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CRUSTACEA.

PART VI.—TANAIDACEA AND ISOPODA.

BY

W. M. TATTERSALL, D.Sc.

(*Keeper of the Manchester Museum*).

WITH TWO FIGURES IN THE TEXT AND ELEVEN PLATES.

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I.—INTRODUCTION.

THE collection of Isopoda (including Tanaidacea) obtained by the "Terra Nova" Expedition comprises forty-seven species, of which twenty-six were captured in the Antarctic seas, seventeen off the coasts of New Zealand, two at a station near the Falkland Islands, and two in the Atlantic Ocean.

Taking account only of the species captured in Antarctic waters, the numbers recorded by other South Polar Expeditions, the reports of which have been published, are :—"Southern Cross," nine ; "Français," seventeen ; "Pourquoi Pas?" twenty-four ; "Discovery," twenty-six ; "Gauss," fifty-eight. The great deficiency in the present collection is in small species of the Asellota, of which the "Gauss" in particular captured a large number.

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* Manuscript received January 10, 1920 (S. F. H.).

For the purposes of this report I have been allowed to include an account of a small collection of Isopoda made in S. Georgia in November and December, 1913, by the late Major G. E. H. Barrett-Hamilton and his assistant, Mr. P. Stammwitz, and kindly entrusted to me for examination by the authorities of the British Museum. This collection comprised thirteen species, of which four were also found in the Antarctic collections of the "Terra Nova," and it has been of the greatest service to me in the elucidation of some of the species.

In view of the activity in South Polar Exploration during the last twenty years, it was not to be expected that the "Terra Nova" collection would yield many novelties, especially when its deficiency in small forms is taken into account. Only four species new to science were found among the Antarctic material, but five other species have only recently been described in the report of the "Gauss" collections.

Of the twenty-six truly Antarctic Isopods in the "Terra Nova" collection, five were also taken by the "Southern Cross," thirteen by the "Discovery," ten by the "Gauss," and eight by the French Expeditions. The four new species are *Aega glacialis*, *Serolis glacialis*, *Antarcturus lilliei*, and *Antarcturus horridus*. In addition to these new forms, seven species are recorded from the Ross Sea area for the first time. Four of them were previously known only from the collections made by the "Gauss," viz.:—*Eisothistos antarcticus*, Vanhöffen, *Gnathia calva*, Vanhöffen, *Cirolana intermedia*, Vanhöffen, and *Cirolana obtusata*, Vanhöffen; one was described from the collections made by the French Expeditions, *Ectias turqueti*, Richardson; and two, *Nototanais dimorphus* (Bedd.) and *Antarcturus furcatus* (Studer), were known from the sub-antarctic regions from earlier expeditions.

The collection from S. Georgia contained thirteen species, of which eight were recorded from the same locality by Pfeffer in 1887, and no fewer than ten are also known from Kerguelen.

Perhaps the most interesting part of the "Terra Nova" collection is that made in New Zealand waters. Seventeen species were collected, of which I have described six as new, viz.:—*Cirolana pellucida*, *C. canaliculata*, *Eurydice subtruncata*, *Exosphaeroma falcatum*, *Cymodoce hodgsoni*, and *Pseudarcturella chiltoni*. Two further species are new to the New Zealand Fauna, *Cirolana japonica*, Hansen, and *Neastacilla falclandica*, Ohlin.

The reports dealing with Antarctic Isopoda, which have so far been published, refer to only about one-half of the Antarctic Ocean, from 100° E. long. to 60° W. long. The report on the "Scotia" collection is not yet published, and, as this expedition collected mainly in the otherwise unknown half of the Antarctic Ocean, the Weddell Sea, it is manifestly premature to consider the geographical distribution of the Antarctic Isopoda as a whole, especially in view of Hodgson's statement (1910, p. 3) that the "Scotia" collection does not contain a single species collected by the "Discovery." It may, however, be remarked that, of the total of forty species known from the Ross Sea, eleven were collected at the winter quarters of the "Gauss" and fifteen by the French

Antarctic Expeditions, but only two species, *Gnathia antarctica* (Studer) and *Glyptonotus antarcticus*, Eights, var. *acutus*, Richardson, are common to the three lists.

The most interesting morphological point revealed by the examination of this collection is the modification of the exopodites of the first pleopod in the males of certain species of the family Arcturidae, as accessory sexual organs. It may be recalled that Ohlin described such a modification in *Pseudidothea bonnieri* from the Magellan region, and was so impressed with the importance of this feature that he created a new family for the reception of that species entirely on the characters of the first pleopod of the male. I have found two distinct types of modified first pleopods in the males of certain Arcturidae.

The first type is characteristic of the genus *Antarcturus*, and is illustrated diagrammatically in text-fig. 1, A, which shows the relations of the various parts of the

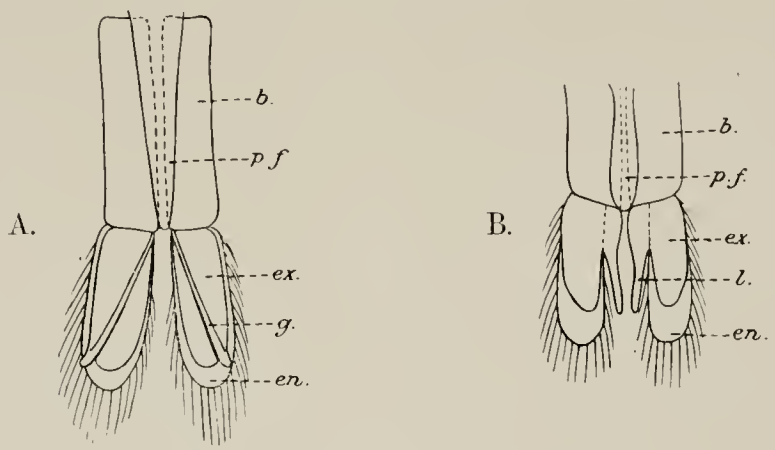

Fig. 1.—First pair of pleopods of male. A, *Antarcturus*. B, *Pseudarcturella*.
b. basipodite ; *en.* endopodite ; *ex.* exopodite ; *g.* groove ; *l.* lobe on inner margin of exopodite ; *p.f.* penial filament.

first pair of pleopods in the males of that genus as they appear when the animal is laid on its dorsal surface and the doors of the operculum opened. In the median line lies the penial filament (formed by fusion of the two filaments present in most Isopods), which is about as long as the basipodite of the pleopods. The exopodite of each pair of pleopods lies on top of the endopodite, and on its under surface there is a rather deep oblique groove which commences at the inner proximal corner, immediately at the posterior end of the penial filament, and traverses the exopod to the outer distal corner. It becomes more or less completely roofed over distally, and at the distal end there is a protuberance on the margin of the exopod roofing over the distal opening of the groove. This type of first male pleopod I have found in all the Antarctic species of *Antarcturus* and the allied genus *Dolichiscus*. It has been noticed, but not sufficiently emphasised, by Barnard in *Antarcturus kladophorus*, Stebbing, and

Neoarcturus oudops, Barnard, from the Cape. A study of Barnard's figures will make it clear that he has really seen a similar modification to that which I have just described. Moreover, the same modification was found by Ohlin in his species, *Pseudidothea bonnieri*.

The second type of first male pleopod I found in a single species, *Pseudarcturella chiltoni*, from New Zealand, and it is represented diagrammatically in text-fig. 1, B. Here, instead of a groove on the underside of the exopodite, the latter bears an additional lobe on the inside. This lobe is swollen at the base, narrow and pointed at the tip, and looks like the appendix masculina of the second pair of pleopods. At the tip are several transverse thickenings of the chitin. The specialisation of the first pair of pleopods of the males as accessory copulatory organs is not known, as far as I am aware, in Marine Isopoda, otherwise than in the tribe Valvifera, and its widespread occurrence in that tribe seems worthy of special emphasis.

