DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

REPORT
ON THE
SEA AND INLAND FISHERIES OF IRELAND
FOR
1902 AND 1903.

IN TWO PARTS.

PART I.—GENERAL REPORT.
PART II.—SCIENTIFIC INVESTIGATIONS.

PART II.—SCIENTIFIC INVESTIGATIONS.

Presented to both Houses of Parliament by Command of His Majesty.

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APPENDIX, No. IV.

i.—Schizopodous Crustacea from the North-East Atlantic Slope, by E. W. L. HOLT and W. M. TATTERSALL, B.Sc.

ii.—Note on a Genus of Euphausid Crustacea, by W. T. CALMAN, D.Sc.

i.—SCHIZOPODOUS CRUSTACEA FROM THE NORTH-EAST ATLANTIC SLOPE.

BY

E. W. L. HOLT AND W. M. TATTERSALL, B.Sc.

PLATES XV. TO XXV.

INTRODUCTORY.

We inhere by the above title no dissent from the views of Hansen, 1895, and Calman, 1904, of the taxonomic position of the forms which, previous to the pronouncements of these authorities, had been regarded as forming a natural group. The old term has its convenience, not only for brevity of title, but because it goes near to expressing, for the higher crustacea, a biological unit, which needs only the Sergestids and certain amphipods to complete it.

Our material consists of collections made (1) by the Oceana (Mr. George Murray and Mr. V. H. Blackman) in November, 1895, in deep water west of the southern part of Ireland, at depths reaching to nearly 1,500 fathoms; (2) by Dr. G. H. Fowler in H.M.S. Research in July, 1906, off the north part of the Bay of Biscay at depths ranging 2,541 fathoms; (3) by the Department's fishery cruiser Hegia along the west coast of Ireland at depths between 50 and 1,000 fathoms, at all seasons of the year, but chiefly in the summer months; (4) by the fishing boat Monica on and about the mackerel grounds outside the Bofin archipelago, Counties Galway and Mayo, in spring, summer, and autumn since 1900.

The Monica's operations barely touch the crest of the slope, which we take as commencing, for the purposes of these notes, at the fifty fathom line, and we shall only notice so much of her catch as consists of organisms obviously belonging rather to the slope than to the littoral area, or as much to each.

The fishing implements by which the various collections were made were of diverse order. The Oceana and Research, being interested solely in plankton, never touched bottom with their nets. The former used ordinary open tow-nets, fished horizontally at known depths (as far as such may be with certainty computed) and hauled, still fishing, to the surface. The Research used a vertical net, opened and closed by messengers at known depths, and for surface work horizontal open nets. The Hegia used a horizontal net, opened and closed by messengers, but it contributed nothing to our material. Her efficient nets were ordinary open tow-nets of various shapes and sizes, and, especially, nets and bags of fine material fastened to the "back" of a beam-trawl. These nets, if placed at the point where the swirl from the apex of the ground rope rises through the meshes of the "back," are certain traps for small bottom organisms which may lie in the path of the trawl. A moderate amount of sand in the net will indicate, in experiment, what seems to be the most...
favourable position. Placed too far back, the nets got too much sand and often burst. With regard to the open tow-nets used by the Helsa, it must be stated that in addition to fishing at the depth indicated in the record, the nets were also fishing during their descent and ascent. It does not, therefore, follow that the whole contents of a tow-net came from the depth to which the tow-net was lowered. Indeed, in May and August, 1894, when these open tow-nets were especially successful in their endeavours to capture the actively swimming Euphausiids, there is evidence that a considerable portion of the catch was obtained during the ascent of the net. The Monas used ordinary tow-nets, mostly fished while she was drifting to her mackerel nets, and a larger tow-net of strong mosquito gauze, towed under sail to and often beyond the bursting strain; but we made no loss of our attempts to catch the large active Euphausiids, known from the evidence of fish-stomachs to be abundant in the neighbourhood, have not met with much success under sail-power in shallow water.

We divide our notes into two parts, of which the first contains the descriptions of new genera and species and other systematic matters, while the second gives a full list of the species taken, with localities of capture, and a brief note of their distribution. Full particulars of the vertical distribution of the material taken by the Geoa and Research are at the request of the collectors, reserved for publication in the Annals and Magazine of Natural History and the Transactions of the Linnean Society respectively, other items of the collections having already been dealt with in those media.

A list of authorities quoted will be found at the end of our notes. We have not thought it necessary to burden the text with reference to original records of distribution when these have been sufficiently summarised in more general papers of later date.

**SYSTEMATIC NOTES, WITH DIAGNOSES OF NEW GENERA AND SPECIES.**

Everyone who has occasion to deal with material from a little explored district must encounter the same difficulty as ourselves. Existing genera will be found to have been framed to con
tinuously subdivide the species in areas already well observed, and the question will arise, in whether it is better to expand old genera for the reception of new believing, on a reasonable appreciation of the fineness of the results, the expansion of genera to their fullest apparently natural capacity (in its widest sense) has been only in the most imperfect fashion. There is a very common form in which we have now to deal the majority of the species which we are compelled to subject to the list were obtained in a few hauls by fine-mesh nets on the back of a trawl. It is a common

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*The Helsa gatherings from deep water in August and November, 1901, have not yet been completely worked out, but a few additions from them have been made to the records in this paper in press.*

only, has resulted in the discovery of undescribed forms, it may be

taken as certain that the extension of this method or the employment of improved apparatus on the same and on other parts of the sea-floor must inevitably result in the recognition of many other kindred organisms.

For this reason, though most of our new material could be accommodated by modification of the existing genera of the Erythrops group, we have decided to abstain from modifying the diagnoses of such genera. A genus, discarded, as ours inevitably must be, when something like a complete account of the fauna permits a rearrangement of species, passes out of knowledge and injures nobody; or will, at least, cease to be

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**PHYLLOGENY.**

In Hyperoerhrops serri
ter and Euchaetocera Fowleri (see pp. 121, 124) the bases of the thoracic limbs bear a well-developed digitiform process (see Pl. XXIII., fig. 2). This is clearly an epipodite, presumably a rudimentary gill, and, as Dr. Calman reminds us, furnishes additional evidence of the affinity of the Mysidacea and Lophonemidae. In a less pronounced form an epipodite is present in other of the Erythrops, as may be seen from Sars' figure (Mysis, Mysid. Pl. II., fig. 4) of the under side of an Erythrops, but no attention appears to have been hitherto directed to the fact.

Norman has divided into sub-families the genera of Mysidacea which were known as British in 1892. In continuation we have very briefly defined such new sub-families as were required for the reception of new material.

**DIVISION.—EUCARIDA.**—Calman, 1904.

**ORDER EUPHUSIAECA.**

**FAM. EUPHUSIDAE.**

**SUB-FAM. NOV. EUPHUSIADAE.**

Eyes not or only slightly bilobate. None of the legs much longer than their immediate fellows, nor terminating in brushes or claws. Palps of maxillae simple.

**GENUS Euphausia, Dana.**

Euphausia pellicula, Dana (1852).

Euphausia pellicula, Sars,—1885.

Thysanopoda bidentata, Sars,—1882.

Representatives of the species found in the N.E. Atlantic seem to invariably have the podatations of the antennular comb much more numerous than in the examples figured by Sars in his Challenger Monograph, while the proamal spine is very often simple, even in adults.
One of the Research specimens, measuring 26 mm. from tip of rostrum to the end of the caudal fan, is the largest of which we have a record.

Several females (Research, July) were found carrying ova loose among the thoracic legs, which, with their setae, form a sort of basket. Calman (1904) surmises that the nursing period is very brief, and this is borne out by the number of ova and very early larvae, apparently belonging to the species which we found in the Research collection.

Euphausia Lancii, sp. n.

Plate XXIV., Figs. 6-9.

It is necessary to refer a small Euphausia to a new species, apparently very closely allied to E. splendidii, but, in so far as it is possible to make comparisons between a single probably young specimen and a minor point of another, the species described from adults examples, distinguishable by the following characters:

Body generally slender, more so than in E. pellicula of same size. Carapace, with one lateral denticle, drawn out in front into a small obtuse rostrum, which only reaches a quarter the length of the eyes. Eyes as in E. splendidii. Antennal peduncle longer, equal in length to the other two, outer distal corner adults in E. splendidii. Basal joint the produced into an acute process which is absent (at least in strong setae is present (see Fig. 6), the setae more numerous than in a pointed process. Antennal scale reaching just a little past the second joint of the antennal peduncle, and somewhat narrower than in E. splendidii, less than one-third the length of scale. Basal spine of the peduncle as much in E. splendidii. Ninth and tenth segment one and two-thirds as long as preceding relative lengths as in E. splendidii. Sub-apical spines of telson as in E. splendidii and E. similis. Length, 20 mm.

Genus Thysanopoda, M.-Ed.

Thysanopoda acutifrons, sp. n.

This form having come to hand after our notes had gone to press, we can only give a preliminary diagnosis, viz.:

All characters almost exactly as in T. obtusifrons, G. O. Sars, except—

Rostrum broadly triangular, its extremity acute, not extending into the eyes, its sides slightly inflated. Telson with four pairs of posterior being immediately above the subapical spines, the anterior about midway between the subapical spines and the telson. There is no trace of the parallel serrated ridges exhibited by T. obtusifrons. The apex of the telson is suddenly constricted, well developed and simple. Coloration variable; all specimens antennae, carapace, pleon and caudal fan more or less completely covered with olive-brown chromatophores. Length from 9 to 22 mm., the smallest specimen having the antennal peduncle imperfectly developed.

This species is probably a small species in comparison with its congeners. It belongs to the section of the genus which is characterised by the absence of a spine on the side of the carapace. Ortmann (1893) describes that Ortmann overlooked the presence in T. obtusifrons of a small spine on the side of the carapace. T. acutifrons certainly has none. In the characters of the proximal spine it agrees with the forms referred by Ortmann to T. obtusifrons.

Except in regard to the rostrum our species would seem to be very closely allied to T. pectinata, Ortmann, in so far as the characters of the latter have been defined.

Locality, see p. 134.

Genus Nyctiphanes, G. O. Sars, 1883.

From Sars' remarks in his preliminary notice of the Challenger Schizo-

poda, it is clear that he found this genus upon Nyctiphanes australis, though he considered his definition wide enough to include the forms then known as Thysanopoda norvegica and T. Couhti. With the latter, even at the time of issue of the Challenger Report, he had obviously no acquaintance, since he expressed a doubt as to its distinctness from N. norvegica. There is between N. norvegica and the two other species a constant difference which we consider to be of generic rank, and we have therefore referred the former to a new genus for which we propose the name Meganyctiphanes.

Taking Sars' diagnosis as a basis, the two genera may be easily recognised by the following characters.

Nyctiphanes, G. O. Sars.

Sixth and seventh thoracic limbs in the female without an exopodite. Antennular peduncle considerably stouter in the adult male than in the female.

Genus Meganyctiphanes, n.

Sixth and seventh thoracic limbs with an exopodite in both sexes. Antennular peduncle scarcely, if at all, stouter in the adult male than in the female.

The important difference is in the absence, in the females of Nyctiphanes, of the exopodite of the sixth and seventh limbs. Both the known species, N. Couhti and N. australis, carry their ova in paired pyriform masses, closely opposed to the bases of these limbs. In the only known species of Meganyctiphanes, a most abundant and well-known form, ovigerous females have never been observed, and it seems probable that the differences of exopodites in the females of the two genera are associated with differences of nursing. If the female M. norvegica carried her ova as in Nyctiphanes her exopodites would be useless and greatly in the way. We suspect that she either nurses them for a brief period in the basket formed by her thoracic limbs and their setae, as is the case with Euphausia pellicula, or does not nurse them at all.

For practical purposes the three species, which alone possess the reflected leaflet at the end of the first joint of the antennal peduncle, may be easily distinguished by the following characters:

A. A spine above the origin of telson.
B. No spine above the origin of telson.
  1. No denticulation of the lateral edge of the carapace.
  2. Denticulation at the middle of its length.

N. Couhti.

N. australis.

M. norvegica.
Nyctiphanes Couchi (Bell).

PLATE XVII.

The only obvious character in which this species differs from N. australis, Sars, is in the spine above the telson, which is an acumination of the posterior margin of the shell of the last segment of the ploon, which is already well developed at the earliest stage at which generic recognition is possible, and persists throughout life. At no stage of N. australis, nor, as we are entitled to state from the examination of ample material, in M. norvegica, does the length of the species exceed 15 mm., but, in the specimen shown in fig. 1, or may still be imperfect. In males of 16 mm. or more, measured from tip of rostrum, there is no comb, and at the most the previously acuminated edge of the integument of the second segment may show a slight acuration, whereas in females the comb persists to the maximum size attained.

While lacking the comb, the antennular peduncle of the large male becomes distinctly larger than that of the female—e.g., in specimens of the two sexes having the same total length of 17 mm., from tip of rostrum, the peduncles have the following measurements:

<table>
<thead>
<tr>
<th>Length of second segment</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width 1:02</td>
<td>1:02</td>
<td>0:90</td>
</tr>
<tr>
<td>Length 1:42</td>
<td>1:42</td>
<td>1:30</td>
</tr>
<tr>
<td>Width 1:50</td>
<td>1:50</td>
<td>1:48</td>
</tr>
<tr>
<td>Length 1:43</td>
<td>1:43</td>
<td>1:24</td>
</tr>
</tbody>
</table>

In the male the third segment bears at its origin near the inferior internal angle three closely-set spines, a little more than half as long as the segment, forwardly directed and somewhat inflected, plumose except at the distal extremities. In several examples (male) spines have been observed on the internal ventral edge of the left peduncle, but they do not seem to be of universal occurrence. In both sexes the outer face of the second segment bears a small bunch of setae, and the brush of setae which arises externally to the origin of the flagella does not appear to differ materially in the sexes. In general the antennular differences of the sexes in large specimens are so nearly the same as that depicted by Sars for N. australis that his figures would serve for N. Couchi.

The copulatory apparatus of the male pleopods does not appear to be more fully developed in large specimens than in the 12 mm. example described by Holt and Beaumont, 1900. The ulterior development of the antennular peduncle is therefore, in all probability, not associated with the attainment of sexual potency. The smaller vigorous female observed measures 10 mm. from tip of rostrum to the tip of telson; the largest specimen measured 17 mm. from tip of rostrum to tip of telson. The size of the egg-mass seems to vary with the size of the parent. In one specimen the ovicase contained nauploid larvae. From the material at our disposal the breeding season would seem to reach its maximum sometime about May.

