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REPORT ON THE COLLECTIONS  
OF  
NATURAL HISTORY

MADE IN THE ANTARCTIC REGIONS DURING  
THE VOYAGE OF THE

“SOUTHERN CROSS.”

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## X I.   C R U S T A C E A.

By T. V. HODGSON.

(Plates XXIX-XL.)

FOR the opportunity of examining the collection of Crustacea brought home by the '*Southern Cross*' Expedition, I am indebted to Professor F. J. Bell, and I am much more indebted to him for his kind assistance and advice during the progress of the examination. The collection came to me in about sixty bottles, for the most part of two-ounce capacity. The state of preservation of the specimens is a matter which calls for some comment; as a rule, far too many specimens were crammed into one bottle, the result being that they arrived at the Museum in a more or less macerated condition; some were very bad.

A summary of the results may be expressed as follows:—

Decapoda . . . .	6	genera,	6	species,	including	1	new	species
Schizopoda . . . .	1	"	2	"	"	2	"	"
Isopoda . . . . .	7	"	10	"	"	10	"	"
Pycnogonida . . . .	1	"	1	"	"	1	"	"
Cumacea . . . . .	1	"	1	"				
Copepoda . . . . .	2	"	2	"				

With regard to the Amphipoda, I sincerely regret that my duties have prevented me from seriously dealing with this group.

A preliminary examination has been made, and the species roughly sorted out; from this I should assume that there are upwards of thirty-five species in the collection, and that at least twenty-five will prove to be new. This group then, as might have been expected, is the most important of the Arthropod phylum.<sup>1</sup>

The Cumacea was represented by a single mutilated specimen from Cape Adare, and I am unable to assign even its generic rank. Two genera of Copepoda were found in a bottle containing an assortment of specimens, but they were so macerated as to be useless for identification. They represented two genera of Calanids. It is

<sup>1</sup> I am glad to say that Mr. A. O. Walker has kindly undertaken to examine it.—F. J. B.

noteworthy that no Decapods were found within the Antarctic circle or anywhere near it, and further that no new genera were discovered; most of the species belong to well-known genera, and on the whole show a close relationship to northern forms.

I am also indebted to the Rev. T. Stebbing, F.R.S., for assistance with regard to the Isopoda, and more particularly to Mrs. L. E. Sexton for the drawings, which have been made with extreme care under very disadvantageous conditions.

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## CRUSTACEA THORACOSTRACA.

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### 1. DECAPODA.

#### FAMILY PORTUNIDAE.

##### NECTOGARCINUS ANTARCTICUS.

**Portunus antarcticus**, Jacquinot and Lucas, Voyage au Pole Sud (Hombron and Jacquinot), vol. iii. (1853), Crustacea, p. 51.

**Nectocarcinus antarcticus**, A. Milne Edwards (21, p. 407.)

This species was one of the discoveries of Dumont d'Urville on his celebrated voyage to southern regions. It was also obtained by Ross (16). The large genus *Portunus* was broken up into numerous genera by Milne Edwards in 1861 (21), and that author ascribes as the distinctive features of the genus *Nectocarcinus* the presence of only four anterolateral teeth on the carapace, and the sub-lanceolate character of the dactylus of the last pair of thoracic appendages. In the paper cited above, Milne Edwards assigns three species to this genus, and figures two of them, but not this species. Milne Edwards does not refer to the dactylus of the last thoracic appendage of this species, which is broadly ovate and typically "portunid," and is so figured by Mr. Miers in the 'Zoology of the "*Erebus*" and "*Terror*,"' and shown by the specimen in the National collection.

The '*Southern Cross*' specimens are two in number, an adult male and a young one, and were taken at the Auckland Islands in ten fathoms.

*Distribution*.—Known only from New Zealand and Auckland Islands.

## FAMILY PERICERIDAE.

## PRIONORHYNCHUS EDWARDSI.

*Prionorhynchus Edwardsii*, Jacquinot and Lucas, Voyage au Pole Sud, Zoology, vol. iii. (1853), Crustacea, p. 8; Rathbun (25, p. 243).

A single specimen of this species was taken at the Auckland Islands on Dumont d'Urville's voyage to the South Pole, and upon this the genus was established. The genus is characterised by the depressed lamellate and emarginate rostrum. In describing the species, MM. Jacquinot and Lucas allude to a second specimen, a female, in the possession of the British Museum, and it would appear that their figure was drawn from this specimen. The figure in question is admittedly defective; the tubercles on the carapace are much too prominent, while the rounded elevations with which they are associated are not indicated, neither is the granular nature of the appendages shown.

Two specimens, ♂ and ♀, occur in the National collection, but nothing is stated as to the locality from which they were obtained. The '*Southern Cross*' specimens, three in number, were taken at the Campbell Islands in 1898, and are all much larger than the specimens alluded to above. The carapace and the greater part of the appendages are concealed by a dense incrustation of Polyzoa, and in addition to this, on the two smaller specimens, there is an interesting growth of a stout foliaceous green alga. These growths very largely conceal many details of structure, but there can be no doubt as to the identity of the species. The granular character of the limbs, which has been made a specific character, is practically absent, but enough remains on the female specimen to show that this feature is doubtless dependent on age. Another point to which it is desirable to call attention is the abdomen of the ♀. In the specimen in the National collection the abdomen is narrow, and scarcely covers more than half of the sternal area, whereas in the '*Southern Cross*' specimen the abdomen is much broader, and entirely occupies the sternal area. This latter specimen bears ova, the condition of which indicates they were not far from hatching.

1 ♂. Size of carapace, 160 × 135 mm.

2 ♂. Size of carapace, 133 × 114 mm. Two legs and a cheliped missing.

3 ♀. Size of carapace, 114 × 102 mm. Both chelipeds missing. Bearing ova.

*Distribution.*—This species is only known from the Campbell and Auckland Islands.

## FAMILY MAIIDÆ.

## PARAMITHRAX PERONI.

**Paramithrax Peronii**, Milne Edwards, Hist. Nat. des Crustacés, vol. i., p. 324 ;  
Jacquinot and Lucas (15, p. 10) ; Miers (17, p. 5) ; Haswell (9, p. 13).

Two small ovigerous females of this species were obtained in Adventure Bay, Tasmania. As with numerous members of the Maioid Crustacea, these specimens are covered with algæ, sponges, &c. A few dried specimens, showing considerable variation in size, occur in the National collection, and from the available information it appears clear that this crab is not uncommon in the shallow waters of the South Australian region.

*Distribution*.—"Indian Ocean" (20), "Australia" (17), "New Zealand" (15).

## FAMILY PINNOTHERIDÆ.

## HALICARCINUS PLANATUS.

**Cancer planatus**, Fabr., Ent. Syst. ii. (1793), p. 446.

**Halicarcinus planatus**, White, Ann. and Mag. Nat. Hist. xviii. (1846), p. 178.

**Hymenosoma planatum**, Haswell, Cat. Austral. Crust. (1882), p. 114, *ibique citatu*.

This is a very abundant and widely distributed species in the Southern Hemisphere. It is subject to a considerable amount of variation, but this after all is confined to comparatively narrow limits. These variations and the immense area over which this species is distributed has led to the existence of a number of synonyms. The '*Southern Cross*' specimens are three in number, males, and quite small, being barely a quarter of an inch across the carapace, and were obtained at Auckland Islands in ten fathoms.

The habitat of this species seems to vary from between tidemarks, rock-pools to a depth of 150 fathoms, and a bottom of sand, mud or ooze.

The National collection contains a large number of specimens from various localities, showing a circumpolar distribution.

## FAMILY GALATHEIDAE.

## MUNIDA SUBRUGOSA.

*Munida subrugosa*, Miers, Zool. Voy. 'Erebus' and 'Terror,' Crustacea (1874), p. 3; Henderson (10, p. 124); Milne Edwards (22, p. F 36).

This is one of the widely distributed species of the Southern Hemisphere and is very closely allied to its congener *M. rugosa* of the northern region. A. Milne Edwards (22) points out that it is subject to a not inconsiderable amount of variation, and Professor Henderson, relying on the distribution of spines on the dorsum of the carapace, names a particular variety *australiensis*. Mr. Miers invariably maintained that *M. gregaria*, which is found in company with this species in the Falkland region, is only the young of *M. subrugosa*. General opinion does not, however, favour this view, though it is generally admitted that the only reliable points of distinction are to be found in the maxillipeds. The specimens brought home by the 'Southern Cross' expedition were numerous and were obtained at the Auckland and the Campbell Islands. None of them, however, show the distinctive features of Professor Henderson's *australiensis*, although it is true that the characteristic row of four spines is usually present. These should be sub-equal, but they are not, for the outer ones are extremely minute and not readily seen. Spines on or near the cervical groove may or may not be present and are usually minute. The absence of spines is more noticeable in the Auckland Island specimens, but as these are much smaller it is only to be expected.

Fifty-one specimens, ♂, ♀, and young, Auckland Islands.  
Ten fathoms.

Thirteen specimens, ♂, Campbell Islands.

*Distribution*.—Circumpolar.

## FAMILY HIPPOLYTIDAE.

In dealing with the Crustacea Macrura of the 'Challenger' Expedition Spence Bate (1) sub-divided this family into some ten genera, but these do not appear to be generally accepted. At any rate, a number of new species belonging to the family have been described since the appearance of that report, and in many cases (Milne Edwards, 22) without either reference to Spence Bate's classification, or the essential features upon which it is based. This

can only cause confusion, and having no desire to add to it I have accepted Spence Bate's classification in its abbreviated form as quoted by Mr. Stebbing in his "Crustacea" (30). This summary admirably answers all practical purposes and serves to discriminate fairly readily between a large and increasing number of species.

The genus *Merhippolyte* of Spence Bate had two species assigned to it by its author and, for the reason alluded to above, I have not been able to ascertain whether any further additions have been made.

MERHIPPOLYTE AUSTRALIS.

(Pl. XXIX.)

Carapace rather short, the posterior two-thirds straight, the anterior third produced into a prominent rostrum, the two together bearing seven or eight prominent teeth. The rostrum is deep and bears two or three teeth on the under margin. The carapace bears a stout spine at the outer margin of the orbit and another exists at the lower angle. Posteriorly the carapace is curved backwards. Pleon smooth, epimera large, those of the first three segments rounded and the second much the largest, the remainder are pointed posteriorly, the last being small and spinous. Telson moderately long, narrow, five spines at the extremity, two pairs of spines and a few setae on the dorsal surface.

First antenna. A stout three-jointed peduncle, of which the basal joint is longer than the other two and bears a very large spine, reaching to the extremity of the following joint. Of the two multiarticulate flagella, the inner one is long and somewhat tapering, the outer one is exceedingly stout for nearly two-thirds of its length and then suddenly becomes quite slender.

Second antenna. The basal joint bears a stout spine externally at the articulation of the exopoditic squame. The second joint of the two-jointed peduncle of the flagellum is long and the two basal joints of the flagellum are larger than the remainder. The flagellum is comparatively long. The squame is spinose at its exterior termination and bears a close fringe of long setae; the broadest part of the squame is rather less than one-third of its length. A row of red pigment spots (in spirit specimen) occurs along the margin of the muscles of the organ.

Eye large, pyriform, cornea hemispherical with ocellus contiguous.

Mandible is stout, with a broad cutting edge bearing five blunt

teeth. The molar process is a somewhat oval pad surrounded by a close fringe of stout papillae. The palp is well developed and consists of a three jointed appendage, the joints being nearly uniform in length but differing considerably in breadth from the basal one.

First maxilla. The coxa is somewhat crescentic in shape, the horn directed forwards and thickly covered with long spinose setae; the basis is large, irregularly oval, and its inner margin very thickly covered with stout setae; the endopodite is a curved, tapering joint, its truncate end being indented and the inner lobe bearing two long setae.

Second maxilla consists of a small rounded setose coxa, and a large bilobed basis, the distal lobe being much the largest, both are setose. The endopodite is a comparatively long, slender process armed at the extremity with two slender spines. The scaphognathite is large and its entire margin is setose, excepting the innermost posterior portion. It is truncate in front and fairly broad, curved and narrow behind.

