Ann, off Casco Bay, in the Bay of Fundy, and in numerous localities in the Gulf of Maine and off Nova Scotia, since 1872; and recently, south of Newport and Martha's Vineyard, in 65 to 500 fathoms. The larger specimens exceed an inch in length.

Among our numerous examples there is, however, considerable variation, both in the form of the shell and in the size and shape of the cartilage-pit and lateral teeth. Moreover, the variations in the hinge are not correlated with the differences in the breadth and length of the rostrum. Therefore, it seems to me probable that this shell should be considered merely a variation of *N. arctica*. The latter, in its typical form, occurs in the same localities and in about the same numbers, and

some examples grow to even greater size, being 1.25 inches long. In our specimens (see Trans. Conn. Acad., v, pl. 44, fig. 10 a) the rostrum is usually longer and narrower than in the specimen figured by Sars, approaching in this respect his figure of *N. glacialis*, but with the cartilage-pit as large and broad as in his *N. arctica*. In fact, the majority of our specimens may be described as intermediate between the two forms figured by Sars.

*Neæra obesa* Lovén (1846) = *N. pellucida* Stimpson (1852).

Associated with the preceding, in most of the localities named, I have found another form, often .5 of an inch or more in length, which I consider identical with *Neæra obesa* of Lovén, and which often agrees well with the figures of this species given by G. O. Sars, but with the rostrum more commonly somewhat shorter. The cartilage-pit has the same form as the one figured by Sars. The young of this shell is the *Neæra pellucida* of Stimpson, without doubt. I have repeatedly dredged it in his original locality.

*Neæra obesa*, as thus determined, is closely allied, in form and structure, to *N. arctica* and var. *glacialis*. Its texture is thinner, more delicate, more translucent, and smoother, or with less conspicuous lines of growth, and freer from adherent mud. These differences are not merely due to age, for I have examined both forms, of various sizes, from .10 of an inch or less, in length, up to the full-grown specimens.

The largest specimens of *N. obesa* are, however, rarely more than .50 of an inch in length. The shell is usually very swollen and ventricose, rather abruptly contracted posteriorly at the base of the rostrum, which is rather narrow and not very long, but varies considerably in length and breadth. The cartilage plate is prominent, and projects inward so as to form a distinct angle.

*Neæra jugosa* S. Wood.

G. O. Sars, op. cit., p. 88, pl. 6, figs. 9 a-c.

This species is easily distinguished from all others found on our coast by its concentric raised lamellæ. Station 894, 365 fathoms, off Newport, R. I.

*Neæra rostrata* (Spengler) Lovén.

G. O. Sars, op. cit., p. 89, pl. 6, figs. 7 a, b.

Several fine, large specimens of this species were dredged by us about 70 to 75 miles south of Martha's Vineyard, in 85 to 115 fathoms, and 90 to 100 miles south from Newport, R. I., in 120 to 500 fathoms. It is easily distinguished from the forms above mentioned by its very long and narrow posterior beak or rostrum, and by the oval form of the shell. It has a nearly smooth surface.

*Neæra multicostata* Verrill & Smith, sp. nov.

This is a large and very distinct species, easily distinguished from all others known on our coast by the strong radiating ribs which cover the

whole surface of the shell. The shell itself is rather large, swollen, subovate, well-rounded ventrally, but obliquely subtruncate anteriorly. Rostrum rather short, narrow, well defined, tapered; on the rostrum there are eight or nine rather broad, low, radiating costæ. The body of the shell is covered with regular, raised and strong, radiating costæ, over fifty in number, separated by deep grooves of about the same width as the costæ; anteriorly these ribs become small; posteriorly, near the base of the rostrum, five or six become much larger than the rest, and have smaller ones alternating with them.

Color yellowish white; in life rosy, from the internal organs showing through. Length, 19<sup>mm</sup>; beak to ventral edge, 12<sup>mm</sup>.

South of Martha's Vineyard, 115 fathoms; about 90 to 100 miles south of Newport, 85 to 120 fathoms, stations 871, 873, 874, 876, &c. Several living specimens of various sizes.