The mouth parts and thoracic appendages examined in detail call for no special remark in comparison with those of N. australis.

The pigmentation of the eyes is brownish-black. Other pigment is bright scarlet, and may probably be variable according to the degree of expansion of the thoracic appendages. The eyes are brilliantly coloured. (Plate XVIII, figs. 3, 4."

Localities and Distribution, see p. 134.

Meganectiphantes norvegica (M. Sars).

Thysanopoda norvegica, M. Sars.

Nyctiphanes norvegica, G. O. Sars et auet.

PLATE XVI.

Figures of this species have already been given by Watase (copy kindly made by Shiroy and Mauro), Koepel and Zimmer. It is a well-known form, and we figure it chiefly in explanation of the differences which separate it from N. Couchi.
Food.—The examples mentioned above are the only ones in our possession which throw any light on the feeding habits. Many of them have the leg-basket more or less stuffed with prey, including copepods, schizopods or decapod larvae, fragments of Spiralis, and other matter which requires further examination. One has the tail of a larval fish, 16 mm. long, in its mouth.

Locality and Distribution, see p. 135.

Sub-Fam. nov. NEMATOSCELINAE.

Eyes more or less bilobate. Second or third legs elongate, with distal extremity forming a brush or claw.*

Genus Thysanoessa, Brandt.

Thysanoessa longicaudata (Krüyer).

T. tenera, Sars.—1882.
T. longicaudata, Hansen.—1887.
T. longicaudata, Norman.—1892.

P. XV.

Carapace with lateral margins entire; rostrum varying somewhat in length, but reaching beyond the middle of the first joint of the antennal peduncle, narrow, lanceolate, slightly keeled. Antennal scale of the third joint; apex more or less obliquely truncated. Eyes rather large, constrictions well marked. Second legs having the usual joint about half as long (if anything rather more than half as long) as the penultimate, narrow, of equal width throughout, with a tuft of setae at the extremity, and about four to six and five to seven no distinct keels on the segments, the last equal to, or very rarely produced into a minute, extremely pointed, or even slightly passing, the outer, nearly of lateral spines.

Hansen, 1887, has shown that Krüyer's types of T. longicaudata agree with the characters given by Sars for T. tenera. Our diagnosis of the few specimens which were measured the average length of the last segment con-dorsal margin entire or (very rarely) produced into an extremely minute, extremely pointed, or even slightly passing, the outer, nearly of lateral spines.

* For a key to the genera which we include in this sub-family, see Calman's paper, p. 133, infra.

* For a key to the genera which we include in this sub-family, see Calman's paper, p. 133, infra.
relation to the telson, rather distinctly longer than in examples from off the Irish coast. We do not think these differences would warrant us in separating the southern forms even by a varietal name.

Our figures, except that of the leg, were taken from Oceana material, and our view should show the most perfect specimen on a large scale, but still retaining their legs, it would have been impossible to definitely associate our Oceana material with *T. longicaudata*. The second legs alone do not furnish a satisfactory means of distinction between this species (which is only known to reach 12 mm.), and small examples of *T. neglecta*, Kr. (= *T. borealis*, G. O. Sars), which grows to 24 mm. While large *T. neglecta* have the ultimate distinctly less than half the length of the penultimate joint, examples comparable in size to *T. longicaudata* have the ultimate joint, in comparison with the latter species, but very slightly shorter, and there is not sufficiently constant difference in the number of setae to be of value.

Our drawings were made before perfect specimens were available, and we use them for publication because they convey the best idea of the species as it usually comes into the hands of the student. *T. longicaudata* is, more than any Schizopoda which we know, liable to lose its legs in the net, and a perfect specimen with its bunch of legs looks so much deeper than one does not at first recognize its specific identity with the ordinary stripped example.

The eyes of Euphausians are very liable to lose their characteristic shape in the net, and the bilobate condition of the eye in *Thysanoessa* and allied genera is less marked in the young than in the adult, while the gills and other characters of the thoracic appendages are, even when they escape net retention, not too tangible in material of small size. Consequently, small, more or less bare, bunches of *Thysanoessa* or its allies (except *Stylocheiron*) often give more trouble in determination than is readily imagined.

We do not know anything about the breeding of *Thysanoessa*. Its close structural affinity suggests, but by no means proves, that the ova are carried in the same way as in *Stylocheiron*.

**Locality and distribution.** See p. 138.

*Thysanoessa gregaria*, G. O. Sars, 1885.

Some small examples of *Thysanoessa*, ranging in length from about 7 to about 9 mm., appear to be referable to this species, though exhibiting certain characters which do not exactly harmonize with Sars' diagnosis. The average length of adult females is stated to be 15 mm., males being smaller, and some, perhaps all, the peculiarities which we have noted, may well be youthful characters.

Some of the specimens are fairly perfect, and it must be understood that in characters which we do not mention below we have failed to detect any divergence from the type.

The segments of the pleon are described as quite smooth above. In our examples the fourth and fifth segments show a very slight depression in the dorsal contour at rather more than two-thirds of the distance from its anterior end, while the posterior part appears to be slightly keeled and very slightly acuminate (in some at the extremity). There is, also, in some, a trace of slight acumination at the extremity of the sixth segment. The epimers agree well enough with Sars' description, and, in the main, with his figure (Pl. XXI., fig. 8), but the postero-ventral corners are not produced into sharply defined angles, as in the figure referred to.

* Especially in *T. neglecta*.

The pleopods have the basal joint somewhat wider, and with a more convex anterior outline than is shown in Sars' figure, but this may be simply a difference in the point of view, since the pleopods are often seen in a somewhat oblique position.

The proenal spine is about as large as in the type, but has either only a few very coarse denticulations or none at all. This is certainly a character which varies with the size of the specimen, although the degree of denticulation is not found to correspond exactly with the total length. Sars has shown that the spine makes its first appearance in *Euphausia pelagicus* as a simple structure, and we have observed it still undivided in specimens of all sizes.

Judging by Sars' figures (Pl. XII., fig. 9, and Pl. XXII., fig. 26) the dorsal denticles of the telson would appear to vary in position. In the examples which we have examined, these denticles agree closely with the first-named figure, but some show an intermediate condition.

**Locality and distribution.** See p. 139.

**GENUS STYLOCHEIRON, G. O. Sars, 1885.**

**Stylocheiron longicornis, G. O. Sars, 1885.**

*S. longicornis*, Sars.—1885.

*S. mastigophorum*, Chun.—1888.

**Stylocheiron longicornis**, Ortmann.—1893.

We believe that Sars and Chun based their respective diagnoses on material which is not really capable of specific distinction; but if Chun's view of the matter be upheld on the examination of specimens from the whole area of distribution of the species designated by Sars and Ortmann as *S. longicornis*, our examples must be named *S. mastigophorum*, since they agree more closely with Chun's description than with Sars'.

Sars' type is mounted in Canada balsam, and has only one chele, which happens to be set on edge. It is therefore not of very much value for settling the question, but in the opinion of one of us, who has examined it, our specimens are referable to the same species.

We must, however, call attention to a feature which appears to have escaped the attention of either observer, viz., the variability of the antennal peduncle, both in relative length and in the number and relative length of its articulations. The peduncle is always more than twice the length of the carapace, from tip of rostrum to hindmost lateral margin, measured between vertices, but, consistent to this extent, its length varies not inconsiderably. The number of joints in the Euphausian antennal peduncle is typically three, and this number we find to be constant in *S. longicornis* in so far as regards the articulations which are conspicuous by reason of the inflation of the apomed extremities of the segments, and which we may here term the main articulations. There are, however, in many of our specimens, subsidiary articulations, not accompanied by any disturbance of the contour of the peduncle, but still apparently perfect and not due to accident, which may raise the number of joints to as many as six. The length of the joints defined by main articulations varies by variety of position of their articulation. In most of our specimens the distal main articulation is distal to the extremity of the antennal scale, as in the diagnoses and figures of Sars and Chun. In others it is shown that the proximal chele, a phenomenon which led us to suppose that we were dealing with two species until we chanced upon a specimen (a female of adult size) in which the peduncle of one side was in this respect typical, while that of the other side had the second main articulation short of the extremity of the scale. The variation is, therefore, obviously of no taxonomic importance. It is not correlated with any variation of
other structural features, nor is it, in any of the cases we have noted above, associated with sex or with growth after the attainment of the adult condition.

The maximum length of the species as represented in the collections before us barely attains, between the tip of the rostrum and the extremity of the caudal fin, 10 mm. Males appear to mature at 7 mm. The smallest ovigerous female which we have seen measures 6 mm. The ova were carried exactly as in Sars' figure of S. castaneum, agglutinated in a thin envelope of a gelatinous nature, attached to the ventrum between the sixth and seventh pair of thoracic limbs, and projecting forward between the preceding pairs. They readily escape from their investment. The few clutches which we have seen varied in number (as evidenced by both full and empty spaces in the envelope) from about 10 to about 14, and were in an early stage of development in July, 1890, in the Bay of Biscay. No ovigerous females were taken by the Oceanica in November, 1898, off the S.W. of Ireland, nor by the Helga at any season of the years 1901 to 1903 within fifty miles of the S.W. and W. coasts, within which limit, as will be apparent, the species is not abundant.

With the larvae we intend to deal fully in a future report, but it may be remarked that they were the earliest recognisable stage upwards, both in July and November, while the collections of adult forms in both months include a series of sizes which is sufficiently continuous to make it difficult to form any idea of the seasonal life-history of the species. The fact that the largest specimens occur in the July collections may be of significance in this respect, but may be equally explicable on the ground that the July hauls in the Bay of Biscay were nearer to the centre of distribution than those taken farther north in other months.

The following measurements, in millimetres, of adult specimens may be useful:

No. 2 is one of the largest specimens in our collection; No. 3 is an ovigerous female. We could find no specimen perfect in all respects:—

**Measurements.**

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length from tip of rostrum to tail, mm.</td>
<td>8-25</td>
<td>10-4</td>
<td>8-00</td>
</tr>
<tr>
<td>Carapace length, mm.</td>
<td>25</td>
<td>33</td>
<td>34</td>
</tr>
<tr>
<td>Length of pleon, excluding telson, mm.</td>
<td>41</td>
<td>59</td>
<td>40</td>
</tr>
<tr>
<td>Telson, mm.</td>
<td>35</td>
<td>35</td>
<td>34</td>
</tr>
<tr>
<td>Last segment of pleon, mm.</td>
<td>1-65</td>
<td>2-2</td>
<td>1-52</td>
</tr>
<tr>
<td>Eye, mm.</td>
<td>1-9</td>
<td>1-2</td>
<td>0-9</td>
</tr>
<tr>
<td>Peduncle of antennule, mm.</td>
<td>2-75</td>
<td>2-85</td>
<td>2-8</td>
</tr>
<tr>
<td>Antennal scale, mm.</td>
<td>2-1</td>
<td>2-5</td>
<td>2-2</td>
</tr>
<tr>
<td>Chelate limb, mm.</td>
<td>7-15</td>
<td>9-3</td>
<td>—</td>
</tr>
<tr>
<td>Antenns (complete), mm.</td>
<td>—</td>
<td>—</td>
<td>12-1</td>
</tr>
</tbody>
</table>

Locality and distribution, see p. 140.

**Stylocheiron chelifor,** Chun, 1888.


Sars regarded his species as of small size, basing it on several individuals not exceeding 8 mm. in length, of which he observes that they "would seem to be females." Such a statement does not seem to preclude the possibility of their having been immature members of either sex. Ortmann records under Sars' specific name material obtained by the Plankton Expedition, and as he makes no comment as to size, it may be taken to have consisted of equally small specimens. Chun also records the capture of S. abbreviatum, but we nowhere find a record of undoubted mature examples of that species, nor an explicit statement that its representatives have been compared with S. chelifor of the same size.

It appears to us, as we have observed, that S. abbreviatum is only the young (possibly of a local variety not entitled to specific rank) of the species of which the adult is S. chelifor, and that Sars, by the paucity and bad preservation of his material, has been betrayed into an inadequacy of description quite foreign to his wont.

In the collections which we have examined occur a number of examples which are certainly S. chelifor, but which, in the absence of Chun's observations, we should have referred, with some remark, to S. abbreviatum, and we hesitate to affirm the identity of the two species only because our series happens to be defective in the sizes comparable to Sars' types of S. abbreviatum.

Chun, in his descriptions of S. chelifor, which he regards as attaining a length of 14 mm. (some of ours reach 20 mm.), mentions the characters in which it differs from S. abbreviatum. He appears, however, to lay chief stress on the characters of the chelate limbs, and, in part, these distinctions appear to us to be probably not unsuscceptible of explanation in terms of growth. We do not understand that he has had the opportunity of comparing a S. chelifor of, say, 8 mm, with a supposed adult S. abbreviatum of the same size.

Our material is sufficient in larvae and in adults, but the intermediate stages are not represented by perfect specimens. The proportions of the chelate limbs cannot therefore be given throughout the life-history, but we are able to show that the different parts of these limbs undergo considerable developmental modification of proportion.

<table>
<thead>
<tr>
<th></th>
<th>Larval S. chelifor, 6-3 mm.</th>
<th>S. abbreviatum from Sars' figure</th>
<th>Adult S. chelifor, 20 mm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merus of Thigh</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Chela</td>
<td>64-15</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>Corpus</td>
<td>62-7</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>Medio-dorsal length of Carapace</td>
<td>70-4</td>
<td>80-1</td>
<td>60</td>
</tr>
<tr>
<td>Sixth segment of Pleon</td>
<td>50-6</td>
<td>47-3</td>
<td>27</td>
</tr>
</tbody>
</table>

The larva mentioned above has the antennal scale still short, and a large spine on the antennal peduncle, while the last segment of the pleon is, as appears from the table, very elongate. In other respects it has the adult form, and the chela only differs from that of the adult in that the third secondary spine of the dactylus is very minute. It is evident that the length of the Corpus as compared with the merus is variable with the size of its possessor; and, as the proportions which we have given for S. abbreviatum depend for their accuracy on that of the figure, it is not possible to be certain that the young S. chelifor may not pass through a stage practically identical, in regard to proportions of segments of chelate limb, with S. abbreviatum. The absence, from Sars' specimen, of the third, presumably still minute, secondary spine of the dactylus is not a feature to which we should have been disposed to attach specific importance; the slender tertiary spine near the base of the dactylus in large S. chelifor was not present in the larva.
We subjoin a table, in which the total length of the example is made the unit of comparison:

<table>
<thead>
<tr>
<th></th>
<th>G. chelifer, 5-5 mm.</th>
<th>G. chelifer, 8 mm.</th>
<th>G. abbreviatum, these figures.</th>
<th>G. chelifer, 10-6 mm.</th>
<th>G. chelifer, 20 mm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Merus or Tibia</td>
<td>42-7</td>
<td>Wanting</td>
<td>33</td>
<td>Wanting</td>
<td>48-2</td>
</tr>
<tr>
<td>Carpus</td>
<td>29-6</td>
<td></td>
<td>19-6</td>
<td></td>
<td>32-5</td>
</tr>
<tr>
<td>Chela</td>
<td>27-4</td>
<td></td>
<td>21-4</td>
<td></td>
<td>29-7</td>
</tr>
<tr>
<td>Medio-dorsal length of Carapace</td>
<td>32-2</td>
<td>25-8</td>
<td>37-7</td>
<td>29-2</td>
<td>32-5</td>
</tr>
<tr>
<td>Sixth segment of Pleon</td>
<td>21-2</td>
<td>19-0</td>
<td>10-1</td>
<td>13-5</td>
<td>11-9</td>
</tr>
</tbody>
</table>

On the difficulty of relevant interpolation of measurements taken from a figure among others taken direct from specimens we have already remarked, it appears that between our G. chelifer of 8 mm. and Sars' G. abbreviatum of the same size there is no great difference in the proportions of the parts which can be compared. We have, however, so much reason to respect Sars' diagnoses and figures that we prefer to leave it to him to associate G. chelifer with G. abbreviatum, if such association prove necessary.