First maxillipede is lamellar, the coxa is comparatively small and somewhat rounded, the basis is half as large again, the inner margin being slightly incurved and the distal margin rounded, both coxa and basis are very setose. The endopodite is a two-jointed setose appendage with a terminal claw. The exopodite is a thin lamellar appendage provided with long setae, and from its inner margin arises a multiarticulate flagellum which bears long plumose setae at its extremity.

Second maxillipede is a large lamellar appendage. The propodus is almost the largest joint, and somewhat pyriform in shape; it is reflexed on the remainder of the limb. The dactylus is a narrow band-like joint which runs along the apparent posterior half of the propodus. Both are richly setose. The exopodite is a large multiarticulate flagellum, setose, more particularly at its extremity; at the base is a fan-like appendage of numerous segments.

Third maxillipede. The first joint is small, the next is very long and stout, with small tufts of setae throughout its entire length, and these not confined to any part of the margin. The two following joints are not so long as the latter, and the longer terminal one appears to be broken; if so, the wound is an old one, and the tip is much discoloured. These two joints bear horizontal rows of setae throughout their length.

The thoracic appendages vary in size; the first two are chelate, the former being very stout and with small tufts of setae throughout its length; these are specially noticeable at the extremity of the

propodos and dactylus. The chela of the second appendage is similar but smaller, and the entire limb is much more delicate and, by a good deal, the longest of the series. The carpus is divided into fourteen more or less distinct joints, and of these the most distal is as long as any other two. Of the remaining appendages, the next or third is the longest. It is stoutly built, and the carpus and meros respectively, bear one and two distal spines. The inner margin of the propodos and dactylus bear smaller spines along their entire length, and the latter terminates in two claws. The fourth and fifth are similar, but the propodos in the latter bears a conspicuous tuft of setae at the distal extremity.

In the specimen most closely examined it was found that the second and fourth appendages were obviously replacements due to injury, as they were very much less than normal size.

The pleopods consist of a stout peduncle and a lanceolate exo- and endopodite, the pair forming the caudal fan being large and ovoid. The exopodite is scarcely as long as the endopodite, but is obscurely divided near the extremity; this division is marked by the presence of a stout spine on the outer border. Another stout spine exists at the proximal end, but this belongs to the peduncle.

The telson is long and gently tapering, rounded at the extremity, which bears five spines among the setae. The middle one of these is small, the adjacent pair are very long and the outer of moderate size. The dorsal surface bears two pair of lateral spines and a few stout setae near its junction with the body.

This species is a very close ally of *Hippolyte magellanicus* of Milne Edwards (22, p. F. 46), but the specific descriptions afforded by that work are by no means satisfactory. Four specimens of this species were taken at Auckland Island in ten fathoms. The specimens varied in size from thirty-eight to twelve millimetres, measured from rostrum to telson. The species also appears subject to some variation as regards the rostrum; the specimen examined had  $\frac{8}{3}$  teeth, two of the others  $\frac{7}{3}$ , and in one of these a lower tooth was very small, and the fourth specimen had  $\frac{7}{2}$  teeth.

A large member of the Palaemonidae was taken from the stomach of a seal on Duke of York Island, but it is in such a mangled condition that no satisfactory description can be made.

## 2. SCHIZOPODA.

Professor Sars, in his 'Challenger' Report (27) on this group, gives a synopsis of all the species of *Euphausia* known at the date of publication of that report. Mr. Stebbing (31), in describing a new species from the Falkland Islands, adds the more recently discovered species to the synopsis of Professor Sars. The latter author gives a brief critical summary of the characters usually made use of in determining the species. In spite of deficient information on many points, I have decided to describe the two following species as new; concerning one, *E. glacialis*, there can be no doubt, but with regard to the other, *E. australis*, there may be some question as to whether or no it is not identical, the differences noted being due to age. The locality is the same, the date of capture does not vary by a fortnight (12 days). Size is the most conspicuous difference, and at present it is very much open to question whether the proportions of the joints of the appendages are trustworthy characters.

## EUPHAUSIA GLACIALIS.

(Pl. XXX.)

Body about twenty-five millimetres long, from rostrum to telson. The anterior part of the carapace is keeled and produced into a short and broad rostrum, of which the base occupies the entire width of the carapace.

The ventral margin of the carapace bears a small spine anteriorly and a larger one laterally about the middle of its length. The hinder margin is produced backwards to form a pair of lateral rounded wings. The pleon segments are very nearly equal.

Telson comparatively long and slender, lateral appendages large with a slight outwardly directed curve. Uropods approximately two-thirds the length of the telson. Eyes large, pyriform, the cornea very large, and a luminous organ in close connection with it externally.

First antenna. The first joint of the peduncle is at least twice the length of the second, and at its distal extremity it bears a membranous lappet on one side and a spine on the other. The second joint also bears a small lappet, and the third carries two sub-equal multiarticulate flagella; the outer flagellum has a swollen base and this bears a few sensory setae.

Second antenna. Basal joint of peduncle large and bearing a long slender spine externally at the base of the antennal squame. The spine bears a row of forwardly directed teeth on its inner margin. The squame is of moderate size, outer margin straight, terminating in a small tooth, distal margin somewhat rounded, only very slightly projecting beyond the tooth and like the inner margin setose; setae long. The multiarticulate flagellum is of moderate length and supported on a three-jointed peduncle, the proximal joint is small and the following one the longest, the three together being about three-quarters the length of the squame.

Mandible. Cutting edge irregularly dentate, the two jaws being dissimilar. The molar process is large and its extremity covered with closely set ridges. The palp is very long, three jointed. The basal joint is short, the middle one is the largest, but only by a little, and sparingly setose. The terminal joint is more slender, and near the distal extremity bears a few stout setae, the terminal ones being long and pectinate.

First maxilla normal; the free margin of the coxa is rounded and bears spinose setae, those which are proximally situated being the longest; the inner margin of the basis is truncate and beset with short spines. The palp is ovoid and carries a few stout setae. The epignath is very large and thin, ovoid and without setae.

Second maxilla. The coxa and basis are both bilobed; in the former case the lower lobe is the largest, and in the latter the distal lobe is nearly twice the size of the other. The lower coxal lobe is rounded, the other lobes merely having their angles more or less rounded off. The inner margin of both segments of the two joints are closely beset with stout setae, most of which are spinose, and they occur on the surface of the appendage, some distance from its edge. The palp is ovoid, and a little longer than the basis; it bears comparatively long setae on its inner edge. The epignath is narrow, about as long as coxa and basis together, and is sparingly setose.

Maxillipede. The dactylus is about half the length of the propus, and the carpus has the same proportion to the meros. The ischium is the longest joint, twice the length of the meros, and slightly exceeds the exopodite in length. Its inner margin is provided rather sparingly with comparatively short setae and long plumose setae throughout its entire length. The exopodite consists of a basal portion, which terminates on the outside in an obtuse point, and a terminal natatory portion setose only on the outer margin. The proportions of the first maxillipede practically hold good for the two following appendages, the ischium, however, increasing in

size to the penultimate limb. In the thoracic appendages, strictly so-called, these proportions fail. In the last three limbs the carpus shortens, and the meros is not only longer in proportion, but of equal size in the three limbs.

The pleopods are subequal in size and of uniform structure, with, of course, the exception of the last. The coxa is very short, its distal margin being very sinuous; the basis is comparatively long and stout. The exopodite is the largest, lanceolate, with long plumose setae on the distal one-third of the outer and two-thirds of the inner margin. The endopodite is smaller, its distal portion being more equally setose on both sides, and the inner margin bears a long finger-like process about the middle of its length.

The uropods are large, the basipodite is broad, and bears on its rounded outer margin a row of plumose setae. The exopodite reaches to the origin of the telsonic appendages, and very closely resembles the antennal squame in structure. The endopodite is about the same length, tapering, and has long plumose setae on both sides.

The telson is proportionately broad at the base; about one quarter of its length it tapers somewhat rapidly for a short distance, and then very gradually. Between the distal half and the origin of the lateral appendages are three teeth on either side. Beyond the third spine, which is the largest, the telson tapers quickly, and then terminates in a lanceolate manner. The appendages are a pair of large, somewhat outwardly curved blades.

Some twenty to thirty specimens of this species were taken between the ice-floes on January 13, 1899, in lat.  $65^{\circ}52'$ , long.  $162^{\circ}32'$  E. Temperature  $31^{\circ}$  Fahr.

#### EUPHAUSIA AUSTRALIS.

Body about forty-five millimetres in length from rostrum to telson, and very stoutly built.

In general anatomical details this species so closely resembles the last that I was disposed to regard *glacialis* as the young of this form. Close examination proves that the two forms seem distinct, and it is only necessary here to call attention to the points of difference.

The carapace is precisely similar, save that the rostrum is narrower; its base does not occupy the entire width of the carapace.

First antenna. Occurs both as singular and plural. The lappet at the distal extremity of the first joint is bi-lobed, and that at the end of the second extends to half the length of the third joint.

Mandible. Second joint of palp a little stouter, and sparingly setose.

First maxilla. Very similar.

Second maxilla. Palp somewhat more conical.

Maxillipede. Proportions of the joints differ slightly, and may be represented as follows: dactylus, 4; propodos, 5; carpus, 6, and meros, 11. The two following maxillipedes do not differ conspicuously from this, but in the two first thoracic limbs proper the dactylus is rather less than half the length of the propodos and the carpus is more than half the length of the meros. In the last limb the proportions are, dactylus, 4·5; propodos, 4·5; carpus, 3; meros, 19·5.

The telson is much more slender, but otherwise precisely similar.

A score or so of individuals of this species were taken between the ice floes in lat. 62° S. on the 1st of January, 1899, the temperature not recorded. They were in a terribly bad state of preservation.

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### 3. CUMACEA.

A single specimen of this group was taken off Cape Adare, but it is in a mutilated condition.

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## CRUSTACEA ARTHROSTRACA.

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### 1. ISOPODA.

#### TANAIDAE.

Like many others, this family stands much in need of revision. Fifteen genera, containing something like sixty species, have been described, and many of these are only known from single specimens. (Dollfus, 8.) The species are separated by very minute characters, and very little is known concerning their life histories and the extent to which sexual dimorphism occurs. Mr. Beddard has described in the 'Challenger' Reports (2) a species under the name of *Paratanaïs dimorphus*, but this species does not seem to belong to any of

the genera defined by Professor G. O. Sars in his "Crustacea of Norway" (29). The species described below is obviously a close relation of Mr. Beddard's *P. dimorphus*, and, considering the present state of our knowledge, I have preferred to place this '*Southern Cross*' species with his rather than constitute a new genus, merely notifying the fact that Professor Sars' (29) and Mr. Beddard's (2) genus *Paratanais* are not in accord. But for the structure of the uropods I should have placed this and Mr. Beddard's species in Sars' genus *Heterotanaeis*.

PARATANAIS ANTARCTICA.

(Pl. XXXI.)

Cephalon very large, pyriform, eyes distinct at the base of the antennae. Thoracic segments very slightly tapering, the first one is the broadest, and less rounded laterally than the others. The fourth and fifth are sub-equal in length. The abdomen continues uniformly the slight taper of the thorax, and the first segment is longer than the following five, but the last is longest as well as narrowest, and is ovoid in shape, with a terminal setose projection in the middle line. The uropods are conspicuous, and comprise a short and stout peduncle, with two-jointed exo- and endopodites, the former being the largest.

First antenna. Peduncle two-jointed, the first joint being two and a half times as long as the second. The flagellum is three-jointed; the first joint is very small, with two setae; the second also carries two setae distally, and is twice as long as the rounded terminal joint, which carries four long setae.

In the female it is triarticulate.

Second antenna. Peduncle three-jointed. The joints are stout, and not very large; the first is shortest and the second longest, the third carries a slender spine distally. The flagellum is three-jointed. The first joint is about as long as the peduncle, but much more slender, and somewhat curved. The second joint is about half the length, and both bear distally one or two setae. The terminal joint, which carries four setae, is minute.

