Faunistic Notes.

By

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Notes on Dredging and Trawling Work during the latter half of 1895. — During the summer and autumn of the year 1895 it was possible, with the aid of a grant made for the purpose by the Government Grant Committee of the Royal Society, to carry on dredging work with some regularity in deeper water, and at greater distance from Plymouth Sound, than had been possible in previous years. Our efforts were concentrated upon the grounds lying between Start Point and the Eddystone, with a view to compiling a chart showing the nature of the bottom at each spot, and the animals and plants which live there. For this purpose samples were taken, as far as possible, of every species brought up by the dredge and trawl, and preserved for identification, note being made of the relative abundance of each species. With the exception of the Polyzoa and Polychætes, the material collected has now been worked over, and lists of the animals obtained at the different spots drawn up. It would not, however, be advisable to publish the full details at the present stage, as it is our intention to work the same grounds again during the first six months of 1896, at the end of which time the results of the year's work will be combined, and a detailed chart drawn up. Many conclusions, gathered from a study of the rough charts already made out, require to be checked, and others, perhaps, will require modification.

Broadly speaking, the district under investigation can be divided into three principal regions, characterized not only by the nature of the bottom, but also by the animals which live there. The first of these comprises the grounds around the Eddystone, where the bottom is, for the most part, composed of broken shell; the second, a broad stretch of sandy ground, extending from a couple of miles east of the Eddystone to a line drawn about north and south, and

passing through Bolt Tail; and the third includes the off-shore grounds between Bolt Head and the Start, where gravel, broken shell, and soft rock predominate. Each of these three principal regions is, of course, capable of considerable further sub-division, but an account of these, with their inhabitants, must be postponed.

It may be well, however, to give some notes on a few of the rarer animals found, or of those which have not previously been taken by the Marine Biological Association at Plymouth.

Paraphellia expansa, Haddon. Three or four specimens of this interesting anemone were dredged, on August 16th, in about 26 fathoms, at a distance of 3 miles N. W. of the Eddystone. The surface was covered with fine particles of gravel. One of the specimens is still alive in the Laboratory. This species, for which a new genus was formed, was first obtained by Haddon at the mouth of Bantry Bay, in a depth of 40 fathoms, and was described from two specimens—one obtained in 1885, and a second in the following year.* Specimens have since been obtained by Prof. Herdman from near the Isle of Man.†

Sarcodictyon catenata, Forbes. The red variety was common on shelly grounds, both round the Eddystone and off Prawl Point.

Heterocordyle conybearei, Allman. Four colonies of this rare hydroid were dredged near the East Rutts, on August 30th. The species was identified by Mr. E. T. Browne, to whom the following note is due:—Each colony was on a large shell of *Buccinum undatum*, inhabited by the common Hermit Crab, *Eupagurus bernhardus*. The colonies correspond to the description given by Allman. There was no difficulty in identifying the species as the gonophores, each with a single ovum, were present in large numbers upon the blastostyles. This hydroid was first taken by Allman in Glengariff Harbour, Bantry Bay, and afterwards by Hincks at Oban, which are, I believe, the only localities where it has been found.

Of the other Hydroids, *Thuiaria articulata*, Pallas, and *Diphasia tamarisca*, Linn., are worthy of mention.

Ophiactis balli, Thompson, was abundant around the Eddystone, and especially so off Prawl Point. *Ophiura affinis* was also taken at the latter place, and a single specimen of *Echinocardium pennatifidum*, Norman, was dredged from a bottom of broken shell, about 5 miles south of Bolt Head.

Polygordius sp. occurred in numbers in gravel and broken shell dredged off Prawl Point (34 fms.), and a few were also taken from a ground of fine broken shell (20 fms.) south of the Eddystone.

* Haddon, "Revision of British Actiniæ," *Trans. Roy. Dub. Soc.* iv. (Series ii.) p. 321.
† *Brit. Assn. Report*, Ipswich, 1895.

