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OBSERVATIONS

ON

CRUSTACEA COLLECTED DURING THE HYDROGRAPHIC
CRUISES, 1902-1903,

BY

THOMAS SCOTT, LL.D., F.L.S.

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OBSERVATIONS
ON
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PART I.

CRUSTACEA OF THE AUGUST CRUISE, 1902.

The number of gatherings submitted to me for examination was twenty-four, and they were all, with the exception of one from 100 metres, collected at or near the surface. The stations where they were collected are as follows:—1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12 (two gatherings), 13, 14, 15, 16 (two gatherings—one at surface and one at 100 metres), 17, 18, 21, 22, 23, 24 and 25. The collections were made chiefly with an ordinary tow-net, but the *Garstang* net was also occasionally used. A list of the crustacea observed in the various gatherings is given in Table I. (p. 232).

The net was towed, as a rule, for 15 minutes; at Stations 3, 14 and 16 for half-an-hour; and at Stations 21, 23, 24, 25 for five minutes only.

In the following notes, which are intended to supplement the information supplied by the Table, reference is made to anything of interest that could not be clearly set forth there.

Station 1.—This, though a small gathering, contained several entomostracan species, the names of which are given in the table. The only other organisms observed were a few Larval Decapods, and a young *Galathea* sp.

Station 2.—This also was a small gathering. *Anomalocera patersoni*, one of the larger and more highly coloured Calanoids, was moderately frequent, but though several other species occurred they were all more or less rare. A few Larval Decapods were observed.

Station 3.—*Anomalocera patersoni* was also in this gathering the commonest of Copepods observed; *Calanus helgolandicus* was also frequent, but other species were scarce. In this gathering larval Decapods were abundant.

Station 5.—This gathering contained a considerable number and variety of organisms. Amongst the Copepoda, *Calanus helgolandicus* and *Metricaria lucens* were frequent, but there were only a few *Anomalocera*. This also was one of the only two gatherings in which *Candacia pectinata* occurred. *Parathemisto oblivia* was a common species here; a few Schizopods were also observed, but some of these were rather immature. A single specimen of the somewhat rare *Pseudocuma similis*, G. O. Sars, was observed in this gathering, which was the only one in which this species was noticed.

Station 6.—*Calanus helgolandicus* and *Metridia lucens* were again frequent, while only a few *Parathemisto oblivia* were noticed. Larval and young Decapods were moderately frequent. *Caridion gordonii* was also observed.

Station 7.—*Calanus helgolandicus* was a common species in this gathering; and this was the only gathering of the series in which *Centropages typicus* was frequent. Schizopoda (*Thysanoessa* and *Rhoda*) were much more frequent here than in any of the other gatherings collected at this time, but they were for the most part immature and imperfect.

Station 8.—*Calanus helgolandicus* was again the most common Copepod obtained; *Oithona helgolandicus* was also frequent, and another *Oithona*, which is almost certainly the *Oithona spinirostris* of Boeck, was obtained here; no larval or young forms were obtained.

Station 9.—About the same number of Crustacean species was observed in this gathering as in the last, but individual specimens were fewer. *Calanus helgolandicus* was moderately frequent, but the others were few or rare. A single specimen of *Tryphana malmi* occurred here. There was in this gathering a considerable amount of what appeared to be Molluscan ova in jelly-like masses, and also of Coelenterata.

Station 10.—Seven species of Copepoda were obtained here, but the only forms of frequent occurrence were *Calanus helgolandicus* and *Metridia lucens*. Three specimens of *Eucalanus elongatus* were obtained. Schizopods (*Nyctiphanes* and *Rhoda*) were moderately common, but for the most part immature.

Station 11.—This gathering consisted chiefly of Coelenterata; only three species of Copepoda were observed, viz., *Calanus helgolandicus*, *Metridia lucens* and *Anomalocera patersoni*, the last two of which were frequent, but of the first only a few were noticed.

Station 12.—Two gatherings, both marked "surface," were collected here, and the contents of the two bottles containing them were similar, consisting chiefly of masses of what appeared to be Molluscan eggs. Three species of Copepoda, *Calanus helgolandicus*, *Anomalocera patersoni* and *Acartia clausi*, as well as young *Parathemisto*, were obtained in one of the gatherings, but they were all very sparingly represented. The contents of the other gathering was somewhat similar except that the *Anomalocera* was common and that *Centropages typicus* was also present.

Station 13.—The contents of this gathering, like the two just described, consisted chiefly of masses of what seemed to be Molluscan ova together with small Coelenterata. A few Crustacean species were observed but these formed a very small part of the gathering.

Station 14.—This was a moderately large gathering, but it consisted almost entirely of *Calanus helgolandicus*, amongst which the following other species were obtained:—*Euchaeta norvegica*, *Anomalocera patersoni*, *Euthemisto compressa*, *Parathemisto oblivia* (frequent), and *Hyperia* sp. (few).

Station 15.—Only three Crustacean species were observed here, viz., *Calanus helgolandicus*, which was common, *Anomalocera patersoni* and *Parathemisto oblivia*, both of which were rare.

Station 16 (1).—Off Faroe, Tow-net at 100 meters, collected August 30th, 1902, Net (*Garstang*) towed twenty-five minutes. Seven species of Copepoda, including such forms as *Paracalanus parvus* and *Ectinosoma atlanticum*, were obtained, as was also *Parathemisto oblivia*; but the only one that occurred with frequency was *Calanus helgolandicus*.

Station 16 (2).—In this gathering *Calanus helgolandicus* was common, as also were *Euthemisto compressa* and young Decapoda. Several specimens of *Euthemisto bispinosa* were also obtained, but most of them were imperfect. The young Decapoda included the Megalops and other stages.

Station 17.—This was a moderately large gathering, but consisted chiefly of *Calanus helgolandicus*, the only other crustacea observed being *Acartia longiremis* and *Parathemista obliqua*; also two female specimens of a Calanoid apparently identical with *Eucheirella rostrata* (Claus).

Station 18.—This was a large gathering and the bottle only contained a moiety of it. This, like the previous one, consisted chiefly of *Calanus helgolandicus*, but *Euchaeta norvegica*, mostly immature, were also frequent, and these were the only Copepods observed. A few other crustacean species were noticed, but these occurred very sparingly; they included, among others, *Hyperoche tauriformis*, *Eurydice achata* (two specimens), and *Sergestes atlanticus* (one specimen).

Station 21.—This gathering, which was a moderately large one, consisted chiefly of Infusoria (*Ceratium*). Young Copepoda belonging to one or two common species were also frequent here, but other forms were very scarce.

Station 22.—This, though a small gathering, contained a considerable variety of organisms; Infusorians were again common; several species of Copepoda were also of frequent occurrence, including *Pseudocalanus elongatus*. It seems worthy of notice that this species was only observed on three occasions in the present series of gatherings, and it was more frequent in this one than in the others. *Ectinosoma atlanticum* was also frequent in this gathering, as also were *Temora longicornis* and *Centropages hamatus*.

Station 23.—This gathering was very small, and the only Copepod of frequent occurrence was *Oithona helgolandica*; a few young *Balani* (Cypris stage) were observed.

Station 24.—This also was a small gathering, but contained *Evadne nordmanni* in abundance; *Paracalanus parvus* and *Oithona helgolandica* were also frequent, but other species were represented very sparingly. The *Temora longicornis* observed here were mostly immature, and there were also a few larval Decapoda.

Station 25.—*Evadne* were moderately plentiful here, but not so abundant as in the gathering from Station 24; *Temora longicornis* were also common, but for the most part immature; young Decapods as well as several other Copepods were also observed, but these occurred only sparingly.

PART II.

CRUSTACEA OF THE DECEMBER CRUISE, 1902,

This collection consisted of sixteen bottles; fourteen of them contained surface gatherings, one a gathering collected at 50 meters and one at 100 meters. The gatherings were all collected by tow-net at fourteen stations in the North Sea and Faeroe Channel.

Table II. (page 236) contains a list of all the species observed, together with particulars of the localities and hydrographic conditions.

Besides the information contained in the Table, I submit the following general observations concerning the contents of each gathering.

Station 2.—This gathering contained a greater number of Crustacean species than any of the others; the Copepoda observed comprised twelve species and some specimens of *Rhoda* and *Parathemisto*, but a considerable proportion of the specimens were immature; no young or larval Decapods were noticed, but a specimen or two of "*Microniscus*" occurred.

Station 4.—The minute *Ectinosoma atlanticum* which was frequent in the previous gathering was only sparingly represented here ; the most common species were *Temora longicornis*, *Metridia lucens* and *Acartia biflosa*. “*Microniscus*” was again observed, and a single specimen of *Rhincalanus nasutus*, Giesb. (♂). *Parathemisto* was also very scarce. No larval Decapods were observed.

Station 6.—On the surface, *Anomalocera patersoni* was common here, and the small *Ectinosoma* was again frequent. A single specimen of *Harpacticus chelififer*, a species somewhat out of place in a surface gathering, was observed. In this gathering were several specimens of the rare *Tryphana malmi*, not however in very good condition, and a single specimen of a Lysianassid which I could not at the time recognise, and have reserved for further examination. At the same Station, the Garstang net, used at a depth of 50 metres, brought up no Crustacea. At 100 metres, the only Crustacean observed was a specimen of *Paracalanus parvus*.

Station 7.—Several Copepods occurred in this gathering, but the only common one was the small *Ectinosoma*. There were a few Schizopods—*Rhoda* and *Thysanoessa*—but somewhat imperfect.

Station 9.—Two species of Copepoda were observed here, viz., *Acartia biflosa* and *Oithona helgolandica* ; both were moderately common, but the former more so than the other, and a considerable proportion of the specimens were immature. No other Crustaceans were noticed.

Station 10.—Nine species of Copepoda were obtained in this gathering, but except *Acartia biflosa* and *Oithona helgolandica*, they were all sparingly represented. A single very small specimen of a *Conchoecia* was obtained here, which is a stranger to me ; it may however only be a younger form, but I have preserved it meanwhile for further examination.

Station 11.—The only common species here were *Pseudocalanus elongatus* and *Acartia biflosa*. Though other seven species were observed they were all very scarce, and a considerable proportion were immature. No other Crustacean group was apparently represented.

Station 12.—Copepoda, which were the only Crustaceans observed here, contained a large proportion of immature forms ; among the rarer species observed was a male specimen of *Rhincalanus nasutus*, Giesb.

Station 13.—The only Crustaceans noticed here were a few *Pseudocalanus elongatus*, *Acartia biflosa*, and *Oithona helgolandica*, and they were all more or less immature.

Station 14.—Collected December 10th. This gathering was very similar to the last one, but there were also a few *Ectinosoma atlanticum*. One or two Schizopods too imperfect for identification also occurred here.

Station 15.—Seven species of Copepoda were obtained in this gathering, the most common being *Paracalanus parvus*, Claus ; *Acartia biflosa* was also moderately frequent, but other species were very sparingly represented. No other forms were observed.

Station 17.—This gathering contained nearly as great a variety of Copepoda as that from Station 2. The species observed number eleven and included the somewhat rare *Thaumaleus claparedi*, Giesb., a species which I think ought to have J. C. Thompson's name *rigida* restored to it. In this gathering *Pseudocalanus elongatus*, Boeck, was frequent, as also the small *Ectinosoma* referred to in previous notes. A larva of *Gnathia maxillaris* occurred here.

Station 19.—Crustaceans was very scarce here, and most of them were immature. Seven species of Copepoda were identified, and are recorded in the Table.

Station 23.—This gathering was a similar one to the last. Six species of Copepoda were observed, but they were all more or less immature.

PART III.

ON CERTAIN CRUSTACEA FOR THE CRUISES OF 1903.

The Tables (III.–VI.) appended to this paper contain lists of the various Crustacea obtained during the quarterly hydrographic cruises of 1903, and are arranged in conformity with the plan adopted in a previous Report on the other plankton organisms that occurred in the same collections. The following notes refer in the main to species that, for one reason or another, appear to be of special interest. An analysis of the collections in relation to the hydrographic conditions at the place and time of their capture is not attempted in the meanwhile.

The Crustacea observed in these plankton collections are for the most part pelagic forms, demersal species seldom occurring except when the tow-net approaches or touches the bottom, or when they happen to be carried seawards on floating weeds. Amongst these pelagic forms Copepoda are usually the most numerous both as regards species and individuals. Amphipoda, especially the Hyperiidæ, and the Euphausiidæ amongst the Schizopoda are also at times moderately common. The other groups are not so frequently represented, at least in their adult form, though in their larval and immature stages they sometimes occur in considerable numbers.

The Crustacea referred to in the following notes comprise twenty-seven species of Copepoda, five of Ostracoda, five of Amphipoda, one Isopod and ten Schizopods, most of which have already been recorded from the neighbourhood of Shetland and the Faeroe Channel. No undescribed pelagic forms have been observed so far.

COPEPODA—CALANOIDA.

Calanus hyperboreus (Krøyer).—

This comparatively large northern and Arctic *Calanus* occurred in several of the plankton samples examined during the past year, particularly in those collected by H.M.S. *Jackal*, between the Faeroe and Shetland Islands. It has been observed very sparingly and much less frequently at stations on the east side of the Shetlands than at those on the west side, and no specimens have been obtained at stations to the south of these islands.

Calanus helgolandicus (Claus).—

The *Calanus* so common in most of the *Jackal* and *Goldseeker* collections is that described by Dr. Claus under the name of *Cetochilus helgolandicus*.* The characters by which this form is distinguished from *Calanus finmarchicus* (Gunner) are not very conspicuous and require careful examination, and on account of the similarity of the two forms some authors consider that the differences between them are not sufficient for their separation as distinct species and include both under Gunner's name. I am inclined, however, to follow Dr. Claus and Professor G. O. Sars in keeping them separate, because though the differences be small they appear to be fairly constant, and, if so, whether we call them specific or varietal,

* "Die freilebenden Copepoden," p. 171, Pl. XXVI., Figs. 2-6 (1863).

they are still worthy of record. Hitherto I have failed to detect in the plankton collected by the *Jackal* and *Goldseeker* any specimens of typical *Calanus finmarchicus* (Gunner) described and figured by Professor G. O. Sars in his work on the Crustacea of Norway.*

Eucalanus elongatus (Dana).—

This *Eucalanus* appears to be widely, though somewhat sparingly, distributed within the area traversed by the *Jackal* and *Goldseeker*, which extends from the Moray Firth northwards to the Faeroe Channel and to the north and east of the Shetland Islands. *Eucalanus elongatus* has been obtained in plankton-samples both from the surface and under surface, but more frequently in the samples from deep water.

Eucalanus crassus (Giesbrecht).—

This species has been observed in only three of the plankton-samples collected during the past year; one of these was a surface gathering from Station 19 A collected on the 20th August, 1903, one was from 100 meters at Station 20 A collected on the 21st August, while the third, which was also a surface gathering, was collected at Station 22 (59° 36' N., 0° 41' W.) on the 22nd November.