My thanks are due to the authorities of the British Museum for entrusting this collection to me for examination and report, and especially to Dr. Calman for the valuable help, always willingly given, which he has rendered me with literature, and the facilities he has given me for the examination of specimens in the National Collection.

I am especially indebted to my wife for the beautiful drawings which illustrate this report.

II.—LIST OF SPECIES.*

Order TANAIDACEA.

Family TANAIDAE.

Nototanais dimorphus (Beddard).
Tanais gracilis, Heller (?).
Tanais novae-zealandiae, G. M. Thomson (?).

Order ISOPODA.

Sub-order ASELLOTA.

Family PARASELLIDAE.

Group JANIRINI.

Janira longicauda, Chilton.
Ianthopsis sp. (?).
Notasellus sarsi, Pfeffer.
Ectias turqueti, Richardson.

Group MUNNINI.

Coulmannia frigida, Hodgson.
Munna maculata, Beddard (?).
Haliaeris antarctica, Pfeffer.

Sub-order FLABELLIFERA.

Family CYMOTHOIDAE.

Cirolana intermedia, Vanhöffen.
,, *obtusata*, Vanhöffen.
,, *pellucida*, n. sp.
,, *canaliculata*, n. sp.
,, *japonica*, Hansen.
Eurydice subtruncata, n. sp.
Aega antarctica, Richardson.
,, *glacialis*, n. sp.
,, *novi-zealandiae*, Dana.

* The classification and arrangement of species followed in this report is that of Hansen, in his account of the Tanaidacea and Isopoda of the "Ingolf" Expedition (Hansen, 1913 and 1916).

Ceratothoa impressa (Say).
Cymothoid, gen. et. sp. (?).

FAMILY SPHAEROMIDAE.

Limnoria antarctica, Pfeffer.
Plakarthrium typicum, Chilton.
Exosphaeroma gigas (Leach).
,, *falcatum*, n. sp.
Isocladus armatus (M.-Ed.).
Cymodoce hodysoni, n. sp.
,, *bituberculata*, Filhol (?).
Cymodocella tubicauda, Pfeffer.
Dynamenella eatoni (Miers).
Cassidinopsis emarginata (Guér).
Euvallentinia darwinii (Cunningham).
Cassidina typa (M.-Ed.).

FAMILY SEROLIDAE.

Serolis schythei, Lütken.
,, *septemcarinata*, Miers.
,, *pagenstecheri*, Pfeffer.
,, *polita*, Pfeffer.
,, *glacialis*, n. sp.

FAMILY ANTHURIDAE.

Leptanthura glacialis, Hodgson.
Eisothistos antarcticus, Vanhöffen.

SUB-ORDER VALVIFERA.

FAMILY IDOTHEIDAE.

Glyptonotus antarcticus, Eights.
Ditto, var. *acutus*, Richardson.

FAMILY ARCTURIDAE.

Antarcturus polaris (Hodgson).
,, *furcatus* (Studer).
,, *franklini* (Hodgson).
,, *hiemalis*, Hodgson.
,, *lilliei*, n. sp.
,, *horridus*, n. sp.
Dolichiscus meridionalis (Hodgson).
Neastacilla (gen. nov.) *falclandica* (Ohlin).
Pseudarcturella chiltoni, gen. et sp. nov.

SUB-ORDER GNATHIIDEA.

Euneognathia gigas (Beddard).
Gnathia antarctica (Studer).
,, *hodgsoni*, Vanhöffen.
,, *calva*, Vanhöffen.

INCERTAE SEDIS.

Rhabdocheirus incertus, Bonnier.

III.—LIST OF STATIONS AT WHICH SPECIMENS WERE OBTAINED.

ATLANTIC OCEAN.

Station 51.	May	12, 1913. 5° S., 27° 15′ W., surface.
,, 66.	,,	27, ,, 25° 35′ N., 34° 10′ W., surface.

SUB-ANTARCTIC ZONE.

Station 38.	April	13, 1913, 52° 23′ S., 63° 50′ W., 125 fathoms (229 m.).

SOUTH GEORGIA.

Cumberland Bay Leith Harbour Stromness Harbour King Edward Cove	Collections made in November, 1913–January, 1914, by P. Stammwitz.

New Zealand Area.

Station 77.	July	18, 1911,	34° 5′ S., 171° 48′ E., surface.
,, 84.	,,	23, ,,	From C. Maria van Dieman Light, S.W. by W., 15 miles, 2 metres. Plankton.
,, 85.	,,	24, ,,	From C. Maria van Dieman Light, W.N.W., 24 miles, 2 metres. Plankton.
,, 86.	,,	25, ,,	Off Three Kings Islands, 3 metres. Plankton.
,, 89.	,,	25, ,,	Off Three Kings Islands, surface.
,, 92.	,,	27, ,,	From Summit, Great King, S. by W., 24 miles, surface.
,, 93.	,,	28, ,,	From Summit, Great King, S.E. by S., 13 miles, surface.
,, 96.	Aug.	3, ,,	Seven miles East of North Cape, New Zealand, 70 fathoms (128 metres). Agassiz trawl.
,, 106.	,,	4, ,,	From West Island, Three Kings Islands, S.W., 5 miles, surface.
,, 107.	,,	4, ,,	From West Island, Three Kings Islands, 5 miles, surface.
,, 109.	,,	5, ,,	34° 15′ S., 172° 0′ E., 3 metres. Plankton.
,, 110.	,,	6, ,,	34° 4′ S., 171° 55′ E., surface.
,, 111.	,,	7, ,,	Off Three Kings Islands, surface.
,, 118.	,,	17, ,,	34° 32′ S., 172° 20′ E., surface.
,, 120.	,,	18, ,,	34° 26′ S., 172° 14′ E., surface.
,, 122.	,,	19, ,,	From C. Maria van Dieman, S., 80° W., 21 miles, surface.
,, 126.	,,	24, ,,	34° 13′ S., 172° 15′ E., surface.
,, 127.	,,	25, ,,	Off Three Kings Islands, surface.
,, 128.	,,	26, ,,	Off Three Kings Islands, surface.
,, 129.	,,	26, ,,	Off Three Kings Islands, surface.
,, 130.	,,	27, ,,	Off Three Kings Islands, surface.
,, 133.	,,	30, ,,	Spirits Bay, near North Cape, 20 metres. Plankton.
,, 134.	,,	31, ,,	Spirits Bay, near North Cape, 11–20 fathoms (20–37 metres). Dredge.
,, 135.	Sept.	1, ,,	Spirits Bay, near North Cape, 3 metres. Plankton.
,, 136.	,,	2, ,,	Spirits Bay, near North Cape, surface.
,, 139.	,,	6, ,,	34° 30′ S., 171° 53′ E., surface.
,, 141.	,,	7, ,,	34° 37′ S., 171° 19′ E., surface.
,, 142.	,,	8, ,,	34° 45′ S., 170° 45′ E., 2 metres. Plankton.
			Sandy pool between tide marks at Motorua, Bay of Islands, New Zealand.

Antarctic Zone.