Mandible. Cutting edge incurved, with fine serrations on the frontal margin. Molar tubercle well developed.

Maxillipede five-jointed. The dactylus small, digitiform, with four long setae, propodos longer and much stouter, inner margin expanded about the middle of the joint, bearing four long setae. Carpus with three long setae near the inner distal extremity, and the meros expanded externally round the carpus.

Thoracic appendages. The first of these in the male reaches an extraordinary development. The dactylus is very long and slender, much curved near its extremity. The propodos is more than half as long, stout, and has articulated to it a piece which is curved through a right angle. This piece bears a tooth at the extremity on the outer margin, and a rounded projection or tubercle on the inner. The carpus is distinctly shorter than the propodos, and is broad, somewhat irregular proximally. The meros is very large and irregular, besides being considerably and irregularly expanded distally. It bears a large lateral wing externally near the proximal end.

The remainder do not present any striking features. The three anterior pairs are a little longer and more delicate than the posterior three. These latter have one or two truncated spines at the termination of some of the joints.

Pleopoda. A rounded basipodite, with ovoid exo- and endopodites arising some little distance apart. The exopodite is smallest, and both have long setae on the inner margin.

Uropoda. The two-jointed exopodite equals in length the first joint of the endopodite. The former terminates in two long setae, the latter possesses four.

Owing to an accident with the preparations further anatomical details cannot be given.

Size about 4 mm.

Eight specimens, four ♂; four ♀, were taken off Cape Adare, in 20 to 24 fathoms, from the roots of seaweed. Temperature 29° Fahr.

#### GNATHIA.

Of this interesting genus a very large number of species, something like twenty-five, are known, nearly all of them coming from European waters. For our knowledge of these species we are mainly indebted to the works of M. Hesse (11 and 12) and Professor G. O. Sars (29). Mr. Beddard has described four species from the '*Challenger*' collections, and, with the exception of the species described below and another from New Zealand, these are all that are known from extra-European seas.

#### GNATHIA POLARIS.

(Pl. XXXII.)

Specific character. Pointed cephalon, more pronounced in male. Scythe-like character of the mandibles in male, and the markings on the two penultimate segments of the thorax.

*Description of Male.*

Body of nearly uniform diameter. The cephalon is broad, roughly quadrangular, the postero-lateral margins being somewhat rounded. The frontal margin bears a broad triangular rostrum in the middle line; it then becomes straight for a short distance on each side the rostrum, and then incurved, to terminate with a stout pre-ocular spine. Eyes small. The anterior portion of the thorax is separated from the posterior by a conspicuous constriction. Of the three posterior segments, the first is marked in the middle line with an ill-defined rectangular patch, the second bears a median longitudinal groove, and the third is very strongly curved. The abdomen comprises the normal number of segments, and terminates in an elongate triangular telson.

Antennae. The first antenna consists of a three-jointed peduncle, the last joint being longer than the other two together, and a four-jointed flagellum. The second has a four-jointed peduncle, the two last being large and sub-equal, and the two proximal ones being much shorter. The flagellum is six-jointed.

Mandible. The mandibles are scythe-like in general appearance, the amount of curvature at the free end being variable. The inner margin is somewhat sinuous, and the outer drops abruptly a little short of its middle.

Maxillipede. This consists of a roughly triangular plate attached by its broad base; the inner margin is straight, the anterior slightly sinuous, and the outer is very oblique. The masticatory lobe is a clavate process bearing two stout knobbed setae, which interlock with those from the opposite side. The palp consists of four rounded segments, tapering from the first, and each bearing some half-dozen long setae on its outer margin.

Gnathopod. This consists of two segments, the first being a large pyriform plate, the more rounded inner margin bearing long plumose setae. The terminal segment is very small, oval, and bears a few long plumose setae towards the extremity, and a few small setae on the inner margin.

Pereiopoda. Sub-similar, sub-equal. They present no very obvious peculiarities, save that the inner margin has a number of button-like tubercles distributed along it.

*Description of Female.*

The fully developed female possesses an enormously swollen body. The cephalon is comparatively small, obtusely pointed in

front. Two thoracic segments are readily distinguishable, and the other three can at times be made out.

Both pairs of antennae, the pereopoda and the abdomen closely resemble those of the adult male.

In the younger individuals and larvae the cephalon is narrower, and bears very large eyes upon lateral tubercles. The mouth organs, which are at these stages of the normal number, are produced into a more or less conical structure in front of the head.

A fairly large number of specimens of this species were taken at various times off Cape Adare, most of them coming from a depth of twenty fathoms or thereabouts. In one case the tube was labelled: "20-24 fathoms. From the roots of seaweed." But all presented the appearance of living in a similar habitat. They were dirty, and as a general rule more or less covered with some growth, which concealed some structural features and gave them a velvety appearance. The specimens include well-developed males and females, as well as larvae.

#### SPHAEROMIDAE.

Considering the great confusion that exists among the numerous members of this family, it is with some hesitation that I put forward two new species. The difficult problem is to assign to these species the genus which might meet with general approval. Authors do not appear to be agreed on the subject of generic distinctions, and on that account I may have added to the existing confusion. Notwithstanding the obvious differences in form I have placed both species in the genus *Cymodocea* (Leach). The anatomical details do not appear to me to warrant their separation.

#### CYMODOCEA ANTARCTICA.

(Pl. XXXIII., fig. 2.)

Body ovoid, about twice as long as broad. Pleon terminating in a triangular shield with the extremity excavated. It is of a greenish colour, more or less irregularly splashed with a warm brown.

Cephalon comparatively small and having a somewhat truncated anterior margin with a small rounded projection between the antennae. Eyes small, at the postero-lateral angle, which is produced on to the succeeding segment.

Thorax. The first segment arches outwards, and is half as broad again as the cephalon. It is as long as the two succeeding segments,

and, in common with all, bears distinct epimera. These are very well developed and prolonged backwards in the three posterior segments.

Abdomen. Four apparent segments are visible, the second of them bearing distinct epimera. The terminal segment is triangular, its extremity being excavated. The uropods arise a short distance from its anterior margin but do not reach the opposite extremity; they are lanceolate in shape.

First antenna. A stout peduncle, of which the second joint is about half the size of the first; this is followed by a larger joint which from its character might belong to the flagellum. The flagellum consists of nine additional joints.

Second antenna. A four-jointed peduncle, of which the joints progressively increase in size, followed by a flagellum of about eight joints.

Mandible strong, cutting edge very prominent, armed with blunt tubercles and a tuft of strong setae close underneath. Molar expansion well developed. Palp large, of three diminishing joints, the middle one laterally expanded, and the two terminal ones setose, the setae of the middle joint being of peculiar structure.

First maxilla. Two parallel plates, the outer one the stoutest and provided with five prominent spines at the extremity, the inner one with three plumose setae, the inner margin of both bears a few slender setae.

Second maxilla. Inner lobe comparatively broad and somewhat pointed, with setae on inner margin and stouter plumose ones at the extremity, the proximal two of this series being larger than the rest. Outer lobe and palp armed at the extremity with a few serrated spines, those of the palp are the longest.

Maxillipede. The masticatory lobe is produced into a large plate, the free terminal margin is irregular and setose, the five terminal joints form a palp, three of them bear a finger-like process on the inner margin, so that with the terminal joint they occupy approximately the same level despite the natural curvature of the organ; these processes are all setose.

Thoracic appendages. The first three slightly increase in size, but the remainder are sub-equal. The first has the last joints short and stout, it terminates in a claw with one, or two, very small accessories. Of the following three, the meros is expanded, the carpus and propus setose. The three posterior limbs are similar and directed backwards.

Uropods lanceolate, smooth, endopodite the largest.

Three specimens were taken off the Auckland Islands in ten fathoms of water.

No conspicuous difference is exhibited by any of these specimens beyond the presence or absence of the two dark spots on the first thoracic segment. This may be, and probably is, a very variable feature.

CYMODOCEA AUSTRALIS.

(Pl. XXXIII., fig. 3, and Pl. XXXIV., fig. 3.)

The body is twice as long as broad and covered, though not very closely, with short and fine setae.

Cephalon is rounded in front, longer than any of the thoracic segments. Eyes moderately large, and that region of the cephalon is produced slightly backwards on to the first thoracic segment.

The first segment of the thorax is the length of the two following, and they all gradually shorten slightly and progressively to the posterior. The pleon is marked in rather a complex manner. The first segment bears a thumb-like elevation directed forwards and outwards which lies between the mid-dorsal line and the lateral margin. The two following segments are incompletely separated and together form a very broad V-shaped structure on the pleon; the extremity of the arms of the V just extend to the margin of the body and are bi-lobed, the posterior lobe being the shorter. The base of the V is a free backwardly-directed spine. The last pleon segment has the postero-lateral margins curved boldly towards the middle line, the extremity is broadly notched, and the notch is almost completely filled with a rounded lobe. A short way in front of this in the middle line is a rounded tubercle. The uropods are very conspicuous and project beyond the extremity of the body. The inner branch is much the largest and lies parallel to the postero-lateral margin of the pleon. It forms an oblong structure, roughly rectangular. The outer branch forms a truncated cone.

First antenna. Peduncle two-jointed, the first being long and stout, widest distally. Second joint small, partly sunk in the extremity of the first, expanded laterally into a somewhat triangular form. Flagellum ten-jointed, first joint longer than the two succeeding, fourth joint conspicuously larger than the second or third and the remainder becoming reduced in size.

Second antenna. Peduncle three-jointed, the third as long as the other two. Flagellum nine-jointed.

Mandible. Cutting edge forms a stout blunt tooth, molar expansion small. Palp three-jointed, first joint fairly stout, the second rather more than half the size, setose laterally and distally, the distal setae being long. The last joint is about the same size, but more slender, and setose along its entire length on one side.

First maxilla. Outer lobe a slightly curved blade, armed at the extremity with some half dozen or more teeth. Inner lobe straight, slender, and tapering, the extremity provided with two long curved setae.

Second maxilla. Inner lobe comparatively broad, rounded at the extremity, where it is armed with stout setae. Two, near the inner extremity, are conspicuously different, have subsidiary setae on one (?) side. The outer lobe and palp bear long spinous setae; they are all sub-equal in length.

Maxillipede. Masticatory lobe long and narrow, slightly curved outwards distally. The extremity forms a blunt point, and there are two or three small teeth a short distance from it; behind these again is a small tuft of setae. Palp of five joints, of which the middle three possess a digitiform lateral process, setose at the extremity. The terminal joint is finger-like, and also setose distally.

Thoracic appendages. In these there is nothing specially striking. In the first, the basal joint is nearly half the length of the entire limb, the remaining joints are short and stout, the meros being laterally expanded outwards, and the inner margin of the meros, carpus, and propodos bear about a dozen long spines and numerous very fine ones, which latter also occur on the dactylus. This last joint bears a stout claw, a small accessory, and two strong setae.

In the following appendage the joints, except the basal, are much longer, and the inner margin is provided with a series of small spines with an occasional large one.

The others are sub-similar, but longer.

Pleopods. Endopodite obovate, with long plumose setae on its inner and distal margin. Exopodite triangular, outer margin straight, and till near the extremity with fine setae, near the extremity and on the inner margin these become long and plumose.

Seven specimens were taken by the dredge off Cape Adare in eight fathoms. Temperature, 30° Fahr., January 17, 1900. Only one of these, the specimen figured, has the abdomen so ornate; in the others the spine is absent, and the terminal notch is not so conspicuous.

## ARCTURUS.

This genus received a large number of additions from the 'Challenger' collections (2); and, later, Mr. Benedict (3) added six species to the genus, and gave a synopsis of the whole. Another species has since been described by Miss Richardson (26), and the three described below make a total of twenty-six species. Two other species, described by Haswell, from New Zealand in 1882 (9), have not been noticed by the authors cited.

## ARCTURUS POLARIS.

(Pl. XXXIV., fig. 2, and Pl. XXXV.)