Eucalanus crassus requires careful discrimination, more particularly if the specimens are not mature, as they may easily be confounded with *E. subcrassus* or *E. monachus*. Dr. Wolfenden has recorded *Eucalanus crassus* also from the Faeroe Channel.

Rhincalanus nasutus (Giesbrecht).—

The occurrence of this species in the gatherings from the neighbourhood of the Shetland Islands and the Faeroe Channel has been nearly as frequent as that of *Eucalanus elongatus*. According to Giesbrecht, *Rhincalanus nasutus* has been observed as far south as the Straits of Magellan, and Professor G. O. Sars records the finding of two well-preserved female specimens in a plankton-sample taken by the *Michael Sars* some distance to the east of Iceland.† It has also been obtained by the present writer on the east coast of Scotland as far south as the Moray Firth.‡

Ætidius armatus (Boeck).—

Ætidius armatus appears to be moderately frequent in the Faeroe Channel and round the Shetland Islands. Reference to the tabulated lists of plankton for the past year shews that the species has been obtained at a considerable number of stations and both in surface and under surface gatherings. It has been taken, for example, at Stations 5, 9, 10, 11, 12, and 22, situated to the north and south of the Shetland Islands, and at Stations 15 A, 15 B, and 18 A, 19 A, 19 B, and 20 A, between Shetland and Faeroe.

From the remarks of Professor G. O. Sars on this species it would appear that though it certainly belongs to the genus *Ætidius* of Brady, it is doubtful whether it be the *Ætidius armatus* described by that author, and if it be so, his name will have to be retained for the species as well as the genus. It is with some hesitation, therefore, that I, for the present, record the species under Boeck's name instead of under that of Brady.

Chiridius armatus (Boeck).—

This species, so frequent in the fjords of Norway, has been observed once only in the collections I have examined. It occurred in a plankton-sample from Station 19 B, collected on August 21st, at a depth of about 500 meters. Very few specimens were observed.

* "Crustacea of Norway," Vol. IV. ; Copepoda, p. 12, Pl. V.

† "Crustacea of Norway," Vol. IV., p. 15.

‡ "Twentieth Ann. Rept. Fishery Board for Scotland," Pt. III., p. 450 (Oct., 1902).

Chiridius tenuispinus (G. O. Sars).—

1900. *Chiridius tenuispinus*, G. O. Sars, "Norw. North-Polar Exped., Crustacea," p. 67, Pl. XVIII.

Three specimens of this somewhat rare species were obtained in two of the plankton-samples collected by the *Jackal* in August. Two of the specimens were captured at Station 15 A, at a depth of 550 to 650 meters, on the 18th of the month, and one specimen at Station 19 B, at a depth of 220 to 320 meters on the 20th.

Professor G. O. Sars describes this *Chiridius* as "not unfrequent at six different stations in the Polar basin explored by Nansen. At one of the stations it occurred at the very surface of the sea, and at another some depth below the ice." From this it would almost appear as if the Faeroe Channel were the meeting place for species that are pushing southward from the Arctic with others making their way northwards from southern latitudes.

Undeuchaeta minor (Giesbrecht).—

1888. *Undeuchaeta minor*, Giesbr., "Atti Accad. Lincei," Rend., Ser. 4, Vol. 4, p. 335; see also "F. Fl. Neapel.," Vol. 19, p. 228, Pl. XIV., Figs. 31-34; Pl. XXXVII., Figs. 55-58 (1892).

A solitary specimen of this Calanoid occurred in a surface plankton-sample from Station 19 A, collected on the 20th of August. Its occurrence at this station extends the distribution of the species considerably further north than that indicated by any record hitherto published. The distribution of *Undeuchaeta minor* as given in *Das Tierreich* (Lieferung 6—Copepoda, p. 34) extends from about latitude 16° to 45° north, while I. C. Thompson and A. Scott, in their account of the Copepoda brought home by Professor W. A. Herdman from Ceylon,* state that they obtained the species in gatherings collected off Gibraltar and at two stations in the Indian Ocean.

Euchirella rostrata (Claus).—

1866. *Undina rostrata*, Cl., "Copepoden-Fauna von Nizza," p. 11, Pl. I., Fig. 2.

This species was observed in plankton-samples from three of the stations examined by the *Jackal* in August: one specimen occurred in a sample from Station 11 (latitude 61° 43' N., longitude 0° 43' W.), depth 100 meters; another in a sample from Station 19 B (latitude 60° 26' N., longitude 4° 02' W.), depth 100 meters; and a third specimen in a sample from Station 17 (latitude 61° 12' N., longitude 6° 33' W.), depth 100 meters—three specimens in all.

Euchirella rostrata does not appear to have been very frequently noticed in our northern seas. One of the earliest records of its occurrence is that published by Dr. Wolfenden in 1902 in his paper on "The Plankton of the Faeroe Channel and Shetlands,"† but he seemed to have had some doubts about it. The next record is that published by the Rev. Canon Norman in October, 1903,‡ who obtained it in a gathering from the Faeroe Channel at a depth of 150 fathoms. These are the only two records of the species known to me previous to the present one. Dr. Claus described the species from Mediterranean specimens.

Euchaeta glacialis (Hansen).—

1886. *Euchaeta glacialis*, Hansen, "Oversigt over de paa Dijnphna-Togtet indsamlede Krebsdyr," p. 74, Pl. XXIII., Figs. 5-5 k; Pl. XXIV., Figs. 1-1 d.

* Report by Professor W. A. Herdman, on the "Pearl Oyster Fisheries of the Gulf of Manaar;" No. VII., Copepoda, p. 244 (1903).

† "Journ. Mar. Biol. Assoc.," Plymouth, N.S., Vol. VI. (No. 3, January, 1902), p. 327.

‡ "Journ. Linn. Soc. (Zool.)," Vol. XXIX. (No. 188, October, 1903), p. 137.

Jackal, Station 19 A (60° 40' N., 4° 50' W.), one specimen in [a plankton-sample from 500 to 600 meters, August 20th, 1903.

The solitary example of this fine species recorded here is a female, and measures in length from the rostrum to the end of the furcal joints fully nine millimetres. *Euchaeta glacialis* has a close resemblance to the more common *E. norvegica*, and may be confounded with it, but when carefully examined we find that, besides being distinctly larger, the form of the genital protuberance in the female is different. So far as its distribution is at present known, *E. glacialis* appears to be a truly Northern and Arctic form.

Scolecithricella minor (Brady).—

This species was observed sparingly in several of the plankton-samples, particularly in those from 100 to 600 meters, collected in August. The following are some of the stations where the species has been captured:—Station 8 (lat. 61° 32' N., long. 3° 10' E.), Stations 13 A, 15 A, 19 A, and 20 A; this last sample, which was from 100 to 200 meters, was collected on November 30th.

The known distribution of *Scolecithricella minor* extends from Baffin's Bay and the Lofoten Islands to the Indian Ocean and the Gulf of Guinea.

Metridia longa (Lubbock).—

Though *Metridia longa* was represented in a number of the plankton-samples from the Faeroe Channel as well as in three of those from Station 8, it was entirely absent in the samples collected at the stations situated south of the Shetland Islands.

In contrast to the restricted distribution of *Metridia longa* it is of interest to notice that the closely-allied species *Metridia lucens* (Boeck) was more or less frequent in a large proportion of the gatherings collected both by the *Jackal* and *Goldseeker*.

Pleuromamma robusta (F. Dahl).—

1893. *Pleuromamma robusta*, F. Dahl, "Zool. Anzeiger," Vol. XVI., p. 105.

This fine species has been observed in four plankton-samples, viz., in a sample from Station 13 A, from 100 meters, collected on August 18th, in another collected at the surface at Station 19 A, and at 100 meters at 19 B, collected on August 20th. The last sample was from Station 20 A, from 100 to 200 meters, and collected on November 30th. The species was moderately common in the surface gathering, but occurred very sparingly in the other three. Dr. Dahl records *Pleuromamma robusta* from the Atlantic Ocean from 100 to 1,500 meters; Professor G. O. Sars found a few specimens in a plankton-sample from the *Michael Sars*, Station 9, somewhat north of the Faeroe Islands, and another specimen was obtained in a sample from Station 4 (Aalesand). Canon Norman also reports its occurrence in the Faeroe Channel at a depth of about 600 fathoms (over 1,100 meters), and at 40 miles N.N.W. of Achill Island, Ireland, at 200 fathoms (about 370 meters).

Pleuromamma xiphias (Giesbrecht).—

1889. *Pleuromamma xiphias*, Giesbr., "Atti Acc. Lincei," Rend., Ser. 4, Vol. V., p. 25 (see also Giesbrecht's "Pelagische Copepoden des Golfes von Neapel," p. 347, et seq.).

A single specimen of this somewhat rare *Pleuromamma* was obtained in a plankton-sample from the *Jackal*, Station 19 B, with tow-net at 100 meters. This appears to be the first record of the species from the Faeroe Channel.

Haloptilus longicornis (Claus).—

1863. *Hemicalanus longicornis*, Claus, "Die freilebende Copepoden," p. 197, Pl. XXIX., Fig. 1.

A solitary specimen—a male—of *Haloptilus longicornis* was obtained in the *Jackal* collections for November. It occurred in a plankton-sample, collected at the surface at Station 20 A on November 31st. Professor G. O. Sars states that a well-preserved female specimen of this form was found in a plankton-sample taken during the cruise of the *Michael Sars* in 1901 at Station 25 A, located between Finmark and Bear Island,* and this, so far as known to me, is the only record other than the present one of *H. longicornis* so far to the north of the British Islands.

The late Mr. I. C. Thompson obtained this species in four of the gatherings from the West of Ireland collected by Mr. George Murray, F.R.S., during the cruise of the ss. *Oceana* in 1898. One of these gatherings was from Station 2 (52° 4' 5" N., 12° 27' W.), depth 620 fathoms; the others were from Station 4 (52° 27' 6" N., 15° 40' W.) at 1,275, 1,370, and 1,770 fathoms.†

According to Giesbrecht, the normal distribution of this species in the Atlantic and Pacific Oceans extends from about 26° N. to 40° S. lat.

The species is readily distinguished by its peculiar papilliform rostrum and very long and slender antennules.

Labidocera wollastoni (Lubbock).—

1857. *Pontella wollastoni*, Lubb., "Ann. Mag. Nat. Hist." (2), Vol. XX., p. 406, Pl. X., Figs. 13, 14; Pl. X a.

The only plankton-sample in which this species was observed was a surface gathering from the *Jackal*, Station 8, collected on August 12th. Only a single specimen—a female—was noticed.

COPEPODA.—Cyclopoida.

Oithona (?) *setigera* (Dana).—

1852. *Oithona setigera*, Dana, "Crust. U.S. Expl. Exped.," p. 1,101, Pl. 76.

The form which I record doubtfully under this name has been observed more or less frequently in plankton-samples from stations to the north, north-east, and south of the Shetland Islands, and between these Islands and the Faeroes. It agrees better with the figures of this species as given by Giesbrecht than with any other species of *Oithona* described by him.

Oithona plumifera, Baird, has a fairly wide distribution in the North Atlantic, but in that species the rostrum is not only less produced than in *O. setigera*, it is also more broadly triangular; it does not agree with our form, which also appears to want the coloured plumose setae so characteristic of *O. plumifera*. On the other hand, the *Oithona spinifrons* recorded by Boeck as occurring off the Norwegian coast may turn out to be identical with this species rather than with *O. helgolandica*, Claus; but till this question is satisfactorily settled, I am inclined to retain Dana's name for the species referred to.

Oithona nana, Giesbrecht.—

This species has been observed in at least one of the plankton-samples collected during the Autumn cruise of H.M.S. *Jackal*, viz., from Station 20 A at the depth of 115 to 215 meters collected on August

* "Crustacea of Norway," Vol. IV. (Copepoda—Calanoida), p. 122.

† "Ann. and Mag. Nat. Hist." (7), Vol. XI., pp. 1-36 (July, 1903).

21st. Being a small species it is readily missed, especially if the specimens are immature or imperfect, and therefore it may have been present in other samples besides the one referred to; there were indeed one or two other gatherings in which specimens apparently belonging to this species were noticed, but as they were either too immature or imperfect for satisfactory identification they were not recorded.

Mr. G. P. Farran, B.A., who, in his paper on Copepoda collected off Cleggan, Co. Galway, Ireland,* who was the first to record *Oithona nana* from British waters, states that while specimens occurred only sparingly off shore they were not uncommon in the sheltered waters of Ballynakill and Killany Harbours. Mr. Farran was also the first to note its occurrence at Plymouth.

The late I. C. Thompson, of Liverpool, in his paper on the Copepoda collected by the *Oceana*, already referred to under *Haloptilus longicornis*, reports the occurrence of *Oithona nana* in a plankton-sample from Station 5 (lat. $52^{\circ} 18' 1''$ N., long. $15^{\circ} 17' 9''$ E.—over 300 miles west of Valentia) at a depth of 1,670 fathoms (nearly 3,000 meters).

In an interesting paper on the presence of *Oithona nana* in the North Sea by P. J. van Breemen,† the author shews that the species has been observed over a wide area extending along the shores of Holland and from there westward to near the coast of England, and northward as far as lat. $54^{\circ} 18'$ N. Dr. Gough has recorded the same species from several stations in the English Channel.‡ Its occurrence in a gathering taken by the *Jackal* at Station 20 A is an indication that the distribution of *Oithona nana* may be even more extended than our present records shew.

Oncaea (?) *mediterranea* (Claus).—

A species of *Oncaea*, which I have doubtfully ascribed to Claus's *Oncaea* (*Antaria*) *mediterranea*, occurred at a number of stations, but with the exception of Station 8, situated to the north-east of the Shetlands, they are all located between these Islands and the Faeroes. This *Oncaea* was only observed in plankton-samples from moderately deep water (100 to 650 meters), and it was not very common in any of them.

Dr. Wolfenden records *O. mediterranea* from the Faeroe Channel.§ The late I. C. Thompson obtained the same species in fifteen of the samples collected by the *Oceana*, and he remarks that it "appears to be a common and widely distributed species, its range extending from Spitzbergen to the Mediterranean and to the Atlantic and Pacific Oceans";|| but it is absent from Norman's list of Copepoda from the Faeroe Channel and North Atlantic.¶

Oncaea conifera, Giesbrecht.—

This species, the female of which is easily distinguished by the conical process on the dorsal aspect of the third segment of the cephalothorax, was only very sparingly represented in the plankton-samples collected by the *Jackal*. It occurred in a bottom sample (300 to 385 meters) from Station 8 to the

* "Rept. on the Sea and Inland Fisheries of Ireland for 1901," Pt. II; "Scientific Investigation," p. 117, 1903.