Station 194.	Feb.	22, 1911,	Off Oates Land, 69° 43′ S., 163° 24′ E., 180–200 fathoms (329–366 metres). Agassiz trawl.
,, 220.	Jan.	3, 1912,	Off Cape Adare, mouth of Robertson's Bay, 45–50 fathoms (82–92 metres). Agassiz trawl.
,, 294.	,,	15, 1913,	Ross Sea, 74° 25′ S., 179° 3′ E., 158 fathoms (299 metres). Agassiz trawl.
,, 314.	,,	23, 1911,	5 miles North of Inaccessible Island, 222–241 fathoms (406–441 metres). Agassiz trawl.
,, 316.	Feb.	9, ,,	Off Glacier Tongue, about 8 miles North of Hut Point, McMurdo Sound, 190–250 fathoms (348–457 metres). Agassiz trawl.
,, 317.	June 7–Oct. 14	,,	Hole in ice between Cape Evans and Inaccessible Island, 175 metres. Plankton.
318.	June 13–Sept. 16	,,	Hole in ice between Cape Evans and Inaccessible Island, 175 metres. Traps and tangles on bottom.
,, 331.	Jan.	14, 1912,	Off Cape Bird Peninsula, entrance to McMurdo Sound, 250 fathoms (457 metres). Dredge.
,, 338.	,,	23, ,,	77° 13′ S., 164° 18′ E., 207 fathoms. Agassiz trawl.
,, 339.	,,	24, ,,	77° 4′ S., 164 17′ E., 140 fathoms (256 metres). Agassiz trawl.

Station 348.	Feb.	13,	,,	Off Barne Glacier, McMurdo Sound, 200 fathoms (366 metres), Agassiz trawl.
,, 349.	,,	15,	,,	Off Butter Point, Western shore of McMurdo Sound, 80 fathoms (146 metres). Agassiz trawl.
,, 355.	Jan.	20,	1913,	77° 46′ S., 166° 8′ E., 300 fathoms (547 metres). Agassiz trawl.
,, 356.	,,	22,	,,	Off Granite Harbour, entrance to McMurdo Sound, 50 fathoms (92 metres). Agassiz trawl.
				North Bay, N. of Cape Evans, McMurdo Sound.

IV.—DESCRIPTIONS OF SPECIES.

Order TANAIDACEA.

Family TANAIDAE.

Genus NOTOTANAIS, Richardson.

1. *Nototanais dimorphus* (Beddard).

Paratanais dimorphus, Beddard, 1886 (1), p. 119; Beddard, 1886 (2), p. 130, pl. XVII, figs. 1–8; *Nototanais dimorphus*, Richardson, 1906 (2), p. 3; Nierstrasz, 1913, p. 39; Vanhöffen, 1914, p. 470; *N. australis*, Richardson, 1908, p. 1, text-fig. 1.

Occurrence.—Station 356, off Granite Harbour, entrance to McMurdo Sound, 50 fathoms, bottom fauna, one male, 4 mm.

Remarks.—I am in complete agreement with Vanhöffen's opinion that Richardson's species, *N. australis*, is the same as that described earlier as *N. dimorphus*, by Beddard. Beddard's type was not available for examination, but the specimen now recorded is in the closest agreement with his description and figures, and I am quite unable to see any important points of difference between *N. dimorphus* and *N. australis*.

Genus TANAIS, Audouin and Milne-Edwards.

2. *Tanais gracilis*, Heller (?).

T. gracilis, Heller, 1865, p. 133, pl. XII, fig. 3; Stebbing, 1905, p. 3, pl. I (D); Nierstrasz, 1913, p. 23; Vanhöffen, 1914, p. 468, text-figs. 6*a–g*.

Occurrence.—Cumberland Bay, South Georgia, December, 1913, collected by P. Stammwitz, one ovigerous female, 6·5 mm.

Remarks.—There is no male specimen in the collection, and in consequence my identification must be accompanied by an expression of doubt.

The question is further complicated by the asymmetry of the pleon. On the left side the abdomen is distinctly composed of six somites, while on the right side only five somites are visible, the articulation separating the fifth and sixth somites being incomplete and finishing in the mid-dorsal line. On the left side, therefore, this specimen is a *Tanais sensu lato*, and on the right side a *Tanais sensu stricto*. It agrees very closely with the description given by Vanhöffen of specimens from Kerguelen which

he refers to *T. gracilis*. The uropods are six-jointed, the terminal joint very small. The body is furnished with a few scattered setae on the anterior margins of its somites, and a tuft of strong plumose setae on the lateral parts of the first and second somites of the abdomen. The egg-pouch is single, and in this respect agrees with Vanhöffen's observations on this species, in contrast with the double egg-pouch found in *T. litoralis*. I can find no valid character to separate this specimen from *T. gracilis*, but in the absence of a male specimen I cannot be sure of the identity. *T. ohlinii*, Stebbing, from the Falkland Islands, seems to be very closely related to *T. gracilis*, and the only really important point of difference lies in the uropods, which are, like those of *T. gracilis*, six-jointed ; but the terminal joint is nearly as large as the penultimate, and not minute as in *T. gracilis*. If the present specimen really belongs to *T. gracilis*, the distribution of the latter is considerably extended, as it has previously only been found at the Cape, St. Paul, Ceylon, Kerguelen and New Amsterdam, localities all to the South of the Indian Ocean.

3. *Tanais novae-zealandiae*, G. M. Thomson (?). Pl. I, figs. 1–5.

T. novae-zealandiae, G. M. Thomson, 1879, p. 417, pl. XIX, figs. 5, 6 ; 1881, p. 207, pl. VII, fig. 3 ; Thomson and Chilton, 1886, p. 151 ; Hutton, 1904, p. 262 ; Chilton, 1909, p. 669 ; Thomson, 1913, p. 245 ; Vanhöffen, 1914, p. 465.

Occurrence.—Station 96, 7 miles E. of North Cape, New Zealand, 70 fathoms, bottom fauna, one male, 5·5 mm.

Remarks.—The only serious difference I can find between this specimen and Thomson's description is in the uropods. In my specimen the uropods (fig. 5) consist of a moderately large basal joint and a seven-jointed terminal portion, the first joint of which shows traces of being a double joint laterally, but I could not trace the line of separation across the joint, and the terminal joint is very small.

Thomson describes the uropods in his species as five-jointed, but from his figure it is obvious that this number does not include the basal joint, and it seems possible that he also overlooked the minute terminal joint. This would make the difference between Thomson's species and my specimen one or at most two joints extra in the uropods. Thomson's specimen measured 4·5 mm., mine measures 5·5 mm. Vanhöffen has shown that in *T. gracilis* the number of joints in the uropods increases with age, and it is possible that the differences in the present instance may be explained on similar grounds. I do not feel justified in instituting a new species on this difference, because otherwise there is the closest agreement between the two forms. I give, herewith, figures of some of the appendages of my specimen for comparison with future specimens. The species has six segments in the urosome, and thus belongs to the genus *Tanais* in the wider sense, and not in the restricted sense as used by Sars. The specimen still retains traces of an extensive development of pigment, giving a mottled or marmorate appearance to the animal.

Order ISOPODA.

Sub-order ASELLOTA.

Family PARASELLIDAE.

Group JANIRINI.

Hansen, 1916, in his account of the Isopoda of the Ingolf Expedition, has expressed the opinion that several genera closely allied to *Janira* have been founded on insufficient grounds. Among these genera, *Iolella*, Richardson (= *Ianthe*, Bovallius, and *Tole*, Ortmann), is definitely relegated by Hansen to the synonymy of *Janira*, and he at least implies that *Ianthopsis* and *Iolanthe* should share a similar fate.