**Cardium, sp.**

A roundish species of *Cardium*, about 18<sup>mm</sup> in diameter, is represented by a single valve, in good condition. The surface is rather closely and regularly cancellated. The ribs are smooth, without scales or spines. It was taken at station 865.

**Astarte crenata** Gray.

Parry's Voyage, app.—Fricke, Catal. Norv. Nordmeer-Exp. Spitzb., Möll., p. 267, 1879.

? *Astarte crebricostata* Forbes; Jeffreys; G. O. Sars; and other European writers.

*Astarte crebricostata* Gould, Invert., Mass., 2d ed., p. 126, fig. 440 (var. *lens*).

*Astarte lens* (Stimp., MSS.) Verrill, Amer. Journ. Sci., iii, p. 287, 1872.

Large numbers of specimens, which seem to agree closely with the typical arctic and deep-water form of this species, were taken at nearly all the stations, in 65 to 500 fathoms. It was most abundant at stations 880, 894, 895.

These form series that appear to graduate into the large, broad, flattened form to which the name *lens* has been applied, which is abundant in the Bay of Fundy and Gulf of Maine, in 50 to 150 fathoms.

The typical form is smaller, more swollen, with the edges more rounded, and less expanded posteriorly. All the forms have the edges regularly crenulated.

**Cryptodon Sarsii** (Phil.).

*Axinus Sarsii* G. O. Sars, op. cit., p. 60, pl. 19, figs. 5 a, b.

A single dead specimen of a shell agreeing very closely with this form, as figured by G. O. Sars, was dredged by our party, in 1879, off Cape Cod.

**Crypton obesus** Verrill.

Amer. Journ. Sci., iii, p. 287, pl. 7, fig. 2, 1872.

I may take this occasion to remark that Sars's figure (pl. 19, fig. 7) of *C. obesus* Verrill does not represent the large form described by me under that name, which is remarkable not only for its swollen form, but

also for its great height (from beak to ventral edge), as compared with its length, while the shell figured by Sars is broadly rounded, more like our typical *C. Gouldii*, of which I am inclined to consider it the adult state.

Very large and characteristic specimens of the typical *C. obsesus*, several of them more than 15<sup>mm</sup> broad, but mostly dead, have been frequently dredged this season, off Newport, R. I., in 12 to 20 fathoms, and especially at stations 865-871, 873, 876, and 877, in 65 to 192 fathoms, south of Martha's Vineyard and Newport.

**Cryptodon ferruginosus?** (Forbes).

*Axinus ferruginosus* G. O. Sars, Moll. Reg. Arct. Norv., p. 63, pl. 19, figs. 10 a, b.

Living specimens were taken at station 871, in 115 fathoms. They were thickly incrustated with iron-oxide, which adheres very tenaciously; beneath this crust the shell is usually much eroded.

**Loripes lens** Verrill & Smith.

Amer. Journ. Sci., xx, p. 400, Nov., 1880 (published Oct.).

Shell rather thin, moderately convex, well rounded, nearly equilateral; beaks acute, a little prominent, curved forward; lunule small, deeply excavated, cordate; ligamental area long, narrow-lanceolate, a little sunken, so that the ligament scarcely rises to a level with its edges. The posterior dorsal outline of the shell is nearly straight or but slightly convex; the posterior end is very obtusely rounded or subtruncate, making a slight angle with the dorsal edge and a very obtusely rounded one with the ventral edge, which is evenly curved and continuous with the regularly rounded anterior end; dorsal edge in front of the beaks incurved. Surface rather smooth, especially toward the umbos, but with more or less numerous and irregular lines of growth, marked by thin and slightly raised lines, which become more regular and more conspicuous at each end of the shell, and especially posteriorly. A faint ridge runs from the beak to the posterior ventral angle. A slight undulation or depression (often obsolete) runs from the beak to the upper part of the anterior edge, bounding a small anterior dorsal area. Hinge without any distinct teeth. Anterior muscular scar elongated, somewhat sinuous; posterior one small, ovate. Shell usually yellowish white; young specimens, when living, are translucent, flesh-color, owing to the animal showing through. Length of the larger specimens, 14<sup>mm</sup>; breadth or height, 12.5<sup>mm</sup>.