† "Conseil Perm. Intern. pour l'explor. de la mer, Publications de Circonstance," No. 7 (Nov. 1903).

‡ "Conseil Perm. Intern. pour l'explor. de la mer," Bull., 1903-1904, Part D., No. 1, August, 1903, p. 36, No. 2 November, 1903, p. 106, *et seq.*

§ "Journ. Mar. Biol. Assoc., Plymouth," N.S., Vol. VI., No. 3 (January, 1902), p. 326.

|| "Ann. and Mag. Nat. Hist." (7), Vol. XII., p. 34 (July, 1903).

¶ "Journ. Linn. Soc., Zool." Vol. XXIX. (No. 188, October, 1903), pp. 133-141.

north-east of the Shetland Islands, and in a sample from 500 to 600 meters at Station 19 A and from 550 to 650 meters at Station 14 A, all the three gatherings being collected in August; the last two are from the Faeroe Channel.

O. conifera was found "rather plentifully," by Professor G. O. Sars in samples collected by Nansen north of the New Siberian Islands, at a depth of about 50 meters, in October, 1893;* and the same species is recorded by Professor Sars from the Coast of Norway. It is absent from the lists of Dr. Wolfenden and I. C. Thompson already referred to, but Canon Norman records it from the Faeroe Channel from 500 fathoms, while Giesbrecht reports its occurrence from the Antarctic Ocean.†

Conaea rapax (Giesbrecht).—

A single specimen of *Conaea rapax* was obtained in a plankton-sample collected by the *Jackal* at Station 20 A, at a depth of 115 to 215 meters. The late I. C. Thompson describes *Conaea rapax* as being "a common species throughout the *Oceana* collection, occurring at twenty-eight stations"; while Canon Norman records a single specimen from the Faeroe Channel at a depth of 600 fathoms. It appears to be a widely distributed species, though scarcely so much so as *Oncaea conifera*.

Corycaeus anglicus (Lubbock).—

This species was observed in only one of the plankton-samples, collected during the past year, viz., at the *Goldseeker* Station situated 45 miles N.N.E. of Rattray Head, on the 23rd of June; it was collected by tow-net at 100 meters from the surface. Though *Corycaeus anglicus* is occasionally captured in the North Sea, it does not appear to be very common there.

COPEPODA.—Harpacticoida.

Ectinosoma atlanticum (Brady and Robertson).—

An Ectinosomid very common at times in the plankton-samples collected at several of the stations—both from the surface and the under-surface—is the somewhat curious and minute *Ectinosoma* (or *Microsetella*) *atlanticum* (Brady and Robertson); it is a species that appears to be extensively distributed in the North Sea and North Atlantic.

Thalestris krohnii (Kroyer).—

This, unlike the majority of the members of the genus, is a true pelagic species, but does not appear to be very common. In the plankton-samples collected during the past year it has only been observed once, viz., in a surface gathering from Station 7 (61° 09' N., 2° 0' E.) collected on May 26th. Two specimens were obtained, but the species is moderately large, and being of a bright red colour is not easily missed even in a large gathering.

Harpacticus chelifera (O. F. Muller).—

1863. *Harpacticus chelifera*, Claus, "Die freilebende Copepoden," p. 135, Pl. XIX., Figs. 12-19.

A few specimens were taken in a surface plankton-sample from Station 4 (59° 26' N., 1° 20' E.), collected on August 11th. These specimens, while agreeing very well with the description and figures of Dr. Claus in the work referred to above, differ to some extent from the description of the same species by other authors. In these specimens, which are a little over a millimetre in length, the antennules (first

* "The Norw. N. Polar Exped." (No. V.), p. 113 (1900).

† "Expéd. Antarct. Belge, 'Belgica,' 1897-99, Zool., Copep.," p. 41 (1902).

pair of antennae) are composed of eight (not nine) joints ; and the inner portion of the primary joint of the fifth pair of thoracic feet is very slightly produced and carries three setae of moderate size and a very small fourth seta ; the secondary joint is broadly ovate, the breadth at the widest part being equal to at least two-thirds of the length, and it is furnished with five setae on its obliquely truncate end. Probably there may be some confusion as to the exact form O. F. Müller had under consideration, but as it is more convenient to keep to one particular type, I am taking that which has been described and figured by Dr. Claus.

COPEPODA.—Parasita.

Caligus rapax.—

It is interesting to notice how frequently this *Caligus* occurs in collections of plankton ; it is almost the only one in a group of Copepod-parasites of fishes comprising a considerable number of species that is found adopting a free-living mode of life to a considerable extent.

OSTRACODA.

Amongst the Ostracoda observed in the various samples examined during the year the following five species may be specially referred to, as they are all typical pelagic forms :—

- Philomedes brenda*, Baird.
- Conchoecia elegans*, G. O. Sars.
- Conchoecia obtusata*, G. O. Sars.
- Conchoecia borealis*, G. O. Sars.
- Conchoecia daphnoides* (Claus).

Philomedes brenda occurred in a surface plankton-sample from Station 16 A, collected May 30th, 1903, but only a single specimen was observed.

Conchoecia elegans was obtained in several plankton-samples, all of which were from moderately deep water. The following are the stations where the samples were collected :—Station 8, 300 to 385 meters ; Station 19 A, 250 to 350 meters ; Station 19B, one sample from 220 to 320 meters, and one from 460 to 548 meters ; Station 20 A, 115 to 215 meters. These samples were all collected during August.

Conchoecia obtusata (G. O. Sars).—

A smaller species than the last, was observed in samples from three stations, viz., from Station 8, 300 to 385 meters ; Station 14 A, 550 to 650 meters ; and in two samples from Station 20 A, one from 100 meters and one from 115 to 215 meters. Collected in August.

Conchoecia borealis (G. O. Sars).—

This, which is a moderately large species, was also obtained in three samples, one from Station 15 A at 550 to 650 meters ; one from Station 19 A at fully 970 meters ; and one from Station 19 B at 220 to 320 meters. The single specimen obtained in the sample from Station 19 A measured fully three millimetres in length. These samples were also collected in August.

Conchoecia daphnoides (Claus).—

Only a single specimen of this rare species has been observed ; it occurred in a plankton-sample from Station 19 A, 500 to 600 meters. According to Professor G. W. Müller, the *Conchoecilla lacerta* of Brady and Norman is a form of this species.*

* "Nordisches Plankton," VII. ; "Ostracoda," von Professor G. W. Müller, p. 6.

AMPHIPODA.

The Amphipoda of the British seas that may be truly described as pelagic belong to comparatively few species, and accordingly only a very limited number have been observed in the plankton-samples collected within the areas traversed by the *Jackal* and the *Goldseeker*. The following notes refer only to a few of the rarer forms obtained during the recent quarterly cruises. These are :—

- Hyperia medusarum* (Müller).
Ethemisto compressa (Goes).
Ethemisto bispinosa (Boeck).
Tryphana malmi (Boeck).
Guernia coalita (Norman).

Hyperia medusarum (O. F. Müller).—

Apparently not yet included among British Amphipoda, was obtained in a surface plankton-sample from Station 7 (61° 09' N., 2° 0' E.), collected on the 12th of August. This was the only gathering in which the species occurred, and only one specimen was obtained. It may be mentioned, however, that in two plankton-samples collected by the *Goldseeker*, thirty-one miles west by north of Marston Light, Kors Fjord, on August 26th, a considerable number of *Hyperia medusarum* were observed, but the majority of the specimens, which was taken with a "Peterson" net at a depth of 2 to 4 meters, were more or less immature. This species, which is not infrequent along the west coast of Norway, is distinctly a more hispid species than the commoner *H. galba* (Mont.).

Ethemisto compressa (Goes).—

This *Ethemisto* was somewhat rare in the plankton-samples collected in 1903.

Ethemisto bispinosa (Boeck) was also rare in the plankton-samples collected by the *Jackal*, and was not observed in any of those collected by the *Goldseeker*.

Tryphana malmi (Boeck).—

This species occurred very sparingly in August in plankton-samples from Station 15 A (100 meters), Station 16 A (100 meters), Station 21 A (100 meters), and in November in a sample from Station 5 (90 meters).

Guernia coalita (Norman).—

I find *Guernia coalita* occasionally in bottom gatherings, but not very often among surface-plankton; it may therefore be of interest to note its occurrence in a surface gathering from Station 12, collected on August 13th. Only one or two specimens were observed.

ISOPODA.

Eurydice truncata (Norman).—

Specimens of a *Eurydice* which I ascribe to this species have occurred in several gatherings collected for the most part in the Faeroe Channel during the month of August; the same form also occurred in surface plankton-samples collected at Station 9 (north-eastward of the Shetland Islands), also in August;

also in a sample from outside the entrance to Lerwick Harbour; and in another from Station 21, south-east of Sumburgh Head, collected in November. This form, which is somewhat darker in colour than *Eurydice achata* (Slabber) (= *E. pulchra*, Leach), has the terminal segment of the metasome more distinctly triangular than in that species, and the apex of the segment is distinctly truncated, and, in adult specimens, is armed with a short but stout spine on its exterior angles, while the margin between the angles is serrated. The species was described by Canon Norman in 1869 under the name of *Cirolana truncata* as follows* :—"Head much wider than long; greatest width in the centre, at the projection of the eyes, narrower behind and in front, which is slightly tridentate. Superior antennæ suddenly bent in a remarkable way at a right angle at the junction of first and second joints of the peduncle; third joint of the peduncle much narrower and shorter than the second; filament consisting of only about four joints, the first twice as long as last joint of peduncle and longer than the rest of the filament. Inferior antennæ very long and slender. Telson as broad as long, margins crenulated, distally truncate and denticulate; the two external teeth on each side larger than the intermediate ones. Last uropods having both branches truncate at the extremity. Dredged in 40-60 fathoms, muddy bottom, in St. Magnus Bay, 1867." After carefully comparing our specimens with Norman's description quoted above, I am inclined to regard them as identical with his species.

Though this *Eurydice* occurred in several of the plankton-samples collected by the *Jackal*, there was only one in which specimens were moderately common, and this was a surface sample from Station 15 B, collected on August 19th.

SCHIZOPODA.

Pelagic Schizopoda, especially the Euphausiidae, were occasionally moderately common in plankton collected both by the *Jackal* and *Goldseeker*, but a considerable proportion of the specimens were immature.

The following are the Euphausiidae that have been observed :—*Nyctiphanes norvegicus* (M. Sars), immature forms not uncommon in some of the plankton-samples; *Rhoda (Boreophausia) raschi* (M. Sars), frequent and generally distributed; *Rhoda inermis* (Krøyer), not common (Station 8, 100 meters); *Thysanoessa neglecta* (Krøyer), moderately frequent in some of the samples, but often imperfect or immature; *Thysanoessa longicaudata* (Krøyer), not common; it occurred in a plankton-sample from Station 15 A from 100 meters, collected on August 18th, and in two from Station 16 A—one collected at the surface and one at 100 meters—on August 19th.

The Mysidae observed comprised several species, but though to some extent pelagic in their habits, they are more frequently found near the bottom than at or near the surface. *Gastrosaccus spinifer* (Goes) was observed in gatherings recently collected at Stations 3 and 21; the first was from 109 meters but the other was a surface gathering. *Mysidopsis didelphys* (Norman) and *Leptomysis gracilis* (G. O. Sars) were obtained in a plankton-sample from 95 meters at Station 2; while *Schistomysis ornata* (G. O. Sars) was obtained in the same gathering with the *Leptomysis*, and in another from 100 meters at Station 23.

The distribution of a number of the species mentioned in the preceding notes, and particularly of the Copepoda, is of much interest from its bearing on the dispersion of marine organisms. Certain boreal species, as *Anonyx nugax* (Phipps), have at odd times made their appearance off the Scottish east coast as far south as the mouth of the Forth estuary; while other northern species, such as *Calanus hyperboreus* and *Metridia longa*, have not yet been observed further to the south than the Shetland Islands. On the other hand, there is the remarkable distribution northwards of some species

* "Last Rept. on Dredging among the Shetland Islands, British Assoc. Report for 1868" (pub. 1869).

of Copepoda whose headquarters appear to be the tropical Atlantic, such as *Euchirella rostrata*, *Eucalanus crassus*, and others. The normal action of oceanic currents has no doubt much to do with the dispersion of pelagic forms, and varying temperature and salinity of the water will also affect favourably or adversely the distribution of these forms; but migrations of species sometimes occur so exceptional in magnitude that they would seem to be due to exceptional influences. Two such migrations as I refer to occurred a number of years ago; one of these consisted of a shoal of Schizopoda—chiefly Euphausiidae—when myriads of them were cast ashore in St. Andrew's Bay; the other was an immense shoal of *Euthemisto compressa*, a northern and Arctic species, which appeared off the Yorkshire coast in February, 1892, when the sea was described as being "literally alive with them," heaps of them being afterwards washed ashore.* Some of these Amphipods made their way into the Firth of Forth and were at the time duly recorded. Such irruptions must tend to bring about changes of at least a temporary nature in the grouping of local marine faunae, as such shoals of organisms may be accompanied by other creatures whose natural prey they are.

A number of moderately rare species of demersal Copepoda, Amphipoda, &c., have also been obtained in bottom gatherings collected by the *Goldseeker* and will form the subject of another report.

* T. H. Nelson in "Naturalist" for May, 1892.

TABLE I.

