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"..... per litora spargite museum,
Nauades, et circum vitreos considite fontes:
Pollice virgineo teneros hic carpite flores:
Floribus et pictum, divæ, replete canistrum.
At vos, o Nymphæ Craterides, ite sub undas,
Ite, recurvato variata corallia trunco
Vellite muscosis e rupibus, et mihi conchas
Ferte, Deæ pelagi, et pingui conchylia succo."
N. Parthenii Giannelloni, Eel. 1.

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I.—*Preliminary Notice of the Schizopoda collected by H.M.S. 'Discovery' in the Antarctic Region.* By E. W. L. HOLT and W. M. TATTERSALL, B.Sc., Department of Agriculture and Technical Instruction, Fisheries Branch, Dublin.

THE full results of our examination of the material confided to us will be published by the authorities of the British Museum in a series specially devoted to the biological collections of the 'Discovery.' The Schizopoda, though immensely numerous in individuals of one species, comprise but a few species, of which five appear to have hitherto escaped description. After consultation with Dr. H. J. Hansen, who has charge of a much larger collection of the same group made by the Swedish and Belgian Expeditions, we have decided to publish diagnoses of the new forms, adopting his manuscript names for two which we found he had already worked out. We include a note of all species taken and some remarks on the characters of *Euphansia superba*, Dana, and *Thysanoëssa macrura*, G. O. Sars.

In describing the appendages of the thorax we call them
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thoracic limbs. Thus, the maxillipede or first maxillipede is termed the "first thoracic limb" and its endopod the "first thoracic leg," and so on.

Fam. Euphausiidae.

Genus EUPHAUSIA, Dana.

Euphausia superba, Dana, 1852.

E. superba, G. O. Sars (1885).

E. Murrayi, G. O. Sars (1885).

E. antarctica, G. O. Sars (1885).

E. glacialis, Hodgson (1902).

E. australis, Hodgson (1902).

Of the five supposed species mentioned above *E. superba* is the adult male, *E. Murrayi* and *E. australis* apply alike to the adult female and nearly adult male, while *E. glacialis* and *E. antarctica* represent youthful stages in which the larval characters are not wholly lost. The supposed distinctions arise from errors in Sars's descriptions and figures of all except the adult male.

E. antarctica is described as having no lateral denticle on the carapace. The type specimen has the side from which Sars took his drawing injured, but the denticle is perfect and quite conspicuous on the other side. It is a young form with the spine on the outer distal angle of the antennular peduncle well developed, as is usual in young *Euphausiæ*. 'Discovery' specimens lead from the *E. antarctica* stage to *E. glacialis*, Hodgson, in which the spine on the basal joint of the antennular peduncle has been reduced to about the adult proportions, while the lappet on the dorsal distal edge of the same joint is beginning to appear. At about 27 mm. specimens in other respects agreeing with *E. glacialis* have practically assumed the actual form of *E. Murrayi*.

The type of *E. Murrayi* differs from Sars's description and figures in the following particulars, which bring it into harmony with Hodgson's types of *E. australis*:—

- (i) It has a pre-anal spine.
- (ii) It has a small rather blunt spine at the outer distal corner of the first joint of the antennular peduncle.
- (iii) It has a spine at the extremity of the outer margin of the antennal scale.
- (iv) The extremity of the pleural plate of the fifth segment of the pleon is rounded rather than pointed.

E. Murrayi may reach 45 mm., but gradations of form

between that size and 27 mm. are most obviously matters of growth. The types of *E. australis* only differ from those of *E. Murrayi* in being more or less badly damaged.

As between the actual condition of *E. Murrayi* and the description and figures of *E. superba* (which are correct) the differences are only two: *E. superba* has no lateral denticle on the carapace, and has the lappet of the second joint of the antennular peduncle less conspicuous than in *E. Murrayi*.

Dana's types of *E. superba* are lost. Sars's type and only specimen is a male with the copulatory apparatus of the pleopods fully developed. The 'Discovery' collection, though fairly rich in the species, as we regard it, as a whole, contains only a few which exactly correspond to *E. superba*, Sars, and they are fully adult males. Males with the characters of *E. Murrayi* do not exceed 43 mm. and have not the full development of the copulatory apparatus, and we have no hesitation in regarding *E. superba* as the fully developed male of the series. *Nyctiphanes Couchi* presents an instance of the reduction in full-grown males of a process of the second joint of the antennular peduncle which is highly developed in younger males and is retained in that condition in full-grown females (Holt and Tattersall, 1905). In *Nematoscelis microps* (teste Hansen, 1905) the lateral denticle of the carapace is of merely sexual character, but as it is only found in the adult female the condition is quite different from that met with in *E. superba*.