Dredged in 1879 in many localities off Cape Cod, in 50 to 100 fathoms; in 1880 common at nearly all the outer stations, in 65 to 192 fathoms (stations 865 to 877). Most of the specimens are dead, but fresh.

**Tellimya ferruginosa** (Mont.).

G. O. Sars, Moll. Reg. Arct. Norv., p. 70, pl. 20, figs. 1 a-c.

*Montacuta ferruginosa* Jeffreys, Brit. Conch., ii, p. 210; v, pl. 31, fig. 9.

Several living specimens from stations 892, 893, and 894, in 365 to 487 fathoms. They were all thickly coated with a brown ferruginous crust, beneath which the shell is usually eroded.

**Leda unca** Gould.

Proc. Bost. Soc. Nat. Hist., viii, p. 282, 1862.—*Otia* Conch., p. 239 (= ? *Leda acuta* Conrad, described as fossil).

Many of our specimens are much larger than the shells described by Gould and Conrad. Our larger specimens are 13<sup>mm</sup> long, 8<sup>mm</sup> broad.

This shell is rather strong and thick, oval, swollen, rounded anteriorly, but posteriorly narrowed to an acute, short, angular beak, at the base of which there is a slight incurvature of the ventral edge. The nearly straight posterior dorsal edge slopes regularly to the beak, and is somewhat compressed or keeled. The whole surface is covered with numerous prominent, regular, rounded, concentric ribs, separated by deep grooves of about the same width. On the posterior dorsal area these ribs are smaller, and are often nearly obsolete close to the edge.

Taken in considerable numbers, alive and dead, at many of the stations, both south of Martha's Vineyard and south of Newport, R. I., in 85 to 155 fathoms, especially at stations 871, 873, 874, and 876.

This species appears to be allied to *L. Messanensis* Cant. (= *L. acuminata* Jeff.), from deep water in the Mediterranean.

**Leda pernula** (Müller).

G. O. Sars, op. cit., p. 35, pl. 5, fig. 1 a-d.

A specimen that appears to be a typical example of this species was dredged by us in 1877, off Halifax, in 59 fathoms. It has a smooth, lustrous, yellowish-green epidermis. The concentric grooves are irregular and mostly obsolete, except anteriorly, where they are fine and close. The form is similar to that of *L. tenuisulcata*. Length, 23<sup>mm</sup>; height, 10<sup>mm</sup>.

**Yoldia frigidia** Torell.

Spitz. Moll., p. 148, pl. 1, fig. 3, 1859.—G. O. Sars, Moll. Reg. Aret. Norv., p. 39, pl. 4, figs. 11 a, b.

This species occurred at station 894. It had not previously been obtained off the New England coast, but had been dredged in the Gulf of Saint Lawrence, by Whiteaves, in 200 fathoms.

**Arca glacialis** Gray.

G. O. Sars, op. cit., p. 43, pl. 4, figs. 1 a-c.—Verrill, Trans. Conn. Acad., v, pl. 44, fig. 5.

This species has been dredged in numerous localities by the various dredging parties of the United States Fish Commission, since 1872, in the Bay of Fundy, Gulf of Maine, off Cape Cod, on George's and Le Have Banks, and off Halifax, Nova Scotia, at various depths from 90 to 430 fathoms; about 70 to 75 miles south of Martha's Vineyard, in 115 to 192 fathoms, and south of Newport, in 85 to 500 fathoms. It attaches itself to pebbles or gravel-stones by a small but strong ventral byssus.

The shorter and more rounded form, known as *Arca pectunculoides* Scacchi, also occurs on our coast, as well as the deformed variety called var. *septentrionalis* by G. O. Sars. These appear to me to be mere vari-

ations of *A. glacialis*. The shortest and most rounded forms that we have taken were dredged south of Martha's Vineyard and south of Newport, in 85 to 225 fathoms, this season.

**Limopsis cristata** (?) Jeffreys.

Ann. and Mag. Nat. Hist., 1876, p. 434; Proc. Zool. Soc. London, 1879, p. 585, pl. 46, fig. 8.