Eupolia curta, Hubrecht. This nemertine was found on three occasions, and was identified by Mr. Riches, who had already taken a specimen in the neighbourhood. It has not previously been recorded for the Atlantic, but occurs in the Mediterranean, at Mauritius, Polynesia, and the West Coast of South America.* We have taken it in the following localities: (1) ½ mile N.W. by ½ N. of Eddystone, August 16th, ground fine broken shell (17–20 fms.); (2) Off Borough Island, August 20th, soft red rock interspersed with gravel (17 fms.); (3) 5 miles S. by E. of Prawl Point, September 17th, shells, broken shell, and gravel (34 fms.).

Dondersia banyulensis, Pruvot. (*Arch. Zool. Exper. et Gen.* ix. 1891, p. 715) = *Myzomenia banyulensis* (Simrot, "Mollusca," *Bronn. Thier-Reichs*, 1893, p. 231.) This interesting neomenian, for the identification of which I am indebted to Mr. Garstang, was taken 3 miles E. by N. of the Eddystone, on the 30th September, in 30 fathoms. Four specimens of the bright red variety were found on the hydroid *Lafoea dumosa*, var. *robusta*, growing on *Pecten* shells. The species has previously been found, also on *Lafoea dumosa*, at Banyul and Roscoff.

Lyonsia norvegica. This lamellibranch was obtained off Prawl Point. A specimen was subsequently taken off Stoke Point.

In addition to the above, which were obtained from deeper water, the following species taken in the ordinary collecting work of the Laboratory may be mentioned.

Tubiclava lucerna, Allman, growing on stones dredged from Millbay Channel (within the Sound), on November 14th. Gonophores were not present. The species is much more slender than *Tubiclava cornucopiæ*, Norman, and the corrugation of the polypary, and its dilatation at the base of the polypite, were very marked. It has previously been taken by Allman, in a rock-pool at Torquay and in Dublin Bay. It does not appear to have been since recorded.

Stylochoplana maculata, Quatrefages, was found in numbers on December 11th, crawling upon zostera dredged in Cawsand Bay. Gamble† gives the following localities for this species: Berwick Bay (Johnston); Firth of Forth (Dalyell); Firman Bay, Guernsey (Lankester); St. Andrews (McIntosh); Jersey (Koehler); St. Malo (Quatrefages); St. Vaaste-la-Hogue (Claparède). It has not been previously recorded for this district. E. J. ALLEN.

* See BÜRGER. Nemertinen. *Fauna u. Flora d. Golfes v. Neapel.* 1895, where an interesting chart is given showing the distribution of the Genus *Eupolia*.

† *Quart. Jour. Micr. Sci.* xxxiv. 1892–93, p. 498.

On Doris maculata, a new species of Nudibranchiate Mollusk found at Plymouth.—Under the name *Doris maculata*, I describe a small Dorid of striking appearance, which has been several times obtained at Plymouth, and which seems to be quite distinct from any form hitherto described. Pending the appearance of a more complete account of the anatomy and affinities of this interesting form, the present note will enable naturalists to recognise its appearance, and to identify it in the event of additional specimens being found. A brief reference to this animal occurs in my "Faunistic Notes at Plymouth for 1893–94." (*Jour. Mar. Biol. Assoc.* vol. iii. 1894, p. 220.)

The notæum of *Doris maculata* is usually about twice as long as broad, the sides being approximately parallel, and the two extremities equally rounded. The body, however, is flexible, and the actual form of the animal varies accordingly at different times. The largest specimen observed was nearly one inch in length, and proportionately stout and broad; but the usual length of the specimens obtained varies from three-eighths to three-quarters of an inch.

The rhinophores are large, distinctly laminated, and completely retractile. The edge of the rhinophoral cavity is very slightly, if at all, elevated, but is usually provided with a pair of purple tubercles at its sides, one lying on the inner side, the other on the outer side of the cavity.

The circumanal gills are constantly five in number, and are so situated that one gill is anterior and median in position, two others form an antero-lateral pair, and the remaining two a postero-lateral pair, symmetrically disposed with regard to the anus. The gills are simple pinnate plumes, completely retractile within a cavity, and are held out somewhat stiffly in expansion. The peribranchial fossa is bounded by a thin raised lip, which is beset with a number of small tubercles, some of which are pigmented with purple granules.