Vanhöffen, on the other hand, places *Iolella*, *Ianthopsis* and *Iolanthe*, with four other genera, in a separate family, the *Iolellidae*, which he briefly diagnoses as "*Janira*-like forms with a more or less distinctly prominent rostrum, with notched lappets drawn out at the sides of the somites, and with two or more side thorns on the abdomen." He suggests briefly a revision of the genera of this family. The name *Iolella* is applied to those species in which the abdomen is produced into two long and pointed lateral extremities with no clearly marked central portion, and *Ianthopsis* is retained for those species in which the lateral processes of the abdomen are pointed and separated from the distinct but broadly rounded median process by deep notches. These distinctions are very slight, and the case for the inclusion of both genera in the older genus *Janira* is strengthened by the fact that one species, *Ianthopsis libbeyi* (Ortmann), which Vanhöffen includes in the genus *Ianthopsis*, has been shown by Hansen to be a synonym of *Janira tricornis*, Kröyer. But Hansen has himself suggested a division of the genus *Janira* which is based on much more definite characters. He notes that the species of *Janira* taken by the "Ingolf" Expedition fall into three groups, as follows:—

"A. Epimeral plates developed at all thoracic segments. The plates are small, never produced into long acute processes, but bifid at two or three of the segments.

"B. Epimeral plates completely wanting.

"C. Epimeral plates developed at the three posterior segments but wanting at least at second and third segments."

These three divisions or groups of the genus *Janira* correspond to the genera *Janira* (A), *Ianthopsis* (B) and *Iolella* (C) of Vanhöffen. There can be no question that all the genera belong to the same family or group, and Hansen's classification is the most natural one yet proposed and the one I follow here. But I think there are sufficient grounds for the retention of the three divisions of the genus *Janira*, indicated by Hansen, as generic groups under the names *Janira*, *Ianthopsis* and *Iolella*.

Genus JANIRA, Leach.

4. *Janira longicauda*, Chilton. Pl. I, fig. 6.

J. longicauda, Chilton, 1884, p. 250, pl. XVIII, figs. 2*a*–6; Thomson and Chilton, 1886, p. 157; *Iathrippa longicauda*, Bovallius, 1886, p. 31–33; Hutton, 1904, p. 264.

Occurrence.—Station 96, 7 miles E. of North Cape, New Zealand, 70 fathoms, bottom fauna, one ovigerous female, 4·5 mm.

Remarks.—The uropods and second antennae are broken off in this specimen, but I have little doubt that it should be referred to Chilton's species. It is readily recognised by the well-marked rostrum, by the non-serrated margins of the terminal somite of the pleon, and by the clothing of scattered hairs on the dorsal surface of the body, especially laterally. Chilton does not mention this character in his description. In 1886, Bovallius instituted the genus *Iathrippa* for this species, separating it from *Janira* on the grounds that the uropods are laminar whereas in *Janira* they are styliform. I cannot judge of the validity of this distinction, because in my specimen the uropods are missing. But the specimen otherwise seems to be a typical *Janira* in the restricted sense, and I here refer it to that genus.

Genus IANTHOPSIS, Beddard.

5. *Ianthopsis* sp. Pl. I, figs. 7–10.

Occurrence.—Station 331, off Cape Bird Peninsula, entrance to McMurdo Sound, 250 fathoms, bottom fauna, one male, 5·5 mm.

Remarks.—In the absence of the uropods and second antennae it is not possible to identify this species with certainty. It is, however, a true *Ianthopsis* as defined by Beddard, and is very closely allied to, if not identical with, *I. bovallii*, Studer, the type species of the genus. Studer, however, only figures a median series of tubercles on the body, but Beddard says there is a double row in specimens which he referred to this species. In my specimen there are three rows of tubercles, rather obscure and difficult to make out, and there is, in addition, an obscure tubercle on the lateral parts of the second to the seventh thoracic somites. Studer, moreover, figures a sharply pointed process on the front margin of the head, between the rostrum and the lateral process. This is not present in my specimen, though the anterior margin of the head is slightly produced at the place where this process is present in Studer's specimen. The latter, too, is almost twice as large as the present one. I give figures of the second thoracic limb and the male operculum of my specimen. The median lamella of the abdominal operculum of the male agrees closely with Beddard's figure of the same appendage in *I. bovallii*. The thoracic limbs are all bi-unguiculate and slender, and the flagellum of the first antennae is quite short and consists of only five joints.

Of the five species of this genus recorded by Vanhöffen from the Antarctic, the

present specimen approaches most nearly to the small unnamed specimen figured by him (*loc. cit.*, p. 544, text-fig. 70). It differs from this form, and indeed from all Vanhöffen's species, in having distinct eyes, though they are almost colourless. Like Vanhöffen's specimen, the present one has the lateral parts of the head, thoracic somites and abdomen microscopically serrulated. The serrulations are not so coarse as Vanhöffen shows, but I think this is due to the difficulty of indicating such minute serrulations accurately rather than to any actual difference in the specimens. The lateral margins of the abdomen in both species are armed with five small spines. Vanhöffen's specimen measured only 2·5 mm. in length and was immature. I think it is quite possible that in so small a specimen the eyes have been overlooked, having regard to their almost colourless appearance. If this is so, I should have no hesitation in identifying my specimen with Vanhöffen's species.

Genus NOTASELLUS, Pfeffer.

6. *Notasellus sarsi*, Pfeffer.

N. sarsi, Pfeffer, 1887, p. 125, pl. VII, figs. 5–28; *N. australis*, Hodgson, 1902, p. 251, pl. XXXVI; Richardson, 1906 (2), p. 13; Richardson, 1908, p. 5; Hodgson, 1910, p. 49; Richardson, 1913, p. 17; *N. sarsi*, Vanhöffen, 1914, p. 532.

Occurrence.—Station 220, off Cape Adare, mouth of Robertson's Bay, 45–50 fathoms, bottom fauna, three females, 4·5 mm. Cumberland Bay, South Georgia, December, 1913, collected by P. Stammwitz, fifteen specimens.

Remarks.—In separating *N. australis* from *N. sarsi* Hodgson relied mainly on the length of the uropods in his specimens compared with that shown in Pfeffer's figure. Hodgson's specific diagnosis reads: "Uropoda biramous, longer than the urosome, which is approximately as long as broad and terminates in a small rounded lobe between them." Pfeffer's figure shows the uropods to be considerably shorter than the urosome, but the examination of the above specimens from the type locality reveals the fact that the uropods are much longer than shown by Pfeffer, are actually longer than the urosome, and are in fact very much as figured by Hodgson for *N. australis*. Pfeffer's figure undoubtedly conveys a wrong impression of the size of the uropods in this species; and Vanhöffen, who examined specimens from Kerguelen, suggests that the specimen from which the figure was taken had regenerated uropods, which would be shorter than the original ones. This suggestion is probably correct, and my observations on specimens from the type locality lend support to Vanhöffen's suspicions that the two suggested species are really one, since the size of the uropods was one of the main characters used for their separation. The second main point of difference, noted by Miss Richardson, relates to the length of the rostrum. In *N. sarsi*, according to Pfeffer, the rostral process is as long as the head, whereas in *N. australis* Richardson says it is only about half as long as the head. This difference disappears in the light of Vanhöffen's observations on specimens from Kerguelen, in which he found that small specimens agree with *N. australis* and large ones with

N. sarsi. There seems, therefore, to be no valid character separating the two forms, and I have here regarded them as one species with a wide circumpolar Antarctic and sub-Antarctic distribution.

As to the genus *Notasellus*, Hodgson has already remarked that it is extremely near to *Janira*. Vanhöffen, however, points out that it differs from all the other genera of the Janirini except *Antias* in the form of the eyes, which are borne on lateral processes of the head instead of being situated on the dorsal surface of the head. For this reason he would retain the genus as distinct from *Janira*, and for the present I would follow that conclusion. Hansen is of opinion that several supposedly distinct genera allied to *Janira* should be suppressed as synonymous, but pending a complete revision of the genus and its allies it is more convenient to retain *Notasellus*, particularly as there is a species *Iolella* (*Ianthopsis*) *sarsi* which in Hansen's view should be called *Janira sarsi*, and confusion could only result if *Notasellus sarsi* were referred to the same genus.

Genus ECTIAS, Richardson.