Examination of the mouth-parts confirms the opinion we have expressed of the identity of the species now united.

The collection contains numerous specimens from larvae to adults, though fully adult males are rare. All were taken outside the barrier ice, and as Mr. Hodgson seems to have fished the waters below the ice very thoroughly, it may be taken that *E. superba* is a creature of the open seas.

Euphausia Vallentini, Stebbing (1900).

Two specimens agreeing very well with Stebbing's description were taken on the way out to the Antarctic, lat. 56° 54' S., long. 170° 28' E.

None occur in gatherings made within the Antarctic Circle.

Euphausia crystallophias, sp. n.

Form rather robust. *Carapace* with the anterior margin produced into a very acute rostrum extending to about the middle of the basal joints of the antennular peduncles;

lateral margins with a single prominent denticle, just above the insertion of the third thoracic limbs. *Pleon* without dorsal ridges or spines, none of the pleural plates much produced; sixth segment about one and a half times as long as the fifth. *Eyes* globose and rather large, greatest diameter exceeding half the length of the sixth segment of the pleon; pigment black. *Antennular peduncle* with the basal joint much the wider and as long as the second and third combined, and set on its distal half with about twelve curved setae on a ridge terminating at the outer distal corner in a short stout spine more or less overhung and concealed by the setae fringing the outer distal edge; no lappet on any of the joints. *Antennal scale* reaching to about the middle of the third joint of the antennular peduncle, about three times as long as broad; outer margin terminating in a spine, beyond which the apex is not produced. *Telson* about once and a half as long as the sixth segment of the pleon; apex acutely pointed; subapical spines extending for half their length beyond the apex and set on their inner margins with a few very minute spines; dorsal denticles usually in two pairs, the first about halfway towards, the second at the base of, the subapical spines. *Uropods*, inner reaching to about the insertion of the subapical spines, outer very slightly longer, with a prominent denticle at its outer extremity.

Length of the largest specimen 30 mm.

E. crystallorophias is chiefly distinguishable from *E. splendens*, Sars, by its much longer and more acute rostrum. It also lacks the lobe or lappet of the inner angle of the distal dorsal margin of the first joint of the antennular peduncle, present in Sars's two types of *E. splendens*, but overlooked in his descriptions and figures*.

Mr. Hodgson has favoured us with several thousand specimens taken through holes cut in the ice. Not a single specimen occurs in gatherings made in the open sea, and the species appears to be, as we have endeavoured to indicate in the specific name, exclusively a dweller beneath the roof of ice.

Euphausia triacantha, sp. n.

Form moderately slender, slightly compressed. *Carapace* with the anterior margin produced into a rather acute rostrum nearly extending to the end of the basal joint of

* This lobe is quite conspicuous, whether in dorsal or lateral view, in the female type. In the male, which is considerably smaller, the lobe is less developed and not conspicuous in dorsal view.

the antennular peduncle; lateral margins with a single rather prominent denticle, posterior to the middle. *Pleon* with the third, fourth, and fifth segments produced posteriorly into rather long, slender, very acute, and slightly curved median spines; sixth segment nearly twice as long as the fifth without the spine. *Eyes* (damaged in the specimen) apparently rather small. *Antennular peduncle* with a somewhat recurved bifid lappet at the inner distal angle of the extremity of the first joint; second joint with a single pointed lappet. *Antennal scale* broad, extending to the end of the second joint of the antennular peduncle; outer edge terminating in a spine; apex obtusely rounded. *Preanal spine* small and simple. *Telson* with acutely produced and smooth apex; subapical spines smooth; dorsal denticles in two pairs, the first at about two thirds of the distance from base to subapical spines, the second just above the spines. *Uropods* subequal in length, extending to about the insertion of the subapical spines.

Length of the single specimen 23 mm.

Locality. Lat. 66° 52' 9" S., long. 178° 8' 15" E. Soundings 2030 fath.

Thysanoëssa macrura, G. O. Sars (1885).