The type of G. abbreviatum, which one of us has examined, does not help much, as it has lost its chelate limbs. The slight deflection of the tip of the rostrum, noted by Chun as differing from the slightly upturned condition of that process in large G. chelifer, is in any case a feature of little moment. In the only other Challenger specimen in the British Museum the deflection of the rostrum is obviously the result of accident, and may be so also in the type.

Locality and distribution, see p. 141.

GENUS Nematobrachion, Calman.

Nematobrachion boëpis (Calman), 1896.

Dr. Calman has kindly dealt with our material in a separate paper, which will be found at page 153 of this Report.

Locality and distribution, see p. 140.

SUB-FAM. NOV. BENTHEUPHAUSINAE.

None of the legs much longer than their immediate neighbours. Palps of the maxillae three-jointed.

GENUS Benthoeuphausia, G. O. Sars, 1885.

Benthoeuphausia sp.?

Dr. Fowler's solitary specimen was taken in a haul of the vertical net between 1,250 fathoms and surface. Unfortunately the messenger, which ought to have closed the net at 500 fath, did not realise its responsibilities, and, as the net was hove thence to the surface as fast as the steamwinch would turn, the contents suffered a good deal. A big Eucopis, the only other Schizopoda taken, reached our hands in fragments of a few millimetres long, and the Benthoeuphausia is a mere hull, without carapace and without appendages, except eyes, part of antennules, and caudal fan.

The thing measures 8 mm. from eye to tip of rostrum, and is clearly a Benthoeuphausia; or, if not, belongs to some closely-allied genus hitherto undescribed.

The characters which remain are not exactly in harmony with those of B. amblyops, the only known species. In the letter—described, so it remarked, from large specimens, the largest 48 mm.—the part of the outer rostral spine appears to be between a fourth and a fifth of the proximal part. In our specimen the apical part is relatively much shorter. What is left of the antennular peduncle agrees well enough with B. amblyops, but the eyes seem to be much more pyriform.

In B. amblyops they are narrow, somewhat mediately constricted, with a small prominence internal to the visual portion. In our example the prominence and the visual part call for no comment, but the whole appendage, in its present condition, is pyriform, almost globular. It is, however, quite flaccid, and its difference in form from that of B. amblyops may perhaps be due merely to mummification.

Even supposing that the differences noted in the several parts are due neither to degree of development nor to imperfect preservation, it is obviously impossible to found a new species on so fragmentary a specimen.

B. amblyops, including Willemsen's material, supposed by Sars to be referable to the same species, is known from the tropical and N. and S. Atlantic and from S. of Australia at depths of 1,000 to 1,800 fathoms, but the specimens may have been obtained during the ascent of the nets through the higher strata. The question of distribution does not therefore affect the possibility of referring Fowler's example to the same species, which, while the above notes were in press, has been recorded on the authority of Sars, from a collection made in the Bay of Biscay (Richard, 1904).

Locality, see p. 141.

DIVISION.—PERACARIDA.—Calman, 1904.

ORDER MYSIDACEA.

FAM. LOPHOGASTRIDAE.

GENUS Gnathophausia, Willemsen Sub n., 1875.

Section 4 nov., cf. Sections 1-3, Sars, 1885.

Infro-posterior corners of carapace produced into a spine. Dorsal keel interrupted anteriorly. Supra-orbital spine small. Antennal scale not jointed at apex. First thoracic legs with distinctly developed exopodites. Epimeral plates of last segment not united on the ventral face.

Gnathophausia drenaphora,* sp. n.

Pt. XVIII.

Form of body slender. Carapace not very large; dorsal spine about as long as first segment of pleon; infra-posterior corners produced into a spine, bluntly serrulate on ventral edge, nearly reaching fourth segment of pleon; upper lateral keel present; dorsal keel unarmed; cervical sulcus rather distinct; rostrum elongate and slender, as long as the carapace without the infra-posterior spines, distinctly denticulate on all three edges; supra-orbital and antennal spines well-defined, but small. Branchiostegal projections of moderate proportions, but distinctly pointed.

* In allusion to the scythe-like infra-posterior processes of the carapace.
Anterior segments of pleon without dorsal spines; epimeral plates produced posteriorly into pointed lappets. Eyes very narrow, cornae scarcely at all expanded, pigment (as preserved in formol) rather pale brown. Outer flagellum of antennule in male expanded and flattened at the base, which is bent on the inner side with a brush-like fringe of fine curling setae. Antennal scale of moderate size, about four times as long as broad, tapering distally and very obliquely truncate; inner angle produced into a sharp point, outer edge with (about) three denticulations distally. Telson large and massive, with the terminal spine crescent-shaped and denticulate along the upper face; lateral margins armed for the usual distance with large spines, separated from each other by intervals occupied by a few smaller spines. Uropoda shorter than telson; the proximal joint of outer uropod terminating externally in spine about one-fourth as long as the distal joint. Colouration red. Length 59 mm.

_Gnathophonia drepaneophora_—Carapace.

As appears from Sars’ _Challenger_ monograph, some of the members of this genus reach a size which, relatively to the rest of the Schizopoda, may be considered enormous. Thus _Gn. ingens_, Dohrn, is known to attain a length of 157 mm., only an inconsiderable fraction being contributed by the rostrum.

Absolutely nothing seems to be known of the category of the genus, so that it is impossible to tell at what size the full development of the adult to exercise caution in founding a species on an example which, from its aspect, we do not see what other course is open to us. The species _Gn. gracilis_ has been found by Willemoes Suhr and endorsed by Sars on the evidence of a single specimen. It is described as dark, _Gn. drepaneophora_ would appear to differ from its congeners, the visual sense being perhaps imperfectly developed. We have already alluded to the structure of the basal portion of the outer flagellum of the antennule (Fig. 2). The whole flagellum is at present 22 mm. in length, and must have been a good deal longer. The inner flagellum is somewhat longer than the rostrum.

The antennal scale (Fig. 3) approaches that of _Gn. gigas_, from which, however, it differs in its narrower and more acuminate outline and in the smaller number of the denticulations of the outer edge. The flagellum is about as long as the inner flagellum of the antennule. Of the oral parts we can only say that the epipodite of the first thoracic leg is well developed, and that the pigmented protubersance of the second maxilla is conspicuous.

are not jointed, and the epimeral plates of the last segment of the pleon are not confluent.

_Description._—The single specimen, 59 mm. in length, has no incutaneous lamellae. In the example of _Gn. gracilis_ of 51 mm., Sars considered the absence of such a lamella to be an indication of the male sex. The specimen on which our species is founded presents, as we think, a more certain proof of its sex. The outer flagellum of the antennule is most distinctly expanded and flattened for about 3 mm. of its basal part, and is bent inwardly in this region with a dense fringe of fine curling setae, but is not separated by any well-defined articulation from the distal part. In the genus _Stylochelaron_ the flagellum in the male exhibits a well-defined basisegment, expanded and flattened, internally with a frill, and toes, no approach to this condition being observable in the female. It appears to us that the condition observed in our _Gn. drepaneophora_ is of similar sexual significance. Sars appears to have detected no important secondary sexual characters in the species which he describes.

The form of the body (Fig. 1) is as slender as in _Gn. gracilis_. The carapace is, in comparison with some members of the genus, rather small, and does not completely cover the last segment of the thorax. Posteriorly it is not unlike that of _Gn. colorata_, but the dorsal spine is more upturned and the inforo-posterior corners are more produced and terminate in longer spines. The latter are only bluntly serrulate on the lower edge. Both lateral keels are well marked, the lower one being closely approximated to the ventral border. The rostrum does not differ materially, in length, shape or armature from that of _Gn. gracilis_. It is a character which appears to us to be likely to undergo modification as growth proceeds, even after the assumption of sexual maturity, so that larger examples (if such exist) of the species may prove to exhibit relatively shorter rostra. The supra-antennal and antennal spines are small; the branchiostegal projections, though only of moderate extent, are most distinctly acuminate, but the margins of all these processes are entire. In considering the possibility of the attainment by our example of the character of _Gn. colorata_, in which the processes referred to are much more developed, it is of interest to note that in _Gn. gracilis_, which is hardly larger than _Gn. drepaneophora_, the spines are already extremely well pronounced (cf. Sars, loc. cit., Figs. IV. and VII). The two anterior segments of the pleon are very slightly keeled on the dorsum, and also transversely sulcate, the contour being somewhat irregular. The hinder edges of these segments, and, to a less degree, of the third and fourth, are somewhat upturned. The epimeres exhibit only a posterior lappet expanded into a well-defined point except in the anterior part of the last segment, where the lappet is reduced to a denticle. It appears to us to be within the bounds of possibility that the confluence and backward growth of the epimeral plates of this segment, as exemplified in the large individuals of Sars’ Section 1, may be a feature of late growth, but of this there is no sort of evidence. In our example the denticules are widely separate.

The eyes are very small and narrow, the ocular papilla occurring as a small spine rather near the distal extremity. In general form they appear similar to those of _Gn. colorata_, and, probably, of _Gn. gracilis_ also. In respect of the pigment, which is brown and can hardly be described as dark, _Gn. drepaneophora_ would appear to differ from its congeners, the visual sense being perhaps imperfectly developed.
The legs appear to us to be relatively somewhat slender as compared with other species. The telson agrees very closely with that of Gn. calcarata. It is about equal in length to the sum of the three preceding segments of the pleon. The lateral margins are evenly arched, and armed, as in Gn. calcarata, with large spines separated by intervals of smaller spines. In Gn. calcarata the smaller spines are represented by Sars as more numerous, but we have found in similarly armed Schizopoda (e.g., Stylodora) that such a difference is not of specific constancy. The occurrence of Gn. drapertophora (the distal ends of the outer uropods) about twice as large as any other, may be a feature of specific moment, though our experience of other forms is limited. The apical crescent appears to us to be exactly similar to that of Gn. calcarata.

The outer uropod is characterized by the great development of the spine being about one-fourth as long as the terminal joint. In Gn. calcarata it is only about one-sixth of the dimension which we have used for comparison. The spine is quite conspicuous in Gn. gracilis at 41 mm. The outer margin of the appendage is more inflated than in Gn. calcarata.

The colour, after preservation in a weak solution of formalin for twelve months, is pinkish, the setae, keels of the carapace, and margins of the integument generally being red. **Locality**, see p. 142.

**Fam. Mysidae.**

**Sub-fam. Leptomysinae**, Norman, 1892. It is reasonable to infer that Norman considered the presence of an antennal scale to be a character of this sub-family. It serves to separate it from the Arocraniomysinae.

**Genus Meteorithops**, S. I. Smith, 1879.

**Parathyrops (para.)**, G. O. Sars, 1879.

The genus Meteorithops was instituted in 1879 by Smith for the reception of a species, M. robusta, found by him off the coast of N. America. Erethrops and Parathyrops, agreeing with the former in the pleopods of antennae, and oral parts. The telson also approaches that of Parathyrops very closely. Sars, however, has included M. robusta, the type species of the genus, in his own genus Meteorithops without, to our knowledge, in any way modifying his original diagnosis of that genus, which would exclude us from the male of Meteorithops. In view of the present additions to the Erethrops group, it appears to pair in the male are as in Erethrops, reserving for Parathyrops those forms which the first pleopods of both sexes vestigial.

**Meteorithops picta**, sp. n.

Pl. XIX, figs. 5-7, and Pl. XXV., figs. 8-9.

Form moderately stout. Carapace not much wider than pleon, rostral region obtusely arched, posterior margin rather deeply emarginate. Colour palo golden brown. **Antennal peduncle with**

The last joint (in immature male) as long as the two preceding; male appendage present (small and with but few setae in the type specimen). **Antennal peduncle** as in M. robusta. **Antennal scale** about four times as long as broad, exceeding by about one-third of its length the extremity of the antennal peduncle; external margin slightly curved, its distal half coarsely dentate, with about four teeth rather widely separated; terminal spine of moderate size; apex obtuse, rounded, extended, exopodite, and endopodite, slightly beyond the terminal spine. Setae strong. **Endopodite of second thoracic limb** somewhat shorter, proportionally, than in M. robusta; merus slightly longer than carpus, and bearing only a few setae on its inner edge; carpus moderately long, propodus and dactylus densely setose, the setae serrated and jointed. **Exopodite of second thoracic limb** shorter than endopodite; tooth of the outer distal angle of basal joint very minute and almost obsolete; flagelliform part composed of ten joints, as also in succeeding limbs. **Endopodites of antennal limbs** with tarsus of three joints, and distinct dactylus; tarsus shorter than the proximal joints taken together and barely longer than merus. Pleon slightly longer than carapace; sixth segment about twice as long as fifth. Telson about as long as sixth segment of pleon; twice as long as wide at base; half as long as outer uropod; triangular, apex narrowly truncate, armed with a median pair of setae and two pairs of spines, of which the inner are about twice as long as the outer, and more than one-third as long as the telson. Inner uropods about one and a half as long as telson, no spines on the under side. **Outer uropods** about twice as long as the telson. **Colouration** after preservation—eyes pale golden yellow, general colour of trunk pale brownish yellow, with patches of deep brown in the region of the stomach, and on the posterior part of the thorax. **Length of immature male** 11 mm.