The foot is broad, and, although concealed beneath the notæum when the animal is at rest, projects slightly behind it during locomotion. The anterior margin of the foot shows a transverse groove, which separates a slender propodial lip from the rest of the foot. The propodium is quite simple, and shews no trace of a division into two lateral halves.

On each side of the oral protuberance is an oral tentacle, whose shape is bluntly conical, or digitiform, according to its state of elongation.

The feature which gives this new *Doris* its most distinctive appearance is the presence, on the back, of a number of conspicuously coloured tubercles, connected with one another by a network of low ridges. These tubercles are of different sizes, and there is a good deal of

irregularity in their arrangement. It is usually possible, however, to recognise two longitudinal rows of particularly large tubercles, three or four on each side, which extend from the rhinophores to the peribranchial fossa. These two rows of large tubercles are situated along a pair of lines which are the sites of tubercular or pigmented modifications in certain other types of *Doridida*, *e.g.* the sub-lateral rows of filaments on the back of *Idalia Leachii*, and the post-rhinophoral rows of pigment-patches in *Doris* (*Jorunna*) *Johnstoni*. In *Doris maculata* there is also an irregular median series of tubercles, as well as a number of smaller lateral tubercles irregularly scattered over the back between the main sub-lateral rows and the margin of the notæum.

The tubercles are of a deep purple colour, due to granular deposits of a purple pigment.

The ridges which connect neighbouring tubercles with one another are often slightly granulated with the same purple pigment.

In specimens in which the serial arrangement of the tubercles is not well defined, the general appearance is that of a central network of ridges, radiating out into irregular lines at the sides. The tubercles arise from the nodes of the network.

Since the general colour of the body is bright yellow, the contrast effected by the purple tubercles and ridges renders this little creature a very striking object in a mass of dredged material; it is, moreover, easily recognised as distinct from any British *Doris* hitherto described.

Doris maculata was first found by me at Plymouth on December 18th, 1893, when two specimens were dredged. It has since been obtained on several occasions, but always from the same locality—the western part of Plymouth Sound, known as the New and Queen's Grounds. The bottom here is clean, and consists largely of hard rock and stones, which graduate into beds of shells to the south. The flora and fauna are characterized by the occurrence of *Delesseria*, *Antennularia*, numerous *Polyzoa*, and *Morchellium argus*.

W. GARSTANG.

On the changes in the Pelagic Fauna of Plymouth during September, 1893 and 1895.—During a visit to the Plymouth Laboratory, in September, 1893, and in September, 1895, for systematic work on medusæ, it was almost a daily occupation to examine with a microscope the contents of the tow-net, for the purpose of obtaining the earliest stages of medusæ. Whilst thus occupied, I noted down not only the medusæ seen, but also other pelagic animals. I propose to give here a few notes to show the change in the pelagic fauna for the same month in different years. This

is not intended for a complete list of all the animals seen, but only a few of the more interesting ones are given, and those which show the changes in quantity.

Noctiluca miliaris.—Bles (1892) states: "The absence of *Noctiluca* is a very extraordinary feature of the year, for 1891 was remarkable for the immense profusion of this infusorian, which in the months of June and July was present in such numbers that it discoloured large stretches of sea. This year it has been almost entirely absent, and a few individuals, which I found at the end of September, were the only signs of its existence." In 1893, I found *Noctiluca* almost daily in the tow-net, the quantity varying day by day. On some days the top of the tow-net jar was covered with a thick layer. In 1895 not a single specimen was seen during September.*

Liriantha appendiculata was exceedingly abundant in 1893, during September and the early part of October. Mr. Garstang sent me an adult male on October 23rd. I never saw a single specimen in 1895.

Amphinema dinema was fairly common during the whole of September, 1893; only a few small specimens seen in 1895, the last on September 20th.

Lar Sabellarum (= *Willia stellata*) was fairly abundant during the whole of September, 1893, especially the early stages; but scarce in 1895, and only medusæ belonging to the first and second stages were seen.

Dipurena halterata, a single specimen taken on 25th September, 1893. None seen in 1895.