A few dead specimens, referred doubtfully to this species, occurred at stations 865 to 867 and at 870 and 871, in 65 to 155 fathoms.

**Limopsis minuta** (Philippi).

G. O. Sars, Moll. Reg. Arct. Norv., p. 44, pl. 3, figs. 5 a-c.

*Limopsis borealis* Jeffreys, Brit. Conch., ii, p. 164; v, p. 174, pl. 100, fig. 3.

This shell was taken in abundance, living, at stations 893, 894 and 895, in 238 to 372 fathoms; in smaller numbers at 891 and 892, in 487 to 500 fathoms; and sparingly at several other localities in 115 to 252 fathoms.

**Modiola polita** Verrill & Smith.

Amer. Journ. Sci., xx, p. 400, for Nov., 1880 (published Oct. 25).

Two living specimens were taken at station 895, in 238 fathoms.

**Avicula hirundo** (?) L., var. *nitida*, nob.

The shell is very inequivalve, the right shell being smaller and flatter, and much bent inward near its ventral edge. The form is very oblique, with the anterior ear small and short, in the left valve, and separated from the body of the shell by a slight incurvature of the edge, from which a depression runs to the beak; right valve with a shallow byssal notch. Posterior ala short, triangular, with a rounded incurvature of the posterior edge of the shell, separating it from the body of the shell, which is produced and rounded at the end. Surface nearly smooth, glossy, and somewhat iridescent, with regular but inconspicuous lines of growth, which on the anterior ears rise up into thin, wavy lamellæ.

Color translucent, pale yellowish, usually with a brown streak radiating from the beak to the outer edge.

Length, beak to outer edge, 13<sup>mm</sup>; length of hinge-line, 11<sup>mm</sup>; beak to end of posterior ala, 8<sup>mm</sup>.

This shell was found in considerable numbers adhering to hydroids, in 65 to 192 fathoms, south of Martha's Vineyard (stations 865 to 867, and 869 to 873). In form it resembles the young *Avicula hirundo* of Florida and the West Indies. It is, however, much smoother and more lustrous than any specimens of that species which I have hitherto seen, and may well prove to be a distinct species, for which I would, in that case, propose the name *nitida*.

**Limæa subovata** (Jeffreys).

*Lima subovata* Jeffreys, Annals and Mag. Nat. Hist., Nov., 1876, p. 427.

Shell small, white, ovate, nearly equilateral, with the valves convex, much swollen in the middle; beaks prominent, incurved; hinge-line straight, shorter than the shell; ligament-pit narrow, elongated, lunate.

Sculpture very numerous (70 to 80 or more) radiating ribs, fine laterally, increasing in strength on each side to the middle, where there are two or three ribs considerably larger than the rest, with wider intervals; the ribs and intervals are crossed by fine, close, raised lines of growth.

Interior with radiating lines corresponding to the external ones. Length, 4<sup>mm</sup>; height (beak to ventral edge), 7<sup>mm</sup>; thickness, 4<sup>mm</sup>. Station 880, 255 fathoms, scarce; 891 to 894, 365 to 500 fathoms, common.

*Limæa gibba* (= *Lima gibba* Jeffreys, op. cit., p. 428) also differs but little from our specimens.

**Pecten fenestratus** Forbes (?).

Report on Mollusca, &c., of Ægean Sea, p. 146, in Proc. British Assoc. for 1843.

*Pecten inequisculptus* Tiberi (teste Jeffreys).

A small, but elegantly colored and sculptured, inequivalve *Pecten* was taken living at station 872. This I refer doubtfully to the above-named, Mediterranean deep-water species. In our two examples the upper valve is finely and regularly cancellated, with fine radiating and concentric lines; the under valve is covered with fine, raised, concentric ribs only. Ears prominent. Color whitish and different shades of red and brown, irregularly mottled.