The species is easily distinguished from its allies by the characters of the antennal scale. Our solitary example is an immature male, and it may be inferred that, though probably smaller than M. robusta, the full size is greater than that attained by other Leptomysinae genera. **Locality**, see p. 143.

**Genus Katerythrops**, n.

Characters of the pleopods in the adult male uncertain, pleopods of the female unknown. Other characters as in Meteorithops, S. I. Smith (vide supra), except—

**Antennal scale** considerably reduced in length in proportion to peduncle. Carapace and antennae and antennal and rostrum and narrow and fade, its outer margin naked, entire, terminating in a small spine, setae few, confined to the apex and distal third (approximately) of the inner margin. Telson possibly without the median setae.

The type of the species upon which we found this genus is a young male in which the pleopods are not sufficiently developed to reveal the adult condition. Their condition, however, as will appear, points to the probable identity of the genus in respect with Meteorithops. The exopodite and endopodite of the thoracic limbs are larger than in the bottom-hunting genera of the family—Erethrops, Parathyrops, Meteorithops, &c., and—approach the condition found in the pelagic Euchactomorpha.

**Katerythrops Oceanae**, g. et sp. n.

Pl. XX.

Form robust. Carapace much wider than the pleon, almost entirely covering the thoracic segments, anterior margin obtusely rounded, cephalic region inflated and posteriorly defined by a well-marked cervical sulcus. Pleon with the last segment almost as long as the two preceding segments taken together. Eyes small, remote from each other, sub-pyriform, the proximal part the broader, visual area restricted to less than *the first eye* when, as in the original diagnosis of the genus, the first thoracic limb is turned a maxilliped.
forms. Fig. 3 shows so much of the appendage from a slightly oblique dorsal view as may be seen without removing the eye.*

As far as their characters are distinguishable in situ, the oral parts offer no peculiarities likely to be useful in determination.

The same remark applies to the legs, of which only the four anterior pairs remain. The natatory exopods are more strongly developed than in Metaerythrops, the spine of the species of Parerythrops, as originally defined by Sars, and in the present specimen, the posterior pair of setae, as shown in Fig. 1, approximately in their present position, but their extremities are actually directed somewhat more upwardly and inwardly.

The genital appendages are short and somewhat tapering. Their extremities, which appear devoid of setae, are being forwardly and inwardly directed between the bases of the last pair of legs.

The pleopods appear to be in a very immature condition, but suffice to show that the specimen cannot be assigned to the genus Parerythrops, as originally defined by Sars. Until the species has been examined it is impossible to affirm that we are right in regarding them as like those of Metaerythrops. Each pleopod consists of a short basal joint, giving rise to two processes, (i) an endopodite, devoid of articulations, but furnished near the base with a short lateral process, each extremity bearing a few setae; (ii) an exopodite in the form of a short digitiform process, devoid of setae.

In the anterior pair the endopodite and exopodite are subequal in length. In the remaining pairs the endopodite is the longer, being, in the fifth pair, more than twice as long as the exopodite (Fig. 2). In adult males of allied forms the endopodite and exopodite are subequal in length, or, in the first pair in Metaerythrops and Erythrops, the exopodite is much the longer. The material examined in this group throws no light on the development of the pleopods, but in a series of young males of Sirilla Couesi, a form in which the pleopods are approximately identical in structure as those of Metaerythrops Erythrops, we find that the endopodite is much more precocious and is bimoult and setiferous at the extremities at a period when the exopodite is still devoid of setae. The endopodite is also the longer in early stages, though we have observed no such differentiation in that part as is exhibited in the fifth pair of the form under consideration.

The developing endopodite in the former is more pointed at the extremity than in K. Oceanae, but in other respects the conditions are so similar that it appears safe to regard our example as immature.

The telson is much shorter than in Metaerythrops. Its lateral margins are nearly straight (Fig. 6). The inner pair of spines are about one-fifth as long as the telson, and are longer and much stouter than the outer pair, of which one is missing in our largest example. Under the high power of the microscope we can detect no trace of a median pair of setae, such as occurs in Metaerythrops and in Parerythrops. Its absence may possibly be due to imperfect development, or to damage.

The inner uropods are not much shorter than the outer. No spines are visible on the ventral surface near the inner margin, but may occur at a more advanced stage, as the stimulation of this region has been observed to vary in other forms with the degree of development.

The lateral parts of the carapace are closely speckled with small dark chromatophores, a median line of which also occurs on the telson. Pigment, except in the eye, is not distinctly visible in any other part, but the gastric region appears dark in colour.

**Locality.** See p. 143.

Genus Hypererythrops, n.

Characters of the distal parts of the endopodites of the third to eighth thoracic limbs, and pigment, unknown. Other characters as in Erythrops. G. O. Sars, except—

Telson well developed, not unusually short; lateral margins armed with spines; apex broadly truncate, armed with a median pair of setae and about three pairs of spines.

All the thoracic and some of the abdominal segments in the males armed with median ventral processes.

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*Ortmann's key to the genera of Myctophoidea, cit. op. cit. p. 96-90, requires some verbal modification in order to accommodate the present species with its nearest allies since the antennal scale is apparently no longer than that of Anchiasis patulus (cf. Sars, 1895).
Hypererythrops serriventris, g. et sp. n.

P1. XXIII and P1. XXIV., fig. 4.

Form moderately stout. Carapace wider in the thorax than in the cephalic region; anteriorly produced and rounded, but not forming a distinct median linguiform process; produced beneath the eyes into acute angles. Labrums with a well-developed blade-like process; a small spinous process immediately in front of it. Eyes rather large, set close together, the anterior and posterior margins of their peduncles not noticeably differing in length; colour orange-brown after preservation. Antennal peduncle with the basal joint as long as the two remaining, its outer or four setae; middle joint much the shortest, its tip bearing a bunch of setae. Antennal scale about three times as long as broad, outer margin entire, terminating in a strong spine, the extremity of which is obliquely truncate, about one-third of the length of the scale being beyond the extremity of the spine; extremity of scale at about the level of that of jointed, first joint small, second longer than third and unusually broad, tipped with a fine seta as long as itself. First and second Maxillae generally, exopod with a small spine at its distal angle, flagelliform part with nine stouter than its proximal portion. Three; second and succeeding thoracic limbs with flagelliform parts of ten joints. Distal parts of first two joints directed obliquely inwards, forming the bases of the first two pairs of thoracic legs; Venter, in the male only, armed between each and each of the stouter in a stout spine, its posterior or inferior edge bossed, except of pereops with two simple spineless processes. Pleon distinctly narrower than carapace, the sixth segment generally as long as the second preceding it to fifth of the male having the lateral lobe of the inner ramus produced about one-third of the length of the whole ramus. Telson more than half rounded at the apex, armed with a median pair of setae and one lateral margin armed on about the distal three-fourths with a series of the posterior spine incised and occupying the angle of the apex. Inner margins armed. 

Length of adult males and females, 10 mm.

Our material consists of males and females, all of which are either very alike in the distinctions which may exist between young and old individuals. The peduncles of the antennules have the sexual differences which are characteristic of the genus, and the mouth-parts are of the same type as in Hypererythrorns, and has the lateral margins armed with spines. The peculiar median ventral processes, found, among adults, in the male only, appear worthy to figure in the generic diagnosis. Their function might be more obvious if we had any means of knowing the characters of the thoracic legs, but only one specimen in our material possessed even the two anterior legs, and these are not very different from those of Erythrorns.

The thoracic median ventral processes (see fig. 8) are all much alike in size and shape. They do not project, ventrally, below the bases of the endopodites of the limbs, but their extremities pass in front of the limbs between which they arise. The terminal spines are comparatively large and stout, and those of the inferior or posterior edge, which in part set in more than one row, are stout though very short. Among Mystedum being wholly stripped of spines, though their facets of attachment are clearly visible.

The abdominal median processes are simple, laterally compressed and small in the fourth and third segments of the pleon. In posterior segments they may be traced as papillae, which we have not thought worthy of note in the specific diagnosis.

Sars has figured, in an immature female ascribed to Erythrorns serrata, a series of apparently homologous structures between the thoracic limbs. They are narrow and elongated, globular processes set with radiating spines. The author does not mention them in his discussion of the genus, and we have not been able to find them in a fairly large collection of immature and mature Irish E. serrata. The phenomenon is not likely to be of a pathogenic character, and we hazard the suggestion, with the respect due to Sars, that the example in which they were found may belong to some species very closely related to E. serrata, but otherwise unknown.

Structures apparently homologous with those which, in Hypererythrorns, we term epipodites, are shown by Sars in the same figure, but they are depicted as simple proliferations of the base of the limb rather than as digitiform globular processes, as such are shown in our fig. 8. Epipodites are found in even better-developed in the Brachyura, such as Porcellana. The character of the second to fifth pleopods of the male H. serriventris (as given in the typical Hypererythrorns pleopod, the condition of the digitiform lobe of the endopodite, with a distinct rounded termination) of one of the last segments, of a sub-peduncular generic value of such a departure from the condition of the known Erythrorns, as yet safe from the zoological pillory.

Locality, see p. 144.

Genus Dactylerythrorns, n.

Characters, as far as they can be diagnosed in the absence of the thoracic limbs, generally as in Melerythrorns, S. T. Smith, except——

Eyes small, with distal processes, visual elements imperfectly developed, spines on either side of a pair of setae; lateral margins armed with a few

Dactylerythrorns dactylopus, g. et sp. n.

Pl. XXII.

Form robust. Carapace of nearly even width throughout, anteriorly gibbose, anterior margin obtusely rounded, posterior margin somewhat to the anterior margin of the head by a wide membranous integument; visual elements in the form of six to eight plates set in mosaic about a central pyriform body; distal extremities formed in processes about as long as the visual parts. Antennular peduncle with the distal joint much the longer; much more robust in the male than in
the female. Male appendage very bristle. Antennal scale about three and a half times as long as broad; outer margin slightly curved, terminating in a spine of moderate size; apex rather obtusely rounded, produced considerably beyond the spine of outer margin, reaching or slightly exceeding the level of the distal extremity of antennal peduncle. Basal joint of antenna wide and massive, distal joint of peduncle of flagellum nearly twice as large as the former, the longer, reaching to about the distal third of antennal scale. Mouth organs (as far as can be made out in the absence of dissection) as usual for Meterrytrops. Thoracic limbs (of which the endopodites are all wanting) with the flagellate parts of the exopodites nine-jointed; male appendages well-developed, but of moderate length; female with two pairs of incubatory lamellae. Pleon with the first five segments sub-equal, the sixth about one and a half times as long as the fifth. First pleopods in the male with the inner rami bifurcating into two narrow sub-equal processes, without any conspicuous basal enlargement. Tail-fan triangular, about as long as the sixth segment of pleon, apex narrowly truncate, inner spinous processes three or more times as long as the outer and about equal in size. Lateral margins entire, except distally, where there are about three small spines on either side. Outer uropods with the exopodite somewhat truncate. Inner uropods but little shorter than the outer, armed internally with a single spine near the posterior end of the uropod. Colouration not noted when the specimens were taken. One retains a crimson spot on the cephalic part of the carapace. Length of mature male and female 9 mm.

The characters of the eyes and telson serve to readily distinguish this species from its nearest allies (Meterrytrops, etc.), and it is evidently quite inconsiderable.

The appearance of the ocular processes suggests a tactile function, since eye, though, according to the position of the useful purpose they could serve. It is possible that they are only spinous other organs. As far as can be judged from optical sections, one can be of little value for visual purposes, while the fold of integument which immobile.

The species is known from three examples—one taken in a tow-net of the trawl at 385 fath, and two, in a tow-net in the back much time on the bottom, and the tow-net on the trawl was of course that no specimens were found. It is on the trawl at 190 fath, which got filled with sand and While obviously differing in form from Euchaeotoma, Decostyrtrophs, and equally resembles Meterrytrops, which is only known as pelagic, Locality, see p. 143.

**Genus Euchaeotoma,** G. O. Sars.

**Euchaeotoma Fowleri, sp. n.**

Pl. XXIV., Figs. 1–5.

Form slender. Integument thin and diaphanous. Carapace with the anterior margin forming a very obtuse angle in the rostral region, its apex considerably posterior to the origin of the peduncles of the eyes; its posterior margin not deeply emarginate. Eyes large, closely apposed, sub-rectangular and slightly bilobate, their functional facets confined to an anterior part, with long retinal elements, and a postero-lateral part with short retinal elements; these parts deeply pigmented, the pigment dark brown after preservation, the remainder of the eye being pale brown, with facets vestigial and probably functionless. Antennal peduncle about one and a half times as long as the eye, distal joint as long as the two preceding, male appendage densely setose in the adult; internal flagellum very long, the proximal joints remarkably setose. Antennal peduncle nearly as long as antennal peduncle, its last joint shorter than the preceding. Antennal scale slightly curved, about one-seventh of its length longer than the antennal peduncle; external margin entire, terminating in a very feeble spine; apex obliquely truncate, extending beyond the spine. Thoracic limbs in the male with well-developed exopodites, the basal part terminating in a minute spine; flagellum with eleven joints, and, in the last three pairs of limbs, of about fifteen-sixths of the length of the carapace. Pleon somewhat narrower than the carapace, with the first five segments sub-equal, the sixth considerably longer than the two preceding segments. Telson short, its lateral margins slightly emarginate and unarmed, with a slightly truncate, its exterior angles armed with two closely-set short slender spines; median seta not closely apposed, somewhat less distant from each other than from the angular spines. Outer uropods, including basal articulation, about once and a half times as long as the sixth segment of pleon; wider, with the apices obliquely truncate and barely at all allgraduated, and setae somewhat widely separate, about eleven on the outer margin. Inner uropods considerably shorter than outer; outermost very large, extending to or beyond the extremity of the telson; distal part narrow, the apex rounded; no spines on the inferior surface; no denticulations on the inner edge.

Length of adult male and female 9 mm.

**E. Fowleri** is very closely allied to *E. brunni*, described by Sars from the northwestern Pacific off Chil. It is, however, readily distinguishable by the following characters: (i) the eyes have no dark pigment except at the anterior and postero-lateral functional parts; (ii) the rostrum, if it can be so called, is much more obtuse in *E. Fowleri*; (iii) the telson has two distinct minute, spines at each angle, and the setae arise at a considerable distance from each other.