Specific character. Spines dorso-lateral. Pleon with two prominent terminal spines, a large lateral spine on each of the three distinguishable segments, the remainder somewhat irregularly covered with short spines, two of which, about the middle of the lateral margin, are more prominent than the rest.

The largest specimens secured by the 'Southern Cross' Expedition measure, exclusive of antennae or spines, some 37 mm. in length, but the average size is about 5 mm., or thereabouts, smaller.

The second antennae are a little shorter than the body.

The mid-dorsal area is smooth; but dorso-laterally there are spines which are more prominent in the anterior thoracic region, and less numerous than elsewhere.

Cephalon. Anterior margin incurved. A prominent spine projects outwards, and somewhat forwards, to protect the eye, which is large. There is a small spine in front of this organ.

The third thoracic segment is the largest, the hinder ones tapering gradually to the pleon. Laterally each segment bears numerous spines of varying size. The spines are most conspicuous on the three anterior segments, and each of these has a large spine more dorsally situated than elsewhere.

Pleon nearly as long as the posterior five thoracic segments.

The first three segments are distinguishable, and bear short spines both dorsally and laterally. A lateral spine is especially prominent on the third segment, and the remainder of the pleon is covered with small spines of approximately uniform size; but two of them, about the middle of the lateral margin, are more prominent than the rest. The mid dorsal line is devoid of spines. The extremity is rounded, and bears two very large and somewhat divergent terminal spines.

First antenna consists of four joints, the first three of which equal the two proximal joints of the second antenna. The first three joints slightly decrease in length from the first, but the proximal one is very broad and irregularly rounded. The last is longer than the two preceding, and is setose along the distal two-thirds of one margin. The setae are stout, tapering, and are borne on a short, slender peduncle.

Second antenna not quite as long as the body and comprises a long peduncle of five joints and a short multiarticulate flagellum. Of the five joints of the peduncle, the two basal are small; the others progressively increase in size, the last one being approximately as long as the two preceding. The second joint has two spines on the outer margin and the third carries two to four; in either case the distal spine is the largest. The fourth joint also bears a distal spine and, with the preceding, it is setose on the inner margin.

Mandible short and stout. The cutting edge bears some half-dozen teeth and a tuft of strong setae below them. The molar process is strongly developed, and there is no palp.

First maxilla. Outer lobe comparatively long and narrow, slightly curved. Armed at the extremity with about nine comparatively long spines. The inner lobe is smaller and more slender, provided with three long plumose setae. The inner margin of both lobes is setose.

Second maxilla. Base is broad, the inner lobe is somewhat rounded, the outer lobe is digitiform, and the palp is similar but broader. All are setose, more particularly the inner lobe, on which three distinct varieties of setae can be distinguished. A tuft of small, simple setae below the inner and distal curve; two or three stout plumose setae come next, and following these distally are the comparatively stout setae, which are more or less plumose.

Maxillipede. Masticatory lobe quadrangular, with rounded angles; anterior margin with stout setae. Palp, the five joints, comparatively short but broad and lamellar, the inner margin richly provided with long setae. The epignath is large, subconical, truncate at extremity.

Thoracic appendages. The first is short and stout, richly setose on the inner margin and on the outer margin of the propus and dactylus. The setae are spinose in places (carpus). The dactylus bears three claws, the middle one being conspicuously the most slender, and is folded in a sub-chelate manner. The three following appendages are sub-similar. With the exception of the two terminal joints all bear distally a prominent spine on the outer margin; the

basal joint bears one or two additional ones. Except this joint, all possess long setae on the inner margin.

The three posterior limbs are of the walking type and also sub-similar. The basis, ischium, and meros are spinose on the outer margin, and, particularly the first of these limbs, the meros to propus inclusive bear numerous small spines on the inner margin.

Pleopods. The first pair are coarse and spinose and form a case protecting the remainder. These consist of a stout basis, spinose on inner side and setose on the other. The exo- and endopodites are large, somewhat widening distally, and having their margins richly clothed with plumose setae.

A large number of individuals were taken off Cape Adare during November and December in from twenty to twenty-six fathoms. In most cases the females had eggs or young in the brood pouch. One fine specimen had no less than sixty young in its pouch.

A small specimen was taken in 6 fathoms off Duke of York Island and at a temperature of  $28.75^{\circ}$  Fahr.

#### ARCTURUS ADAREANUS.<sup>1</sup>

(Pl. XXXIII., fig. 1.)

Specific character. Body not spinose but minutely tuberculated. Pleon segment uniformly covered with very small blunt spines and terminating with two moderately long and parallel spines.

This species is smaller and more slender than the last. The spines, properly so-called, are confined to a pair on the cephalon, the anterior thoracic segments, and the pleon. Spines are replaced by small tubercles, which, however, take a spinous character in the hinder part of the body.

Cephalon. Anterior margin incurved: a pair of prominent blunt spines arise between and somewhat in front of the large eyes. Behind these is another pair of very much smaller spines.

Thorax. The fourth segment is the largest and all are covered with a number of small, closely-set tubercles: a pair of spines are situated dorsally on the first segment.

Pleon about as large as the four posterior thoracic segments. The first three segments are distinct: these and the terminal shield are covered with small spines. The extremity of this shield is rounded and bears two prominent but blunt spines.

The anatomical details bear a very close resemblance to the last

<sup>1</sup> Name altered, after author had sailed for the Antarctic.—F. J. B.

species, and it will be amply sufficient for all practical purposes to point out the differences.

First antenna. The terminal joint is shorter than the two preceding together.

Second antenna. The first joint is very small and the second about twice the size, with four small blunt spines. The third joint is long and bears three or four blunt spines and a few long setae on the opposite side. The fourth joint bears one or two small spines, and setae are disposed along the inner margin at fairly regular intervals. These also occur on the fifth joint, which is the longest.

The mandibles, maxillae, and maxillipedes very closely resemble those of *A. polaris*. The epignath of the maxillipede is narrower distally, and thus becomes more conical.

Thoracic appendages. The first almost exactly resembles that of *A. polaris*. The three following are also similar, but practically devoid of spines; the spines of *A. polaris* are represented by very inconspicuous tubercles. The last three limbs bear one or two blunt spines on the coxa and basis only and the ischium to the propodos bear a row of small curved spines along the inner margin.

Pleopods. The first pair are large and stout, forming a protecting shield to the remainder. Those which serve the branchial function are less clavate than in *A. polaris*, and the basipodite bears seven slender teeth as against five stouter ones.

Five specimens of this species were taken among large numbers of *A. polaris* off Cape Adare.

#### ARCTURUS FRANKLINI.

Specific character. A stout spine near the antero-lateral margin of the cephalon, and six long slender spines on the second and third thoracic segments.

Cephalon of normal contour, with two stout spines between the eyes, and directed slightly forwards, and a stout pair near the antero-lateral angle.

Thorax, first three segments with six long slender spines, two dorsal, two dorso-lateral, and two epimeral. These spines are best developed on the second and third segments, where they are particularly prominent; posterior segments of the thorax with numerous small spines, for the most part situated laterally.

Pleon, first three segments with a row of rather small spines across the dorsum, and the last of the three having a very stout lateral spine. The terminal segment bears numerous small spines

throughout its length laterally, and a few inconspicuous ones are scattered dorsally; two above the average size are situated dorsally about the middle of its length. The extremity is rounded, and bears two divergent and prominent terminal spines.

First antenna, normal structure, reaches to about two-thirds the length of the third joint of the second antenna. Setae on terminal joint few.

Second antenna. The two basal joints each with stout spine, the third joint with three stout spines, proximal shortest, distal largest, fourth joint with two spines proximally situated, and the fifth joint is slightly the longest. Flagellum missing.

Thoracic appendages. The three pairs of setose limbs bear a stout spine on the ischium and meros; the basis has several of varying length. The three posterior, which are essentially ambulatory in character, have a few blunt spines on the basal joints. The meros, carpus, and propodos bear a few slender forwardly-curved spines on the inner margin.

The opercular shield of the pleon is covered with short spines.

A single specimen of this species was taken off Franklin Island in 10–24 fathoms of water, and a temperature of 29·8° Fahr. It is a female, and its body is largely concealed by a vigorous growth of *Spirorbis* and other tubicolous worms, as well as diatoms of large size.<sup>1</sup> Exclusive of antennae, the animal measures some 15 mm. in length.

Three other specimens were taken at this locality; they are of smaller size, but I am not as yet disposed to make a new species for them. With the exception of the two frontal spines, the two terminal spines of the pleon, which are only stumps, and a few very small spines on the lateral margin of the pleon, the bodies are quite smooth; they are, in spirit, light-coloured, and covered with minute brown spots. The second antennae of two of the specimens is perfectly smooth, but in the third, and largest, there are obvious traces of developing spines. This would indicate that these specimens are not yet mature, and to give them a specific rank does not seem to me to be desirable.

#### NOTASELLUS AUSTRALIS.

(Pl. XXXVI.)

Specific character. Uropoda longer than pleon, which is approximately as broad as long, and terminates in a rounded projection.

<sup>1</sup> Mr. V. H. Blackman informs me that the diatom belongs to the genus *Triceratium*.

Body oval, about two and a half times as long as broad, with very large uropoda, covered with small dark coloured spots, which, however, leave small light coloured vacant spaces here and there.

Cephalon, the normal size for the genus. It bears a large prominent median rostrum, the base of which curves outwards to form a stouter if less prominent tooth at the antero-lateral angle. The eyes are large and borne on lateral processes of the cephalon, which is somewhat constricted posteriorly.

Thorax. The segments are all short, the fourth is the broadest and straight, the three anterior ones having a more or less conspicuous forward curve. The lateral margin of these four segments is toothed anteriorly and posteriorly, the intermediate portion being bi-lobed. The three posterior segments are curved backwards, particularly the last one, their lateral margins are rounded but still bi-lobed.

Pleon, lateral margin rounded, posterior truncated, but with a stout rounded projection in the middle line.

First antenna. Peduncle three-jointed; the first is very stout, the other two are more slender, the third being more so. They are sub-equal in length, the flagellum is multiarticulate and reaches about two-thirds the length of the penultimate joint of the peduncle of the second antenna.

Second antenna. Peduncle six-jointed; the first four are short and stout, the third, which is the largest of the four, carries externally a small digitiform scale setose at the distal extremity.

Of the two large terminal joints, the more distal one is slightly the longest, both are sparingly setose, as long again as the proximal four joints. They are followed by a long multiarticulate flagellum.

Mandible. Cutting edge, with a prominent bi-lobed tooth and below a fringe of stout setae. A deep incision between this and the molar expansion. Palp long and slender, second joint twice as long as the first terminal joint, curved and with setae on the inner margin and at the extremity.

First maxilla. Terminal spines of the outer lobe toothed, a series of weaker spines some little distance from the extremity.

Second maxilla. Inner lobe slightly enlarged at its extremity and rounded, the terminal portion densely clothed with rather long setae. The outer lobe and palp are both slender and curved backwards, the former terminates in three, and the latter in two, long setae.

Maxillipede. Inner margin of masticatory lobe quite straight, distal and outer margins slightly rounded, the former bearing a

fringe of spinous setae. The palp has the proximal joints stout, the meros and carpus being laterally expanded, the propodos and dactylus are quite slender. The dactylus, the extremity of the propodos and the inner margins of the carpus and meros all bear comparatively long setae. The epignath is large and ovoid in shape, but the external margin is angular.

Thoracic appendages. The seven pairs are long, sub-equal and much alike. They present no striking features; the meros is expanded distally and bears a tuft of stout setae at its extremity, the carpus and propodos are sub-equal in length, the latter bearing a trianguiculate claw.

The uropods are large and considerably longer than the pleon; the basal joint is distally expanded and almost bi-lobed; the podites are a long oval in shape, the exopods being much the smallest. The entire organ bears tufts of setae at regular intervals.

Three specimens of this species were taken off Cape Adare in 13 fathoms with a temperature of 28·9° Fahr., and three or four more were found on the beach after a gale.