Numerous specimens, of which the largest reach a length of 28 mm., were taken both in the open sea and through holes in the ice. While agreeing in all other respects with Sars's description they almost all have elongate legs proportionally much longer, the merus extending to about the end of the antennular peduncle, instead of "scarcely reaching beyond the middle of antennal scale." This difference is not related to the size of the individuals, since it is equally manifest in specimens of the same size as Sars's types (13 mm.) and in larger forms. Two specimens alone agree in the proportional length of these legs with the types. There is no other distinction and it seems to us probable that the shorter-legged examples, including the type, have at some period lost their elongate limbs, which have been replaced, as is usual in the higher Decapoda, by smaller members. We have figured (1905, pl. xv. fig. 2) a *Thysanoëssa* in which one of the same legs is seen in an early stage of regeneration. Stebbing's record of *T. macrura* (1900) refers to a specimen in which the legs are longer than in the type.

Fam. Petalophthalmidæ*.

Genus HANSENOMYSIS, Stebbing (1893).

Synon. *Arctomyxis*, Hansen (1887), nec Czerniavsky (1883).

The type of the genus and of *H. fyllæ*, the type species, was a solitary specimen without eyes, and Hansen was unable to decide whether these organs were naturally absent or had been torn out. In the specimens referred below to *Hansenomyxis* the eye-apparatus is perfect and does not look as if it could be very easily detached. Pending the capture of further specimens of *H. fyllæ* the generic importance of the eyes remains doubtful.

Hansenomyxis antarctica, sp. n.

Form slender, tapering considerably towards the posterior end. *Carapace* submembranaceous, very short, leaving the last two thoracic segments quite exposed and free; produced in front into a broadly rounded but rather strongly upturned rostrum, antero-lateral corners broadly rounded and produced almost as much as the rostrum; a small median tooth is present just behind the rostrum and a larger lateral tooth on each side some little way behind the median tooth; cervical sulcus well marked. *Segments of the pleon* cylindrical; postero-inferior corners not at all produced; first segment arcuate in dorsal contour, its anterior margin raised slightly above the level of that of the last thoracic segment, its posterior margin broadly produced so as to partly cover the second segment; sixth segment not quite twice as long as the fifth. *Eyes* united together, forming a flattened pad, the anterior end of which is produced in front of the carapace into two short, thin, subtriangular, slightly diverging lappets not extending to the middle of the basal joint of the antennular peduncle. *Antennular peduncle* short, extending rather more than halfway along the antennal scale, the three joints subequal in length and rather broad; second and third joints with their inner margins densely armed with setæ; basal joint with a single seta on its inner distal corner, and a more or less continuous submarginal row of setæ across the dorsal region; below and slightly external to the eye-lappets is a slight semicircular ridge, marked by pigment, apparently

* We have defined this family in 'Fisheries, Ireland, Sci. Invest.,' 1904, v., now in the press. It comprises the genera *Petalophthalmus*, *Hansenomyxis*, *Scolophthalmus*, and *Ceratomyxis*.

bounding a membranous area which is overhung by a membranous flap apparently rising from its posterior border. *Antennal peduncle* longer than the antennular, and almost as long as the antennal scale, slender, distal joint shorter than the preceding. *Antennal scale* lanceolate in shape, about three and a half times as long as broad, tip evenly rounded, the whole of the inner margin and distal third of the outer margin setose; proximal two thirds of the outer margin without setæ, but bearing eleven strong spines, the first spine at about the end of the proximal quarter of the outer margin, the spines increasing in size distally. *Mouth-parts* agreeing in all particulars with those of *H. fjyllæ*. *First thoracic limb* very much like that of *H. fjyllæ*, without exopod but with a well-developed epipod, no inner meral lobe, seventh joint of endopod with four strong and rather long spines, sixth joint with two, fifth joint with three, and fourth joint with six short spines on their inner margins. *Remaining thoracic limbs* agreeing in their main points with those of *H. fjyllæ*, all with rather slender endopods and well-developed exopods. *Marsupial pouch* of female composed of seven pairs of incubatory lamellæ. *Pleopods* of the female all uniramous, the rami of the first four pairs uniaarticulate, those of the fifth pair biarticulate; pleopods increase in size posteriorly, the fifth and longest pair reaching to the base of the telson. *Telson* longer and a little wider than the last segment of the pleon, almost oblong in shape, sides slightly arcuate; apex wider than the base, truncate or very slightly emarginate, with a median small spine and about six or seven long spines on each side; lateral margins armed with about twenty-five fairly long spines arranged more or less in series of three. *Outer uropod* nearly twice as long as the last segment of the pleon, two-jointed, terminal joint about one seventh as long as the basal; outer margin of the basal joint without setæ, but armed with twenty-one stout spines.