In both the specimens taken by Dr. Fowler the setae of the telson are represented only by prominence which mark their origin. The telson of one specimen (a female) is in bad condition and appears to have been shrivelled up, so that the nature of the angular spines cannot be deter-
mined. In the male the telson is in good condition, and at the left angle are seen two minute slender spines, which arise close to each other. The outer spine curves inward so that its distal part comes to lie in nearly the same vertical plane as the inner. Of the spines of the right angle only the outer remains, but the base of the inner is visible. The condition is quite different from that of P. tenius, in which there are signs to only a dentellation, but not a true spine, at each angle of the telson.

In the two specimens two thoracic limbs remain, the first and second. They are very slender, as compared with Erythrops, and have the carpus as long as the merus.

The exopods only of the remaining thoracic limbs of the male are present, and they are in every way normal in structure. The posterior thoracic limbs of the female specimen appear to be arrested in their development. The endopodite consists of two joints (including the small dactylus) very imperfectly defined. The penultimate joint, which corresponds to the future tarsus, is still unjointed. The tip of the dactylus is rounded and transparent. The flagellum of the exopod is likewise devoid of articulations, and the whole limb is devoid of setae.

Well-developed epipods, such as we describe for Eurygethys scriveneri, are present in this species as well. We are unable to say whether this condition of the development of the legs in the female is normal for this species or not, owing to the endopodite of the leg in the male having broken away. But it may be noticed that the female has well-developed incertatory lamellae, and the male, which is of exactly the same size, has the brush of setae on the antennules remarkably well-developed. Moreover, in all the exopodites of all the limbs are well-developed.

Beyond noting the shape, Sars devotes no special attention to the eyes-save that in the surficial parts of E. Foerleri, in which the absence of pigment from the non-functional parts of the facetted eye area enables the visual elements to be seen clearly in optical section. They do not appear to differ in any way as described by Chun (1895). Among known Mysids Euchaeta deformis is the observed. It occurs in several genera of Euphausiidae, and the Caridea, and in Phronima among amphipods. The wall of the epicranial plate is therefore of an apparently smooth, crustacean, and in such plates forms as the Sergestidae, Euphausia and immediate allies among Euphausiidae, Katerghyops (if truly pelagic) among Mysidae, and numerous pelagic genera of amphipods.

**Genus Parambylops, n.**

Characters generally as in Amblyops, G. O. Sars, except—in part including the eyes.

Carapace of moderate size, produced anteriorly in subtriangular form, outer angles rather acutely produced. Telson with the apex broadly truncate.

Amblyops has the carapace large (magnus). If sufficiently large to telson has the type species of the latter lacks the median seta, but this character is perhaps hardly worth mention in generic diagnosis.

But for the inconvenience of not present, not mention with Sars’ definition of Amblyops, that genus might be easily expanded to admit Parambylops. The margin of the carapace produced into a rostral hood. Its resemblance in this respect to the Calyptopis larva of an Euphausiine is suggestive, but there is little probability of phylogenetic kinship in the evolution of the two conditions. A development of protective armature in compensation for loss of sight is familiar enough, and the diversity of means by which the same end may be accomplished is well illustrated in closely allied forms. A comparison of Parambylops with Pseudomna. In both the front dorsal margin is provided with an edge of fine denticulations, but whereas in the former these are of the carapace, in the latter edges contributing nothing but a small spinous process not impossibly tactile rather than protective in function. In Pseudomna the denticulate edge is furnished by the eyes themselves, the median and united into a broad shield extending beyond the carapace, but not, in the known species, presenting any considerable pseudo-rostral proliferation.

**Parambylops rostrata, g. et sp. n.**

Pl. XXI.

Form moderately stout. Carapace wider than pleon, posteriorly emarginate, not covering the last thoracic segment; the whole of the antero-dorsal margin produced in subtriangular form and depressed, the sides flexed; the apex or rostrum longer in the female than in the male, reaching in a dorsal view to about the middle of the antennal scale in the latter, and to about the distal third of the scale in the former sex;* its edge finely denticulate except at the extremity. Eyes without visual elements, rather small, sub-fusiform, partly concealed by carapace, somewhat flattened, very minutely scaled or hispid anteriorly, produced distally into short spinous-like processes. Antennal peduncles with the first joint produced rather acutely at its outer distal corner, the tip of the process bearing a bunch of setae, middle joint small, last joint longer and stouter than the preceding, much longer and stouter in the male than in the female, furred in the male with an appendage of the usual form, but (in our material) devoid of the usual spines. Antennal scale four times as long as broad, outer margin terminating in a short stout spine, and other, often extended beyond the terminal spine. Labium produced into a blade-like process about as long as the rostral prolongation of the carapace. Mouth parts as in the genus Amblyops, except that the mandibular pair is not as setose. First thoracic legs as in Amblyops abbreviata. Second thoracic legs somewhat stouter and relatively shorter than in Amblyops abbreviata, with the merus a little longer than the carapace, the latter somewhat expanded distally; propodus small and densely setose, nail distinct, exopod with the basal joint produced at its outer distal angle into an acute spine, the flagelliform part of nine joints. The remaining thoracic legs long and slender, the merus, three-jointed, and terminated by a distinct nail; exopod with the remaining thoracic legs similar to that of the second leg. Pleon longer than the carapace, the first five segments sub-equal, the sixth about as long as the two preceding ones taken together, the inner ramus of the first pair short, non-articulate, nearly devoid of setae on the distal parts; inner ramus of all the pairs with a lateral basilar lamina. Telson very massive and strongly produced, as long as last segment of pleon, apex widely truncate, its brevity equal to a quarter of the length, armed with five pairs of spines, the median pair very small, the second and slightly longer than the second, the outer three pairs of spines long and stout, the median of the three pairs being slightly the longest. Lateral margins armed with about fourteen to sixteen short stout spines. Outer uropods about one-fourth longer than the first pair, armed with a single minute spine at the level of the posterior end of the oostegite. Length, about 10 mm.

Locality, see p. 144.
GENUS Pseudonema, G. O. Sars.

Pseudonema calloplura,* sp. n.

This new species having come to hand after our notes had gone to press, only a brief preliminary diagnosis can be given here, viz.:—

Form much as in P. rosacum, sublinear in dorsal view, generally compact. Carapace obliquely rounded in front, emarginate behind. Pleon longer than the carapace, with the last segment one and a half times as long as the preceding. Antennule with the usual setose appendages in the male. Antennal scale about five times as long as broad, extending for nearly half its length beyond the antennular peduncle; outer margin entire and terminated in a short spine, though not extending beyond the terminal spine of the outer margin. Eyes in normal form, of the genus, of two rectangular lamellae devoid of pigment, and with usual elements, antero-lateral and lateral edges with about twenty small teeth. Labrum produced in an acutely pointed process. First thoracic legs much as in P. rosacum, but the merus relatively shorter and the carpus rather longer. Second thoracic legs more slender than in P. rosacum, merus longer than carpus, propodus short, dactylus distinct, not so densely armed with setae as in P. rosacum. Pleopoda in normal structure. Telson about as long as the last segment of the pleon and a little shorter than the inner uropods, apex rounded and armed with three pairs of long strong spines, each spine being itself 'feathered' with short setae; lateral edges of the telson of their length. The median setae usually present at the apex of the telson in species of Pseudonema are wanting in this species. Outer uropod longer than the telson. Length 10 mm.

Weber of preserved specimens white with a rosy red patch on the carapace behind the eyes.

Locality, see p. 145.

This Pseudonema differs from all the other species of the genus, except the type, P. rosacum (Olshausen, 1892) and P. parrani (van Houten, 1898), in the absence of median setae and by the plumose character of the telson. The telson is distinguished by the spines on the distal part of the terminal spine of the telson. The terminal spines of P. rosacum have a median spine, but the terminal spines of the Greenland form from 193 fathoms, and is only known from Van Houten's Specimen. It is a very brief diagnosis of the characters of the antennal scale and telson. Pseudonema Kempf,† sp. n.

This form, like the preceding, came to hand after our paper was in press. The species, in its most obvious characters, very closely resembles

Antennal scale about three times as long as broad, its apex not exquisitely ciliated. Denticles confined to the antero-lateral margins. Eye-plate with the sixth segment as long as the two preceding segments taken together. Pleon Telson, without one of the terminal spines, about as long as the sixth segment extending to about the extremity of the inner uropods; in shape rather slender slightly curved, with a few pairs of long slender spines armed with setae, of which the inner pair is the dactylus, and with a pair of median denticles, or with a single bifid a little in front of the denticles; lateral margins, from the median level to the apex. Inner uropod with a single long slender spine at the inner posterior corner of the ociput. Length of adult female, 11 mm.

Our material consists of several females taken on 1901, until recently owing to the mislaying of the tube in which they were preserved.

Locality, see p. 145.

* In reference to the plumose spines of the apex of the telson.
† W. Kemp.

GENUS Mysidies, G. O. Sars, 1864.

Mysidies insignis, G. O. Sars.

(†) Mysidies hibernicus, Norman, 1892.

Pl. XXIV., Fig. 5.

Our specimens were at first regarded as examples of Mysidies hibernicus, diverging somewhat from Norman's forms in the characters of the telson. A close examination has shown them to be Mysidies insignis, and to this species the present form probably belongs, and the imperfect specimen assigned to M. hibernicus by Holt and Beaumont (1900).

In externally visible characters the description of M. hibernicus separates this form from M. insignis only in the telson, of which the apex shows but a very slight indistinctation, while no median setae are described. The number and description of the lateral spines, given as "twenty... of equal size," would be held by no one as specifically excluding forms of the same nature as to which the number given as twenty-five, and in which the size of the spines infer as is somewhat variable.

In our examples the clasp of the telson, though always more than a mere wisp, is variable in extent, and never very deep. Moreover, the median setae arise from the central face of the clasp, so that when they are broken off no trace of them is to be seen from the usual (dorsal) point of view of the observer.

To us it seemed improbable that forms so closely allied by external characters as M. hibernicus and M. insignis could really belong to different genera. We therefore applied to Canon Norman, who, with his usual prompt kindness, re-examined his types and informed us that in the characters of the mouth parts and in the presence of the median setae of the telson M. hibernicus is a Mysidies. He has also sent us his type, the male of which has the pleopods as in M. insignis. As he observes, the largest of them is 15 mm., whereas M. insignis in Norwegian waters reaches 25 mm. The male type of M. hibernicus, though fully mature, measures only 15 mm., and our own examples of M. insignis do not exceed 25 mm. Unfortunately, none of them grew above before they were critically examined, and the only mature male sufficiently perfect for comparison in regard to sexual characters measures 16 mm.

While it is possible that M. hibernicus is a valid species, constantly distinguishable from M. insignis by its smaller size and by the absence of an adjacent clasp of the telson, we incline strongly to the belief that it is a smaller variety of M. insignis, and the southern race of M. insignis may not be distinctly clastic. It is worthy of note that Canon Norman took a specimen which he determined as M. insignis in the same habitat as his type of M. hibernicus. This, as he tells us, must have been "elsewhere than in its proper place" at the time when he was writing his diagnosis of M. hibernicus: it agrees with M. insignis except in having a slightly greater emargination of the telson. We have two examples of 9 and 11 mm., of which the first has the telson absolutely devoid of terminal emargination, while the second agrees in this respect with Norman's male type; but another, of 5 mm., has the clasp already well developed. It follows that, if M. insignis and M. hibernicus are to be regarded as synonyms, the condition of the apex of the telson cannot be shown to vary constantly with the size of the individual.

Locality and distribution, see p. 146.

Mysidies (†) Farrani,* sp. n.

This form having been received after our notes had gone to press, only a brief preliminary description can be given here, viz.:

Body moderately robust. Carapace with a very slight oblique rostrum; only slightly emarginate posteriorly. Pleon longer than the carapace, the first two segments unequal, the last segment one and a half times as long as the fifth. Eyes large, pigmented red. Antennal scale lanceolate, about four to five times as long as broad, extending for a little way

* G. P. Farran.
Genus Chunomyris. n.

Form rather stout. Carapace short, gibbous, armed with spines on anterior margin, with a single spine on each lateral margin in the origin posteriorly with spines, of which some are apically or in the same direction, Cephalon thus not unusually elongated, no perceptible interval between cephalic and thoracic appendages. Manidibular palp three-jointed, antennal short, lamellar, feebly flagellate. Two pairs, the types, two examples of the species which follows, have the antennal elongate, and the seta posterior thoracic legs, which are largely in character. \n
Chunomyris diadema, g. et sp. n.

Pr. XIX, Figs 1–4. Pr. XXV, Figs 1–7.

Form robust. Carapace much wider than pleon, not covering all the thoracic segments; deeply emarginate on its posterior border, anterior and curved, its length in the form of a crown. Lateral edges of the pleon. Eyes large, reaching to the end of the second joint of the antennae. Colour of viscid part orange brown after preservation. Antennular joint as long as the preceding two, much stouter and thicker than either peduncle, their peduncles short, subtriangular in horizontal section peduncle about one-quarter the length of the carapace; last of the others. Antennal peduncle more slender than the anterior, peduncle completely hidden by the latter. Antennae reach nearly to the centre of the last joint of the peduncle. Manidibular very strong, palp three-jointed, basal joint the longest, stout, armed on the inner edge with strong setae, a fascicle of which also occurs on the inner distal angle of the joint; next joint smaller and more slender, the first joint, feebly armed with setae; last joint longer than the other, rather broad, armed with an obtusely rounded, notched, and slightly plumose, with occasional numerous setae on the inner edge, which are densely plumose. There is one long and strong seta at the tip of the last joint of the palp. Cutting edge not equally developed on both sides, the left side having more teeth than the right. Mandible is as in Enchactenus, and likewise much smaller than fifth. \n
Very strong, palp three-jointed, basal joint the longest, stout, armed on the inner edge with strong setae, a fascicle of which also occurs on the inner distal angle of the joint; next joint smaller and more slender than the first joint, feebly armed with setae; last joint longer than the other, rather broad, armed with an obtusely rounded, notched, and slightly plumose, with occasional numerous setae on the inner edge, which are densely plumose. There is one long and strong seta at the tip of the last joint of the palp. Cutting edge not equally developed on both sides, the left side having more teeth than the right. Mandible is as in Enchactenus, and likewise much smaller than fifth.

* A portion of the fifth leg remains, and shows the 'Scutiforme' described seen in Enchactenus.
usually stout in bottom mysids, furnishes the only evidence we have of the probably pelagic habitat of the species.

Locality and distribution, see p. 146.

SUB-FAM. NOV. BOREOMYSINAE.

Outer uropods with their outer margins interrupted and set with a few small spines not far from the base. A more or less distinct suture extending from the point of intersection towards the opposite margin, but not quite reaching the latter. Female with seven pairs of incipient lamellae.