Lizzia blondina was not taken during September, 1893; but Garstang obtained specimens during the summer months. During the early part of September, 1895, this medusa was fairly abundant, and disappeared about the middle of the month.

Solmaris and *Octorchis.*—Two early stages of a *Solmaris*, and a specimen of *Octorchis* were taken on 7th September, 1895, about two miles south of the Breakwater. Both genera are new to Plymouth. The *Solmaridae* (Narcomedusæ) inhabit the Mediterranean and the Tropical Seas. *Octorchis* is also a Mediterranean medusa. On 10th September, 1895, a new species of *Dipurena* was taken, and on the 17th September several specimens of *Euchilota*, also new to British seas.

The medusæ were certainly not so abundant in September, 1895, as in September, 1893. This may have been due to the enormous number of *Doliolum* and *Muggiæa* which daily entered the tow-net. In 1893, *Doliolum* was scarce during September, and *Liriantha* exceedingly

* *Noctiluca* did not appear until December, *vide* Hodgson, *infra*, p. 174.—Ed.

abundant. *Obelia lucifera* was exceedingly plentiful during the whole of September, 1893, but in 1895, though a few specimens were taken daily at the beginning of the month, the great crowd did not appear until September 14th, then in the shallow water of Whitsand Bay, but soon swarmed everywhere, along with *Muggiæa and Doliolum*.

Muggiæa atlantica, Cunningham.—Cunningham (1892) has given a description of this species. He first obtained specimens near the Eddystone on September 12th, 1891, "and afterwards it was obtained in great abundance close to the Plymouth Breakwater, and even inside the Sound. It was brought in numbers to the Laboratory almost every day up to about the middle of October, but after the end of that month it was not seen again."

Cunningham (1892), p. 398, gives an earlier history of this siphonophore, and also states that in 1892 it was very abundant at Plymouth, about the middle of September, but decreased considerably towards the end of the month.

In 1893, *Muggiæa* was present during the whole of September, and during the early part of the month fairly abundant. In 1895 it was exceedingly abundant. *

Beroe.—A single specimen taken on 19th September, 1895, about 3 mm. in length.

Echinoderm larvæ.—In 1893, Plutei were abundant during the early part of September, but very scarce towards the end. In 1895 several kinds were seen, some very abundant at the end of the month. The Bipinnariæ, described by Garstang (1894), were first taken at Plymouth in 1893, during August, and apparently disappeared before my arrival, as I saw none during September. But, in 1895, a few specimens were occasionally taken.

Pilidium.—I did not see any larvæ during September, 1893, but frequently saw them in 1895. Fairly abundant on September 7th and 19th.

Terebella.—The larval form in its tube was always present in the tow-net during September, 1893; a sudden increase occurred on September 23rd. In 1895, none seen until September 13th; after this date a few were generally present in the tow-net, but they were never abundant.

Chætopterus.—In 1893, one or two larvæ were usually taken every day. In 1895, a few were seen at the end of August, but none during September.

Polynoe.—In 1893 a few of the early larval stages were taken about the middle of September. In 1895 a few were occasionally seen, but scarce.

* Cf. Hodgson, *infra*, p. 174. It remained this year (1895) until the middle of December.—Ed.

Magelona.—Abundant throughout the whole of September, 1893. On some days I counted the specimens seen—September 21st, 30; 22nd, 20; 23rd, 5; 25th, 50; 26th, 35; 27th, 38. On September 23rd all the Polychaete larvæ were scarce, but medusæ and other animals did not show any visible decrease. In 1895, Magelona was not nearly so abundant; often only a few present, occasionally none seen. On September 13th it was fairly abundant.

Mitraria.—This appears to be a rare animal on the southern coast of England. I only obtained three specimens on 31st August, 1895. Dr. Fowler informs me that some were taken a few years ago at Plymouth, but were not recorded in the journal. Vallentin (1891) records Mitraria for Falmouth in July, 1890.

Actinotrocha.—None seen during September, 1893. Very scarce in 1895; only a few specimens seen; the last taken on September 19th.