7. *Ectias turqueti*, Richardson.

E. turqueti, Richardson, 1906 (2), p. 14, pl. I, fig. 5, text-figs. 14–19; Richardson, 1913, p. 18.

Occurrence.—Station 220, off Cape Adare, mouth of Robertson's Bay, 40–50 fathoms, bottom fauna, seven females, up to 7 mm. long.

Group MUNNINI.

Genus COULMANNIA, Hodgson.

8. *Coulmannia frigida*, Hodgson.

C. frigida, Hodgson, 1910, p. 54; Vanhöffen, 1914, p. 580, text-fig. 111.

Occurrence.—Station 356, off Granite Harbour, entrance to McMurdo Sound, 50 fathoms, bottom fauna, two specimens.

Genus MUNNA, Boeck.

9. *Munna maculata*, Beddard (?). Pl. I, figs. 11–14.

Munna maculata, Beddard, 1886 (1), p. 98; Beddard, 1886 (2), p. 25, pl. XI, fig. 14; Vanhöffen, 1914, p. 563, text-figs. 92*a*, 92*b*.

Occurrence.—King Edward Cove and Cumberland Bay, S. Georgia, December, 1913, collected by P. Stammwitz, three males and six females, 3 mm.

Remarks.—I am doubtful of the identity of these small Munnids. They have not the prominent pigment-spots as figured by Beddard from which the species derives its name, but they have a distribution of subdued pigment-spots more or less as figured by Vanhöffen. They were captured with *Haliacris antarctica*, Pfeffer, and at first I thought they represented immature specimens of the latter, but closer

examination revealed a few small but constant differences. The body is more compac than in *H. antarctica*, and rather broader proportionally than in the latter. It is covered by a not very close pile of short hairs, whereas the body of *H. antarctica* is practically smooth. The pigment, as I have already remarked, is not so intensely developed or so well marked as in *H. antarctica*, but is much more subdued and diffuse, as Vanhöffen shows. The coxal plates of the first four free thoracic somites are rounded, those of the last three somites bluntly pointed. In this character they are sharply distinct from *H. antarctica*, in which all the coxae are acute. The antennae are long, and have a flagellum composed of fifty-six to sixty joints. The second thoracic limb of the female (pl. I, fig. 11) closely resembles that of *H. antarctica*, but that of the male (pl. I, fig. 14) is quite distinct, and there is not nearly so striking a sexual dimorphism as I have described for *H. antarctica*, unless, indeed, I have only seen immature males. Compared with the same limb in immature males of *H. antarctica* the second thoracic limb of *M. maculata* has the carpus shorter and broader, and the palmar edge evenly curved without any trace of the palmar tooth of the former species. The uropods (pl. I, fig. 12) are quite distinct, those of *H. antarctica* being short straight one-jointed appendages, whereas in *M. maculata* these appendages are strongly curved and hook-like with two or three subsidiary spinules. The median lamellae of the operculum of the males of both species are closely similar, as my drawings show (pl. I, fig. 13, pl. II, fig. 3). Finally, on the lateral margin of the abdomen of *H. antarctica*, about half-way down, there is a short transverse row of stout sensory hairs, forming quite a conspicuous lateral tuft. These hairs are absent in *M. maculata*.

From *M. maculata* as described by Vanhöffen, my specimens differ in the absence of dorso-lateral spinules on the abdomen, and in some minor details in the form of the second thoracic limb of the female. Vanhöffen says nothing about the uropods of his specimens.

Genus HALIACRIS, Pfeffer.

10. *Haliacris antarctica*, Pfeffer. Pl. I, figs. 15, 16; Pl. II, figs. 1–3.

H. antarctica, Pfeffer, 1887, p. 137.
(?) *H. australis*, Hodgson, 1902, p. 253, pl. XXXIV, fig. 1, and pl. XXXVII; Richardson, 1906, p. 16; 1908, p. 5.
(?) *H. antarctica*, Hodgson, 1910, p. 58; Richardson, 1913, p. 19.
Munna antarctica, Vanhöffen, 1914, p. 562, text-fig. 90*a* and *b*.

Occurrence.—Cumberland Bay and King Edward Cove, S. Georgia, December, 1913, collected by P. Stammwitz, one adult male, three sub-adult males, two adult females, and three juvenile specimens, 2–4 mm.

Station 220, off Cape Adare, mouth of Robertson's Bay, 45–50 fathoms, bottom fauna, two immature males, 2–5 mm.

Remarks.—I have no doubt whatever that the specimens from S. Georgia, which is the type locality, are referable to Pfeffer's species. Their examination has yielded very

interesting results, for it is quite evident that fully adult male specimens have not before been met with. There is a very marked sexual dimorphism in the form of the second thoracic limb in this species. Pl. II, fig. 1, illustrates the second thoracic limb of an adult male, 4 mm. in length, from S. Georgia. The appendages are about twice as long as the body of the animal, and lie folded between the remaining thoracic appendages, against the ventral surface of the body, the "elbow" between the ischium and the merus reaching the posterior end of the body. They are altogether out of proportion to the rest of the animal, and give it a weird and grotesque appearance. In sub-adult males these appendages are not so long. Pl. I, fig. 16, represents those of a male 3·5 mm. long, but while these are of the same general form as in the fully grown male, the ischium and merus are very much shorter and the elbow does not extend much more than half-way along the body. I have no specimens of the first stage in the development of these appendages, from S. Georgia, but two specimens from "Terra Nova" Station 220, which I refer to this species, are immature males in this stage. Pl. I, fig. 15, illustrates the distal part of their second thoracic limbs. They agree, in general form, with those of the sub-adult male, even to the tooth on the palmar edge of the carpus, but are smaller, the ischium and carpus are not elongated but of normal size, and the whole limb is not any larger than that of the female. Chilton (1909) has described a very similarly marked sexual dimorphism in *Munna neo-zelanica*, Chilton, which he, therefore, refers to the genus *Haliacris*, in the light of Miss Richardson's observations (1906) on *H. antarctica*, in which she was the first to discover evidences of the marked sexual dimorphism of this species. Miss Richardson's figure of the second thoracic limb of the male of this species, judging from my own observations, is taken from a sub-adult male. It differs from my figure of the same stage in having the merus longer than the ischium, whereas in my specimens of all stages the ischium is longer than the merus. It is possible, therefore, that Miss Richardson had under observation a closely allied Antarctic species, and this has led me to doubt whether all the recent records of *H. antarctica* from Antarctic waters really refer to this species, or whether, after all, *H. australis*, Hodgson, is a distinct species, more markedly polar in its range, to which the records of recent writers under the names *H. antarctica* and *H. australis* really refer. The matter cannot be cleared up until fully adult males from Antarctic waters are available.

The discovery of so marked a form of sexual dimorphism in this species naturally raises the question how far such a dimorphism is in reality developed in the genus *Munna* and its allies, and how many new species of the latter genus have been established on immature specimens. The genera *Munna* and *Haliacris* are undoubtedly very closely related. Pfeffer, who had no adult males at his disposal, gave no satisfactory characters for the separation of the genus from *Munna*; Hodgson, in describing *Haliacris australis*, suggested that the genus was synonymous with *Munna*; and Chilton, in spite of the marked sexual dimorphism of his species *Munna neo-*

zelanica, which he reluctantly refers to *Haliacris*, is inclined to share Hodgson's opinion. Miss Richardson (1913), however, suggests that the genera *Munna* and *Haliacris* should be kept separate, on the ground of the sexual differences in the second thoracic limbs. The genus *Munna* is well known from Northern waters, but no such form of sexual dimorphism is known in Northern species. Much, however, still remains to be done among the Southern species. Most of them have been described from one or two specimens, and the occurrence of marked sexual dimorphism may in reality be much more widely spread than appears at present. The facts emphasise the importance of having a full range of specimens before describing new forms. For the present I accept Miss Richardson's suggestion to keep *Munna* and *Haliacris* distinct, the latter, so far as present knowledge goes, including only two species, *H. antarctica*, Pfeffer, and *H. neo-zelanica*, Chilton, with possibly a third in *H. australis*, Hodgson.