Other characters as in Leptomysinae, Norman.

Genus Boreomysis, G. O. Sars, 1869.

Boreomysis arctica, (Krøyer).

As we record a very considerable extension of range on the evidence of a single small specimen*, it is necessary to note any divergence exhibited by the latter.

Sars' descriptions and figures are taken from specimens of 25 and 27 mm. Ours measures only 10 mm. The front margin of the carapace is rather more widely arched than in the figure of the adult, but the posterior projection is the same, and there is no trace of lateral denticles (such as occur in B. tridenta). In the lateral armature of the telson the spines show a slightly more marked tendency (as compared with Sars' drawings) towards arrangement in series of several smaller divided by single larger ones, but slight variation in this respect is common. The varying regard to the small size; these spines being of late development when their number is small, of rather variable occurrence even in adults. The relative number of these spines being quite satisfactory, there seems to be no risk of a false record. See note, p. 146.

Locality and distribution, see p. 147.

Boreomysis microps, G. O. Sars, 1885.

It may be well to note the one or two minor points in which the single example which we refer to this species differs from the description given in Sars' figures. The small scale of our specimen, in other respects exactly as third of its length, whereas in Sars' example it projects only by one-quarter of its length. The exopods of the thoracic legs are decidedly smaller than Sars' figures would indicate, while the endopods may be distinguished from its congeners by three well-marked characteristics:

(i.) by the eye, which is small and fusiform in shape, with the cornea not at all expanded and occupying a very small part of the eye;

(ii.) by the last segment of the pleon, which is remarkably elongate and exceeds in length the two preceding segments combined;

(iii.) by the telson, which is unusually slender, and has the edges small denticles, the number of the latter between each spine increasing posteriorly. The apical efferent of the telson is small and has a very curious dilatation at the top (side view, Sars, 1886, Pl. xxxii, fig. 10).

The number of spines on the inner margin of the inner spines would appear to be two, though it is impossible to absolutely certain of this number owing to the rather damaged condition of these appendages. The Challenger example measured 24 mm., while ours is 21 mm. in length. Both males were females, the male being as yet unknown.

Locality and distribution, see p. 148.

* A second, taken while these notes were in proof stage, agrees with the first.

** One of our large B. tridenta has two on one side, one on the other. This is not due to accident, as the uropod is big enough to show the scar if one spine had been broken off.

PART II.

LOCALITY AND DISTRIBUTION.

The different forms which we have temporarily united as Schizopods fall into two main categories, of which one comprises wholly pelagic forms, while the other accounts for those which dwell at or near the bottom. None of them, as one may easily perceive from their form, actually crawl on the bottom like crabs, but some seem to keep as near as they can to their structure allows, and when we speak of a species as belonging to the bottom we merely intend to imply that it does not, to our belief, make any considerable ascent. The proof of this is most difficult. A horizontal net, which can be opened and closed at a known depth, and fished there with sufficient rapidity to catch such active forms, is not within our experience. Vertical nets, worked through sections of really deep water, act excellently, but in moderately deep water have not scope enough to catch much between particular depths. Serial open tow-nets catch more than any other kind, but the contents of the lower ones are obviously difficult to assign with certainty to particular species, even when they consist of organisms not met with in the upper nets.

Dealing with minute creatures, such as Copepods, which must be caught by any net that comes their way, it is easily discovered that density of distribution varies immensely at times within quite narrow horizontal limits, and much more may be supposed to be the case with larger and less numerous organisms, which, moreover, possess sufficient activity and perceptive power to make effort to avoid the net. It will be understood, therefore, that our conclusions in regard to vertical distribution are given with considerable reserve, and we may remark that the lists published by the International Bureau show that much more work is required before we can obtain an adequate knowledge of the movements of even well-known shallow water forms. To what extent vertical movements, whether of pelagic animals which never touch bottom, or of those which seem normally to live on the bottom, may ultimately prove to depend upon light or darkness, storm or calm, temperature, or factors hitherto untabulated, is still quite uncertain, but in the case of at least one species, Dr. Fowler's work will be found to have made a substantial advance to this end.

We have used the term Atlantic Slope in the title in perhaps too wide a sense, having more regard to the organisms with which we are dealing than to exact physical conditions. Fifty fathoms of water practically eliminate the littoral Mysids, while the Oceana and Research collecting areas fairly contain those of the Helga to the abyss. The actual exploration of the bottom, however, stops for the present at 45 fath., and is confined to the work of the Helga, and to such records as are available from the northern part of the Atlantic. We have used the general term of the truly oceanic forms as with their occurrence on the fringe of their general range. We shall therefore Ormann and others, whose work may be supposed to make it certain on the oceanic form might not be classed as coast-line, one is compelled to inquire what reason there is to regard the occurrence as exceptional. Frequently it will be

We use the term in a compound sense and not in recognition of a separate Irish marine area. The western boundary, which alone concerns these notes, is the 1,000 fath. line.
found that attempts to collect the animal, under circumstances conducive to success, in the offshore part of the area have been as infrequent as the captures, and that in fact we have no reason to say that we know anything about the pelagic inhabitants of our coasts, save in the narrow strip of shallow water to which collecting is ordinarily confined. Yet, especially in research dealing with drift-net fisheries, the normal and even the occasional pelagic tenants of the seaward zone have an obvious import.

Turning to bottom forms, such as appear to be the majority of the Myxidae, limited, with due allowance for latitude, to certain depths and to certain conditions of the sea floor, the territorially-named areas have a more apparent reason for existence, since they graphically display the observed limits of range on the shores or slope of the ocean, and since, in the case of a bottom-haunting form, the capture of even a single specimen is a significant occurrence of the species in the neighborhood. Even more in the case of pelagic forms, breaks in continuity, so the deduction of factors of distribution based on existing data must necessarily be most tentative.

Questions of temperature, current, drift, etc., are now receiving an attention which has never been bestowed upon them before, and we think it well to defer consideration of these for the present, as they may be more satisfactorily handled when the work has reached a more advanced stage, and in connection with the fauna as a whole, rather than with a particular unit. It may suffice to note that in the case of the bottom Myxidae of the Slope, the range of temperature from their northern to their southern observed limit seems so wide that except in so far as it may be a difference of importance. Again, at least off the Irish slope, the upper water by any sharp difference. Depths, however, as far as is present the horizontal range.

Of truly oceanic forms, the following will, by ordinary usage, be admitted to the British and Irish list:—

**Euphausia pellucida**, West of Ireland* and English Channel (International).

**Euphausia similis**, English Channel (International).

**Euphausia Lanzi**, sp. n., West of Ireland.

**Thysanoessa antarctica**, sp. n., West of Ireland.

**Nematostracum bispinum**, sp. n., West of Ireland.

**Nematostracum gregarium**, West of Ireland.

**Thysanoessa erythraea**, sp. n., West of Ireland.

**Thysanoessa longipes**, sp. n., West of Ireland.**

**Nematostracum megalops** do not appear to have been previously recorded from the Irish part of the Atlantic coast.

**Chunomyxus diadema** is a new species from the West of Ireland, possibly list C. The authority of International records from the Channel, is a species at least in part pelagic and perhaps truly oceanic.

Of apparently bottom-haunting forms the following may be added to the list:—

**Metridothyra robusta**, West of Ireland.

**Metridothyra sieci**, sp. n., West of Ireland.

**Dactylothere theretra**, g. et sp. n., West of Ireland.

**Hypothryxops scottii**, g. et sp. n., West of Ireland.

**Pseudomyxus rostrata**, g. et sp. n., West of Ireland.

**Pseudomyxus rostrata**, West of Ireland.

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The previously known members of this section of the list occur at similar depths in Norwegian waters, and Norman in 1892 predicted that they would be found on our western coasts as soon as the latter were explored.

**Gnathophausia drepanophora** and **Euchelonea Fowleri** are new oceanic species, taken respectively in deep water off the West of Ireland (outside the British and Irish area) and to the north of the Bay of Biscay.

**Borophagus microps**, a species hitherto known only from a single specimen taken by the Challenger at the other side of the Atlantic, and below recorded from the West Coast of Ireland, cannot be added to the British list since the place of capture lies outside the British and Irish area.

The circumstances of capture point to its lying, at least in part, oceanic. It may be noted that the following species (of which the first is now added to the Irish list) are shown by the International lists to have occurred at, or over, depths of 50 fath. in localities facing the Atlantic slope without the intervention of land:—

**Borophagus microps**, Erythrops elegans, Erythrops Goezei, Euplomys granum, Glaucus aranea, Glaucus araneus, Sirella norvegica, Sirella norvegica.

Some of these are common West of Ireland forms, but we have only met with them so far in water of less depth. **Lophogaster typicus**, a deep-water form, is known only on the Slope of Norway to the south of Ireland, and **Borophagus microps**, mostly found in shallow water, has been recorded from more than 50 fath. on our S.W. coast.

FAM. EUPHASYIIDAE.

SUB-FAM. EUPHASYINAE, H. & T.

**GENUS Euphausia**, Dana.

**Euphausia pellucida**, L. W. H.

Helga.

Inside Porcupine Bank, 175 fath., and of June, 1901, midwater tows-nets at dusk. Three, 4 to 7 mm. 77 mi. off Achill, 383 fath., August, 1901, tow-net on trawl.—One 11 mm., and (1) one, damaged.

60 mi. off Achill, 190 fath., August, 1901, tow-net on trawl.—Eleven, largest 14 mm. Tow-net on dredge. Four, 7 to 14 mm.

50 mi. off Tertiary, 230 fath., February, 1903, tow-net at 100 fath.—Four, 7 to 14 mm.

50 mi. off Cleggan Head, 120 fath., July, 1903, tow-net on trawl.—Fragments.

40 mi. off Cleggan Head, 96 fath., August, 1903, bottom tow-net.—One, 7 to 14 mm. Also in several hauls in August, 1903, off the Mayo coast, at depths between 1,000 to 200 and 0 fath.; one in the surface net and in November, 1904, off the Mayo and杀灭coasts, in hauls from 600 and 150 to 0, and in a tow-net on the dredge at 244 fath.

Ocean, November, 1886.

In twenty-four hauls out of a total of thirty which caught echinoids. The hauls were made at from 270 to 1,770 fath., the nets fishing from these depths to the surface. None of the specimens reach the full size of the species.
Mayo, from which depth a tow-net attached to the trawl-head lifted a single specimen. There were none in the nets on the "back" of the trawl net, which probably catch only benthiic species; so, if our *Nyctiphanes* came from the bottom on that occasion, members of its species were certainly not abundant there. Without recapitulating a long list of captures, it may suffice to say that N. Couchi is frequently brought to hand on the W. coast of Ireland from water of less than 100 fathoms deep. Nets, except huge coarse-mesh tow-nets, fished at night, it is skilled to avoid, but during the spring and early summer it may constantly be found in the stomachs of sea-trout taken at night in surface drift-nets on certainly be common at night at or near the surface at depths which often than of the oceanic slope, but cannot be altogether excluded from the company with examples of the latter exceeding 20 mm. Occasionally *Thysanoessa longipes*. Its breeding period, as evidenced by the ovigerous months.

**Distribution.**—Peculiarity of record is, we imagine, largely due to failure to distinguish this species from *M. norvegica*, but such surmise does not account for its absence from the Norwegian list, as Sars would certainly have noted it had it occurred in Norse waters. It is known from the Firth of Tay and from the coast of Denmark in the North Sea, and must certainly occur in other parts of that region. Its occurrence on the W. coast of Scotland is not recorded, but may be presumed. We have seen that it is common on the W. coast of Ireland and in the Irish Sea and at least in the western part of the English Channel, both at sea and within the Plymouth Sound. We know of no record from the Atlantic coast south of the Channel, but the Euphausias of that region do not seem to have been much studied. It would seem to be absent from the Mediterranean.

**Genus Thysanoessa**, O. Sars, 1885.

**Thysanoessa longipes** (N. Couchi). (Bell). This is one of the few N.E. Atlantic representatives of the family which, though essentially pelagic, appear to be non-oceanic. The deepest water in which we have taken it is 500 fathoms, off the coast of
vertical distribution; it is only possible to say that while captures were made at the surface and in the upper strata, none were made under circumstances which prove the species to have been actually at the bottom. As compared with N. Couchi, Meganyelichthys is, on our western coast, a more seaward form. Its occurrence, even in the young condition, on the presence of salmon and the like, is clearly associated with a general inward movement of ocean water. In particular the absence of a fish from the list of the abundant species mentioned in the above list, from the point of view of its general exclusion from heavy seas and open waters, is a fact which would be understandable in the presence of a ground-feeding fish. These last were specimens of a very small size, as are those taken in the big triangular net at night in May, 1904, whereas all others mentioned in the above list are of larger size, or at least short of the full size.* The probable explanation is that the species, when large, is too agile for ordinary tows, especially in the daytime, and did not happen to be on the ground worked by the trawl. There is only a single record from the surface tows worked during daylight.

The Oceanus, working towards the l.000 fath. line off the S.W. of Ireland in November, encountered the species in one haul only, viz., in a tow-net fished at 650 fath., and hence to the surface (52°45'59" N.; 12°27' W.). None were found in the more westerly gatherings.

Distribution.—N. Siberia, Spitsbergen, Jan Mayen, Greenland, Coast of Norway, Faroe Channel, Shetland, Orkney, E. and W. of Scotland, N. of North Sea, Skagerrak, Kattegat, Ireland (but not yet observed on S.E.); Bay of Biscay, Portugal, N.E. America.

Genus Boreophasia, G. O. Sars.

Boreophasia inermis (Krøyer).

Though not previously recorded from Irish waters, we have taken this species frequently at various points on the west coast, but not at or above any depth greatly exceeding 50 fath. It is at times an important food of mackerel, herring, and sea trout on this coast. We have also taken it in the Irish Sea.


We can find no record which definitely assigns B. inermis to a deepwater habitat, but it is mentioned in the International lists from a net worked between about 750 fath. and the surface. It seems probable that it occurs, when found at any considerable distance from the shore, only in the upper strata.

Sub-fam. Nematoscoelinae, H. & T.

Genus Thysonessa, Brandt.

Thysonessa neglecta (Krøyer).

T. borrisi, G. O. Sars, 1892.

Though ranging far to sea and over considerable depths, this is not an oceanic species and is not represented in the collections of the Oceanodromus.

In the Helga collections on off-shore grounds its seaward limits are represented by captures at 190 fath., 60 mi. off Achill, and 120 fath., 50 miles off Cleggan Head. It occurs in Helga gatherings at 40, 50, and 20 miles off Cleggan Head, and is fairly common in the Moniea tow-net.