Length of adult female 20 mm.

Locality. Off Coulman, 100 fath., two females.

Apart from the eye-apparatus, which may possibly be entirely absent in *H. fjyllæ*, the latter differs from *H. antarctica* chiefly in the characters of the antennal scale and outer uropods, and of so much of the telson as remains in Hansen's specimen. The peculiar structure which we have noted on the basal joint of the antennular peduncle in *H. antarctica* may prove to be an auditory organ.

Fam. Mysidæ.

Genus PSEUDOMMA, G. O. Sars.

Pseudomma Belgicæ, Hansen (MS.).

Form as usual in the genus. *Carapace* with the cervical sulcus well marked, evenly rounded in front, emarginate behind so as to expose the last thoracic segment. *Pleon* longer than the carapace, first five segments subequal in length, sixth about twice as long as the fifth. *Eye-plates* contiguous, slightly cleft in the median line, subquadrangular in shape, extending not quite to the end of the basal joint of the antennule, margins quite smooth, without teeth or armature of any kind. *Antennal scale* about three and a half times as long as broad, its apex extending very slightly beyond the terminal spine of the outer margin. *Mouth-parts and thoracic limbs* not differing in any salient point from those of *P. roseum*. *Telson* slightly shorter than the last segment of the pleon; apex evenly rounded, armed with four pairs of smooth spines, the inner pair about one sixth of the length of the telson, median setæ present; lateral margins armed along their distal halves with about five spines. *Inner uropod* about half as long again as the telson. *Outer uropod* about twice the length of the telson.

Length of an adult female 23 mm.*

Locality. Lat. 78° 25' 40" S., long. 165° 39' 6" E., one specimen.

This species is very closely allied to *P. Sarsi* described by Will.-Suhm from Kerguelen †. It differs, however, in two points: (i.) in having the eye-plates quite smooth, whereas in *P. Sarsi* they are toothed at their antero-lateral corners; (ii.) in having only four pairs of spines at the apex of the telson, which is more evenly rounded than in *P. Sarsi*. *P. Belgicæ* is, moreover, much larger than *P. Sarsi*, the type of which, a female with ovigerous lamellæ well developed, measures only 14 mm. Minor differences in the shape of the antennal scale may also be noticed.

Genus DACTYLAMBLYOPS, nov.

Characters generally as in *Amblyops*, G. O. Sars, except:—*Eyes* more or less pyriform in shape, not flattened, placed

* Dr. Hansen has shown us larger specimens.

† See G. O. Sars, "Voyage H.M.S. 'Challenger': Report on Schizopoda," Zool. vol. xiii.

close together but not contiguous, bearing on the inner dorsal face a short digitate process; visual elements imperfectly developed.

Telson without median setæ.

Second thoracic limbs with the endopods well developed and considerably longer than the endopods of the first limbs.

Type species, *D. Hodgsoni*.

As far as can be judged from Ohlin's description and figures of *Amblyops Sarsi* (Ohlin, 1901), that species should also be included in *Dactylamblyops*.

Dactylamblyops Hodgsoni, sp. n.

Form as usual in the genus *Amblyops*. *Carapace* submembranaceous, covering all the thoracic segments except the last; cervical sulcus well marked; evenly rounded in front and at the antero-lateral corners. *Eyes* rather small, placed close together in the median line, but not in any way contiguous; pyriform in shape, front end evenly rounded; a short digitate process arising from the inner dorsal face; visual elements imperfectly developed, apparently represented by minute granular bodies having a refractive centre. *Pleon* with the first five segments subequal in length, the sixth nearly twice as long as the fifth. *Antennules, antennæ, and scale* missing in the specimen. *Mandibles and maxillæ* not exhibiting any salient points of difference from those of *Amblyops abbreviata*. *First thoracic limb* with endopod of the same size and general structure as in *A. abbreviata*. *Second thoracic limb* with endopod slender and about twice as long as that of the first. *Pleopods* in the male agreeing essentially with those of the males of the genus *Amblyops*. *Telson* not quite as long as the last segment of the pleon, triangular in shape, tapering evenly to a narrowly rounded apex and about twice as long as it is broad at its base; the distal half of each lateral margin bearing about nineteen spines gradually increasing in length towards the apex; terminal spines about one tenth of the total length of the telson; median setæ absent. *Uropods* broken in the specimen.