**Pecten**, sp. (near *P. opercularis*).

Fragments of a large and peculiar *Pecten* occurred at stations 873 and 874. They closely resemble, in sculpture, the *P. opercularis* of Europe, except that the large ribs are triangular and carinated at summit, instead of rounded. These large ribs are separated by equally wide, concave interspaces, which, like the ribs, are marked by slightly concave, radiating furrows, and the surface of these furrows is covered with thin, concentric, slightly raised, wavy plates, the waves being limited by the fine radiating ridges between the grooves. Interior of valves with broad, flat grooves, alternating with flat ribs of the same width. Color grayish white, the ribs pale reddish.

*List of species enumerated in the preceding article.*

[One asterisk signifies that the species is an addition to the New England or North American fauna; two, that it is a newly discovered species; E=European; G=Greculandic; M=middle region of New England, or both north and south of Cape Cod; N=northern coasts of America (Cape Cod to Labrador); S=southern; O=oceanic; P=North Pacific.]

- |            |                                     |         |  |
|------------|-------------------------------------|---------|--|
| * *        | <i>Heteroteuthis tenera</i> V.      | * G. E. | <i>Bela rugulata</i> (Möller).                   |
| * G. E.    | <i>Gonatus amœnus</i> (Möll.) Gray. | * P. E. | <i>Bela simplex</i> (Middend.).                  |
| * *        | <i>Calliteuthis reversa</i> V.      | * *     | <i>Bela hcbes</i> Verrill.                       |
| * *        | <i>Alloposus mollis</i> V.          | * *     | <i>Pleurotoma Agassizii</i> V. & S.              |
| * O. E.    | <i>Argonauta Argo</i> Linné.        | * *     | <i>Pleurotoma Pandionis</i> V. & S.              |
| * G. E.    | <i>Bela Pingelii</i> (Möller).      | * *     | <i>Pleurotoma Carpenteri</i> V. & S.             |
| * N. E.    | <i>Bela Sarsii</i> Verrill.         | * *     | <i>Taraxis pulchella</i> V.                      |
| * E. N.    | <i>Bela tenuicostata</i> Sars.      | * E.    | <i>Taraxis Mörchii</i> (Malm) Jeff.              |
| N. E.      | <i>Bela Trevelyana</i> (Turton).    | * S.    | <i>Marginella rosida</i> ? Rav.                  |
| N.         | <i>Bela cancellata</i> (Migh.) St.  | * G. E. | <i>Tritonofusus latericeus</i> (Möll.)<br>Morch. |
| * N. E.    | <i>Bela impressa</i> Mörch.         | * *     | <i>Neptunea (Sipho) cœlata</i> Verrill.          |
| * N. G. E. | <i>Bela exarata</i> (Möller).       |         |  |