* This applies to, &c.

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* There are also some deep-water records for November, 1904, off the coast of Mayo and Kerry, but the gatherings are not yet completely sorted.
from the mackerel grounds, practically at all seasons of the year, but
most commonly in winter, and ranges at times into coastal waters of
quite inconspicuous depth. We know of its occurrence at the surface
only from hauls made at night, and during daylight it seems to frequent
the bottom or its neighbourhood.

It may be classed as one of the occasionally important items in the food
of the mackerel, and is also captured by the spar dog (Decapterus vulgaris).
In general the habitat on the Irish coast presents a close affinity to that
of Neustiga pholus, but, from the evidence of tow-nets and fish-
traps, the two forms do not coexist together to any great extent.

Distribution.—Norway, from Finnmark South; in deep water off the
Norwegian coast in the upper strata, Faroe Channel (upper strata), Shet-
land, Shetland, parts of the Irish and Scottish coasts, north part of
North Sea, Bay of Biscay, N.E. America.

We do not know of a record from the southern part of the North Sea.
water record from the Bay of Biscay is based on mangled specimens and
requires confirmation.

**Thysanoessa longicaudata** (Kroyer).

**Helga.**

Porcupine Bank, 91 fath., end of June, 1901, bottom tow-net.—
EIGHTEEN, 5 to 8 mm., one about 12 mm.*

Inner edge of Porcupine Bank, 120 fath., June, 1901, tow-net on
dredge.—FIVE larvae (presumably of this species).

Inside Porcupine Bank, 175 fath., end of June, 1901, mid-water tow-
nets, at dusk.—SEVENTEEN, 8 to 13 mm.

77 miles off Achill, 222 fath., August, 1901, tow-nets on trawl.—
EIGHT, 8 to 10 mm.

50 miles off Achill, 199 fath., August, 1901, tow-nets on dredge.—
Three 8 mm., one 10 mm.

50 miles off Tareforth, co. 120 fath., tow-net at 20 fath.—One
fath. — Seven, 9 mm.

48 miles off Tareforth, November, 1904, tow-net on trawl, 337 fath.—

50 miles N. by W. (Magnet.) of Eagle Island, Co. Mayo, 1,000 fath.,
August, 1904, tow-net, 1,000 to 0 fath.—Fourteen
40 miles same course and date, 750 fath., tow-net, 750 to 0 fath.—

20 miles N. by W. (Magnet.) of Eagle Island, Co. Mayo, 1,000 fath.,
August, 1904, tow-net, 1,000 to 0 fath.—Twenty

Also in August, 1904, in tow-nets on trawl, at 112 and 180 fath., off
Galway.—Ten and three

**Oceana.**

The most abundant in number of all forms taken by the Oceana, but
exceeded in prevalence in hauls by E. pellicuda and S. longicornis, which
represented. The nets in which it was taken were fished at 500 to 1,770
from the upper strata, since nets fished at depths of 2,000 fath.

Distribution.—Occasionally taken in company with other northern forms
on the British coast of the North Sea, this species is better known from
warm water on the “Gulf Stream.” It is, therefore, a truly oceanic
rather full account of its then known distribution, says it has “no more
right to be regarded as a British species than an occasional Velella or

*This is the only specimen which we have seen with the slight nematocyst over taken
ile as in T. levarum.

**Thysanoessa gregaria, G. O. Sars.**

The small specimens, which we have referred with some remark (see p. 108) to this species, were taken by the Oceana on either side of the
1,000 fath. line in nets fished at from 500 to 1,710 fath., from these depths to the surface.

The Research collections comprise four larvae, apparently referable to this
species, taken between 100 and 75 fath. and the surface.

Distribution.—Oceanic, North, Equatorial, and South Atlantic; Medi-
terranean; Pacific, Japan to Australia.

**Genus Nematoscis, G. O. Sars.**

**Nematoscis megalops, G. O. Sars.**

**Helga.**

Inside the Porcupine Bank, 175 fath., end of June, 1901, mid-water tow-
net.—One, 14 mm.

50 mi. N. by W. (Magn.) of Eagle Island, Co. Mayo, August, 1904,
1,000 fath., large tow-net, 1,000 to 0 fath.—Two

40 miles same course and date, 750 fath., same net, 750 to 0 fath.—Two

81 mi. W. by W. (Magnet.) of Eagle Island, Co. Mayo, 220 fath., August, 1904, tow-

nets on trawl.—One.

40 mi. N. by W. of Eagle Island, Co. Mayo, November, 1904, large tow-
net, 600 fath.—Five, 14 to 18 mm., Twelve, 7 mm.

Research.

Rather abundant, especially at night, in nets hauled from 100 fathoms
and less to the surface. It appears, but it is not with certainty shown, to
rise at night, but only one was taken in an actual surface net. Its deepest
occurrence is between 400 and 500 fath., if some mangled specimens have
been rightly named by us. Proceeding upwards we next find it in a net
hauled between 150 and 50 fath., during the day time.

Distribution.—Apparantley oceanic, occurring in both North and South
Atlantic. Though taken on the coast of Great Britain, as well as on
the Irish slope, the rarity of its occurrence on the latter, in spite of fairly
consistent netting, suggests that it does not normally approach our shores.
We have, however, taken it in the Irish Sea on one occasion. The
northern limit of its range appears to be the Irish Sea between Green-
land and Iceland. Southwards it is not known from beyond the sub-
tropical region.

l. 2
**Genus Nematobrachion, Calman.**

*Nematobrachion boopis* (Calman).

*Helga.*

50 mi. N. by W. of Eagle Island, Co. Mayo, 1,000 ft. to 0 fath., August, 1904, tow-net 1,000 to 0 fath.—Three.

40 mi. same course and date, 750 fath., tow-net 750 to 0 fath.—Two.

50 mi. W. of Tearaght, 225 fath., August, 1904, bottom tow-net.—One.

40 mi. N. by W. (magn.) of Eagle Island, Co. Mayo, November, 1904, large tow-net, 600 fath.—Three, 11 to 18 mm.

**Research.**

One specimen in each of seven hauls, of which all but two were carried to the surface. Two specimens were demonstrated to have occurred between 500 and 250, and between 250 and 150 fath. respectively. One was in 100 fath. and remained between 1,250 and 0; the remainder between 150 to 250 and 0 fath. Without exception, and not at all likely to be restricted to the small part of the N. Atlantic from which it is known.

**Genus Stylocheiron, G. O. Sars.**

*Stylocheiron longicorne,* G. O. Sars.

*S. mastigophorum,* Chun, 1888.

*Helga.*

60 mi. off Achill, 190 fath., August, 1901, tow-net on trawl.—Two.

50 mi. off Tearaght, 320 fath., February, 1903. Tow-net at 50 fath.—One, 8 mm.

50 mi. off Tearaght, Co. Kerry, November, 1904, large tow-net, 350 fath.—Six, 6 to 9 mm.

40 mi. N. by W. (magn.) of Eagle Island, Co. Mayo, November, 1904, large tow-net, 600 fath.—One, 15 mm.

Also in August, 1904, 200 fath., off Co. Galway, in tow-net from bottom to surface.—One.

**Ocean.**

In twenty-four out of thirty hauls, in open tow-nets, fished at depths of from 270 to 1,770 fath., and thence to surface. Occurs in stations on either side of the 1,000 fath. line.

**Research.**

Of very frequent occurrence in hauls between 100 fath. or less and surface, but cannot be definitely referred to any depth greater than 50 fath., though some of the nets in which it was taken started their course much deeper. Only taken actually at the surface at night.

**Distribution.** Oceanic, apparently of the upper strata. North and South Atlantic, not known from north of a line drawn from the north of Ireland to the United States, but extending as far south as the Cape of Good Hope; Mediterranean.

Though apparently abundant over deep water west and south west of Ireland and in the Bay of Biscay, absence from the International lists seems to show that it does not range further towards the north-eastern coast of Europe.

**Stylocheiron cheliferr, Chun.**

*Helga.*

40 mi. N. by W. (magn.) of Eagle Island, Co. Mayo, November, 1904, large tow-net, 600 fath.—One, 15 mm.

**Ocean.**

In a net fished at 1,410 fath., and thence to the surface, in lat. 52° 18' 1' N., long. 13° 53' 9" W.—One, very large.

**Research.**

In seven hauls, between 100 to 75 fath. and surface, in the Bay of Biscay.

**Distribution.** Oceanic, apparently in the upper strata. North Atlantic and Mediterranean, and if, as we suppose, identical with *S. abbreviatum*, Sars, South Atlantic and Pacific. Ireland to the sub-tropical region seems to be the extent of its known Atlantic range from north to south.

**Sub-Fam. BENTHEUPHAUSINAE, H. & T.**

**Genus Bentheuphausia, G. O. Sars.**

*Bentheuphausia sp. (I).**

**Research.**

A single mutilated specimen in a haul between 1,250 fath. and surface.

**Distribution.** *B. ambiguum,* though known from very few specimens, appears to range through the oceans. Though almost certainly excluded from the fauna of the upper strata, there is nothing to show its precise vertical habitat.

**Fam. LOPHOGASTRIDAE.**

**Genus Lophogaster, M. Sars.**

*Lophogaster typicus,* M. Sars.

*Helga.*

50 mi. W. of Cleggan Head, 120 fath., ca., August, 1903, tow-net on trawl.—One.

**Distribution.** Atlantic, Norway to Cape of Good Hope; Mediterranean.

**Genus Gnathophasia, Willebores Suhm, 1875.**

*Gnathophasia zoë,* Willebores Suhm, 1875.

*Gnathophasia zoë,* G. O. Sars, 1886.

**Helga.**

77 mi. off Achill, 382 fath., August, 1901, tow-net on trawl-head.—Two, 25 and 30 mm.

40 mi. N. by W. (magn.) of Eagle Island, Co. Mayo, November, 1904, large tow-net, 600 fath.—Two, 26 mm.

**Distribution.** Oceanic, in North and Tropical Atlantic, and in South Pacific; known from a few Challenger records from open nets fished at depths from 660 to 1,850 fathoms, and fishing to the surface.

*Our specimens, far short of the full size, show that the species ranges, at least at times, into comparatively shallow water. So large a form, even if numerous, is likely to evade tabulation by the nets which can ordinarily be used in deep-water work.*
Gnathophausia drepanephora, H. & T.
Oceanus, Lat. 52° 27' 6" N., Long. 15° 40' W.
The only known specimen was taken in a net fished at 1,770 fath., and thence to the surface.

Fam. EUCOPTIDAE, G. O. Sars.

Genus Eucopia, Dana.

Eucopia australis, Dana.

Helga.
77 mi. off Achill, 382 fath., August, 1901, tow-net on trawl.—One, 19 mm.
50 mi. N.W. by N. of Eagle Island, Co. Mayo, 1,000+ fath., August, 1904, tow-net 1,000 to 0 fath.—One.

Oceanus.
In three hauls at depths from 500 to 1,710 fath., and thence to surface. None of the specimens are of full size.

In six hauls, from which it appears that the species was taken at least as low as 780, and at least as high as 200 fathoms. Probably 100 to 1,000 fath. include the strata in which it occurred, with some margin each way. The rest are small.

Distribution.—Oceanic, in all the oceans; Antarctic, but not so far recorded as Arctic. Possibly ranging to 2,500 fath., its vertical distribution cannot with certainty be extended beyond the limits ascertained by the research. Evidently not a surface form.

The material which we have taken or received has always been preserved in formaldehyde, a medium which suits other schizopods well enough to warrant the claim that, if specimens suitable for museum purposes are desired, it should be hardened as soon as taken.

Fam. MYSIDAE.

Sub-fam. LEPTOMYSINAE, Norman.

Genus Erythrpa, G. O. Sars.

Erythrpa serrata, G. O. Sars.

Helga.
60 mi. off Achill, 199 fath., August, 1901; very numerous both in tow-net on trawl with sand and in tow-net on dredge, 9 to 10 mm.
Also taken on several occasions at 50 mi. off Cleggan Head, 116 to 230 fath.

Distribution.—Norway, West Finnmark to Christiania Fjord, 30 to 200 fath.; coasts of Scotland and Ireland; Denmark.

This seems to be a bottom species. Though perhaps properly belonging to the Atlantic slope, it is by no means confined thereto, ranging into the North Sea and occurring abundantly in the Irish Sea. So far as we are aware there is no record which proves its capture except at or in the immediate neighbourhood of the bottom. It is only mentioned in the International lists from a capture between bottom and surface.
Genus *Hypererythrops*, H. & T.

*Hypererythrops serriventris*, H. & T.

*Helga.*

60 mi. off Achill, 199 fath., August, 1901, tow-nets on trawl and dredge.—About twenty, 5 to 10 mm.

40 mi. off Tararoght, Co. Kerry, November, 1904, 244 fath., tow-net on dredge.—Four, 6 to 9 mm.

Several were in the tow-net of sand on “back” of trawl, but more in the tow-net on dredge. Apparently a bottom species.

Genus *Parerythrops*, G. O. Sars.

*Parerythrops obesus*, G. O. Sars.

*Helga.*

60 mi. off Achill, 199 fath., August, 1901, tow-net on dredge.—Four, 7 to 10 mm. ca.

40 mi. off Achill, 199 fath., August, 1901, tow-net on dredge.—Four, 5 to 9 mm. ca.

*Helga.*

60 mi. by W. (magn.) of Eagle Island, Co. Mayo, 670 fath., November, 1904, large tow-net, 600 fath.—One, 5 mm.

*Distribution.*—Norway, West Finnmark to Christiania Fjord, 50 to 250 fath.; S.W. of Ireland (off the Skelligs), 52 to 62 fath., a single specimen, rather imperfect (Kelts and Beaumont).

*Research.*—If chiefly a bottom form, we have not found it in recognisable condition in the large gathering made by tow-nets on the trawl back at 199 fath. It is not abundant on the ground at the same time as the dredge. It cannot, therefore, have extended southwards, its absence from a number of hauls with suitable common form on the Irish part of the Atlantic slope. The 600 fath. net was never within less than 70 fath. of the bottom.

Genus *Euchaetomera*, G. O. Sars, 1885.

*Euchaetomera Fowleri*, H. & T.

*Helga.*

An adult male and female in two hauls from 250 and 200 fath., respectively, to the surface in the Bay of Biscay. Obviously pelagic and oceanic, the species is only known from the above record. Its nearest relative, *E. tenax*, is a Pacific form.

Genus *Amblyops*, G. O. Sars.

*Amblyops abbreviata*, G. O. Sars.