Sub-order FLABELLIFERA.

Family CYMOTHOIDAE.

Sub-family CIROLANINAE.

Genus CIROLANA, Leach.

11. *Cirolana intermedia*, Vanhöffen.

C. intermedia, Vanhöffen, 1914, p. 500, text-fig. 37.

Occurrence.—Station 316, off Glacier Tongue, about 8 miles N. of Hut Point, McMurdo Sound, 190–250 fathoms, bottom fauna, one male, 25 mm.

Remarks.—In his report on the Isopoda of the German South Polar Expedition, Vanhöffen (1914) described four species of giant *Cirolana* which had been found in great abundance at the winter quarters of the "Gauss." Two of these species are represented in the "Terra Nova" collection by one and two specimens respectively. Fortunately all three specimens are males, and by the aid of Vanhöffen's figures can be referred easily and without doubt to their correct species. *C. intermedia* may be distinguished from the following species, *C. obtusata*, by its smaller eye with pale pigment, its relatively longer antenna (which in the single specimen measured 11 mm.), by the long penial filaments on the sternum of the last thoracic somite in the male, and by the strongly curved appendix masculina on the second pleopod of the male. Both species belong to Hansen's "Sectio prima" of the genus *Cirolana*, and have the epistome (labrum and frontal lamina and clypeus) of the same form as *C. borealis* and *C. hirtipes*.

12. *Cirolana obtusata*, Vanhöffen.

C. obtusata, Vanhoffen, 1914, p. 496, text-fig. 34.

Occurrence.—Station 194, off Oates Land, 69° 43′ S., 163° 24′ E., 180–200 fathoms, bottom fauna, two males, 25 and 28 mm.

Remarks.—Compared with *C. intermedia* this species has larger eyes with black pigment, relatively shorter antennae, measuring in these specimens 8 mm. as compared with 11 mm. in *C. intermedia* of the same size, very short and blunt penial filaments, and an appendix masculina on the second pleopods of the male, which is not very much curved and has an obtuse or club-shaped apex.

13. *Cirolana pellucida*, n. sp. Pl. II, figs. 4–10.

Occurrence.—Stations 86, 129 and 130 (types), off Three Kings Islands, plankton, from the surface and 3 metres, about two hundred specimens.

Station 133, Spirits Bay, near North Cape, New Zealand, plankton, at 20 metres, one specimen.

Description.—Body robust in general form and considerably vaulted; integument soft and only very slightly calcareous, semi-transparent and without pigment or chromatophores.

Eyes a beautiful golden brown colour in specimens preserved in formaline; in spirit the colour disappears and the eyes appear colourless; seen from the side, slightly longer than deep, with the upper margin practically straight.

Frontal plate about four times as long as broad, its front end not visible from above; clypeus without anterior process; the whole form and structure of the frontal plate, clypeus and labrum is very similar to that of *C. borealis* and the other species belonging to Hansen's "Sectio prima" of the genus.

Antennules (pl. II, fig. 5) shorter than the peduncle of the antennae, robust; flagellum composed of ten to twelve short joints furnished with numerous sensory hairs.

Antennae (pl. II, fig. 6) reaching just beyond the posterior margin of the second free thoracic somite; second joint of the peduncle very short, third joint longer than fourth, fifth one and three-quarters the length of the fourth; flagellum composed of 22–24 joints.

Coxal plates of the thoracic somites shaped and furrowed almost exactly as in *C. neglecta*, Hansen; seventh coxal plate shorter than the sixth, with its oblique furrow extending to the posterior margin.

Last thoracic legs (pl. II, fig. 8) with the second joint flattened and expanded, about twice as long as broad, with a conspicuous ridge on its lower side; the outer lateral margin and the distal portion of the inner margin closely set with long plumose setae; the proximal portion of the inner margin with a few short simple setae; the longitudinal ridge on the lower side furnished with setae, which are shorter than on the outer margin and not so closely set nor so numerous as in *C. neglecta*, to which this species is most closely allied; fourth joint shorter than the fifth and much shorter than the sixth.

Last abdominal somite (pl. II, fig. 9) triangular, wider than long, its apex very obtuse and evenly rounded, not angular; armed with six pairs of spinules on the distal third of its margins.

Uropods (pl. II, fig. 9) reaching to about the level of the apex of the last abdominal somite; inner ramus not twice as long as broad, with about nine spinules on its margins; outer ramus nearly three times as long as broad, with three spinules on its inner margin and five or six on its outer margin.

Appendix masculina on the second pleopods of the male (pl. II, fig. 10) equal in length to the rami, slightly curved and pointed in shape.

Length of an adult female, 10 mm.; of an adult male, slightly smaller. There are no conspicuous sexual differences.

Remarks.—Of the described species of the genus *Cirolana*, this species is most closely allied to *C. neglecta*, Hansen. It agrees with this species in most of its characters, and especially in the colour of the eyes, the form of the epimera and the shape of the frontal plate and clypeus. The two species may be separated by the difference in the shape of the eyes and of the last abdominal segment, and by the difference in the second joint of the last four thoracic legs. In *C. neglecta* the eyes are shorter than deep, viewed laterally, and have the upper margin strongly convex. In *C. pellucida* the eyes, viewed laterally, are somewhat longer than deep, with the upper margin straight. In *C. pellucida* the setae on the longitudinal ridge of the lower side of the second joint of the last four thoracic legs are shorter and not so numerous nor so closely set as in *C. neglecta*. I have not seen the latter species, but nothing is mentioned in existing descriptions about the soft, semi-transparent character of the integument, which is such a feature of *C. pellucida*. It gives the animal the appearance of a deep-sea species. Both *C. neglecta* and *C. pellucida* are pelagic species, and are undoubtedly very closely related.

14. *Cirolana canaliculata*, n. sp. Pl. III, figs. 1–8.

Occurrence.—Station 134, Spirits Bay, near North Cape, New Zealand, 11–20 fathoms, bottom fauna, twenty specimens (types).

Station 135, same place, plankton, from 3 metres, three specimens.

Description.—This species belongs to Hansen's "Sectio secunda" of the genus, and is most closely allied to *C. sulcata*, Hansen.

Body about three times as long as broad, microscopically scaled, without tubercles or spines. Head without rostrum, but with a distinct rim marked off by a sub-marginal furrow round the anterior end. Eyes rather small, pigment black, seen from the side longer than deep, with the upper margin convex, the whole eye partly covered by the coxae of the first free thoracic somite.

First free thoracic somite larger than any of the others; the second the shortest; third, fourth and fifth successively longer: sixth longer than seventh. The first five free thoracic somites with a single distinctly impressed line or furrow running right across the segment, rather nearer to the posterior margin than to the anterior; the sixth and seventh free thoracic somites with two such impressed lines. The coxae of

the thoracic somites increase gradually in size backwards; each has a deep oblique furrow besides the sub-marginal one.

Telson (pl. III, fig. 8) broadly triangular, wider than long, with bluntly rounded apex armed with six spines and numerous short plumose setae. The dorsal surface has a median, shallow, longitudinal groove or sulcus, narrowing anteriorly.

Frontal plate (pl. III, fig. 7) small, pentagonal, about one and a half times as long as broad, its front end acute and not visible from above. Clypeus without anterior process, its surface slightly convex, with a furrow along each lateral margin.

Antennules (pl. III, fig. 2) about as long as the head; flagellum with about six joints.