CRUSTACEA. AUGUST TO

Station..	NORTH SEA.										
	1.	2.	3.	5.	6.	7.	8.	9.	10.	11.	
Date, 1902	26/8.	26/8.	26/8.	26/8.	27/8.	28/8.	28/8.	28/8.	28/8.	29/8.	
Position { Latitude N.	58° 0'.	58° 36'.	59° 10'.	59° 40'.	60° 37'.	61° 09'.	61° 32'.	61° 34'.	61° 38'.	61° 43'.	
{ Longitude	2° 54' W.	1° 46' W.	1° 27' W.	1° 14' W.	0° 30' E.	2° 0' E.	3° 10' E.	2° 05' E.	0° 33' E.	0° 43' W.	
Depth in Metres	0	0.	0.	0.	0.	0.	0.	0.	0.	0.	
Temperature ° C.	11° 71.	12° 1.	11° 71.	10° 71.	11° 61.	11° 58.	10° 58.	10° 98.	10° 98.	10° 98.	
Salinity—pro Mille	34'97.	34'79.	34'59.	34'83.	34'36.	34'20.	34'07.	35'01.	35'03.	35'36.	
COPEPODA.											
<i>Calanus helgolandicus</i> , Cl. ... .. .	...	r	+	+	+	c	c	+	+	r	1
<i>Eucalanus elongatus</i> , (Dana) ... .. .	...	...	...	...	...	...	...	...	3	...	2
<i>Paracalanus parvus</i> , Cl. ... .. .	...	...	...	...	r	...	...	...	...	...	3
<i>Euchirella rostrata</i> , Cl. ... .. .	...	...	...	...	...	...	...	...	...	...	4
<i>Pseudocalanus elongatus</i> , Boeck ... .. .	...	...	...	...	...	...	...	...	...	...	5
<i>Euchaeta norvegica</i> , Boeck ... .. .	...	...	...	...	...	...	...	...	...	...	6
<i>Centropages typicus</i> , Kröyer ... .. .	...	r	r	r	r	+	r	r	r	...	7
— <i>hamatus</i> , Lilljeb	r	r	r	r	r	r	...	...	...	...	8
<i>Temora longicornis</i> , (Müller)	r	...	r	r	r	r	...	r	r	...	9
<i>Metridia lucens</i> , Boeck ... .. .	...	...	...	+	+	r	...	...	+	+	10
<i>Candacia pectinata</i> , Brady... .. .	...	...	...	r	r	...	...	...	...	...	11
<i>Anomalocera Patersoni</i> , Templ.	r	+	c	r	...	r	r	r	r	+	12
<i>Acartia Clausi</i> , Giesbr.	r	r	r	r	...	r	r	r	r	...	13
— <i>longiremis</i> , (Lilljeb)	r	...	...	r	...	...	+	...	...	...	14
— (?) <i>biflora</i> , Giesb. ... .. .	...	...	...	...	...	...	...	...	...	...	15
<i>Oithona helgolandicus</i> , Cl. ... .. .	...	r	...	...	r	r	+	...	...	...	16
— <i>spinifrons</i> , Boeck... .. .	...	...	...	...	...	...	r	...	...	...	17
<i>Ectinosoma atlanticum</i> , Brady et Rob.	r	...	...	r	r	...	...	r	...	...	18
<i>Caligus rapax</i> , M. Edw. ... .. .	...	...	l	...	...	...	...	...	...	...	19
CRUSTACEA (ceter).											
<i>Podon leuckarti</i> , G. O. Sars ... .. .	...	...	...	r	r	...	...	...	...	...	20
<i>Evadne Nordmanni</i> , Loven	r	r	r	...	r	...	...	...	...	...	21
<i>Hyperia galba</i> (juv.) ... .. .	...	...	...	...	...	...	...	...	r	...	22
<i>Parathemisto obliqua</i> , (Kröyer) ... .. .	...	l	...	c	r	r	r	...	...	...	23
<i>Euthemisto compressa</i> , Goes. ... .. .	...	...	...	...	...	...	...	...	...	...	24
— <i>bispinosa</i> , Boeck ... .. .	...	...	...	...	...	...	...	...	...	...	25
<i>Hyperoche tauriformis</i> , B. and W. ... .. .	...	...	...	...	...	...	...	...	...	...	26
<i>Tryphana malmi</i> (Boeck) ... .. .	...	...	...	...	...	...	...	l	...	...	27

TABLE I.—*continued.*

Station.. .. .	NORTH SEA.										
	1.	2.	3.	5.	6.	7.	8.	9.	10.	11.	
Date, 1902	26/8.	26/8.	26/8.	26/8.	27/8.	28/8.	28/8.	28/8.	28/8.	29/8.	
Position { Latitude N. { Longitude	58° 0'. 2° 54' W.	58° 36'. 1° 48' W.	59° 10'. 1° 27' W.	59° 40'. 1° 14' W.	60° 37'. 0° 30' E.	61° 09'. 2° 0' E.	61° 32'. 3° 10' E.	61° 34'. 2° 05' E.	61° 38'. 0° 33' E.	61° 43'. 0° 43' W.	
Depth in Metres	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
Temperature ° C.	11°·71.	12°·1.	11°·71.	10°·71.	11°·61.	11°·58.	10°·58.	10°·98.	10°·98.	10°·98.	
Salinity— $\frac{1}{1000}$ pro Mille	34·97.	34·79.	34·59.	34·83.1	34·36.	34·20.	34·07.	35·01.	35·03.	35·36.	
<i>CRUSTACEA (ceter)—cont.</i>											
Guernia coalita, Norm. ... .. .	...	...	...	r	r	...	...	...	...	...	28
Eurydice achata, Slabber ... .. .	...	...	...	...	...	...	...	...	...	...	29
Pseudocuma similis, G. O. Sars ... .. .	...	...	...	l	...	...	...	...	...	...	30
Rhoda Raschii (M. Sars) ... .. .	...	...	...	...	...	+	...	...	+	...	31
Nyctiphanes norvegicus (M. Sars) ... .. .	...	...	...	...	...	...	...	...	r	...	32
Thysanoessa neglecta (Kröyer) ... .. .	...	...	...	r	...	+	...	...	...	...	33
Gastrosaccus spinifer (Goes.) ... .. .	...	...	...	r	...	...	...	...	...	...	34
Leptomysis gracilis, G. O. Sars ... .. .	...	...	...	rr	...	...	...	...	...	...	35
Sergestes atlanticus, M. Edw. ... .. .	...	...	...	...	...	...	...	...	...	...	36
Caridion gordonii, Bate ... .. .	...	...	...	...	r	...	...	...	...	...	37

TABLE I.—*continued.*

FAEROE CHANNEL.									NORTH SEA.			
12.	13.	14.	15.	16.	16.	17.	18.	21.	22.	23.	24.	25.
29/8.	29/8.	29/8.	30/8.	30/8.	30/8.	30/8.	31/8.	31/8.	31/8.	1/9.	1/9.	1/9.
61° 02'. 1° 10' W.	61° 12'. 2° 06' W.	61° 25'. 3° 24' W.	61° 35'. 4° 39' W.	61° 47'. 6° 04' W.		61° 13'. 6° 34' W.	60° 52'. 5° 31' W.	59° 46'. 2° 21' W.	59° 36'. 0° 41' W.	59° 31'. 0° 37' E.	58° 55'. 0° 04' E.	58° 11'. 0° 32' W.
0.	0.	0.	0.	100-0.	0.	0.	0.	0.	0.	0.	0.	0.
11° 08.	10° 98.	9° 49.	8° 7.	8° 35.	9° 0.	8° 8.	9° 3.	10° 58.	11° 68.	11° 58.	11° 97.	12° 27.
35° 34.	35° 32.	34° 97.	34° 99.	35° 20.	35° 20.	35° 13.	35° 07.	34° 88.	33° 96.	33° 48.	33° 86.	34° 60.
28
29	2	...	...	...	...	...
30
31	rr	...	...	...	...	...
32	...	1	...	...	...	...	r	...	...	...	...	...
33
34
35
36	1	...	...	...	...	...
37

TABLE II.

CRUSTACEA.

Station	2.	4.	6.		7.	9.	
Date, 1902	4/12.	4/12.	8/12.		8/12.	9/12.	
Position { Latitude N. { Longitude	58° 36'. 1° 46' W.	59° 17'. 1° 30' W.	60° 37'. 0° 30' E.		61° 12'. 1° 52' E.	61° 39'. 2° 0' E.	
Depth in Metres	0.	0.	100.	0.	0.	0.	
Temperature ° C.	8° 15.	8° 75.	8° 11.-8° 45.		8° 85.	9° 15.	
Salinity—pro Mille	34.99.	35. ?	35.13.		35.26.	35.29.	
COPEPODA.							
<i>Acartia biflosa</i> , Giesbr.	+	c	...	+	...	cc	1
— <i>Clausi</i> , Giesbr. ... .. .	...	...	...	...	+	...	2
<i>Anomalocera Patersoni</i> , Templ.	rr	+	...	cc	r	...	3
<i>Bradyidius armatus</i> (Vanhoff) ... .. .	...	...	...	...	...	...	4
<i>Calanus helgolandicus</i> , Cl.	+	+	...	r	c	...	5
<i>Diaixis hibernicus</i> (A. Scott)	l	...	...	...	...	...	6
<i>Centropages typicus</i> , Kröyer	r	r	...	r	...	...	7
<i>Ectinosoma atlanticum</i> , Brady et Rob.	c	+	...	c	c	...	8
<i>Harpacticus chelifer</i> , Cl. ... .. .	...	...	...	l	...	...	9
<i>Idya furcata</i> , Baird ... .. .	...	...	...	...	...	...	10
<i>Longipedia coronata</i>	l	...	...	...	...	...	11
<i>Metridia lucens</i> , Boeck	l	c	...	...	...	...	12
<i>Oithona helgolandica</i> , Cl. ... .. .	+	+	...	...	c	c	13
— <i>spinostris</i> , Boeck ... .. .	...	...	...	...	...	...	14
<i>Paracalanus parvus</i> , Cl.	c	...	rr	...	...	...	15
<i>Pseudocalanus elongatus</i> , Boeck ... .. .	+	+	...	...	+	...	16
<i>Rhincalanus nasutus</i> , Giesbr. ... .. .	...	l	...	...	...	...	17
<i>Temora longicornis</i> (Müll.)	+	c	...	+	rr	...	18
<i>Thaumaleus claparedi</i> , Giesbr. ... .. .	...	...	...	...	...	...	19
CRUSTACEA (ceter.).							
<i>Parathemisto obliqua</i> , Kröyer	l	2	...	1	...	...	20
<i>Typhana Malmi</i> , Kröyer ... .. .	...	...	...	+	...	...	21
<i>Gnathia maxillaris</i> ... .. .	...	...	...	...	...	...	22
<i>Microniscus</i> ... .. .	...	1	...	...	...	...	23
<i>Rhoda Raschi</i> (Sars)	r	...	...	1	r	...	24

TABLE II.

DECEMBER, 1902.

	10.	11.	12.	13.	14.	15.	17.	19.	23.
	9/12.	9/12.	10/12.	10/12.	10/12.	10/12.	11/12.	11/12.	15/12.
	61° 38'. 0° 33' E.	61° 50'. 1° 0' W.	61° 0'. 1° 18' W.	61° 10'. 2° 09' W.	61° 23'. 3° 25' W.	61° 38'. 4° 39' W.	61° 13'. 6° 34' W.	60° 35'. 4° 26' W.	59° 32'. 0° 02' E.
	0.	0.	0.	0.	0.	0.	0.	0.	0.
	9° 55.	9° 35.	9° 15.	9° 45.	9° 45.	6° 95.	7° 95.	6° 85.	8° 15.
	35° 30.	35° 34.	35° 20.	35° 37.	35° 30.	35° 21.	35° 28.	35° 18.	35° 09.
1	c	cc	+	+	+	c	+	r	r
2	...	...	...	...	...	...	...	...	...
3	...	rr	...	...	...	...	...	...	...
4	r	...	...	...	...	...	+	...	...
5	rr	rr	rr	...	...	r	+	r	r
6	...	...	...	...	...	...	...	...	...
7	r	rr	...	...	...	...	...	...	...
8	r	...	+	...	+	r	cc	rr	+
9	...	...	...	...	...	...	...	...	...
10	...	...	...	...	...	...	rr	...	...
11	...	...	...	...	...	...	...	...	...
12	...	rr	rr	...	...	r	r	rr	r
13	c	+	+	+	+	c	+	rr	+
14	r	+	r	...	...	+	+	rr	...
15	...	r	...	...	...	cc	+	r	..
16	+	c	+	r	+	...	c	...	...
17	...	...	l	...	...	...	...	...	...
18	rr	...	r	...	...	...	...	...	rr
19	...	...	...	...	...	...	r	...	...
20	...	...	...	..	...	...	...	...	...
21	...	...	..	...	...	...	..	...	...
22	...	...	..	...	...	...	l	...	..
23	..	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...	...

TABLE III.

19A.			19B.		20A.		21A.		13A.		14A.				15A.			15B.		
31/5.			31/5.		31/5.		1/6.		18/8.		18/8.				18/8.			19/8.		
60° 41' N. 4° 31' W.			60° 45' N. 3° 50' W.		60° 33' N. 3° 33' W.		60° 14' N. 2° 22' W.		61° 16' N. 2° 08' W.		61° 18' N. 2° 59' W.				61° 27' N. 3° 42' W.			61° 39' N. 4° 45' W.		
900-0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	650-550.	300-200.	100-0.	0.	650-550.	100-0.	0.	220-170.	100-0.	0.
-0° 48 -8° 96.	7° 47 -8° 96.	8° 96.	7° 58 -9° 06.	9° 06.	8° 70 -9° 66.	9° 66.	7° 90 -9° 26.	9° 26.	8° 24 -10° 97.	10° 97.	-0° 12 at 600 m. -0° 63 at 500 m.	5° 22 -6° 95.	7° 83 -10° 97.	10° 97.	0° 72 at 600 m. -1° 09 at 500 m.	8° 18 -10° 92.	10° 92.	5° 83 -7° 93 at 150 m.	8° 09 -10° 17.	10° 17.
34° 92 -35° 28.	35° 20 -35° 28.	35° 28.	35° 26 -35° 34.	35° 34.	35° 31 -35° 38.	35° 38.	35° 26 -35° 33.	35° 33.	35° 23 -35° 19.	35° 19.	24° 90 -34° 90.	35° 07 -35° 19.	35° 23 -35° 19.	35° 19.	34° 94 -34° 94.	35° 26 -35° 23.	35° 23.	35° 08 -35° 24.	35° 24 -35° 19.	35° 19.
1	..	..	..	+	..	..	..	+	+	..	r	..	..	..	..	+	+	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	r	..	..	+	..
4	..	..	..	..	c	..	..	..	..	..	..	..	..	r	..	..	rr	..	..	..
5	+	cc	cc	cc	c	cc	..	cc	c	cc	+	+	+	cc	+	c	c	+	+	c
6	r	c	+	c	r	..	..	..	..	..	rr	r	..	..	+	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..
9	+	+	+	+	+	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..
10	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	rr	rr	..	..	..
11	r	..	..	..	..	..	..	..	+	..	rr	r	..	..	+	..	..	rr	+	+
12	r	..	..	..	..	..	..	..	+	..	rr	+	..	..	+	..	..	+	..	..
13	r	..	..	..	..	..	..	c	+	c	+	rr	..	rr	..	+	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..
15	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..
16	r	..	..	r	..	rr	..	rr	..	..	..	+	+	..	..	+	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..
19	rr	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	+	..	..
20	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..
21	rr	..	..	..	..	..	..	c	+	..	..	+	..	..	+	..	..	r	..	..
22	..	..	..	..	..	..	..	..	..	..	rr	r	..	..	rr	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	r	..	..	..	..	+	..	..	..	..	..
24	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..
25	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	+	..	..	..	..	..	+	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr
30	..	..	..	..	..	..	..	..	..	..	rr	..	rr	..	..	..	..	..	+	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	c
34	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
35	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	r	..	..	r	..
39	..	..	..	..	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

TABLE III.—continued.