Dr. Pfeffer (24) has described a species from South Georgia which is undoubtedly very closely allied to the '*Southern Cross*' species. He considered himself justified in creating a new genus *Notusellus* for its reception, though it very closely resembles certain northern species of the widely distributed genus *Junira*.

#### HALIACRIS AUSTRALIS.

(Pl. XXXIV., fig. 1, and Pl. XXXVII.)

Specific character. Pleon ovoid, notched at the insertion of the uropods.

Size. Exclusive of antennae, about 4 mm.

Cephalon. Wide, truncate in front, with deep recess for the origin of the antennae. The lateral margin of this recess forms a stout outwardly curved tooth. Eyes large, situated on a lateral projection of the hinder part of the cephalon. Part of the mouth organs project in front of cephalon and can be seen from the dorsal surface.

Thorax. The first four segments do not conspicuously differ in size, although the first is the smallest. The epimera of the first three segments are pointed and of the fourth truncate. The three posterior segments become reduced in size and more curved in a backward direction in passing to the hinder extremity.

Pleon. Two segments are visible in the curve of the last thoracic, the terminal one is ovoid with the small uropods placed laterally some little distance from the extremity.

First antenna. Small, reaching about one-third the length of the fourth joint of the second antenna. Second joint of peduncle longest.

Second antenna. Very long, half as long again as the body. Peduncle five-jointed, the three proximal ones being short and stout, the two distal ones being long and slender, sub-equal in size. The flagellum is multiarticulate, not so long as the two distal joints of the flagellum.

Mandible. Cutting edge consists of a long slender three-lobed tooth and a group of stout setae. Molar expansion well developed and somewhat widely separated from the cutting edge. Palp three-jointed, rather stout, first and third joint sub-equal, third the longest.

First maxilla. Normal.

Second maxilla. Inner lobe truncate, with two long setae, among others, on the inner margin, outer lobe and palp with very long, stout terminal setae.

Maxillipede. Masticatory lobe with inner margin straight and four small spines just above the middle. Extremity truncate and outer margin rounded. Palp of five joints, of which the distal two are proportionately slender, the next two are much expanded. The epignath is large curved, truncate posteriorly, less so anteriorly.

Thoracic limbs. The first is comparatively short and stout, subchelate, meros and carpus expanded; propodos ovoid, dactylus about half its length and slender. The second pair of appendages were missing, the remainder are long, slender, and increase in length to the last, they are alike in structure.

Uropods. Small, simple.

Three specimens were taken off Cape Adare in 20 to 26 fathoms. Temperature 28·9° Fahr.

This is another species closely allied to a form described by Dr. Pfeffer (24) for which he established the genus *Haliacris*.

#### ECHINOZONE.

This genus is one of four into which Professor Sars has divided his genus *Ilyarachna* (29). Five species belong to the original genus, but one of them is doubtful; the other genera each contain a single species. All but one are European or Arctic forms.

## ECHINOZONE SPINOSA.

(Pls. XXXVIII. and XXXIX.)

Specific character. Four prominent spines on each of the four anterior thoracic segments, two on the cephalon; smaller spines on the epimera and on the posterior thoracic segments.

Body ovoid, truncate in front but pointed behind, divided into two by a deep constriction between the fourth and fifth thoracic segments. Body arched and epimera well developed, both spinose.

Cephalon arched in front, with two prominent spines situated laterally; the epimera are large and angular, with a small spine at the antero-lateral angle and another about the middle of the plate.

Thorax. First segment narrow with the epimera poorly developed; the four large spines are confined to the body portion. The three succeeding segments are similar, but the hinder margin of the epimera are more rounded, passing backwards. Each segment has the four prominent spines and a small one at the antero-lateral angle of the epimera, the first two segments having an additional one just behind this. The three posterior segments and the pleon taper uniformly to a blunt point. The thoracic segments bear a spine on either side the middle line, but on the last segment they are mere rudiments. Of the first of these three segments there are four small spines along the anterior margin.

First antenna. Peduncle two-jointed. First joint large and stout, with long seta on the margin and a spine at the distal extremity. Second joint is very small proportionately, and bears the multiarticulate flagellum.

Second antenna. Five joints are visible from the dorsal surface. The first of these bears a stout spine externally, the two distal joints are very long, particularly the last one; both are setose. The multiarticulate flagellum is about half the length of the entire organ.

Mandible. Anterior margin rounded to the cutting edge, which is represented by a large blunt tooth; a tuft of small setae lies close below it, and the molar process is a long slender appendage setose at its extremity.

First maxilla. Outer lobe comparatively broad, curved. The oblique terminal margin with a series of stout spines, of which the two most distally situated are the longest.

Second maxilla. Inner lobe broad, somewhat curved backwards. One very long seta at the terminal angles. Outer lobe and palp normal but stout.

Maxillipede. Inner margin of masticatory lobe straight, distal and outer margins rounded. Distal part setose, the lateral and outer setae being comparatively long and slender, those near the inner angle being stout and spinose. Palp of the normal number of joints, the meros enormously broad. The carpus bears a large ploughshare-like expansion on its inner margin; the edge of this, and to some extent the sides, bear stout setae. The propodos and dactylus are normal, and both bear setae distally.

The epignath is large, roughly semicircular.

Thoracic appendages. The first is missing. The three following are more distinctly ambulatory, and increase in size passing posteriorly. They are slender, and the first is almost devoid of setae; the second is provided with long setae throughout its length, and has the basis, ischium and meros somewhat swollen. The third is attenuated, and is poorly provided with small setae, except at the extremity of the various joints. The ischium, however, bears numerous delicate spines.

The three posterior appendages present a different appearance, and are sub-equal in length. In the first the basis, ischium and carpus are much swollen; in the second the carpus only is thus modified; both limbs are provided with long setae. The joints of the last appendage do not present any striking feature.

The uropods are minute, and are concealed from the dorsal aspect by a slight projection of the pleon.

Two specimens of this species were obtained off Cape Adare, in 26 fathoms. Temperature 28·8° Fahr.

#### COPEPODA.

Two genera of Calanids were taken with *Euphausia glacialis* in lat 65° 52 S., long. 162° 32 E., between the ice floes; temperature, 31° F. They were in a terribly bad state of preservation, much macerated and unfit for description.

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#### PYCNOGONIDA.

Of the large number of specimens obtained by the 'Southern Cross' Expedition, all may be referred to a single species, and that, as might be expected from the locality, a new one.

The genus *Nymphon* is a large one, and a list of twenty-five reliable and eleven doubtful species is given by Dr. Hoek (13) in the 'Challenger' Report referring to this class.

Prof. Sars, in 1891 (28), while adding a few species, divides the genus into three—*Nymphon*, *Chectonymphon*, and *Boreonymphon*.

## NYMPHON AUSTRALE.

(Pl. XL.)

Body robust, with lateral processes of a large size; these are setose, though the body is apparently smooth. Neck short and constricted. Head segment two and a half times as long as the following one. Ocular peduncle long, but very variable, sometimes rounded at the extremity, sometimes obtusely pointed, and occasionally much reduced in size. Lenses apparently rudimentary; sometimes four may be detected, but more commonly only two; a very large proportion of the specimens, however, only show an irregular mass of pigment, the quantity and its precise position being very variable. Proboscis cylindrical, directed downwards.

Mandibles. Scape longer than proboscis, becoming stouter at its distal extremity, and provided with stout setae, many of which are very long.

Chela stout, setose, the claws being longer than the propodus bearing them. They are slender, somewhat abruptly curved at the tips, and beset along their entire biting edge with teeth, which, though conspicuously large and small, are not arranged in strict alternation.

Palp slender, five-jointed; the second joint is the longest, the fifth is a little shorter than the preceding. All are setose; the setae on the two terminal joints being the smallest and the most numerous.

Ovigerous legs, ten-jointed; the first two are very small, and the third is equal in length to the two, the fourth and fifth are much longer, and sub-equal; the last three are also sub-equal in length, the terminal joint bearing a long pectinate claw. The last four segments bear a single row of denticulate spines.

These spines bear three or four lateral teeth on each side. The entire limb is more or less setose. In the ovigerous individuals the first six joints of this appendage are usually much swollen, and this more particularly applies to the fifth joint.

The four walking legs are alike. The second coxa is conspicuously the larger of the three, and the third bears a prominent swelling on

its inner margin. This last joint is more setose than the others. The femur is the stoutest joint of the limb, and is longer than the three coxae together. On its inner margin the setae are short, but on the outer they almost amount to spines, especially at the extremity.

Of the two tarsi, the proximal is both longer and stouter, both exceed the femur in length, setose on the inner margin, the outer is more thickly covered and the setae are almost in the nature of long spines. The distal tibia bears three spines at its extremity; of these the middle one is much shorter than the other two. The tarsus and propus together are a little shorter than the second tibia, they are slightly curved and tapering. The latter bears a long terminal claw with a single minute accessory. The tail is an elongate ovoid.

A very large number of individuals of this species were taken off Cape Adare at various dates and at depths varying between 20 and 26 fathoms. Almost all were in an exceedingly dirty condition, due to a thick growth of diatoms of the genus *Triceratium* or an ally, and other vegetable matter in a more or less decomposed state. This foreign matter is very adherent and it is almost impossible to clean satisfactorily many of them. It gives the animal quite a woolly appearance to unassisted vision. Many specimens, which apparently have recently moulted are quite light-coloured and have a more "refined" appearance, being cleaner, and the spines and setae are much sharper.

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DESCRIPTION OF PLATES.

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PLATE XXIX.

MERHIPPOLYTE AUSTRALIS.

- |                    |                        |
|--------------------|------------------------|
| 1. Carapace.       | 6. Second maxilla.     |
| 2. First antenna.  | 7. First maxillipede.  |
| 3. Second antenna. | 8. Second maxillipede. |
| 4. Mandible.       | 9. Third maxillipede.  |
| 5. First maxilla.  |                        |

PLATE XXX.

EUPHAUSIA GLACIALIS.

- |                    |                                     |
|--------------------|-------------------------------------|
| 1. Animal entire.  | 6. Second Maxilla.                  |
| 2. First antenna.  | 7. Telson and Uropoda.              |
| 3. Second antenna. | 8. Rostrum of <i>E. glacialis</i> . |
| 4. Mandible.       | 9. Rostrum of <i>E. australis</i> . |
| 5. First Maxilla.  |                                     |

PLATE XXXI.

PARATANAIS ANTARCTICA.

- |          |            |
|----------|------------|
| 1. Male. | 2. Female. |
|----------|------------|

PLATE XXXII.

GNATHIA POLARIS.