*Helga.*

48 mi. off Tararoght, 337 fath., November, 1904, tow-net on trawl.—Twelve, 12 to 16 mm.

54 mi. off Tararoght, 454 fath., November, 1904, tow-net on trawl.—Two, 15 mm.

*Distribution.*—Norway—Lofoten to Christiania Fjord, 100-300 fath.

Genus *Paramblyops*, H. & T.

*Paramblyops rostrata*, H. & T.

*Helga.*

77 mi. off Achill Head, 382 fath., August, 1901, tow-net on trawl.—One.

60 mi. off Achill Head, 200 fath., August, 1901, tow-net on trawl and dredge.—About seventy, 9 to 10 mm., and many fragments.

51 mi. W. by N. Eagle Island, Co. Mayo, August, 1904, 220 fath., tow-nets on trawl.—One, 7 mm.

40 mi. off Tararoght, Co. Kerry, November, 1904, 244 fath., tow-net on dredge.—Eight, 6 to 8 mm.

Near last, 337 fath., November, 1904, tow-net on trawl.—One, 6 mm.

Most of those were found in the tow-net of sand from the “back” of the trawl. It is evidently a bottom species.

Also taken in August, 1904, in tow-net on trawl at 220 fath., off Co. Galway, and 75 mi. off Fastnet, 181 fath., May, 1904.

Genus *Pseudomma*, G. O. Sars.

*Pseudomma roseum*, G. O. Sars.

*Helga.*

60 mi. off Achill, 199 fath., August, 1901, tow-net on trawl and dredge.—Over a hundred, 5 to 11 mm.

50 mi. off Cloggan Head, 120 fath., July, 1903, mosquito-net on trawl.—Three, 5 to 7 mm. One adult, fragmentary.

40 mi. off Tararoght, Co. Kerry, November, 1904, 244 fath., tow-net on dredge.—Twelve, 6 to 9 mm.

*Distribution.*—Norway, from extreme north (W. Finnmark) to south, 100 to 450 fath. North America, Nova Zembla, West Greenland seas.

Definitely relegated by its occurrence in numbers in sand on the trawl tow-net to a bottom habitat, the species may be expected to extend along the Atlantic slope to a point considerably south of Ireland. An International record from the coast of Norway mentions it in a net which was fished from about three fathoms off the bottom upwards.

*Pseudomma calloplura*, H. & T.

*Helga.*

77 mi. off Achill Head, 382 fath., August, 1901, tow-net on trawl.—One.

60 mi. off Achill Head, 199 fath., August, 1901, tow-net on dredge.—Eight; tow-net on trawl.—Four.

50 mi. off Tararoght, 337 fath., November, 1904, tow-net on trawl.—Eight, 6 to 10 mm.

40 mi. off Tararoght, 244 fath., November, 1904, tow-net on dredge.—Twelve, 6 to 10 mm.

*Pseudomma Kempi*, H. & T.

*Helga.*

77 mi. off Achill Head, 382 fath., August, 1901, tow-net on trawl.—One.

Genus *Mysidopsis*, G. O. Sars.

*Mysidopsis didelphys*, Norman.

*Helga.*

60 mi. off Achill, 199 fath., August, 1901, tow-net on trawl.—Over thirty, 7 to 13 mm. Tow-net on dredge. Twenty-two, 6 to 12 mm.

50 mi. off Cloggan Head, 120 fath., July, 1903, tow-net on trawl.—Two.

*Off Co. Galway, 112 fath., August, 1904, tow-net on trawl.—Three.*

*Distribution.*—Norway (from Lofoten southwards), 30 to 150 fath.; Denmark; Shetland; east and west coasts of Scotland; north-east coast of England; west coast of Ireland.

Our specimens from the tow-net on trawl off Achill were mixed up with sand and must have come from the bottom. A capture at 62 to 68 fath. off the Skelligs, Co. Kerry, in 1880, was, almost certainly, also affected at the bottom.
The species seems therefore to range on our western coast from about 50 to about 200 fathoms, and we know of no record to prove that it ever leaves the neighbourhood of the bottom. Its occurrence, however, in the North Sea and at so small a depth as 30 fathoms, in Norway, seems to mark it as a form not essentially belonging to the Atlantic slope, and susceptible, by means of suitable methods of observation, of reference to a considerably greater range than that which can at present be assigned to it.

**GENUS Mysideis, G. O. Sars.**

*Mysideis* (♀) *Farrani, H. & T.*

**Helga.**
54 mi. off Teeragh, 454 fath., November, 1904, tow-net on trawl.—Nine, 10 to 15 mm.
48 mi. off Teeragh, 437 fath., November, 1904, tow-net on trawl.—Three, 12 mm.

*Mysideis insignis*, G. O. Sars.

**Helga.**
60 mi. off Achill, 180 fath., August, 1901, tow-net on dredge.—One, 6 mm., one, 12 mm., five, about 15 to 20 mm.
40 mi. off Teeragh, Co. Kerry, November, 1904, 244 fath., tow-net on dredge.—One, 8 mm.

**Distribution.**—Norway.—West Finnmark to Christiansfjord, 100-300 fath.; S.W. Ireland.—off Skelligs, 62-63 fath.; off Valentia, 112 fath. (Norman in litt.).

The dredge to which the *Helga* tow-net was attached presented no certain evidence of having been actually on the bottom, though it probably was for part of the time. The species does not appear among those taken at the same time in the tow-nets on the trawl, so there is no absolute certainty of its vertical level of capture. We regard it, however, as a bottom species.

**SUB-FAM. ARACHNOMYSINAE, H. & T.**

**GENUS Boreomysis, G. O. Sars.**

*Boreomysis orcutti* (Krøyer).

**Helga.**
77 mi. off Achill, 382 fath., August, 1901, tow-net on trawl.—One, 10 mm.
48 mi. off Teeragh, 537 fath., November, 1904, tow-net on trawl.—One, 8 mm.
15 mi. off Fastnet, 181 fath., May, 1904, tow-net on trawl.—One, 12 mm.

**Distribution.**—Jan Mayen, Lofoten to Christiania Fjord, 200 to 400 fath.; North Sea, Greenland, and N.E. America. Presumably extending southwards, at suitable depths and on suitable ground, from its northern observed limit to Ireland. We have alluded (p. 150) to the characters of two specimens which, though small, seem clearly referable to this species. See note, p. 149.

*Boreomysis tridens*, G. O. Sars.

**Helga.**
54 mi. off Teeragh, 454 fath., November, 1904, tow-net on trawl.—Nine, 15-25 mm.
77 mi. off Achill, 382 fath., August, 1901, tow-net on trawl.—One male, 25 mm., one ovigerous female, 28 mm.

**Distribution.**—Norway.—Lofoten, Trondhjem and Vestfolds, 300 to 400 fath. Presumably extending between Norway and Ireland at suitable soundings.

*Boreomysis megalops*, G. O. Sars.

**Helga.**
60 mi. off Achill, 190 fath., August, 1901, tow-net on trawl, with sand.—Ten, 10 to 17 mm., and many framents. Tow-net on dredge.—About one hundred and thirty, 9 to 15 mm.
Inner edge of Porcupine Bank, 175 fath., end of June, 1901, tow-net on dredge.—One, 5 mm., apparently referable to this species, but too young for certain determination.
50 mi. off Cleggan Head, 120 fath., July, 1903, tow-net on trawl.—Two, very small, one adult.

**Distribution.**—Norway, west coast and West Finnmark, 80 to 200 fath., and presumably thence, at suitable soundings, to the Irish coast, where it is evidently common.
**Boreomysis microps**, G. O. Sars.

*Helga.*

50 mi. N. by W. (magn.) of Eagle Island, Co. Mayo, 1,000+ fath., August, 1904, large tow-net, 1,000 to 0 fath.—One, female, 21 mm.

The net in which our solitary example was captured was an open one, and therefore fishing both during the descent to and ascent from 1,000 fath., at which it worked. The specimen may, therefore, have been caught anywhere between the surface and 1,000 fathoms. All that is certain is, that it was obtained at least some considerable distance from the bottom (which on the chart was shown to be several hundred fathoms below the greatest depth reached by the net). The circumstances of its capture, therefore, point to its being, at least in part, pelagic, in which respect it would seem to differ from its congener which are apparently all bottom haunting forms. The method of capture of the Challenger example is not stated, but the depth at the station at which it was taken was 1,250 fathoms.

**Distribution.**—The Challenger obtained a single individual of this species south of Nova Scotia, in lat. 42° 8' N., long. 63° 39' W. It has not since been obtained. The present record, therefore, considerably extends the geographical range of the species.

Sub-fam. MYSIDELLINAE, Czeniavsky.

**Genus Mysisella,** G. O. Sars.

**Mysisella typica,** G. O. Sars.

*Helga.*

50 mi. off Cloggan Head, 116 to 120 fath., July, 1903, tow-net on trawl.—Two, adult.

Same place, depth and net, August, 1903.—Five, adult.

**Distribution.**—West Norway, 50 to 150 fath.; S. W. Ireland, 52 to 62 fath.; W. of Ireland, as above, and presumably from Norway to Ireland at suitable soundings.

So small a species is very likely to escape notice, and we expect that if any means reasonably calculated to effect its capture are employed, it will be found to extend into the North Sea and English Channel, as well as southwards of its present known range. It does not seem to enter the Irish Sea.

* In 1890 and 1901.

**Boreomysis arctica,** see pp. 130 and 147.

In February, 1903, a number of adult specimens, undoubtedly belonging to this species, were taken off Teeragh, Co. Kerry.

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EXPLANATION OF PLATES XV. TO XXV.

PLATE XV.

*Thysanoessa longicaudata* (Kröyer).

Fig. 1. Dorsal view.
Fig. 2. Lateral view.
Fig. 3. Lateral view of antennular peduncle, enlarged.
Fig. 4. Antennal scale, enlarged.
Fig. 5. Leg of the second pair, enlarged.

PLATE XVI.

*Meganyctiphanes norvegica* (Sars).

Fig. 1. Female. Lateral view.
Fig. 2. Carapace, lateral view.
Fig. 3. Carapace, dorsal view.
Fig. 4. Carapace, dorsal view, slightly flattened.

PLATE XVII.

*Nyctiphanes Couachi* (Bell).

Fig. 1. Male. Lateral view.
Fig. 2. Ovisera of female, Lateral view.
Fig. 3. Antennular comb of female, enlarged.

PLATE XVIII.

*Gnathophausia drepamorphora*, sp. n.

Fig. 1. Male. Lateral view.
Fig. 2. Base of antennular flagellum of male, enlarged.
Fig. 3. Antennal scale, enlarged.

PLATE XIX.

*Ohunomytis diadema*, g. et sp. n.

Fig. 1. Female. Dorsal view.
Fig. 2. Antennal peduncle. Lateral view.
Fig. 3. Telson (of another specimen), enlarged.
Fig. 4. Telson (of Fig. 1), enlarged.

*Metacyclops picea*, sp. n.

Fig. 5. Immature male. Dorsal view.
Fig. 6. Telson, enlarged.
Fig. 7. Male process of antennule, enlarged.

PLATE XX.

*Katerithrops Oceanae*, g. et sp. n.

Fig. 1. Immature male. Dorsal view.
Fig. 2. Immature male. Lateral view.
Fig. 3. Antennal scale with peduncle, enlarged.
Fig. 4. Endopodite of the leg of the 1st pair, enlarged.
Fig. 5. Pleopod of the 1st pair, ventral view, enlarged.
Fig. 6. Telson, enlarged.

PLATE XXI.

*Paramblisops rostrata*, g. et sp. n.

Fig. 1. Male. Dorsal view.
Fig. 2. Female. Dorsal view of anterior end.
Fig. 3. Rostrum, enlarged.
Fig. 4. Eye, enlarged.
Fig. 5. Antennal scale, enlarged.
Fig. 6. Leg of 2nd pair, enlarged.
Fig. 7. Endopodite of one of the posterior thoracic legs (5th?), enlarged.
Fig. 8. Telson, enlarged.

PLATE XXII.

*Dactylorhynchos dactylops*, g. et sp. n.

Fig. 1. Female. Dorsal view.
Fig. 2. Female. Dorsal view of anterior end.
Fig. 3. Lateral view of eye, enlarged.
Fig. 4. Dorsal view of eye, enlarged.
Fig. 5. Pleopod of the 1st pair, enlarged.
Fig. 6. Telson, enlarged.

PLATE XXIII.

*Hyperocyclus serriventer*, g. et sp. n.

Fig. 1. Male. Dorsal view.
Fig. 2. Male. Dorsal view of anterior end.
Fig. 3. Antennal peduncle and scale, enlarged.
Fig. 4. Mandible, enlarged.
Fig. 5. 1st Maxilla, enlarged.
Fig. 6. 2nd Maxilla, enlarged.
Fig. 7. Leg of the 1st pair, enlarged.
Fig. 8. Processes on the ventrum of the male, with the base of the last thoracic leg showing the epipodite, and the male copulatory organ.
Fig. 9. Telson, enlarged.

PLATE XXIV.

*Euchactomera Foulani*, sp. n.

Fig. 1. Male. Dorsal view.
Fig. 2. Leg of the 2nd pair, enlarged.
Fig. 3. Extremity of the telson, enlarged.
Hypererythrops serriventer, g. et sp. n.

Fig. 4. Leg of the 2nd pair, enlarged.

Mysideis insignis, G. O. Sars.

Fig. 5. Telson, enlarged.

Euphausia Laci, sp. n.

Fig. 6. Basal joint of antennular peduncle, enlarged.
Fig. 7. Leg of the 1st pair, enlarged.
Fig. 8. Leg of the 2nd pair, enlarged.
Fig. 9. Extremity of the terminal joint of the leg of the 2nd pair, still further enlarged.

Plate XXV.

Chunomysis diadema, g. et sp. n.

Fig. 1. Mandible, enlarged.
Fig. 2. Cutting edge of right mandible, further enlarged.
Fig. 3. Cutting edge of left mandible, enlarged.
Fig. 4. 1st maxilla, enlarged.
Fig. 5. 2nd maxilla, enlarged.
Fig. 6. Leg of the 1st pair enlarged.
Fig. 7. Leg of the 2nd pair, enlarged.

Metamythrops picta, sp. n.

Fig. 8. Leg of the 1st pair, enlarged.
Fig. 9. Leg of the 2nd pair, enlarged.
1-3. Euchaeotomera Fowleri.  
4. Hypererithrops serriventris.  
5. Mysideis insignis.  
6-9. Euphausia laneli.
Pl. XXV.

1-7. Chunomysis diadema.

W. M. Tattersall del.