Antennae (pl. III, fig. 3) reaching almost to the posterior margin of the third free thoracic somite; flagellum with about fourteen joints.

Second thoracic legs (pl. III, fig. 4) with the third and fourth joints produced; third joint with one, and fourth joint with five blunt spines on the inner margin. Third and fourth thoracic limbs with the third and fourth joints produced at their outer distal corners.

The remaining thoracic limbs slender, without natatory setae; last pair (pl. III, fig. 5) with the second joint not expanded, nearly three times as long as broad; fourth joint a little shorter than the fifth, which is somewhat shorter than the sixth.

Male stylet on the second pleopod (pl. III, fig. 6) longer than the rami, slightly curved, but not nearly so acutely pointed as in some other species belonging to this section of the genus.

Uropods (pl. III, fig. 8) with the endopods nearly twice as long as broad, extending some way beyond the apex of the telson, inner margin with three spines, outer margin with four spines, apex sub-bifid with a tuft of long setae, longer than the other setae fringing the margins; exopods shorter than the endopods, three times as long as broad, inner margin with two spines, outer with four, apex bifid with a tuft of long setae.

Length of the largest female, 9 mm.; of the largest male, 5·5 mm.

Of all the species of *Cirolana* belonging to the second section of the genus, this species approaches most closely to *C. sulcata*, Hansen. It differs, however, in the absence of tubercles on the somites of the abdomen, and in the shorter and broader form of the telson. The impressed lines on the somites of the thorax are also distinguishing characters, and I cannot find a similar arrangement figured in any other species. Hansen shows a single line across the dorsal surface of the last four thoracic somites of *C. sulcata*, and that is the nearest approach I can find to the condition I have represented in the present species.

15. *Cirolana japonica*, Hansen. Pl. II, figs. 11–16.

C. japonica, Hansen, 1890, p. 349, pl. IV, figs. 2–21.

Occurrence.—Stations 77, 89, 92, 107, 109, 110, 111, 122, 128, 129, 130, 139, 141 and 142, in the neighbourhood of Three Kings Island, between 34° 4′–34° 58′ S.,

170° 45′ E.–172° 18′ E., plankton at the surface and down to 3 metres, about four hundred specimens.

Remarks.—I am unable to find any differences of specific importance between these specimens and the description of *Cirolana japonica* by Hansen. The legs appear to be somewhat stouter in general build, but the antennae, antennules, clypeus, coxae and last abdominal somite agree very closely with Hansen's figures. The body and appendages appear to be microscopically scaled, and under a moderately high power of the microscope a regular arrangement of hexagonal markings can be detected. The species does not appear to have been met with since Hansen described his single specimen. Hansen regarded it as a pelagic species, and the present specimens have the same habit. It is not unlike the species described and figured by Filhol under the name of *C. cooki*, but Filhol speaks of special hairs on the internal face of the basal joint of the last four pairs of thoracic legs. There are no such hairs on *C. japonica*, but they are characteristic of the group of species of the genus to which *C. borealis* belongs, and to which, I presume, Filhol's species must be referred.

16. *Eurydice subtruncata*, n. sp. Pl. III, figs. 9–17.

Occurrence.—Stations 84, 85, 86, 89 (types), 92, 93, 106, 107, 109, 110, 111, 118, 120, 122, 126, 127, 128, 129, 130, 139 and 141, in the neighbourhood of Three Kings Islands, between 35° 4′–34° 38′ S., 171° 19′–172° 20′ E., plankton at the surface and down to 3 metres, about nine hundred specimens.

Stations 133, 135 and 136, Spirits Bay, near North Cape, New Zealand, plankton at the surface, about fifty specimens.

Description.—General form in the female robust and dorsally much vaulted, body about two and a half times as long as broad; in the male, general form much more slender and less vaulted, and the body about three and a half times as long as broad. Whole surface of the body and appendages microscopically scaled.

Eyes large, with pigment intense black; there seems to be considerable variation in the size of the eyes, which variation is not sexual; I have found specimens which otherwise do not differ from one another, in some of which the eyes are much larger than in the others, and consequently appear closer together.

Clypeus (pl. III, fig. 16) and labrum of the type found in *E. truncata* (Norman), the process of the clypeus, seen from below, covering only a small portion of the space between the mandibular palps.

Antennulae (pl. III, figs. 9, 10) exhibiting no marked differences between the sexes, reaching the antero-lateral angle of the first free thoracic somite; peduncle with the third joint sub-equal to the second; flagellum slender, with the first joint considerably longer than the remaining four and furnished with long sensory hairs, second joint longer than the third or fourth, terminal joint minute and furnished

with a few setæ, one of which is moderately robust and as long as the whole flagellum.

Antennae in the male about three-fourths of the total length of the body, reaching the second abdominal somite; in the female slightly shorter, only three-fifths of the total length, and extending barely beyond the penultimate thoracic somite; third joint of the peduncle (pl. III, fig. 11) approximately half as long as the fourth; flagellum of 22–24 joints terminated by a long robust seta.

Coxal plates of the second, third and fourth free thoracic somites not produced at all; those of the fifth, sixth and seventh produced into distinct processes; those of the sixth segment much longer than those of the fifth or seventh somites. The coxal plates are almost exactly similar to those of *E. truncata*, Norman.

Eighth thoracic legs (pl. III, fig. 13) moderately robust; fourth joint only very slightly longer than broad, shorter than the fifth joint; fourth, fifth and sixth joints with two or three groups of spines on both the upper and lower margins, mingled with long setae.

Last abdominal somite (pl. III, fig. 17) with the posterior margin about one-third as long as the breadth of the somite, almost straight and finely serrate, without movable spines, at each end furnished with a prominent tooth, outside which is a smaller tooth; some of the serrations between the external prominent teeth larger than the rest, the margin furnished with small setae between the serrations.

Rami of the uropods (pl. III, fig. 15) each furnished at their outer distal angles with two or three conspicuous spines among the long plumose setae fringing their margins.

Appendix masculina on the second pleopod of the male (pl. III, fig. 14) longer than the rami; its apex abruptly narrowed and almost spiniform.

The colour of preserved specimens indicates that in life the species is mottled or marbled brown, with a profuse system of black chromatophores.

Length of an adult male, 5 mm.; of an adult female, 7 mm.

Remarks.—This new species is very closely allied to *Eurydice truncata*, Norman, a pelagic species of similar habits known from the Atlantic Ocean and the Mediterranean. The main differences are to be found in the length of the antennules and antennae, in the absence of marked sexual differences in the antennules, in the robuster and rather more spiny nature of the posterior thoracic legs, and in the shape of the appendix masculina of the second pleopods of the male. In such fundamental structures as the clypeus, the form and shape of the coxae of the thoracic segments, and the shape and armature of the last abdominal segment, the species are hardly distinguishable. It should be remarked that Stebbing (1910) has recorded *E. truncata* from the Indian Ocean, near the Seychelles, thus indicating a much extended geographical distribution. The present form is so close to *E. truncata* that it may perhaps be more properly regarded as a local race.

Sub-family AEGINAE.

Genus AEGA, Leach.

17. *Aega antarctica*, Hodgson.

Aega australis, Richardson, 1906 (2), p. 4, text-figs. 8–11.
A. antarctica, Hodgson, 1910, p. 17, pl. II; Richardson, 1913, p. 4.
Non *A. australis*, Whitelegge.

Occurrence.—Station 294, Ross Sea, 74° 25′ S., 179° 3′ E., 158 fathoms, bottom fauna, two specimens, 10 and 24 mm.

Station 331, off Cape Bird Peninsula, entrance to McMurdo Sound, 250 fathoms, bottom fauna, five specimens, 9–19 mm.