- |                            |                            |
|----------------------------|----------------------------|
| 1. Male.                   | 7. Mandible of male.       |
| 2. Female.                 | 8. Maxillipede of male.    |
| 3 and 4. Larva.            | 9. Gnathopod of male.      |
| 5. First antenna of male.  | 10-12. Pereiopods of male. |
| 6. Second antenna of male. |                            |

## PLATE XXXIII.

- |                                  |  |                                 |
|----------------------------------|--|---------------------------------|
| 1. <i>Arcturus adarcanus</i> .   |  | 3. <i>Cymodocea australis</i> . |
| 2. <i>Cymodocea antarctica</i> . |  |                                 |

## PLATE XXXIV.

## 1. HALIACRIS AUSTRALIS.

- |                     |  |                  |
|---------------------|--|------------------|
| 1a. Second maxilla. |  | 1c. Mandible.    |
| 1b. First maxilla.  |  | 1d. Maxillipede. |

## 2. ARCTURUS POLARIS.

- |                    |  |                                 |
|--------------------|--|---------------------------------|
| 2a. First antenna. |  | 2d. Second maxilla.             |
| 2b. Mandible.      |  | 2e. Maxillipede.                |
| 2c. First maxilla. |  | 2f. First pereopod (gnathopod). |

## 3. CYMODOCEA AUSTRALIS.

- |                     |  |                    |
|---------------------|--|--------------------|
| 3a. First antenna.  |  | 3d. Maxillipede.   |
| 3b. Second antenna. |  | 3e. First maxilla. |
| 3c. Mandible.       |  |                    |

## PLATE XXXV.

## ARCTURUS POLARIS.

## PLATE XXXVI.

## NOTASELLUS AUSTRALIS.

## PLATE XXXVII.

## HALIACRIS AUSTRALIS.

## PLATE XXXVIII.

## ECHINOZONE SPINOSA.

## PLATE XXXIX.

## ECHINOZONE SPINOSA.

- |                     |  |                      |
|---------------------|--|----------------------|
| 1. Second pereopod. |  | 6. Seventh pereopod. |
| 2. Third pereopod.  |  | 7. First antenna.    |
| 3. Fourth pereopod. |  | 8. Mandible.         |
| 4. Fifth pereopod.  |  | 9. Second maxilla.   |
| 5. Sixth pereopod.  |  | 10. Maxillipede.     |

## PLATE XL.

## NYMPHON AUSTRALE.

- |                                       |  |   |
|---------------------------------------|--|---|
| 1. Male, with appendages of one side. |  | 4. Ovipigerous limb, with fringed spine enlarged. |
| 2. Palp.                              |  | 5. Chela enlarged.                                |
| 3. Chela.                             |  |   |



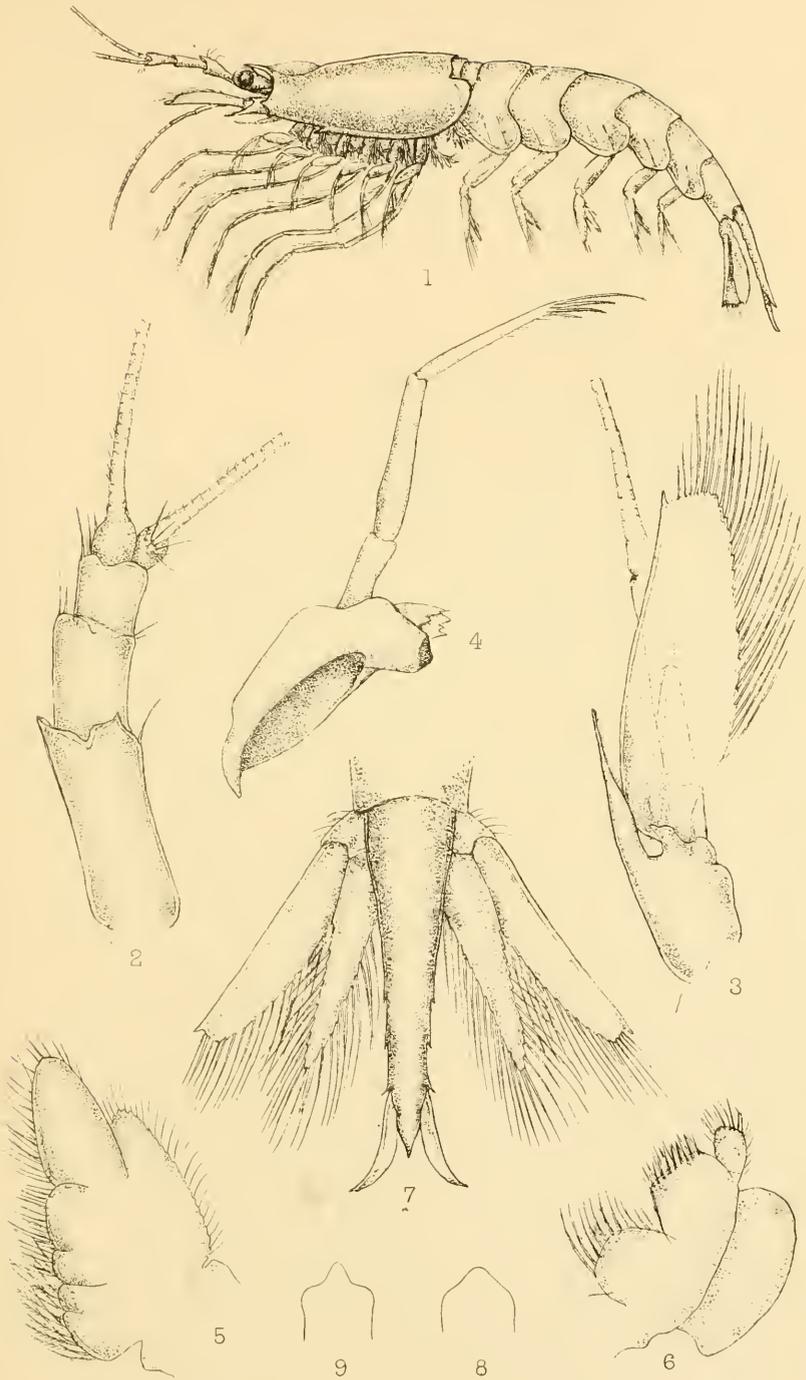


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West. Newman photolith.

HIPPOLYTE AUSTRALIS





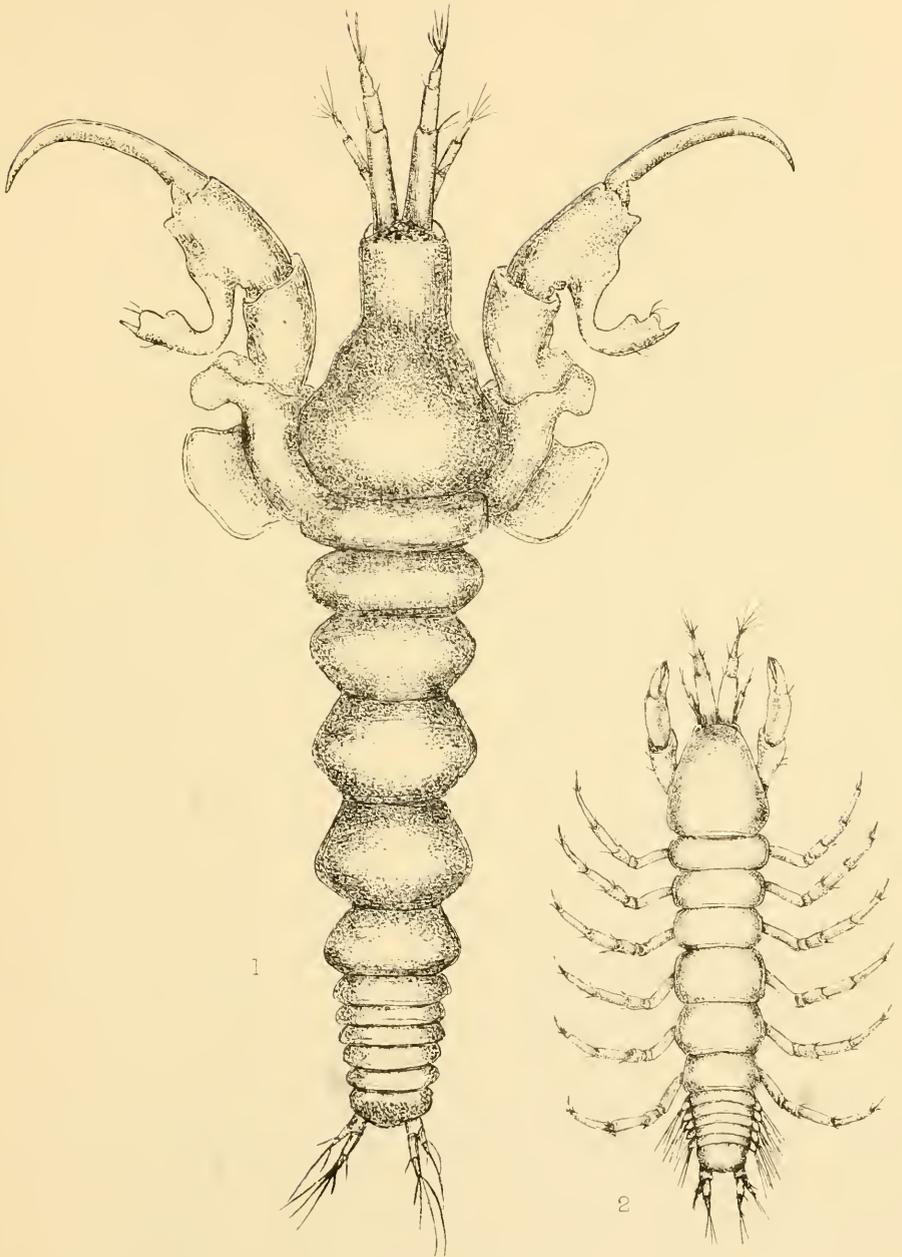
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1-8 EUPHAUSIA GLACIALIS.

9 EUPHAUSIA AUSTRALIS.



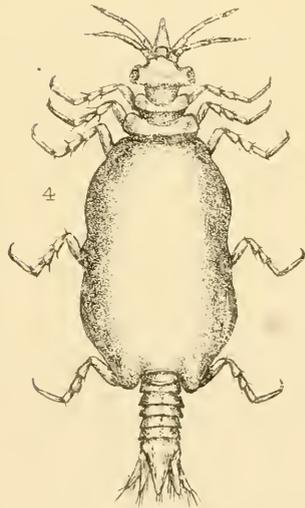
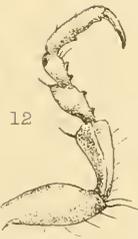
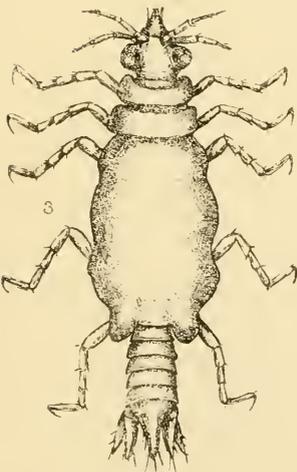
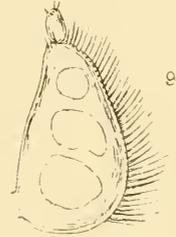
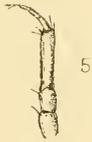
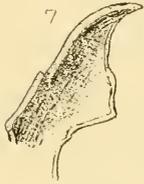
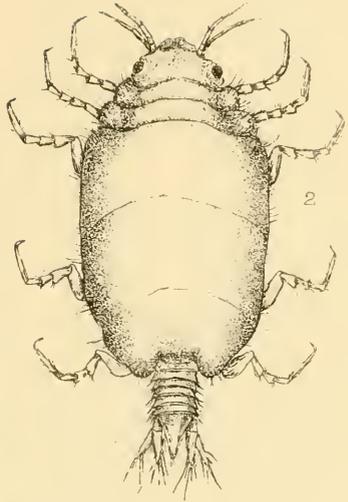
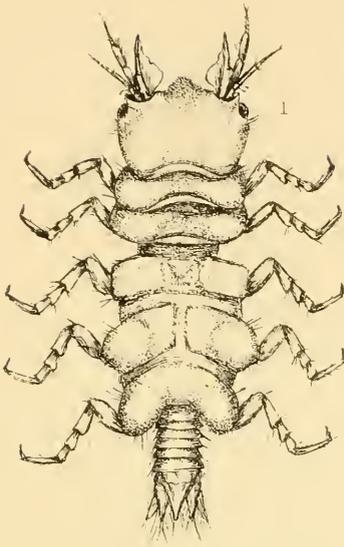