Station	16A.		16.		17.		18A.					
	19/8.		19/8.		20/8.		20/8.					
Date	61° 49' N. 5° 38' W.		62° 00' N. 6° 12' W.		61° 12' N. 6° 33' W.		60° 57' N. 5° 47' W.					
Position (Latitude Longitude	100-0.		100-0.		100-0.		360-260.	220-120.	100-0.	0.		
Depth in Metres	8° 07' -10° 00.		9° 02' -9° 45.		8° 75' -9° 92.		6° 40' -7° 44' at 258 m.		7° 96' at 200 m. -8° 35.		9° 35' -10° 92.	
Temperature °C.	35° 21' -35° 19.		35° 14' -35° 14.		35° 28' -35° 26.		35° 16' -35° 21.		35° 23' at 200 m. -35° 26.		35° 26' -35° 28.	
Salinity—pro Mille.. .. .												
COPEPODA.												
Acartia Clausi, Giesbr.	+	+	..	r	+	+	..	42
Aetidius armatus (Boeck)	43
Anomalocera Patersoni, Templ.	r	..	..	..	..	..	..	..	..	..	44
Calanus helgolandicus, Cl.	c	+	..	..	cc	+	c	+	cc	cc	..	45
— hyperboreus, Kröyer	r	..	..	..	..	46
Centropages hamatus (Lilljeb)	+	47
— typicus, Kröyer	48
Chiridius armatus (Boeck)	49
— tenuispinus, G. O. Sars	50
Conaea rapax, Giesbr.	51
Ectinosoma atlanticum (Brady et Rob.)	+	52
Eucalanus crassus, Giesbr.	53
— elongatus (Boeck)	54
Euchaeta glacialis, Hansen	55
— norvegica, Boeck	+	+	r	..	..	..	56
Euchirella rostrata	rr	..	..	..	..	..	..	57
Metridia longa (Lubb.)	+	58
— lucens, Boeck	+	+	59
Oithona nana, Giesbr...	60
— setigera, Dana	+	+	+	+	61
— similis, Cl.	62
Oncaea conifera, Giesbr.	63
— mediterranea, Cl.	64
Paracalanus parvus, Cl.	+	+	65
Pleuramma robusta (Dahl.)	66
— xiphias	67
Pseudocalanus elongatus, Boeck	+	+	r	..	..	..	68
Rhincalanus nasutus, Giesbr.	rr	..	..	..	..	69
Scolecithricella minor, Brady	70
Temora longicornis (Müller)	71
Xanthocalanus spec.	72
CRUSTACEA (ceter.).												
Conchoecia borealis, G. O. Sars	73
— daphnoides (Cl.)	74
— elegans, G. O. Sars	75
— obtusa, G. O. Sars	76
Pontocypris spec.	77
Evadne Nordmanni, Loven	78
Podon intermedius, Lilljeb	79
Euthemisto compressa, Goes.	80
Parathemisto obliqua, Kröyer	81
Tryphana Malmi, Boeck	82
Eurydice truncata, Norm.	rr	+	..	..	..	..	..	..	..	..	..	83
Gnathia spec. (juv.)	84
Nyctiphanes norvegicus (Sars)	85
Thysanoessa neglecta (Kröyer)	86
Schizopoda (juv.)	87
Decapoda (Carida) (juv.)	+	r	+	..	..	..	..	88

TABLE III.—*continued.*

19A.				19B.				20A.			21A.		19B.		21A.		
20/8.				21/8.				21/8.			21/8.		30/11.		30/11.		
60° 40' N. 4° 56' W.				60° 26' N. 4° 02' W.				60° 17' N. 3° 36' W.			60° 02' N. 3° 13' W.		60° 22' N. 4° 04' W.		60° 04' N. 3° 14' W.		
600-500.	350-250.	100-0.	0.	548-460.	320-220.	100-0.	0.	215-115.	100-00.	0.	100-0.	0.	200-100.	0.	75-0.	0.	
3° 24 -5° 36.	8° 41 -8° 77.	9° 44 -11° 72.	11° 72.	4° 42 -5° 65 at 400 m.	6° 00? -7° 40?	8° 58 -10° 31.	10° 31.	9° 15 -9° 25 at 100 m.	9° 25 -11° 25.	11° 25.	9° 34 -11° 55.	11° 55.	9° 31 -9° 30.	9° 14.	9° 46 -9° 54.	9° 54.	
35° 07 -35° 07.	35° 31 -35° 33.	35° 33 -35° 36.	35° 36.	35° 03 -35° 10 at 400 m.	35° 16 -35° 24 at 200 m.	35° 26 -35° 26.	35° 26.	35° 38 -35° 38.	35° 8 -35° 42.	35° 42.	35° 26 -35° 31.	35° 31.	35° 38 -35° 38.	35° 45.	35° 23 -35° 21.	35° 21.	
42	r	..	+	c	..	..	+	+	..	+	..	r	..	+	..	+	..
43	..	..	r	..	..	..	..	..	rr	+	..	rr	..	..	rr	..	..
44	..	..	..	r	..	..	..	..	..	..	..	rr	+	..	..	..	..
45	+	r	+	c	+	+	c	cc	c	+	c	+	+	r	r	..	r
46	r	r	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..
47	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
48	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..
49	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..
50	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..
51	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..
52	+	..	..	..	+	..	..	..	+	..	..	..	..	..	..	..	..
53	..	..	..	+	..	..	..	..	..	rr	..	..	..	+	..	..	..
54	..	rr	..	r	..	..	..	..	rr	rr	..	r	..	..	..	..	..
55	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
56	..	..	..	+	+	..	+	..	..	..	r	..	..	..	..	..	..
57	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..
58	+	r	..	..	+	+	..	..	+	..	..	..	..	..	..	..	..
59	..	r	..	c	..	..	+	+	..	r	..	+	..	+	..	r	r
60	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..
61	+	+	..	..	+	+	..	..	+	..	..	..	..	r	rr	..	..
62	..	..	..	..	..	..	..	..	rr	..	..	..	..	+	..	+	..
63	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
64	..	+	..	..	r	..	..	..	+	..	..	..	..	..	..	..	..
65	+	+	+	..	+	+	..	..	+	..	..	..	..	..	..	..	..
66	..	..	..	e	..	..	+	..	..	..	..	..	..	rr	..	..	..
67	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..
68	+	..	..	..	+	r	..	..	+	+	..	..	..	..	..	..	..
69	..	..	r	+	..	..	..	rr	rr	rr	..	+	..	r	..	..	..
70	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
71	..	..	+	..	..	..	..	..	..	..	..	..	rr	..	..	..	..
72	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..
73	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..
74	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
75	..	rr	..	..	rr	rr	..	..	rr	..	..	..	..	..	..	..	..
76	..	..	..	..	..	..	..	..	rr	rr	..	..	..	rr	..	..	..
77	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..
78	..	..	r	..	+	+	..	..	..	..	..	..	..	r	..	..	..
79	r	..	+	+	..	..	+	..	..	+	..	..	..	..	..	..	..
80	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..
81	..	..	..	+	..	..	+	..	..	..	..	..	..	r	..	rr	..
82	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..
83	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..
84	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..
85	..	..	..	+	..	..	+	..	..	..	..	..	..	+	..	+	..
86	..	rr	..	..	..	rr	..	..	..	..	..	..	..	+	rr	c	..
87	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..
88	..	..	..	..	..	..	+	..	..	+	..	..	..	..	..	..	..

TABLE IV.

Station	2.		3.		4.		5.		6.		7.		8.		9.		10.		11.		
Date	22/5.		22/5.		23/5.		23/5.		26/5.		26/5.		26/5.		26/5.		26/5.		27/5.		
Position { Latitude } Longitude	58° 38' N. 1° 46' W.		59° 10' N. 1° 27' W.		59° 26' N. 1° 20' W.		59° 40' N. 1° 14' W.		60° 37' N. 0° 30' E.		61° 09' N. 2° 00' E.		61° 32' N. 2° 50' E.		61° 34' N. 2° 05' E.		61° 38' N. 0° 43' N.		61° 43' N. 0° 43' W.		
Depth in Metres	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	
Temperature °C.	7° 25 -7° 86.	7° 86.	7° 31 -8° 36.	8° 36.	7° 50 -8° 16.	8° 16.	7° 64 at 90 m. -7° 86.	7° 86.	7° 69 -8° 46.	8° 46.	8° 00 -8° 56.	8° 56.	7° 80 -7° 96.	7° 96.	7° 82 -8° 66.	8° 66.	8° 02 -9° 06.	9° 06.	7° 76 -9° 06.	9° 06.	
Salinity - pro Mille	35·29 -35·23.	35·23.	35·29 -35·42.	35·42.	35·35 -35·32.	35·32.	35·35 at 90 m. -35·35.	35·35.	35·36 -35·35.	35·35.	35·35 -35·31.	35·31.	35·29 -32·77.	32·77.	35·24 -34·99.	34·99.	35·28 -35·36.	35·36.	35·23 -35·33.	35·33.	
COPEPODA.																					
Acartia Clausi, Giesbr.	r	e	+	e	e	e	+	e	+	+	e	e	r	+	+	+	+	r	r	r	1
- longiremis (Lilljeb.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	2
Anomalocera patersoni, Templ. .. .. .	..	r	..	..	r	..	..	..	..	..	..	e	..	+	..	..	..	r	+	rr	3
Calanus helgolandicus, Cl.	cc	..	cc	e	cc	cc	cc	e	cc	+	cc	e	e	r	cc	cc	cc	e	cc	cc	4
- hyperboreus, Krøyer .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
Centropages hamatus, Lilljeb	+	r	..	..	..	+	..	..	..	..	..	..	..	r	..	..	..	..	..	..	6
- typicus, Krøyer	+	..	r	..	+	..	..	..	e	+	..	..	..	+	..	rr	..	r	..	..	7
Ectinosoma atlanticum (Brady et Rob.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	+	..	r	e	+	8
Euchaeta norvegica, Boeck. .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	9
Metridia longa (Lubb.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	10
- lucens, Boeck	+	r	e	..	e	e	e	..	e	r	r	r	r	..	+	..	+	r	..	..	11
Oithona setiger, Dana .. .. .	..	..	..	..	+	..	+	..	..	..	+	..	+	..	r	..	+	..	..	..	12
- similis, Claus.	e*	e	e	+	e	+	+	..	e	+	e	e	+	+	+	+	+	..	+	..	13
Paracalanus parvus, Claus. .. .. .	..	..	e	..	+	e	+	..	..	..	..	..	+	..	r	..	+	..	..	..	14
Pseudocalanus elongatus, Boeck	e	+	e	+	e	e	e	+	e	+	+	..	+	..	+	..	e	e	+	r	15
Scolecithricella minor (Brady) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16
Temora longicornis (O. F. Müll.) .. .. .	+	..	+	..	..	..	+	..	..	..	..	..	+	..	r	..	..	..	..	..	17
Thalestris Krohnii (Krøyer) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	18
Copepoda, juv.	e	e	..	e	e	e	..	..	e	e	e	e	..	..	e	e	e	e	..	e	19
CRUSTACEA (ceter.).																					
Evadne Nordmanni, Loven .. .. .	..	..	..	..	..	..	..	..	+	+	+	e	+	c	+	..	..	..	..	..	20
Podon intermedius, Lilljeb .. .. .	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	21
- Leuckarti (G. O. Sars) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	r	..	..	..	..	22
Apherusa bispinosa (Sp. B.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	23
- borealis, Boeck .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24
Hyperoche tauriformis (Sp. Bate) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25
Metopa Alderi (Sp. Bate) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	26
Metopella nasuta (Boeck) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	27
Parathemisto obliqua (Krøyer)	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	e	+	+	28
Tryphosites longipes (Sp. Bate) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	29
Eurydice achata (Hall) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	30
Diastylis lucifera (Norm.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31
- resima (Krøyer) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32
Eudorella sp. .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	33
Hemilamprops rosea (Norm.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	34
Leucon nasica, Krøyer .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	35
Erythrops serratus, G. O. Sars .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	36
Leptomysis gracilis, G. O. Sars .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	37
Rhoda Raschii (M. Sars) .. .. .	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	38
Thysanoessa neglecta (Krøyer) .. .. .	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	39
Balani, juv. .. .. .	+	..	+	..	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	40
Schizopoda, juv.	+	..	e	..	e	..	e	cc	+	e	..	..	..	..	..	..	..	..	..	..	41
Decapoda, juv.	+	e	e	..	+	..	+	e	+	e	+	..	..	..	..	..	..	+	..	..	42

* The gathering at 150 m, Station Sc G 8, brought up a quantity of mud and with it the following Crustacea: Cervinia Bradyi, Norm. (rr), Longipedia coronata, Cl. (r), Bradya typica, Boeck (rr), Bythocythere dromedaria, G. O. Sars; (several specimens—new to Britain); Ampelisca (?) tenuicornis, Lilljeb. (rr), A. brevicornis, (A. Costa) (rr), Halimodon parvimanus, (Sp. B.), (rr), Harpinia neglecta, G. O. forcipatus, (Lilljeb.) (r) Leucon nasica, Krøyer, Leptostylis villosa, G. O. Sars (r).

TABLE IV.