Rotifera.—Garstang (1894), p. 235, writes—"Apparently characteristic of this period (September) are the clouds of pelagic Rotifers, which may be occasionally taken." I cannot find any references to Rotifers in my notes for 1893. Certainly none appeared during Sept., 1895, as I kept a special look out for the benefit of a friend.*

Thalia democratica-mucronata.—Garstang (1894) states the nets were crowded with Salps in June, 1893. I saw none during September. In 1895 a few specimens were taken on September 9th only.

Doliolum tritonis.—In 1893 a few specimens were taken at the beginning of September, but soon became scarce. One or two occasionally taken at the end of the month. In 1895, Doliolum was exceedingly abundant at the beginning of September. Often the tow-nets were crowded with specimens. There was a gradual decrease towards the end of the month.

Tornaria.—None seen during September, 1893, but often taken in 1895. Fairly abundant at the beginning of September, and a few were occasionally taken at the end of the month. This is the same species, *Tornaria Krohnii*, which Bourne (1889) found at Plymouth in 1888, during August and September.*

Amphioxus.—A specimen taken in the tow-net on September 3rd, 1895, about 2 mm. in length, and another on September 7th, about 3 mm. in length. None seen during September, 1893.

In some of the species the variation is great, as they are absent in one year and abundant in the other. Little value, however, can be attached to the slight differences in numbers, as a species may be present every year, but owing to its scarcity escape the tow-net, which after all only traverses through a very small portion of the sea, even in

* Cf. Hodgson, *infra*, p. 176-7.—Ed.

the course of a month. I have given these rarer forms to show that they do occur in September, and they may be of use to other naturalists on faunistic work.

The following list is drawn up to show more clearly the variation in the fauna for the two years:

	1893.	1895.
Noctiluca	abundant	absent.
Liriantha	„	„
Chætopterus	few daily	„
Dipurena	one	„
Amphinema	fairly abundant	all show a great decrease.
Lar (*Willia*)	abundant	all show a great decrease.
Magelona	„	all show a great decrease.
Doliolum	few	very abundant.
Pilidium	absent.	fairly abundant.
Tornaria	„	„ „
Lizzia	„	„ „
Actinotrocha	„	few.
Thalia	„	„
Bipinnaria	„	„
Mitraria	„	three.
Amphioxus	„	two.
Beroe	„	one.
Solmaris	——	all new to Plymouth.
Octorchis	——	all new to Plymouth.
Dipurena (*sp.?*)	——	all new to Plymouth.
Euchilota	——	all new to Plymouth.

From this list it is easily seen that more interesting animals were taken during September, 1895, than in 1893. The cause is difficult to account for; it may, perhaps, be due to the weather, which was exceptionally fine during September, 1895. There was scarcely any rain, but plenty of sea mists and fogs; the last week of the month was exceptionally hot. The sea was usually calm; in fact, September was an ideal month for marine work.

The weather during the summer months was very changeable. Mr. Allen informs me that May and June were fine, July was stormy and wet. There was a spell of fine weather at the end of July, and during the first few days of August, then unsettled weather until middle of the month, when the fine weather commenced, which lasted till the end of September.

Garstang (1894) gives a general account of the weather for 1893, which may be of interest to quote for comparison:—

"The year 1893 was one of exceptional interest to the marine zoologist. During the first two months Plymouth experienced a continuous succession of heavy gales, but towards the middle of March the winds became lighter, and the sea, which had been running remarkably high outside the breakwater, subsided. From that time onwards till the middle of September we enjoyed six months of the most delightful weather—a period, with scarcely a break, of calm seas and almost cloudless skies. Under the influence of the great heat the temperature of the Channel waters rose continuously, until, in August, it had attained a point unprecedented for a quarter of a century; and it was of the highest interest to observe the effect of this high temperature, and of the prolonged calmness of the sea, upon the floating population of the neighbouring portion of the Channel. Numbers of semi-oceanic forms which rarely reach our shores arrived in remarkable profusion. In June the tow-nets were crowded with salps, while towards the latter end of August they were almost choked by masses of living Radiolaria." (p. 210.)