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PARATANAIS ANTARCTICA



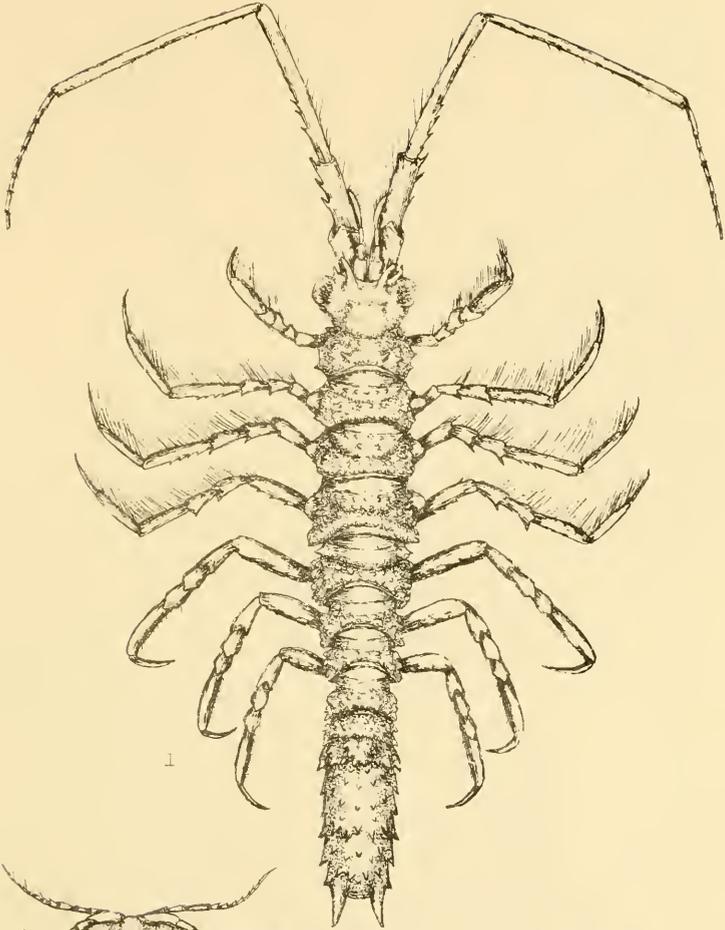


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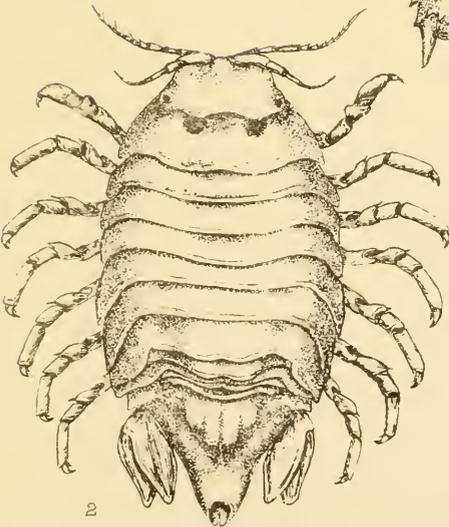
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GNATHIA POLARIS

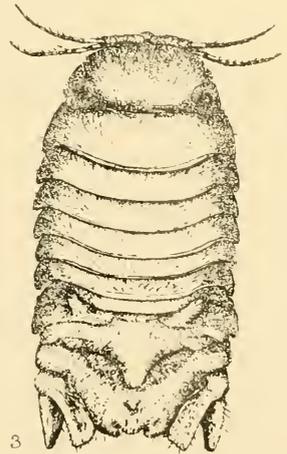




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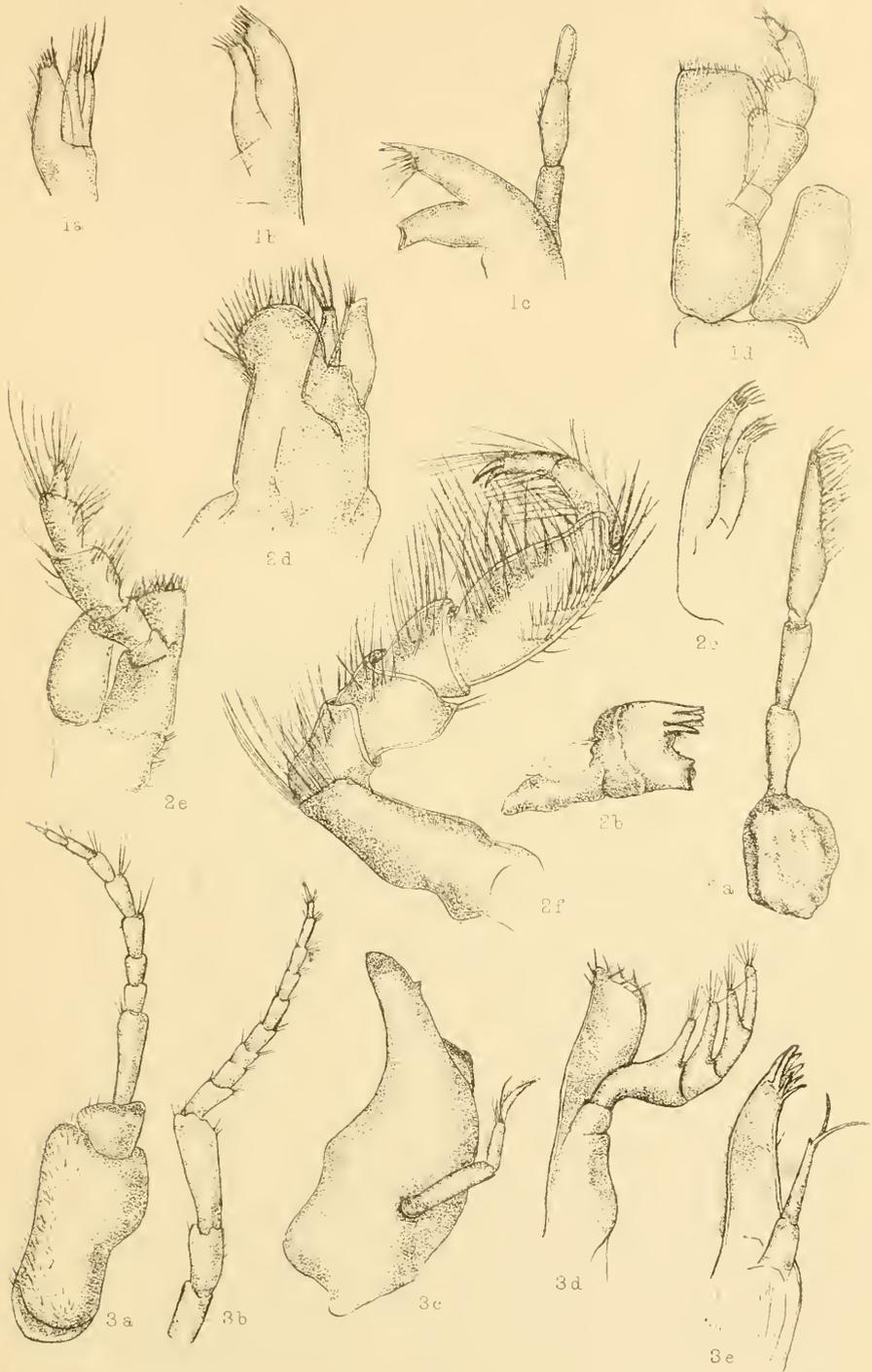
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1. ARCTURUS ADAREI 2. CYMODOCEA ANTARCTICA  
 3. CYMODOCEA AUSTRALIS



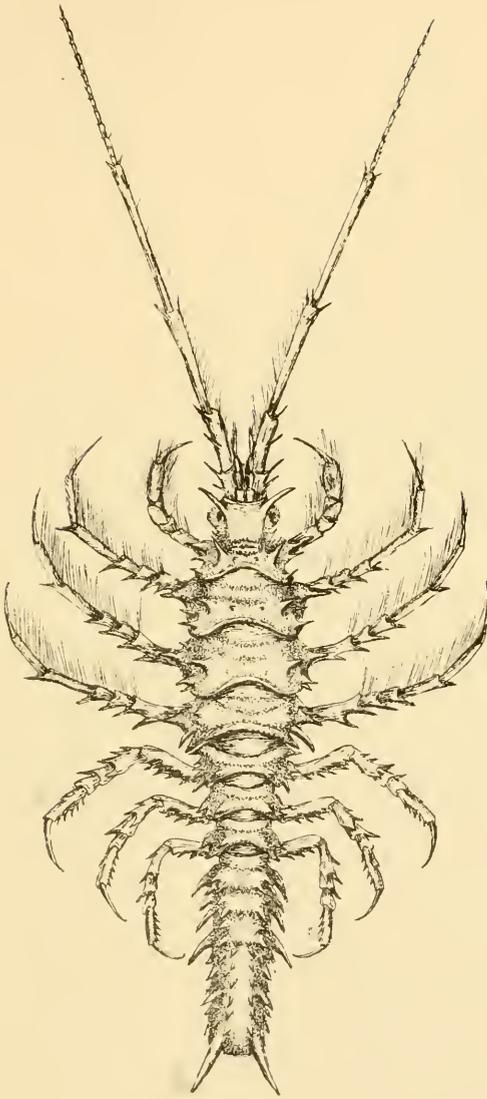


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West. Newman photofax

1 HALIACRIS AUSTRALIS 2 ACTURUS POLARIS.  
 3 CYMODOCEA AUSTRALIS.



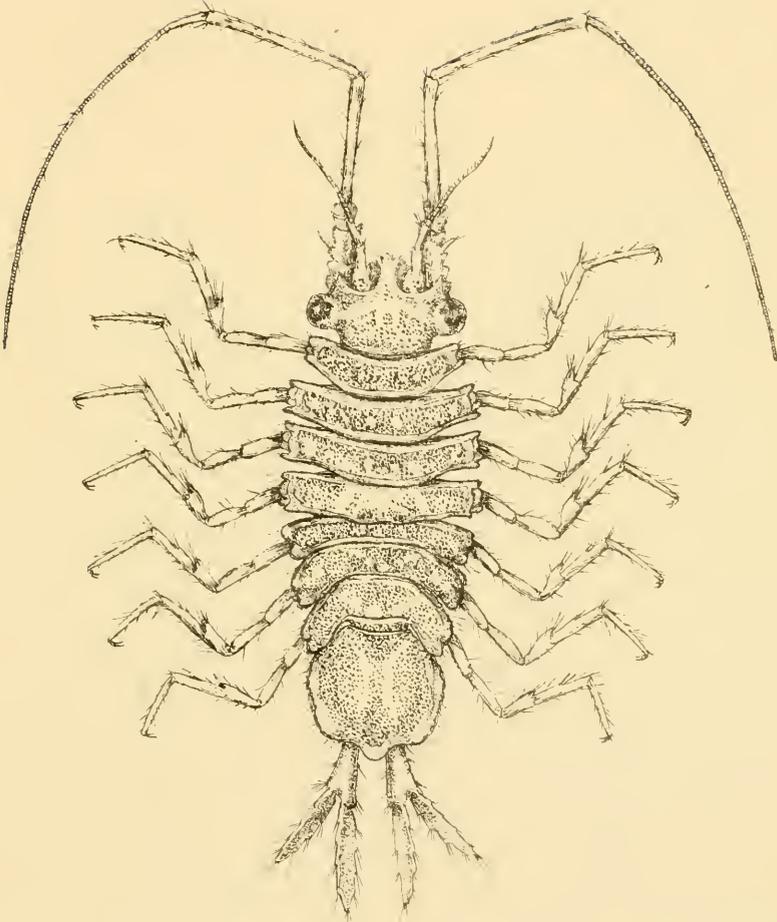


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ARCTURUS POLARIS.