12.		21.		22.		G. 1.		G. 2.		G. 3.		G. 4.		G. 5.		G. 6.		G. 7.		G. 8.		G. 9.		G. 10.		
27/5.		1/6.		2/6.		28/5.		23/5.		27/5.		27/5.		27/5.		26/5.		26/5.		26/5.		26/5.		25/5.		
61° 02' N. 1° 10' W.		59° 46' N. 2° 11' W.		59° 36' N. 0° 41' W.		56° 02' N. 0° 31' E.		56° 35' N. 0° 59' E.		57° 26' N. 1° 41' E.		58° 06' N. 2° 14' E.		58° 38' N. 2° 40' E.		59° 25' N. 1° 48' E.		58° 52' N. 1° 22' E.		58° 13' N. 0° 40' E.		57° 50' N. 0° 30' E.		56° 46' N. 0° 24' E.		
100-0.	0.	100-0.	0.	80-0.	0.	84-0.	0.	92-0.	0.	93-0.	0.	82-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	73-0.	0.	
8° 00' ? -9° 06'	9° 06'	7° 65' -8° 71'	8° 71'	6° 88' -9° 16'	9° 16'	6° 31' -9° 30'	9° 30'	6° 07' at 80 m. -9° 25'	9° 25'	6° 16' at 80 m. -9° 50'	9° 50'	6° 23' -9° 75'	9° 75'	6° 29' at 80 m. -9° 30'	9° 30'	6° 80' -9° 30'	9° 30'	6° 49' -9° 25'	9° 25'	6° 44' -8° 80'	8° 80'	6° 77' -8° 50'	8° 50'	6° 90' at 60 m. -8° 50'	8° 50'	
35° 31' -35° 38'	35° 38'	35° 31' -35° 22'	35° 22'	35° 31' -35° 34'	35° 34'	34° 93' -34° 86'	34° 86'	34° 91' at 80 m. -34° 84'	34° 84'	35° 07' at 80 m. -34° 97'	34° 97'	34° 99' at 60 m. -34° 92'	34° 92'	35° 01' at 80 m. -34° 96'	34° 96'	35° 27' -34° 62'	34° 62'	35° 10' -35° 08'	35° 08'	35° 17' -34° 99'	34° 99'	35° 20' -35° 08'	35° 08'	34° 86' -34° 75' at 10 m.	34° 75' at 10 m.	
1	+	c	+	..	r	..	+	..	..	..	..	e	cc	e	e	e	e	..	cc	+	cc	+	cc	c	+	
2	..	..	..	..	..	+	..	..	+	+	..	..	..	..	..	..	+	..	..	..	..	..	..	..	+
3	..	r	..	+	..	..	r	c	+	+	+	+	..	c	..	..	..	+	..	r	..	+	..	r	..	+
4	cc	cc	c	c	r	r	c	+	cc	+	cc	+	cc	..	cc	+	cc	e	r	c	+	cc	cc	cc	e	
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	rr	rr	+	+	+	+	+	+	..	+	+	+	+	..	+	+	+	+	+	c	+	+
7	+	e	rr	+	..	..	..	+	r	+	..	+	..	c	..	+	+	+	..	+	r	+	..	+	..	+
8	r	..	..	..	+	..	..	..	c	+	e	..	+	..	+	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	e	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
11	e	..	+	..	..	..	..	..	c	c	e	..	c	..	cc	..	+	..	cc	..	e	..	e	+	e	+
12	..	..	..	..	..	..	..	..	..	..	..	..	+	..	+	..	e	..	..	..	r	+	..	..	..	..
13	+	e	r	r	+	+	+	+	e	..	c	+	..	r	c	e	e	+	e	..	+	..	cc	cc	+	+
14	r	..	..	..	..	..	+	..	+	..	..	..	..	..	e	+	..	..	r	..	e	..	+	..	..	+
15	e	..	+	r	+	+	c	..	+	r	cc	..	cc	..	cc	e	cc	..	cc	r	cc	+	cc	cc	cc	cc
16	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	rr	..	..	..	..	..	..	..	..	..
17	..	..	..	..	..	..	c	+	e	e	cc	cc	e	..	+	+	e	e	+	..	+	..	+	..	e	+
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	e	e	..	..	..	..	e	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	..	..	..	..	rr	+	..	+	+	+	e	+	..	cc	e	cc	cc	+	e	+	e	+	+	+	+
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	+	+	+	+	+	+	+	+	..	..	..	..	r	r	+	..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	r	..	+	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	+	..	..	..	..	..	+	+	r	r	..	..	..	..	..	..	..	..	..	..	r	..	..	r	..	..
29	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	rr	+	..	..	..	..	..	..	..	..	..	..	..	+	rr	..	..
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..
33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..
34	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..
35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
42	+	+	..	..	e	+	+	+	+	+	+	c	+	..	e	..	..	..	..	..	..	..	..	..	..	..

Eucanuella spinifera, T. Sc. (rr), *Pseudotachidius coronatus*, T. Sc. (rr), *Macrocypris minna*, (Baird) (c), *Pontocypris mytiloides*, (Norm.) (rr), *Cythere limicola*, Norm. (rr), *Cytheroptum alatum*, G. O. Sars (r), *Sars* (r), *Metopa pusilla*, G. O. Sars (r), *Metopella nasuta*, Boeck (+), *Eugerdia tenuimana*, G. O. Sars (new to Britain), *Leptognathia breviremis*, (Lilljeb.) (r), *L. (?) filiformis* (Lilljeb.) (rr), *Pseudotanaïs*

TABLE V.

Station	1.		2.		3.		4.		5.		6.		7.			
Date	11/8.		11/8.		11/8.		11/8.		11/8.		12/8.		12/8.			
Position { Latitude Longitude	58° 00' N. 2° 54' W.		58° 36' N. 1° 46' W.		59° 10' N. 1° 27' W.		59° 28' N. 1° 20' W.		59° 40' N. 1° 14' W.		60° 40' N. 0° 27' E.		61° 09' N. 2° 00' E.			
Depth in Metres	54-0.	0.	102-0.	0.	108-0.	0.	89-0.	0.	97-0.	0.	100-0.	0.	138-128.	100-0.	0.	
Temperature °C... .. .	10°·60 -11°·50.	11°·50.	9°·46 -11°·25.	11°·25.	10°·11 at 100 m. -10°·80.	10°·80.	9°·69 at 80 m. -10°·80.	10°·80.	10°·80 at 80 m. -10°·20.	10°·20.	8°·33 -12°·37.	12°·37.	7°·62 at 139 m.	8°·08 -12°·98.	12°·98.	
Salinity—pro Mille	34·88 at 60 m. -34·80.	34·80.	35·23 -34·99.	34·99	35·25 at 100 m. -35·21.	35·21.	35·30 at 80 m. -35·25.	35·25.	35·28 at 80 m. -35·26.	35·26.	35·33 -35·20.	35·20.	35·29.	35·29 -33·57.	33·57.	
<i>COPEPODA.</i>																
<i>Acartia Clausi</i> , Giesbr. .. .. .	..	..	+	+	+	+	c	+	+	+	+	+	..	rr	..	1
— <i>longiremis</i> (Lilljeb) .. .. .	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
<i>Aetideus armatus</i> (Boeck) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3
<i>Anomalocera Patersoni</i> , Templ. .. .. .	..	+	+	+	r	+	..	r	r	r	rr	c	..	..	+	4
<i>Calanus helgolandicus</i> , Cl.	+	r	+	+	+	+	+	+	+	r	c	+	..	c	+	5
— <i>hyperboreus</i> , Krøyer .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
<i>Caligus rapax</i> .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7
<i>Candacea armata</i> , Boeck .. .. .	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	8
<i>Centropages hamatus</i> (Lilljeb)	+	..	+	+	+	..	+	+	+	+	..	+	..	+	r	9
— <i>typicus</i> .. .. .	..	..	r	+	+	+	+	+	..	+	rr	+	..	r	r	10
<i>Chiridius armatus</i> (Boeck) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11
<i>Conaea rapax</i> , Giesbr. .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	12
<i>Diaxis pygmaea</i> , Th. Scott .. .. .	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	13
<i>Ectinosoma atlanticum</i> (Brady et Rob) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14
<i>Eucalanus elongatus</i> (Boeck) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15
<i>Euchaeta norvegica</i> , Boeck .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16
<i>Euchirella rostrata</i> .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	17
<i>Harpacticus chelifer</i> (Müll.) .. .. .	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	18
<i>Idya furcata</i> (Baird) .. .. .	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	19
<i>Labidocera Wollastoni</i> (Lubb.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	20
<i>Metridia longa</i> (Lubb.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	21
— <i>lucens</i> (Boeck) .. .. .	..	..	+	..	+	..	+	..	+	+	+	..	..	+	..	22
<i>Oithona setigera</i> , Dana .. .. .	..	..	..	..	..	..	+	..	+	+	..	..	..	r	..	23
— <i>similis</i> , Cl. .. .. .	..	..	..	+	+	..	..	..	..	+	..	+	..	rr	..	24
<i>Oncaea mediterranea</i> , Cl. .. .. .	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	25
<i>Paracalanus parvus</i> , Cl. .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	26
<i>Pseudocalanus elongatus</i> , Boeck .. .. .	..	..	c	..	+	..	+	..	c	..	..	..	..	+	r	27
<i>Rhincalanus nasutus</i> , Giesbr. .. .. .	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	28
<i>Scolecithricella minor</i> , Brady .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	29
<i>Temora longicornis</i> (Müller)	+	..	+	..	+	..	+	..	+	..	rr	..	..	+	..	30
<i>CRUSTACEA (ceter.).</i>																
<i>Conchoecia elegans</i> , G. O. Sars .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31
— <i>obtusa</i> , G. O. Sars .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32
<i>Evadne Nordmanni</i> , Loven .. .. .	+	..	+	+	+	+	+	+	+	+	..	+	..	..	r	33
<i>Podon intermedius</i> , Lilljeb .. .. .	+	..	+	+	+	+	+	+	+	+	..	..	..	+	+	34
<i>Guerneia coalita</i> (Norm.) .. .. .	..	..	..	..	..	..	..	..	rr	r	..	..	..	..	..	35
<i>Hyperia galba</i> (Mont.) .. .. .	..	..	..	..	..	..	..	..	..	..	..	r	..	..	..	36

TABLE V.

	8.				9.		10.		11.		12.		21.		23.		24.		25.		26.	
	12/8.				13/8.		13/8.		13/8.		13/8.		21/8.		14/8.		14/8.		17/8.		17/8.	
	61° 32' N. 3° 10' E.				61° 34' N. 2° 05' E.		61° 37' N. 0° 45' E.		61° 43' N. 0° 43' W.		61° 02' N. 1° 09' W.		59° 46' N. 2° 21' W.		59° 31' N. 0° 37' E.		58° 55' N. 0° 04' E.		58° 11' N. 0° 32' W.		58° 09' N. 1° 50' W.	
	355-300.	200-100.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	90-0.	0.	128-0.	0.	93-0.	0.	108-0.	0.	60-0.	0.
6° 31 -6° 26.	6° 88 -6° 34.	6° 34 -13° 50.	13° 50.	8° 33 -12° 29.	12° 29.	8° 85 -12° 16.	12° 16.	9° 15 -11° 82.	11° 82.	8° 70 -12° 07.	12° 07.	10° 17 -11° 57.	11° 57.	6° 79 -12° 40.	12° 40.	6° 89 -12° 60.	12° 60.	8° 30 at 100 m. -12° 25.	12° 25.	9° 90 -11° 80.	11° 80.	
35° 10 -35° 08.	35° 16 -34° 06.	34° 06. -30° 29.	30° 29.	35° 29 -34° 36.	34° 36.	35° 40 -35° 18.	35° 18.	35° 36 -35° 31.	-35° 31.	35° 31 -35° 27.	35° 27.	35° 15 -35° 05.	35° 05.	35° 26 -34° 66.	34° 66.	35° 23 -34° 94.	34° 94.	35° 25 -35° 17.	35° 17.	35° 08 -34° 90.	34° 90.	
1	+	..	+	r	+	+	+	..	+	..	..	..	+	..	+	+	+	+	+	+	+	+
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	+	..	rr	..	rr	..	..	..	..	..	..	..	..	..
4	..	..	..	+	..	+	..	r	..	rr	..	..	+	+	+	c	+	cc	..	+	..	+
5	+	..	cc	cc	c	c	c	+	c	c	c	cc	cc	+	c	+	c	..	+	+	+	+
6	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	rr	..	+	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	+	+	+
10	..	..	..	r	+	+	+	..	r	..	..	..	..	rr	+	+	+	..	+	..	+	+
11	..	..	..	..	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	..	..	..	..	r	..	..	..	+	..	rr	..	..	..	..	..	..	..	..	..	..	..
16	+	..	+	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..
17	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
21	+	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	+	r	+	..	+	..	+	..	+	c	+	..	c	..	c	..	+	+	+	+
23	+	..	+	..	+	..	+	..	..	..	..	..	..	..	+	..	+	..	+	+	+	+
24	+	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..
27	+	..	+	+	+	+	+	..	..	..	..	..	..	c	+	+	r	c	+	c	..	..
28	..	..	..	..	r	..	rr	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..
29	..	..	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	+	+	+	..	+	..	+	..	..	..	+	..	+	..	+	..	+	..	+	..
31	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	..	..	..	..	..	..	r	..	..	..	..	..	+	..	c	+	+	..	+	+	c	+
34	..	..	..	..	..	..	..	..	..	..	..	..	+	..	c	+	+	+	c	c	+	..
35	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..	..	..	rr	rr	..	..	rr	..	..	..	..	..	..	..

TABLE V.—*continued.*

8.				9.		10.		11.		12.		21.		23.		24.		25.		26.	
12/8.				13/8.		13/8.		13/8.		13/8.		21/8.		14/8.		14/8.		17/8.		17/8.	
61° 32' N. 3° 10' E.				61° 34' N. 2° 06' E.		61° 37' N. 0° 45' E.		61° 43' N. 0° 43' W.		61° 02' N. 1° 09' W.		59° 46' N. 2° 21' W.		59° 31' N. 0° 37' E.		58° 55' N. 0° 04' E.		58° 11' N. 0° 32' W.		58° 09' N. 1° 50' W.	
355-300.	200-100.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	90-0.	0.	128-0.	0.	93-0.	0.	108-0.	0.	60-0.	0.
6° 31 -6° 26.	6° 88 -6° 34.	6° 34 -13° 50.	13° 50.	8° 33 -12° 29.	12° 29.	8° 85 -12° 16.	12° 16.	9° 15 -11° 82.	11° 82.	8° 70 -12° 07.	12° 07.	10° 17 -11° 57.	11° 57.	6° 79 -12° 40.	12° 40.	6° 89 -12° 60.	12° 60.	8° 30 at 100 m. -12° 25.	12° 25.	9° 90 -11° 80.	11° 80.
35° 10 -35° 08.	35° 16 -34° 96.	34° 96 -30° 29.	30° 29.	35° 29 -34° 36.	34° 36.	35° 40 -35° 18.	35° 18.	35° 36 -35° 31.	-35° 31.	35° 31 -35° 27.	35° 27.	35° 15 -35° 05.	35° 05.	35° 26 -34° 66.	34° 66.	35° 23 -34° 94.	34° 94.	35° 25 -35° 17.	35° 17.	35° 08 -34° 90.	34° 90.
37	r	..	..	..	..	..	..	..	..	..	..
38	+
39
40
41	rr	..	rr	..	..	..	..	..	..	..	..	..	..	r	..	..	rr	..	..	..	..
42	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
43
44	+	r	rr	..	..	..	..	..	..	..	..	..	..
45	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
46	+	..	+	..	rr	..	+	..	+	..	..	..	..	..	..	..	..	..	..
47	+	..	+	+	+
48	r	+	..	+	..	..	..	r	rr	+	r	+	+	+	+	+	+	..	+
49	rr	..	..	..	..	..	..	..	..	..	..	..

TABLE VI.