On looking up my notes for 1893, I find that the fine weather first broke up on September 6th, with a south-westerly wind with squalls of rain. The sea remained rough until the 11th, then followed a period of fairly calm seas until September 28th, when bad weather again set in till the end of the month. During the latter half of September westerly winds usually prevailed; rain fell nearly every day, and on two occasions showers of hail.

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EDWARD T. BROWNE.

Notes on the Pelagic Fauna at Plymouth. August–December, 1895.—The following notes are by no means exhaustive, or even complete, and merely indicate the more important features of the varied characters of marine life during the period covered by them. In their compilation I have followed the system of a monthly calendar adopted by Garstang (8). If these notes are compared with those of other

observers, certain differences present themselves, some striking, others trivial. That considerable and varied changes in the Floating Fauna do take place is sufficiently obvious, and they are doubtless strongly influenced by conditions of climate and currents. Garstang (**9**) briefly deals with the inter-relations of the Plankton; but very little accurate information on this point is available, and no explanation has yet been given of the periodic appearance and disappearance of certain forms. Thus, *Noctiluca* is recorded by Bles (**1**) as superabundant in 1891, scarce in 1892. Browne (**7**) comments on its abundance in 1893; Garstang (**9**) does not mention it for 1893 or 1894. I have only found a few individuals in December, 1895, a season quite at variance with the notes of other observers. *Muggiœa*, in 1895, appeared about the middle of August, as expected from previous notes; but it remained constantly present, or nearly so, up to the middle of December, two months later than in other years.

As regards Copepods, I have found *Oithona spinirostris* and *Coryceus anglicus* continuously from August to December, both inclusive, the former in diminishing numbers as the winter approached. Bourne (**3**) records both these species as occurring in the spring only; but, in another paper (**4**), refers to them both as being extremely abundant in the open sea in July. The non-appearance of *Paracalanus parvus* (Claus) is noteworthy.

With regard to other forms, Browne (**7**) has dealt in some detail with the more important features of the Plankton for September, and in comparison with a former period, so that there is but little for me to add, nor have I any other definite information of a similar season with which to make comparison.

Some reference is, perhaps, necessary to the observations of Prof. McIntosh, at St. Andrews (**10**). My own scanty notes accord, as far as they go, with his exhaustive record; but certain differences, probably due to locality, are conspicuous. In winter Ctenophores appear to be abundant, and of maximum size, at St. Andrews, but no trace of them exists at Plymouth. This is only one case in point.

The Tow-nettings were taken outside, and usually within a few miles of the Breakwater, at various depths from the surface, to about fifteen fathoms, but without any definite system. In this connection it is interesting to note that certain organisms usually rare, and first found in the open waters of the Channel, in the neighbourhood of the Eddystone, were this year abundant, and found comparatively close in shore. *Tornaria* (Bourne, **2**) was fairly evenly distributed in the inshore and open-sea areas; *Doliolum* penetrated as far as the Sound; while *Muggiœa* was abundant within it.

AUGUST.—This month is perhaps the best in the year, or, maybe, it

divides honours with September. This year, however (1895), the weather was distinctly prejudicial to good work outside the Breakwater, during the earlier part of the month.

Of the Crustacea, *Podon intermedius* (Lillj), and *Evadne Nordmanni* (Lowen), were constantly present, and a large proportion of the females carried ova. The Copepods *Cetochilus septentrionalis* (Goodsir), *Clausia elongata* (Boeck), *Dias longiremis* (Lillj), *Temora longicornis* (Müller), *Centropages typicus* (Kroyer), were invariably taken, the first-named in somewhat limited numbers, the remainder in more or less profusion. *Anomalocera Patersoni* (Templeton) only occurred once, on the 24th, when two individuals were taken. This conspicuous species is stated by Bourne (**3**) to be abundant in the late summer and autumn, though Bles (**1**) and Garstang (**9**) do not mention it.

Oithona spinirostris (Claus), recorded by Bourne (**3**) as an early spring species, was abundant all through the month, and, on the 23rd, females bearing ovisacs were taken. *Coryceus anglicus* (Lubbock), was also taken, though not previously recorded before September (Bles, **1**). Bourne (**3**) describes it as occurring from February to May. Nauplii were extremely abundant, more especially those of Cirripedes. The Zoœa of *Carcinus* appeared about the middle of the month, and soon became abundant, with the larvæ of various other Decapods.