- \*\* *Neptunea (Sipho) arata* Verrill.  
 \* E. N. *Neptunea propinqua* (Alder).  
 \* N. G. E. *Buccinum cyaneum* Brug.  
 \*\* *Nassa nigrolabra* V.  
 N. G. E. *Lunatia nana* (Möller).  
 \*\* N. *Lunatia leucula* V.  
 \*\* *Lamellaria pellucida* V.  
 \* G. E. *Marsenina prodita* Bergh.  
 N. G. E. *Marsenina glabra* (Couth.) V.  
 \*\* N. *Marsenina ampla* Verrill.  
 \* P. E. N. *Velutella cryptospira* (Middend.).  
 \* G. E. N. *Trichotropis conica* Möller.  
 \*\* M. *Cingula harpa* Verrill.  
 \* E. *Cingula turgida* (Jeff.) V.  
 \* N. G. E. *Cingula Jan-Mayeni* (Friele) V.  
 \*\* *Lepetella tubicola* V. & S.  
 \*\* N. S. *Lovenella Whiteavesii* Verrill.  
 \* E. *Truncatella truncatulus* (Drap.).  
 \*\* *Solarium boreale* V. & S.  
 \*\* *Scalaria Pourtalesii* V. & S.  
 \*\* *Scalaria Dalliana* V. & S.  
 \*\* *Scalaria*, sp.  
 \*\* *Acirsa gracilis* Verrill.  
 \* N. E. *Aelis Walleri* Jeff.  
 \*\* N. S. *Aelis striata* Verrill.  
 \*\* *Calliostoma Bairdii* V. & S.  
 \*\* *Margarita regulis* V. & S.  
 \*\* *Margarita lamellosa* V. & S.  
 \*\* N. *Margarita*, sp.  
 \* E. N. *Macharoplas bella* (Verk.) Friele.  
 \* E. *Cyclostrema trochoides* (J.) Sars.  
 \* E. *Assimineia Grayana* Leach.  
 E. *Eulima intermedia* Cant.  
 \* E. *Eulima distorta* Desh.  
 N. S. *Turbonilla nirea* (Stimp.).  
 \*\* *Turbonilla Rathbuni* V. & S.  
 \*\* *Turbonilla formosa* V. & S.  
 \*\* *Turbonilla Smithii* Verrill.  
 \* E. N. *Eulimella ventricosa* (Forbes).  
 \*\* *Odostomia (Menestho) sulcata* V.  
 N. E. *Odostomia unidentata* (Mont.).  
 \* E. *Auriculina insculpta?* (Mont.) G. O. Sars.  
 \* N. E. *Diaphana nitidula* (Lovén).  
 N. E. *Diaphana pertenuis* (Migh.) V.  
 \*\* *Diaphana gemma* V.  
 \* E. *Diaphana conulus* (Desh.).  
 \* E. *Amphisphyrta globosa* Lovén.  
 N. S. *Amphisphyrta pellucida* (Br.) Lovén.  
 N. *Cylichna Gouldii* (Couth.) V.  
 \*\* *Philine anabilis* Verrill.  
 \* E. N. *Philine Finnarchica* Sars.  
 \* E. N. *Philine fragilis* G. O. Sars.  
 \* E. N. *Philine cingulata* G. O. Sars.
- \*\* *Pleurobrancha tarda* V.  
 \*\* N. *Dendronotus elegans* V.  
 \*\* *Doris complanata* V.  
 \*\* S. *Polycerella Emertoni* V.  
 \*\* N. *Coryphella nobilis* V.  
 N. *Coryphella Stimpsoni* V.  
 M. *Facolina Bostoniensis* (Couth.) V. & Em.  
 M. *Facolina pilata* (Gould) V. & Em.  
 \*\* N. *Cratena Veronea* V.  
 M. *Cratena gymnota* (Couth.) V. & Em.  
 \* N. E. *Tergipes despectus* (Johnst.) A. & H.  
 N. E. *Galvinia exigua* A. & H.  
 \* N. E. G. *Aemwa rubella* (Fabr.) Dall.  
 \* O. *Atlanta Peronii* (Les.).  
 \* O. *Carinaria Atlantica* Ad. & R.  
 \* O. *Carolina longirostris* (Les.).  
 \* O. *Carolina uncinata* (Gray).  
 \* O. *Carolina inflexa* (Les.) Gray.  
 \* O. *Clio pyramidata* Linné.  
 \* O. *Balantium recurrum* Children.  
 \* O. *Styliola acicula* (Rang).  
 \* O. *Styliola virgula* (Rang).  
 \* O. *Spirialis MacAndrei* Forbes & Han.  
 \*\* O. *Cymbulia calceolus* V.  
 N. *Halopsyche globulosa* (Rang) V.  
 N. E. *Dentalium occidentale* Stimpson.  
 \* N. E. *Siphonodentalium vitreum* Sars.  
 \* N. E. *Siphonentalis affinis* Sars.  
 \* E. *Siphonentalis Lofotensis* G. O. Sars.  
 \* E. *Cadulus propinquus* G. O. Sars.  
 \* E. *Cadulus Jeffreysii* (Monteros.).  
 \*\* *Cadulus Pandionis* V. & S.  
 \* E. *Poromya rotundata* Jeff.  
 \* N. E. *Poromya granulata* (Nyst) Forbes & H.  
 \* E. *Lyonsiella abyssicola* Sars.  
 \*\* *Lyonsiella gemma* Verrill.  
 \* N. E. *Kennerlia glacialis* (Leach) Carp.  
 \* N. E. *Næra glacialis* G. O. Sars.  
 N. E. *Næra arctica* Lovén.  
 N. E. *Næra obesa* Lovén (= *N. pellucida* St.).  
 \* E. *Næra jugosa* S. Wood.  
 \* E. *Næra rostrata* (Speng.) Lovén.  
 \*\* *Næra multicostrata* V. & S.  
 \*\* *Cardium*, sp. ind.  
 \* E. *Tellimyia ferruginosa* (Mont.).  
 \* E. *Cryptodon Sarsii* (Phil.).  
 M. *Cryptodon obesus* Verrill.  
 \* E. *Cryptodon ferruginosus?* (Forbes).  
 \*\* N. S. *Loripes lens* V. & S.