Station	1.		2.		3.		4.		5.		
Date	13/11.		18/11.		18/11.		18/11.		18/11.		
Position { Latitude Longitude	58° 00' N. 2° 54' W.		58° 36' N. 1° 46' W.		59° 10' N. 1° 27' W.		59° 26' N. 1° 20' W.		59° 40' N. 1° 14' W.		
	Depth in Metres	70-0.	0.	95-0.	0.	95-0.	0.	95-0.	0.	102-0.	0.
Temperature °C.	9°·80 —9°·95.	9°·95.	8°·91 —9°·65.	9°·65.	9°·66 —9°·55.	9°·55.	9°·54 —9°·35.	9°·35.	9°·29 —9°·25.	9°·25.	
Salinity—pro Mille	34·76 —24·76.	34·76.	34·9 —34·98.	34·98.	35·12 —35·16.	35·16.	35·14 —35·14.	35·14.	35·26 —35·26.	35·26.	
COPEPODA.											
<i>Acartia Clausi</i> , Giesbr.	1
<i>Aetidius armatus</i> (Boeck)	rr	...	2
<i>Anomalocera Patersoni</i> , Templ.	rr	+	...	3
<i>Calanus helgolandicus</i> , Cl.	+	r	+	+	+	+	+	+	c	4
<i>Caligus rapax</i> , M. Edw.	5
<i>Candacia armata</i> , Boeck	r	r	6
<i>Centropages typicus</i> , Kröyer	rr	...	rr	...	...	7
<i>Ectinosoma atlanticum</i> , Brady et Rob.	8
<i>Eucalanus crassus</i> , Giesbr.	9
— <i>elongatus</i> (Dana)	r	...	r	+	+	10
<i>Laophonte thoracica</i> , Cl.	11
<i>Metridia lucens</i> (Boeck)	rr	...	12
<i>Oithona similis</i> , Cl.	13
<i>Paramesoehra dubia</i> , T. Scott	14
<i>Pseudocalanus elongatus</i> , Boeck	15
<i>Rhincalanus nasutus</i> , Giesbr.	r	+	16
<i>Temora longicornis</i> (Müller)	r	...	...	...	...	...	...	17
CRUSTACEA (ceter.).											
<i>Halimemon parvimanus</i> (Sp. Bate)	rr	...	...	...	...	...	...	...	18
<i>Parthemisto oblivia</i> (Kröyer	+	+	r	...	r	...	...	r	19
<i>Tryphana Malmi</i> (Boeck)	rr	+	rr	rr	...	20
<i>Eurydice truncata</i> (Norm.)...	21
<i>Idothea emarginata</i> (Fabr.)	rr	22
— <i>neglecta</i> , G. O. Sars (juv.)	rr	23
<i>Gastrosaccus spinifer</i> (Goes.)	24
<i>Leptomysis gracilis</i> , G. O. Sars	r	...	...	...	...	...	...	...	25
<i>Mysidopsis didelphys</i> (Norm.)	r	...	...	...	...	...	...	...	26
<i>Nyctiphanes norvegicus</i> (Sars)	+	r	...	...	...	...	...	...	...	...	27
<i>Rhoda Raschi</i> (Sars)...	28
<i>Schistomysis ornata</i> (G. O. Sars)	r	...	...	...	...	...	...	...	29
<i>Thysanoessa neglecta</i> (Kröyer)	r	+	...	...	...	r	...	...	30
Crustacea, juv.	r	rr	...	...	r	...	...	...	...	...	31

TABLE VI.

	21.		22.		23.		24.		25.		26.		2 m. E. Sumburgh Head.	Outside Lerwick Harbour.
	29/11.		23/11.		23/11.		23/11.		23/11.		18/11.			
	59° 46' N. 2° 21' W.		59° 36' N. 0° 41' W.		59° 31' N. 0° 37' E.		58° 55' N. 0° 04' E.		58° 11' N. 0° 32' W.		58° 09' N. 1° 50' W.			
	75-0.	0.	0.	100-0.	0.	100-0.	0.	100-0.	0.	100-0.	0.			
	8° 09 -8° 54.	8° 54.	—	6° 86 -7° 85.	7° 85.	6° 80 -8° 05.	8° 05.	8° 71 -8° 65.	8° 65.	9° 83 -9° 45.	9° 45.			
	35·10 -35·21.	35·21.	—	35·28 -35·14.	35·14.	35·21 -35·03.	35·03.	35·23 -35·21.	35-21.	34°·96 -34·96.	34·96.			
1	...	r	...	...	...	...	...	...	...	...	...	...	r	...
2	...	...	rr	...	...	...	...	...	...	...	...	...	...	...
3	...	...	+	rr	+	...	...	...	...	...	...	...	...	...
4	r	+	c	rr	+	r	+	+	...	...	c	+	+	+
5	...	...	...	...	rr	...	...	...	...	...	...	...	...	...
6	...	...	...	r	r	...	...	+	...	...	...	...	...	...
7	...	...	+	...	+	...	c	...	...	...	r	...	...	...
8	+	+	...	...	...	...	...	...	...	...	...	c	c	c
9	...	...	r	...	...	...	...	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...	+	...	rr	rr	...	...	...
11	...	rr	...	...	...	...	...	...	...	...	...	...	...	...
12	...	r	c	...	+	r	...	...	...	...	r	r	r	...
13	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14	...	rr	...	...	...	...	...	...	...	...	...	...	...	...
15	+	+	...	...	...	...	...	...	...	...	...	...	...	...
16	...	...	+	...	...	...	...	...	...	...	...	...	...	...
17	r	...	...	...	...	...	...	...	...	...	r	rr	...	...
18	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19	r	+	+	r	+	+	+	+	+	+	+	+	+	+
20	...	...	rr	...	...	...	...	...	...	...	...	...	...	...
21	...	rr	...	...	...	...	...	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...	...	...	...	...	...	...	...
23	...	...	...	...	...	...	...	...	...	...	...	...	...	...
24	...	rr	...	...	...	...	...	...	...	...	...	...	...	...
25	...	...	...	...	...	...	...	...	...	...	...	...	...	...
26	...	...	...	...	...	...	...	...	...	...	...	...	...	...
27	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28	r	+	r	...	+	...	...	...	...	...	+	+	+	+
29	...	...	...	r	...	...	...	...	...	...	...	...	...	...
30	...	...	...	+	...	r	...	...	...	...	+	r	+	...
31	...	...	...	...	...	...	...	r	...	...	r	r	...	...

PART IV.

GENERAL REMARKS, WITH REFERENCE ALSO TO SOME RESULTS OF THE YEAR 1904.

The plankton gatherings on which the following observations are made are those collected during the quarterly cruises of the *Jackal* and *Goldseeker* in 1903 and 1904, but those made by the *Goldseeker* between the quarterly cruises are also referred to.

The crustacea contained in these gatherings consisted chiefly of pelagic Copepoda which for the most part belong to the Calanoida; but a few other species which are pelagic in their habits though not included in the Calanoida were also present, the most prominent among them being the Oithonæ and the Microsetillæ, which at times occurred in considerable numbers in the samples examined; these forms however being individually very small, are of minor importance in a quantitative estimate of the total catch in any single experiment.

Another form frequent in plankton gatherings is *Caligus rapax*, one of a group of copepods found parasitic on fishes of various kinds and seldom found anywhere else, but which differs from its allies in being to a large extent a free-swimmer. This species is of interest because it seems as if we had here an example of a parasite in a transition stage towards a free pelagic life.

Other pelagic forms frequent in these plankton gatherings include one or two species belonging to the Cladocera, *Evadne Nordmanni* and *Podon Leuckarti* and *P. intermedia* being the forms usually observed; the published lists of the crustacea found in these plankton gatherings show that the species referred to occurred chiefly in those collected at stations south of the Shetland Islands.

Another species frequent in these gatherings is *Parathemisto oblivia*, an amphipod belonging to the Hyperiidæ. There appear to be two forms of this species, one small and moderately stout, not very common; the other larger and comparatively more slender. This amphipod, though of frequent occurrence in several of the samples examined, appeared on the whole to be somewhat sparingly distributed; no great swarm resembling that which occurred on the north-east coast of England in February, 1902, appears to have been encountered either by the *Jackal* or the *Goldseeker*. The form most plentiful at that time was *Ethemisto compressa*, a species closely related to the one in question, but *Parathemisto* was also fairly numerous as shown by the tow-net gatherings collected during the summer of 1892. So numerous were these about the time referred to that an eye-witness described the sea as being "literally alive with them," and he stated further that heaps of them "were afterwards washed ashore by sea winds and afforded a feast for starlings and other frequenters of the tidal line."*

Ethemisto compressa and one or two other nearly related species have, in addition to the *Parathemisto*, been observed in the plankton gatherings collected during the past two years, but they occurred only very sparingly.

* T. H. Nelson, in the "Naturalist" for May, 1892.

The Schizopoda, which along with the species already alluded to, constitute the principal sustenance of the herring as well as of many of the other marine food fishes, were also at times fairly numerous in the collections made by the *Jackal* and *Goldseeker*. Two of the species most frequently observed were *Thysanoëssa neglecta* and *Rhoda raschi*, belonging to the Euphausiidæ. The Mysidæ, which are also to some extent pelagic in their habits, were not so frequent in the collections. Young crustaceans belonging to various groups occurred in a considerable number of the gatherings, but were seldom very numerous. It may also be mentioned in passing that the little Pteropod mollusc *Limacina retroversa* was present in large numbers in some of the gatherings, the net having evidently passed through considerable swarms of this species; small Medusæ and medusoid forms appear also to have been very abundant in the North Sea during the past summer and autumn, as many of the plankton gatherings consisted for the most part of these organisms.

In making the collections, vertical as well as horizontal hauls are taken with the tow-nets and, though owing to the unequal distribution of the various organisms neither method can be altogether relied on as affording a true indication of the abundance or scarcity of life in the water at any particular time or place, the horizontal hauls are, I venture to think, more reliable than those made by hauling the net vertically. It is now fairly well known that pelagic crustacea are to some extent gregarious in their habits and that they occur sometimes in considerable swarms, and a tow-net hauled vertically may pass on one side of such a swarm and yield a very small gathering, while the gathering collected by the same net hauled horizontally may be a moderately large one. Some collections recently made by the *Goldseeker* show such differences as are referred to very distinctly; on the 23rd of September, 1904, a tow-net, one metre in diameter, was hauled from a depth of 66 metres to the surface, and only contained a very small quantity of plankton, whereas a horizontal haul made with the same or a similar net at a depth of about 66 metres, yielded a moderately large gathering which contained calanoid Copepoda in abundance, Sagitta being also common; other horizontal gatherings collected at the same station and on the same date at depths of about 33 and 20 metres were also large, and in both cases the catch consisted chiefly of Calanoida and Sagitta. Moreover, a horizontal gathering made at the same station with a "Fry net" at a depth of about 66 metres required two fairly large bottles to hold it. Two plankton samples from Station 38 collected on October 20th were distinctly different one from the other; one was a vertical haul from a depth of 140 metres, the other was a horizontal haul at about the same depth, and the plankton collected was three times more than that collected by the vertical haul. Other examples of a similar kind might be given but these will suffice. Sometimes, however, there appears to be a general scarcity of plankton, and at such times tow-net collections are small whether they be obtained vertically or horizontally; but such scarcity may be only temporary and accidental and not due to seasonal variation or to other more or less regularly recurring changes.

A reference to two incidents that came under my own observation may be of interest from their bearing on the gregarious habits of pelagic crustacea, and as shewing the importance of these organisms as a food supply for fishes. The stomachs of five herrings—a sample from a "catch" taken off King's Cove, Arran, in November, 1886, were submitted to me for examination. I found them all distended with food; one was full of Schizopods—Euphausiidæ—only, the food observed in the others consisted of two kinds not mixed but distinctly separated as if by a thin horizontal septum. The lower half was filled exclusively with Copepods (*Calanus*), the upper with Schizopods, and the former being of a reddish colour and the latter white made the difference in the nature of the food more obvious. This abrupt and complete change in the food of these herrings is interesting; for, from the well-preserved condition of both kinds of organisms, there could scarcely have been any interval between the time that the herrings ceased feeding on the Copepoda and the beginning of their attack on the Schizopoda. The only explanation of this

curious incident was that a swarm of *Calanus* had become on one side a prey to a swarm of Schizopoda while a shoal of herrings attacked them on the opposite side and passing through and feeding on them as they proceeded they presently met in with the Schizopods and commenced feeding on them in turn, and were themselves captured a short time afterwards.

A shad, *Clupea alosa*, was captured in the salmon nets in the Bay of Nigg near Aberdeen on August 17th, 1890. This fish had, apparently, a short time before it was captured, met in with a swarm of Copepods, and had fed greedily upon them, for its stomach was packed with recently captured specimens which belonged almost exclusively to one species, viz., *Temora longicornis*; the quantity removed from the stomach measured about 150 c.c.; a considerable proportion of the specimens appeared to be immature being comparatively small in size. A careful enumeration of the specimens contained in 2 c.cs. gave 5,765 specimens of *Temora*, equal in round numbers to about 433,000 in the 150 c.cs., besides a small number of other forms, such as *Alteutha depressa*, *Thalestris longimana*, *Longipedia*, *Centropages*, *Dactylopus*, etc.

But though these examples prove not only that pelagic crustacea sometimes occur in large swarms and that fishes may feed greedily when the opportunity to do so comes in their way, there is evidence to shew that fishes may occasionally choose semi-starvation rather than quit the place where for a time they may be congregated. Mr. Robert Duthie, Fishery Officer, mentions in a paper on "the Fisheries of Shetland," published in Part III. of the Tenth Annual Report of the Fishery Board for Scotland, pp. 203-4, that "not far off those Islands there is said to be a shallow ridge with about 12 fathoms water, inside of which the depth is much greater. In westerly gales the cod came over this ridge into the deep still water inside and they cannot, or will not, return to the open sea till they have spawned. Any season that the fishing is exceptionally heavy the fish are generally in poor condition, the opinion of fishermen being that the ordinary supply of food is not sufficient for the number of fish on the ground."

Considerably over a thousand samples of plankton have been examined for Crustacea, and although their general distribution over the area traversed by the *Goldseeker* and *Jackal* has not shown any very marked seasonal or other changes, a comparison of the result obtained in 1903 with those of 1904 exhibit certain differences to which it may be of interest briefly to refer as they may correspond with, or have a bearing on differences that may have been observed in the distribution of other organisms that may have been specially studied during these two years.

As already stated, the principal part of the Crustacean plankton collected by the *Jackal* and *Goldseeker* consisted of free-swimming Copepoda, the most common species being *Calanus helgolandicus* Claus; and concerning this species it has already been remarked that Professor G. O. Sars has shown that there exist two closely allied forms of *Calanus* which, though resembling each other in several respects so closely as to be regarded by the novice as the same thing, are sufficiently distinct in the adult stage to be separable by an experienced student of the Copepoda. Whether these forms be regarded as "species" or "varieties" is very much a matter of opinion and therefore of comparatively little importance; but it is important that when there are differences of a fairly permanent character, the things which differ should have distinctive names and when recorded it should be under their distinctive name. Any perfect and fully adult specimens of *Calanus* from these North Sea collections that have been examined by me agree in every respect with the form described by Professor G. O. Sars under the name of *Calanus helgolandicus* Claus and not with *C. finmarchicus*, Gunnerius. The majority of the specimens examined, however, have been more or less immature, and only occasionally have I come across a gathering containing fairly perfect and adult males. No satisfactory diagnosis of a species can be made from specimens that are immature or imperfect, but I am satisfied that *C. finmarchicus* if present in these gatherings must be represented very sparingly.