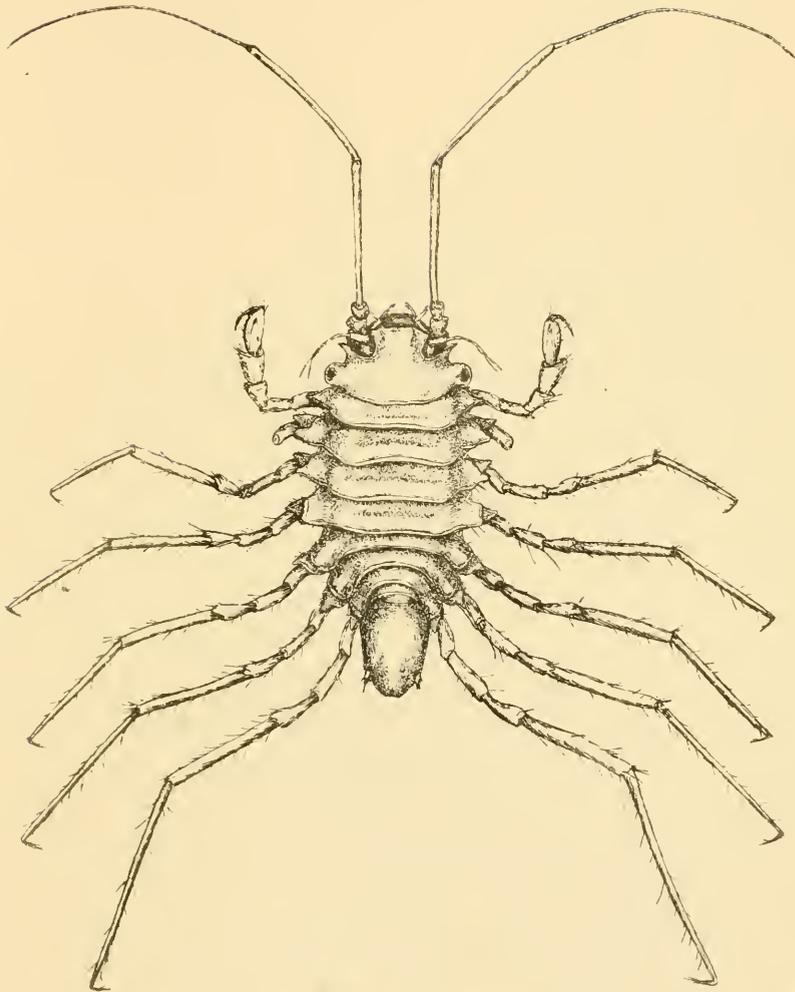


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NOTASELLUS AUSTRALIS



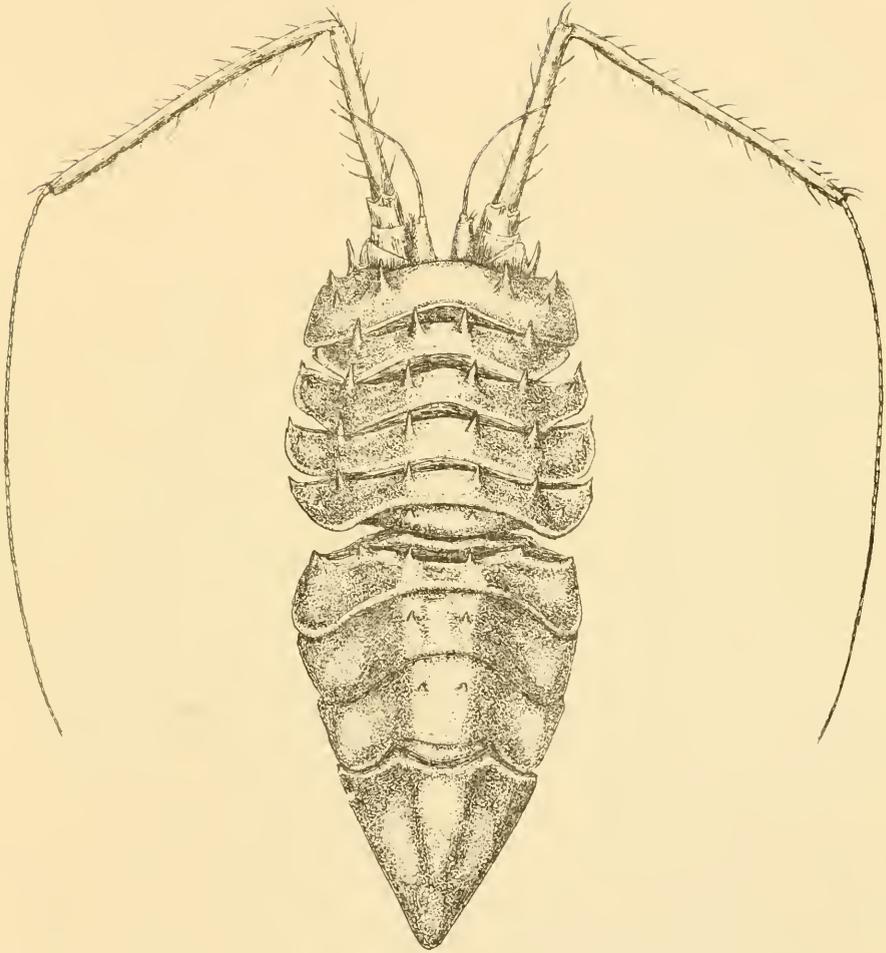


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West Newman photo lith.

HALIACRIS AUSTRALIS.



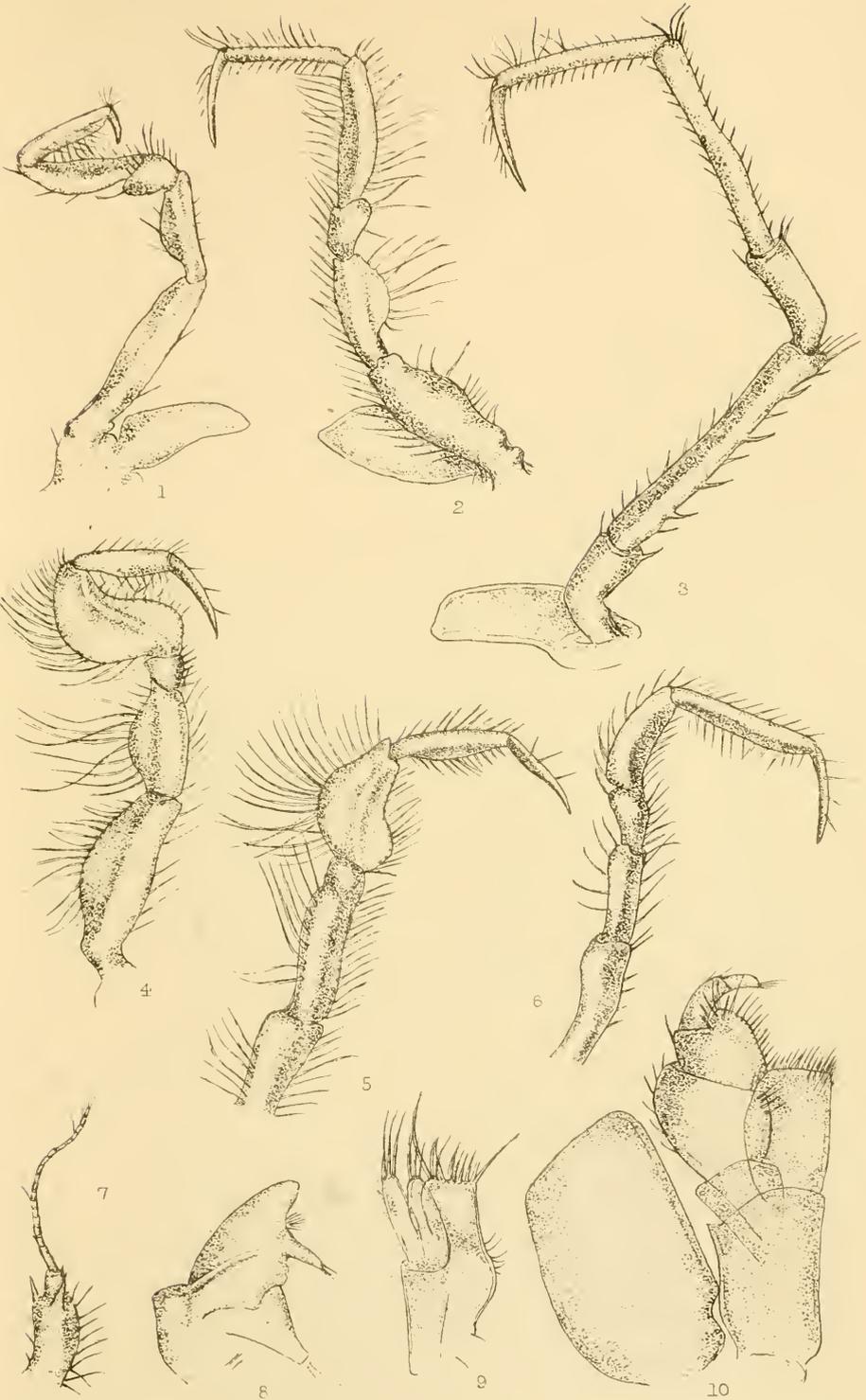


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ECHINOZONE SPINOSA



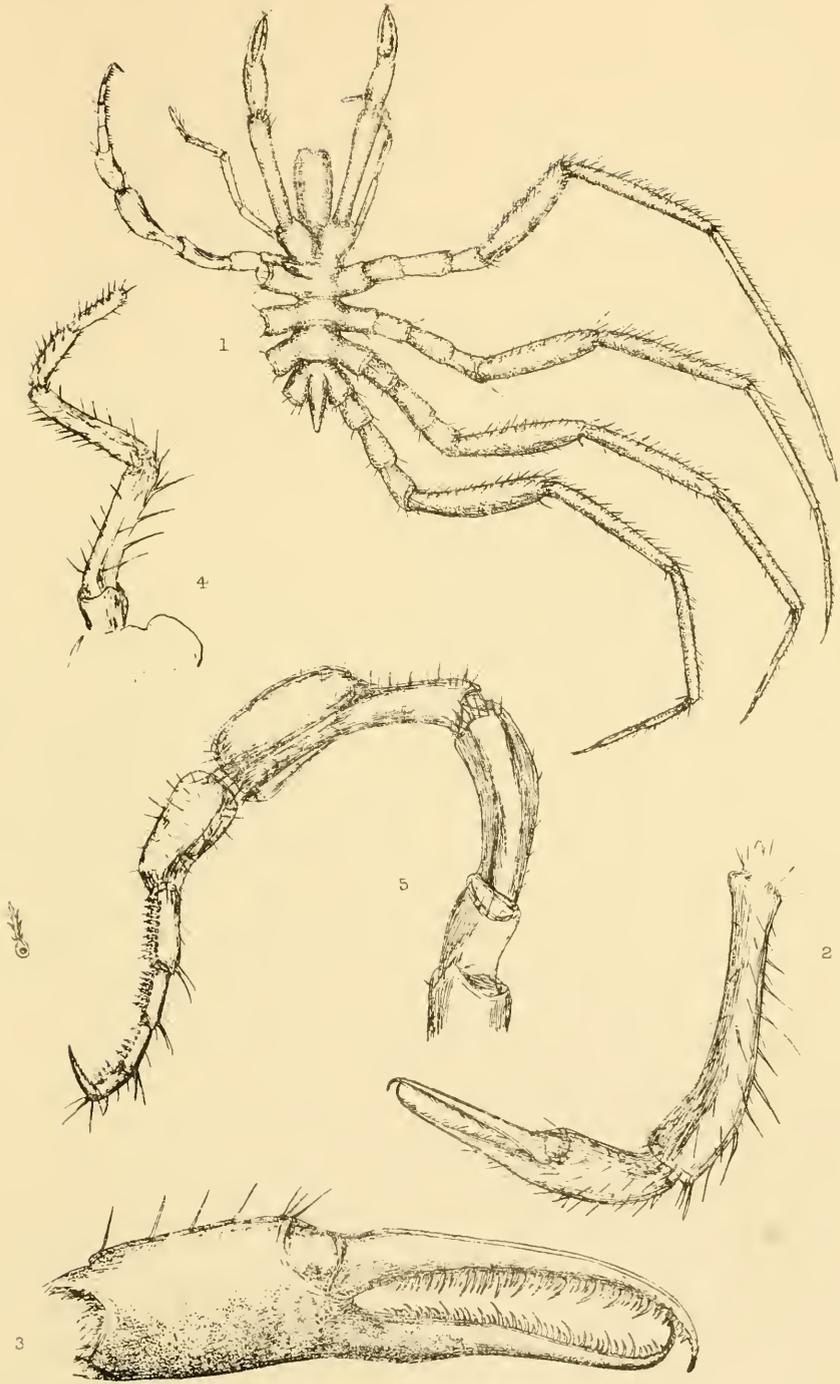


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ECHINOZONE SPINOSA.





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NYMPHON AUSTRALE