- |            |  |         |  |
|------------|--|---------|--|
| N. E.      | <i>Astarte crenata</i> Gray (= <i>A. lens</i> Stimp.). | * E.    | <i>Limopsis minuta</i> (Phil.).                          |
| * S.       | <i>Leda unca</i> Gould.                                | * *     | <i>Modiola polita</i> V. & S.                            |
| * N. E.    | <i>Leda pernila</i> (Müll.).                           | * S.    | <i>Avicula hirundo?</i> var. <i>nitida</i> V.            |
| * E.       | <i>Yoldia expansa</i> Jeff. ?                          | * N. E. | <i>Pecten ritrens</i> (Gmel.) Wood.                      |
| * N. E.    | <i>Yoldia frigida</i> Torell.                          | N. E.   | <i>Pecten Hoskynsi</i> Forbes, var. <i>pustulosus</i> V. |
| * N. G. E. | <i>Arca glaucialis</i> Gray.                           | * E.    | <i>Pecten fenestratus</i> Forbes ?                       |
| N. E.      | <i>Arca pectunculoides</i> Scacchi.                    | * *     | <i>Pecten</i> , sp. (near <i>opercularis</i> ).          |
| * E.       | <i>Limopsis cristata</i> Jeff. ?                       | * E.    | <i>Limax suborata</i> (Jeff.) Monter.                    |

PART III.—CATALOGUE OF MOLLUSCA RECENTLY ADDED TO THE FAUNA OF SOUTHERN NEW ENGLAND.

By A. E. VERRILL.

The following lists include 130 species of Mollusca that have recently been added to the fauna of Southern New England, mainly through the researches of the dredging party of the United States Fish Commission on the steamer "Fish Hawk". The greater portion of these, with several others undetermined or not yet described, were taken on September 4 and 13 and October 2, on the outer bank or slope, 70 to 115 miles south from Martha's-Vineyard and Newport, R. I., in 65 to 500 fathoms. For a list of these localities see p. —.

In these lists those species which were unrecorded from or entirely new to New England or to the northeastern coast of America are indicated by an asterisk; previously undescribed species by two asterisks; those known previously from our northern coasts have N prefixed; those from the middle parts of the coast have M, and are neither specially southern nor northern; those oceanic species belonging to the surface fauna have O prefixed; southern forms are designated by S; those that are also known from Europe are designated by E; those peculiar to America by A.

In the tables, living specimens are indicated by an *asterisk*; dead ones by a *dagger*; *m* signifies many; *sv*, several; *r*, rare; *l*, unusually large; *j*, young.

List of Mollusca from the outer banks previously unknown south of Cape Cod.

Stations .....	{ 865 to 867	872 to 874	870 to 878	869	879 880 895	893 894	891 892
Depths in fathoms.....	{ 64 to 65	85 to 100	115 to 135	192	225 to 232	365 to 372	487 to 500
CEPHALOPODA.							
** Calliteuthis reversa Verrill.....							* 1
** Heteroteuthis tenera Verrill.....	* m.	* m.	* m.	* m.	* sv.		.....
N. A. Rossia sublevis Verrill.....			* 2	* sv.	* 3	* 2	.....
N. E. Octopus Bairdii Verrill.....		*	* sv.	* sv.	* sv.	* sv.	* 1
** Alloposus mollis Verrill.....					* 3	* 2	* 1
* O. E. Argonauta Argo Linné.....	†		†				† 3