Of Ascidians, *Oikopleura dioica* (Fol), was frequently present, though by no means abundantly. On the 26th, *Doliolum tritonis* (Herdman), appeared for the first time. The Ctenophore *Hormiphora plumosa*, (Agassiz), almost invariably occurred in small numbers. *Muggiœa atlantica* (Cunningham), appeared on the 13th, and from that time forward was constantly present.

From the middle to the end of the month the tow-nettings were taken well within two miles of the Breakwater, and from the 20th onwards the medusoid forms of *Obelia* appeared numerously, but in somewhat fluctuating quantities; and together with them a few other medusæ. Larval forms in abundance made their appearance towards the end of the month. Echinoderms were among the first, with several species of Plutei, and a few Bipinnaria. An occasional Tornaria, *T. Kröhnii*, followed by a variable number of *Trochospheres, Pilidia*, &c., and post-larval stages of numerous Polychætes. *Cyphonautes* also appeared in fair numbers. *Spadella bipunctata* occurred somewhat sparingly near the end of the month, and the individuals were of moderate size only. *Ceratium* was taken very sparingly on three occasions, and Diatoms of the genus *Rhizoselenia* were not uncommon.

SEPTEMBER.—The calm and hot weather prevailing almost entirely through this month, if it did not directly increase pelagic life, was decidedly more favourable for its capture. All the Entomostraca

mentioned last month were found, and from the 7th to the 14th were particularly abundant. More especially was this the case with *Cetochilus septentrionalis*. Ova-bearing females of *Clausia elongata* were taken on the 23rd, and females of *Coryceus anglicus* in a similar condition at short intervals throughout the month. *Podon intermedius* diminished considerably in numbers.

On the 13th, Mr. E. T. Browne brought me a fine specimen of the rare *Monstrilla Danæ* (Claus), and I obtained another on the 18th. This species does not appear to have been recorded in this neighbourhood since 1889, when Messrs. Bourne and Norman obtained no less than eight specimens, then its first appearance (**5**). *Nauplii*, of various species and stages, became very abundant, and among the equally numerous Decapod larvæ, the Zoœa of *Porcellana* were conspicuous. *Spadella bipunctata*, of small to moderate size, were fairly abundant, and larval forms of all kinds were more numerous than before. *Tornaria*, fairly numerous at first, was not taken by me later than the 24th. *Plutei*, invariably present, were particularly numerous 7th, 9th, 18th, and 30th. *Trochospheres* and *Pilidia* were plentiful, and the larvæ of Terebella appeared in small numbers, but on the 18th were fairly abundant. *Doliolum tritonis* was more or less abundant throughout the month, and on the 9th a few specimens of *Thalia democratica-mucronata* (Lusk) were taken. *Oikopleura* maintained its numbers as in August. *Muggiœa* was abundant throughout the month, sometimes exceedingly so. *Ceratium* occurred occasionally in small numbers, and Diatoms were fairly plentiful, more particularly so on the last day of the month, when the tow-net was quite choked with them.

October.—The diminution of numerous forms of life, indicated towards the end of September, became very conspicuous during October. *Podon* and *Evadne* disappeared early, and were soon followed by *Centropages typicus*. *Clausia elongata*, *Oithona spinirostris*, and *Coryceus anglicus* alone maintained their numbers, and of the two latter ova-bearing females were frequently found. *Nauplii* and *Decapod* larvæ became scarce. *Doliolum* disappeared on the 13th, but *Oikopleura* appeared more frequently, seldom a tow-netting without it. A fine specimen of *Tomopteris onisciformis* (Eschsch), was taken on the 22nd. *Spadella* increased in numbers and in size. Post-larval stages of many *Polychœtes* were still abundant, and with them *Cyphonautes* maintained itself without perceptible variation. *Muggiœa* was still abundant, and accompanied by its larval form. *Obelia*, with one sudden and conspicuous accession to its numbers, died out, and with it the few Medusæ associated with it. This increased number of Obelia was taken about a mile from the Breakwater. Diatoms, which were inconveniently conspicuous for the first day or two, resumed normal proportions.