From a comparison of the Copepod-fauna contained in the collections made during the past two years it would appear that *Calanus* was somewhat more common in the North Sea in 1903 than in 1904, especially in May, and to some extent also in August. For the sake of uniformity only two gatherings from each station, a surface and an undersurface gathering, were selected for comparison; the undersurface gathering was usually taken at 100 metres, but some were over and some under that depth; the gatherings were collected by cheese cloth nets. On comparing the various gatherings alluded to I find that *Calanus* occurred as "common" or "very common" in about 81 per cent. of those collected in May and in about 46 per cent. of those collected in August, 1903; and in about 64 per cent. of those collected in May and in 42 per cent. of those collected in August, 1904. These differences will be more obvious by arranging the results in tabular form as follows:—

Calanus occurred as "common" or "very common" in about—

81	per cent.	of the gatherings	collected in	May,	1903.
64	"	"	"	May,	1904.
46	"	"	"	August,	1903.
42	"	"	"	August,	1904.

Acartia clausi, Giesbrecht, exhibited a variation somewhat similar to that of *Calanus*, but the difference was scarcely so well marked.

There were one or two other examples of variation in distribution among the more common species which may also be referred to. One of these, *Pseudocalanus elongatus*, was abundant in several of the gatherings made by the *Goldseeker* and common in a number of the others collected in May, 1903, but was much scarcer in the gatherings collected in May, 1904, being observed as "common" in only about ten per cent. of the samples examined. But though the species appeared thus to differ numerically in the May collections for 1903 from those for the same month of the year following, its presence in the collections made in August was about equally infrequent in both years. *Temora longicornis* and *Oithona similis* exhibited somewhat similar though less obvious variations in the numbers of them observed in 1903 and 1904.

Differences similar to those referred have also been observed in the distribution of a few of the rarer species. These rare forms have been obtained chiefly in gatherings from the more northerly stations, and especially from those stations situated between the Shetland and Faroe Islands, indeed the Faroe Channel appears to be a kind of neutral ground where representatives of the sub-tropical and sub-arctic copepod faunas meet. Such northern species as *Calanus hyperboreus* and *Metridia longa* are sometimes found associated here with *Eucalanus crassus*, *Amalophora magna*, *Euchirella rostrata*, and other tropical and Mediterranean forms. Professor G. O. Sars, by the way, has furnished some interesting examples of the apparent extension northwards of species that have their headquarters in tropical or sub-tropical waters.

The distribution of some of the rarer forms captured in the tow-nets of the *Goldseeker* and *Jackal* and especially in those of the latter vessel exhibits certain peculiarities, which, though perhaps only local or accidental, may after all be attributable to seasonal influence. These peculiarities are more clearly brought out by comparing the occurrences of the two sub-arctic species *Calanus hyperboreus* and *Metridia longa* with *Eucalanus elongatus* and *Rhincalanus nasutus*, two species not uncommon in the warmer waters of the Atlantic. In comparing the distribution of these species, I have, for obvious reasons, referred only to the collections made during the quarterly cruises. It was on these occasions that the *Jackal* had a share of the work, and the collections contained representatives of species from a more extended area.

Of the samples examined for the purpose of making this comparison, fifty were collected in May,* seventy-two in August, and twenty-six in November, 1903; twenty-six were collected in February,† seventy-seven in May,‡ the same number in August, and twenty-two in November, 1904.§ It will be observed that the number of the quarterly samples differed considerably and it will be necessary to keep this in view when dealing with the tables given below. But it will also be noticed that the tables shew variation in the distribution of the species specially referred to, which the difference in [the number of samples examined does not explain, but for which an explanation has to be sought for elsewhere. Take, for example, the quarterly collection for May, 1904. Seventy-seven samples (exclusive, as already explained, of the twenty-six extra samples) were examined for that month; and, while *Calanus hyperboreus* occurred in twenty-three of them and *Metridia longa* in seventeen, neither *Eucalanus elongatus* nor *Rhincalanus nasutus* were observed in a single sample. On the other hand, it will be observed that the results for August, 1903, are distinctly different; *Calanus hyperboreus* was obtained in eight of the samples collected in that month, *Metridia longa* in thirteen, while *Eucalanus elongatus* was observed in eleven, and *Rhincalanus nasutus* in as many as fourteen. This comparison exhibits what appears to be a considerable variation in the distribution of the two groups of species in May, 1904, from what was the case in the previous month of August. Moreover, it will be observed that, even in the case of the two northern species mentioned, the apparent difference in their distribution during the months of May of the two years as indicated by the number of samples in which they occurred is fairly well marked. In May, 1903, the *Calanus* was observed in 10 out of the 50 samples collected (equal to 20 per cent.); but in May, 1904, it occurred as already stated in 23 of the 77 samples examined (or almost 30 per cent.). While the *Metridia* was obtained in 4 of the samples collected in May, 1903 (or 8 per cent.), and in 17 of the samples collected in May, 1904 (or fully 22 per cent.); and curiously enough if the number of samples in which the same species was observed in the gatherings collected in August, 1903 and 1904 be compared, a somewhat opposite result will be noticed; the number of samples in which the *Calanus* was observed in the August gatherings for 1903 and 1904, is fully 11 per cent. and scarcely 4 per cent.; while for *Metridia*, the numbers for 1903 and 1904 are fully 18 per cent. and scarcely 15 per cent. Differences in the apparent distribution of other species besides those referred to have also been noticed during the examination of the various plankton collections, and I have given one or two additional tables shewing variations among a few of the less common species.

One point bearing on the distribution of some of the species as brought out by the tabulated data and which seems to be of interest, is the nearly uniform decrease in the number of samples from August, 1903, to May, 1904, in which both *Eucalanus elongatus* and *Rhincalanus nasutus* were observed. The maximum number of samples in which they occurred was in August, 1903, in the case of the *Rhincalanus*, which was found in nearly 19.5 per cent. of the gatherings collected, and in November in the case of the *Eucalanus* which was observed in nearly 27 per cent. of the gatherings collected; while in the gatherings collected in May, 1904, both were entirely absent. It is also interesting to note that the northern species to which I have been referring were on the whole *less* frequent in the winter gatherings when it might have been expected that their distribution would have extended further to the south, and *more* frequent in those collected in May and August; it has to be remembered however that they were observed chiefly

* The exact number is 72, but 22 were extra and collected outside the area under consideration.

† In November and February, stormy weather interfered with the work, and only a limited number of stations could be visited.

‡ The exact number of samples collected in May, 1904 was 103, but 26 of these were extra and are therefore excluded here.

§ November, 1904, should be kept out in making this comparison, as there were no samples from stations usually examined by the *Jackal*.

in undersurface gatherings from 100 metres or more in depth, but even on the very few occasions when they did occur in February it was in undersurface gatherings in which they were chiefly observed.

Mention may be made of other two species whose distribution within the area traversed by the *Goldseeker* and *Jackal* as indicated by the frequency of their occurrence in the collections examined seems to be to some extent affected by seasonal changes. These are *Anomalocera Patersoni*, a richly coloured copepod, and *Tryphana Malmi*,* an amphipod belonging to the Hyperiidæ. I have given in tabular form the number and percentage of the samples in which these two species were observed in the collections made during the quarterly cruises of 1903 and 1904. A glance at these tables will show that while the copepod was more frequently met with during the summer months, the maximum number of the records for the amphipods occur in November and February. *Anomalocera Patersoni*, the first of the two species referred to, I find more commonly distributed in the form of swarms than is the case with some of the other Calanoida, and occasionally, therefore, a gathering may consist of little else than this pretty species. The table shews that this species was present in about 40 per cent. of the samples examined in August, 1903 and 1904, but only in about 18 per cent. to 19 per cent. of those examined in November of both years, and in about 11 per cent. of those collected in February, 1904. On the other hand, the number of records for the amphipoda, *Tryphana Malmi*, was larger in November and February than at any other time during the two years; no specimens were recorded for May, 1903; in the following August it was observed in nearly 3 per cent. of the samples, while in November of the same year the percentage of the samples in which it occurred rose to fully 15, and in February, 1904, to fully 19 per cent. In May, 1904, as in the same month in 1903, no specimens were noticed; in August, 1904, it occurred in two samples and in November in three (or fully 13 per cent.).

The occurrences of the various species mentioned in the preceding notes may, some of them, be accidental, but the uniform increase and decrease is too marked to be attributable wholly to accident; they point rather to a more or less regular variation probably due in some measure to the changes of the seasons. But the number of observations is as yet too limited to permit any very definite conclusions being arrived at.

The following are the tables referred to in the preceding observations; their arrangement will be readily understood from the explanations that have already been given:—

TABLES shewing differences in the occurrence of certain Species referred to in the preceding remarks.

<i>Calanus hyperboreus</i> was observed in:—				<i>Metridia longa</i> was observed in:—				Total Number of Samples Examined.
May, 1903	in	10 samples =	20 per cent.	May, 1903	in	4 samples =	8 per cent.		50†
Aug., 1903	„	8 „ =	11 „	Aug., 1903	„	13 „ =	18 „	72
Nov., 1903	„	0 „ =	0 „	Nov., 1903	„	0 „ =	0 „	26
Feb., 1904	„	1 „ =	4 „	Feb., 1904	„	2 „ =	8 „	26†
May, 1904	„	23 „ =	30 „	May, 1904	„	17 „ =	22 „	77†
Aug., 1904	„	3 „ =	4 „	Aug., 1904	„	11 „ =	14 „	77
Nov., 1904	„	0 „ =	0 „	Nov., 1904	„	0 „ =	0 „	22†

* As pointed out by the Rev. J. R. R. Stebbing,† the name of this genus as used by Boeck is *Tryphana*, not *Tryphaena* (Boeck—Crust. Amphip. Bor. et Arct., p. 9).

† See footnotes on page 254.

TABLES shewing differences in the occurrence of certain Species referred to in the preceding remarks—*cont.*

<i>Eucalanus elongatus</i> was observed in :—			<i>Rhincalanus nasutus</i> was observed in :—			Total Number of Samples Examined.
May, 1903	in	0 samples = 0 per cent.	May, 1903	in	1 samples = 2 per cent.		50
Aug., 1903	„	11 „ = 15 „	Aug., 1903	„	14 „ = 19 „	72
Nov., 1903	„	7 „ = 27 „	Nov., 1903	„	3 „ = 11 „	26
Feb., 1904	„	2 „ = 8 „	Feb., 1904	„	2 „ = 8 „	26
May, 1904	„	0 „ = 0 „	May, 1904	„	0 „ = 0 „	77
Aug., 1904	„	1 „ = 1.3 „	Aug., 1904	„	3 „ = 4 „	77
Nov., 1904	„	2 „ = 9 „	Nov., 1904	„	0 „ = 0 „	22

<i>Eucalanus crassus</i> was observed in :—			<i>Euchaeta norvegica</i> was observed in :—			Total Number of Samples Examined.
May, 1903	in	0 samples = 0 per cent.	May, 1903	in	3 samples = 6 per cent.		50
Aug., 1903	„	2 „ = 3 „	Aug., 1903	„	17 „ = 24 „	72
Nov., 1903	„	1 „ = 4 „	Nov., 1903	„	0 „ = 0 „	26
Feb., 1904	„	2 „ = 8 „	Feb., 1904	„	1 „ = 4 „	26
May, 1904	„	0 „ = 0 „	May, 1904	„	11 „ = 14 „	77
Aug., 1904	„	0 „ = 0 „	Aug., 1904	„	7 „ = 10 „	77
Nov., 1904	„	1 „ = 4.5 „	Nov., 1904	„	0 „ = 0 „	22

<i>Ætidius armatus</i> was observed in :—			<i>Scolecithricella minor</i> was observed in :—			Total Number of Samples Examined.
May, 1903	in	0 samples = 0 per cent.	May, 1903	in	0 samples = 0 per cent.		50
Aug., 1903	„	11 „ = 15 „	Aug., 1903	„	4 „ = 6 „	72
Nov., 1903	„	3 „ = 11.5 „	Nov., 1903	„	1 „ = 4 „	26
Feb., 1904	„	5 „ = 19 „	Feb., 1904	„	3 „ = 11.5 „	26
May, 1904	„	4 „ = 5 „	May, 1904	„	4 „ = 5 „	77
Aug., 1904	„	6 „ = 8 „	Aug., 1904	„	2 „ = 3 „	77
Nov., 1904	„	0 „ = 0 „	Nov., 1904	„	0 „ = 0 „	22

TABLES shewing differences in the occurrence of certain Species referred to in the preceding remarks—*cont.*

<i>Pleuromamma robusta</i> was observed in :—				<i>Euchirella rostrata</i> was observed in :—				Total Number of Samples Examined.
May, 1903	in	0 samples	= 0 per cent.	May, 1903	in	0 samples	= 0 per cent.		50
Aug., 1903	„	3 „	= 4 „	Aug., 1903	„	3 „	= 4 „	72
Nov., 1903	„	1 „	= 4 „	Nov., 1903	„	0 „	= 0 „	26
Feb., 1904	„	0 „	= 0 „	Feb., 1904	„	0 „	= 0 „	26
May, 1904	„	0 „	= 0 „	May, 1904	„	1 „	= 1·3 „	77
Aug., 1904	„	4 „	= 5 „	Aug., 1904	„	1 „	= 1·3 „	77
Nov., 1904	„	0 „	= 0 „	Nov., 1904	„	0 „	= 0 „	22

<i>Anomalocera Patersoni</i> was observed in :—				<i>Tryphana Malmi</i> was observed in :—				Total Number of Samples Examined.
May, 1903	in	12 samples	= 24 per cent.	May, 1903	in	0 samples	= 0 per cent.		50
Aug., 1903	„	29 „	= 40 „	Aug., 1903	„	2 „	= 3 „	72
Nov., 1903	„	5 „	= 12 „	Nov., 1903	„	4 „	= 15 „	26
Feb., 1904	„	3 „	= 11 „	Feb., 1904	„	5 „	= 19 „	26
May, 1904	„	28 „	= 36 „	May, 1904	„	0 „	= 0 „	77
Aug., 1904	„	31 „	= 40 „	Aug., 1904	„	2 „	= 2·5 „	77
Nov., 1904	„	4 „	= 18 „	Nov., 1904	„	3 „	= 14 „	22