Length of the single specimen, a male, 13 mm.

Locality. Lat. 66° 52' 9" S., long. 178° 8' 15" W., 2030 fath.

This species may be distinguished from its nearest ally and probable congener, *Amblyops Sarsi*, Ohlin, by the eye, which in the latter appears to be sharply pointed in front; and by the telson, which Ohlin describes in *A. Sarsi* as having the distal half of the lateral margins fringed with short setæ.

GENUS *MYSIDETES*, Holt and Tattersall.

Mysidetes, of which we give a full diagnosis in a paper now in the press*, differs chiefly from *Mysideis*, G. O. Sars, in having the pleopods rudimentary in both sexes. The telson is cleft, the cleft armed with spines, and the inner uropod has a row of spines from the otocyst almost to the extremity. The antennal scale is setose on both margins. The first and third thoracic limbs have endopods of the usual type and serve respectively to distinguish the genus from *Heteromysis* and *Mysidella*, which resemble it in the other characters mentioned above.

Mysidetes posthon, sp. n.

Form robust. *Carapace* produced in front, with a short and very obtuse rostrum; emarginate behind, leaving the last thoracic segment exposed. *Pleon* with the first five segments subequal in length, sixth segment barely once and a half as long as the fifth. *Eyes* large, globose; pigment brown. *Antennular peduncle* with the outer distal corner of the basal joint produced into a long narrow process, which extends beyond the distal extremity of the second joint. *Antennal scale* lanceolate in shape, setose all round, about four times as long as broad. *Antennal peduncle* very little more than half of the length of the scale, third joint shorter than the second. *Mouth-parts* in all respects as in *Mysideis*. *First and second thoracic limbs* with the endopods substantially as in *Mysidopsis*. Remaining thoracic limbs having the tarsus of the endopod composed of six to eight joints; the endopods of the last pair much more slender than in the preceding pairs. *Male genital process* very long and narrow. *Pleopods* of both sexes rudimentary, consisting of a single short ramus bearing at its base a short external lateral process tipped with setae. *Telson* about as long as or a little longer than the sixth segment of the pleon and about twice and a quarter as long as wide at base; tapering gradually to the apex, in which is a cleft equal in depth to nearly one fourth and in greatest width to about one seventh of the total length of the telson; cleft armed with about eighteen teeth on each side; apex of the telson with a pair of spines on each side of the cleft, the outer being the longer; lateral margins armed throughout with about seventy spines, which become arranged in series towards the apex. *Inner uropods* with about twenty-six spines from the otocyst to the last fourth

* 'Fisheries, Ireland, Sci. Invest.,' 1904, v.

of the total length of the uropod. *Outer uropods* about half as long again as the inner.

Length 25 mm.

Locality. Four specimens from holes in the ice at winter-quarters. One from 100 fathoms, off Coulman.

Mysis maxima, Hansen (MS.).

The 'Discovery' collection contains two Mysids, taken at lat. $78^{\circ} 25' 40''$ S., long. $165^{\circ} 39' 6''$ E., of which the largest is an immature male measuring 40 mm. In general these individuals agree, except in size, rather closely with the northern *Mysis mixta*, lately transferred by Norman (1902) to the new genus *Michthemysis*. The pleopods of the male, however, though imperfectly developed, present a sharp distinction, in that the last pair are biramous; but do not as yet offer evidence of distinction in the adult from *Hemimysis*, while the mouth-parts differ in no important respect from those of *Mysis, sensu stricto*, and its immediate allies.

On visiting Dr. Hansen one of us found that he had already diagnosed the specific characters of this form, of which he possesses an abundant material, and some specimens which he was kind enough to lend us show that the adult is distinct from any of the genera recognized by Norman.

As we cannot from 'Discovery' material give an adequate account of the species in the adult form nor assign it to a properly diagnosed genus, we leave these tasks in the very capable hands of Hansen.

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