NOVEMBER.—*Clausia elongata* became the most conspicuous Copepod. *Coryceus anglicus* also maintained its numbers, but the remainder diminished considerably. The not uncommon *Longipedia coronata* was taken twice, previously only recorded by Bourne (3) in March and April, 1889. *Harpacticus chelifer* was also taken once. This species does not appear to have been recorded at all, though it is fairly common in the littoral and laminarian zones. The Copepods frequenting these regions have been quite neglected.

Two specimens of *Caligus rapax* were taken free swimming. *Nauplii* and *Decapod* larvæ were reduced to a minimum. *Spadella*, at times numerous, was rather small. A single specimen of *Tomopteris* was taken on the 23rd. The post-larval stages of various *Polychætes* were fairly numerous, and, for a time, the larvæ of *Terebella* also. Echinoderm larvæ were rare, one or two *Plutei* being occasionally found. *Cyphonautes* were fairly numerous, and *Muggiæa*, with its larva, was generally present in small numbers. *Obelia* was occasionally represented by a few stragglers.

Diatoms were plentiful, and *Ceratium* was only found occasionally, and in very limited numbers.

DECEMBER.—This month was very similar to the last. *Oithona spinirostris* was only occasionally found. On the 18th, a fine specimen of *Candace pectinata*, Brady, was taken. This species has not hitherto been recorded in this neighbourhood, and, as far as I know, only once for the British Seas, when it was taken by Professor G. S. Brady (6), off the Scilly Isles. *Spadella* still increased both in numbers and in size.

Muggiæa disappeared altogether about the middle of the month. On the 20th, *Ceratium* was taken more numerously than before, and with it was a fair sprinkling of *Radiolaria*. These occurred for the first and only time, but are mentioned by Garstang (9) as frequently abundant in the summer. At the same time a single Rotifer was seen, again the only occasion, and rather a contrast to the frequent clouds of these organisms that Garstang (9) reports as generally occurring in August and September.*

Noctiluca was frequently present, but in extremely limited numbers.

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* *Cf.* BROWNE (7), p. 171.

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Nautilograpsus minutus, Milne Edwards.—On September 26th a large three-masted sailing-ship, the *Ballachulish*, of Ardrossan, entered the Sound from a distant port, and enquiry from the Agents showed that she had come direct from Iquique, in Peru, and that for nearly two years previously she had been trading in the Central Pacific.

As the Laboratory boat was passing on the 28th, it was stopped to make a rough examination of the ship's bottom for specimens, and a fine male specimen of *Nautilograpsus minutus*, M. Edw., was taken. This species is a native of the Sargasso Sea, and only a very rare straggler to the British coasts. It is described by Bell* under the name of *Planes linnæana* (Leach), and he states that there are several species of this genus. Stebbing, however, in his *Crustacea*,† reduces the reputed species to one, and substitutes Milne-Edwards' name for that of Bell. The bottom of the ship was covered, in patches, with a number of fine specimens of *Lepas anatifera*, and a single specimen of *Conchoderma aurita* (Spengel) was taken. With these and some green algæ was an enormous quantity of *Tubularia sp.* The latter was in fine condition, and both male and female reproductive organs were well developed. Specimens were taken by Mr. E. T. Browne for identification, and will be described by him. Overrunning both alga and *Tubularia* was a crowd of large *Podocerus falcatus*.

On October 21st a fisherman brought to the Laboratory an enormous bunch of *Lepas anatifera*, fixed to a fragment of some cork structure—thick sheets of cork secured together by wooden pins—found floating in the Channel some two or three miles out. Concealed in this mass was another specimen of *Nautilograpsus minutus*. (M. Edw.) Both specimens were about half an inch across the carapace, and of a reddish colour, but the second specimen had a broad band of white across the anterior portion.

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* BELL, T.—*History of the British Stalk-eyed Crustacea*, London, 1853.

† STEBBING, T. R. R.—*Crustacea*. Int. Sc. Ser. 1893.