Station 338, 77° 13′ S., 164° 18′ E., 207 fathoms, bottom fauna, one ovigerous female, 18 mm.

Station 339, 77° 5′ S., 164° 17′ E., 140 fathoms, bottom fauna, eleven specimens, 15–24 mm.

Station 349, off Butter Point, western shore of McMurdo Sound, 80 fathoms, bottom fauna, one female, 22 mm.

Station 356, off Granite Harbour, entrance to McMurdo Sound, 50 fathoms, bottom fauna, seven specimens, 18–27 mm.

2.3.1911, washed up on the beach at North Bay, one specimen, 23 mm.

Remarks.—This species is closely allied to the new species described below, but is distinguished by its smaller eyes, and by the armature of the anterior thoracic limbs, as well as by its relatively smaller size. I have examined the "Discovery" specimens named by Hodgson and find that they all belong to the small-eyed form. Richardson's species is, I think, the same as Hodgson's. It agrees with the latter in the armature of the thoracic limbs, and the eyes are certainly smaller than in the new species I describe below.

18. *Aega glacialis*, sp. nov. Pl. IV, figs. 1–10.

Occurrence.—Station 194, off Oates Land, 69° 43′ S., 163° 24′ E., 180–200 fathoms, bottom fauna, one male, 27 mm., and one female, 34 mm.

Station 314, 5 miles north of Inaccessible Island, McMurdo Sound, 222–241 fathoms, bottom fauna, three specimens, 16–25 mm.

Station 316, off Glacier Tongue, about 8 miles north of Hut Point, McMurdo Sound, 190–250 fathoms, three ovigerous females, 34–37 mm.; nine other specimens, 14–25 mm. (types).

Station 339, 77° 5′ S., 164° 17′ E., 140 fathoms, bottom fauna, one female, 30 mm.

Station 355, 77° 46′ S., 166° 8′ E., 300 fathoms, bottom fauna, three specimens, 17–29 mm.

Description.—This new species is so closely related to *A. antarctica*, Hodgson, that it is perhaps most easily described by pointing out the differences between the two.

A. glacialis differs from *A. antarctica*:—

(1) In the size of the eyes. Pl. IV, figs. 1, 2, 3.

In the type specimen, measuring 37 mm. in length, the head measures 7 mm. in a straight line across its widest part. The eyes measure 2·5 mm. along their longer axes, and the distance between the eyes is less than the length of the longest axis of each eye. The eyes are of elongate pyriform shape, the longer axis running transversely across the head towards the centre with the narrower end of the eye nearer the centre. The pigment is somewhat paler than in *A. antarctica*.

In a specimen of *A. antarctica*, 25 mm. in length, the head measures 6 mm. in greatest width, the longest axis of the eye measures 1·25 mm., and the distance between the eyes is 3·5 mm., or more than double the length of the longest axis of the eye. The eye is of a much shorter pyriform shape than in *A. glacialis*, as if the elongate narrower end of the eye in the latter had become obsolete, while the pigment is much blacker.

(2) In the armature of the anterior thoracic limbs.

In *A. antarctica*, according to Hodgson, and the specimens in the present collection bear out his description, the propodus of the second to fourth thoracic limbs is armed with three blunt spines on the inner margin, one at either end and one intermediate, while the carpus has three such blunt spines.

In *A. glacialis* both propodus and carpus of the second to fourth thoracic limbs have only one spine each, at the distal end of the inner margin (pl. IV, fig. 8).

(3) In size.

The largest *A. antarctica* recorded hitherto measures 28 mm. *A. glacialis* reaches 38 mm. in length.

For the rest, the body in *A. glacialis* is rather more than twice as long as broad, perfectly smooth and without hairs. The telson is rather less in length than one-quarter of the entire animal, and one and a quarter times as broad, at its widest part, as long. There is a well-developed keel in the mid-dorsal line, and the margins are produced into a short acute apex, minutely crenulated distally, with short setae between the crenulations. The uropods are slightly longer than the telson, both with rather acute apices, their margins crenulate and armed with short setae.

The peduncle of the antennule (pl. IV, fig. 5) is as long as the head, and has the third joint considerably longer than the first two combined. The flagellum has about twenty joints.

The antenna (pl. IV, fig. 6) reaches the posterior end of the third free thoracic somite. The fourth joint of the peduncle is level with the end of the

peduncle of the first antenna. The fourth and fifth joints are sub-equal in length and longer than any of the first three. The flagellum has about twenty-five joints, the distal joints about double the length of the proximal ones.

The appendix masculina on the second pleopods of the male (pl. IV, fig. 10) is longer than the rami of the pleopods, its distal half very acutely pointed in the form of a stylet.

19. *Aega novi-zealandiae*, Dana. Pl. IV, figs. 11–14.

A. novi-zealandiae, Dana, 1852, p. 767, pl. LI, figs. 2*a–e*; Miers, 1876, p. 108; Thomson and Chilton, 1886, p. 153; Hutton, 1904, p. 262; Thomson, 1913, p. 246.

Occurrence.—Station 96, 7 miles E. of North Cape, New Zealand, 70 fathoms, bottom fauna, one ovigerous female, 13·5 mm.

Remarks.—Dana's original description is short and inadequate, and though the species has since been recorded by Thomson and Chilton, no more complete description has been published. It is therefore with considerable doubt that I refer the present single specimen to Dana's species. There is nothing in Dana's description and figures to suggest the possibility of my specimen belonging to another species. In the hope that the species may be recognised and more fully described in the future, I add a few notes. The body is absolutely smooth, without carinae, ridges or tubercles of any kind, and is covered on the dorsal surface by a regular series of minute red flecks or chromatophores. These microscopical dots of pigment have persisted extraordinarily well in the spirit specimen.

The specimen is to be placed in Section 2A of Schioedte and Meinert's Synopsis of the Species of *Aega* (1879, p. 339), and, having the eyes distant, it comes nearest to the two Northern species, *A. arctica*, Lütken, and *A. ventrosa*, M. Sars.

The head is furnished with a small rostrum, which curves over ventrally to meet the frontal lamina, and thus separates the bases of the antennules.

The eyes are of moderate size, black in colour, separated from each other by a distance almost equal to the length of each eye.

The frontal lamina and clypeus are almost identical with those figured by Schioedte and Meinert for *A. ventrosa* (1879, tab. IX, fig. 8), and it is sufficient to refer to this figure for their general structure.

The antennules reach the posterior margin of the first free thoracic somite. The peduncle is slightly shorter than the head, and equal to the first four joints of the peduncle of the second antenna. The third joint of the peduncle is about equal to or slightly longer than the first two combined, and the flagellum is composed of thirteen joints.

The antennae reach the posterior margin of the third free thoracic somite, and the flagellum is composed of eighteen joints.

The second thoracic limbs (pl. IV, fig. 12) have one spine on the fourth joint, one on the fifth, and two on the sixth.

The telson (pl. IV, fig. 14) is broadly triangular, with the apex rounded. The distal half of the margins is serrate, the serrations at first regular but becoming uneven towards the apex, and there is a fringe of small plumose setae between the serrations. The uropods are about as long as the telson. Both rami have margins coarsely serrate or toothed, and in my figure I have indicated the spinules which still remain in my specimen.

In comparing my specimen with Dana's description and figures the following differences may be noted :—

(1) The first free thoracic somite in my specimen, while longer than the succeeding ones, is not so disproportionately long as Dana shows.

(2) The eyes are larger in my specimen, and the distance between them correspondingly smaller than Dana's figure illustrates.

(3) The flagellum of the antennules is nine-jointed according to Dana, and thirteen-jointed in my specimen.

(4) The antennae in my specimen have the last joint of the peduncle rather longer and narrower than Dana figures it, while the flagellum has sixteen to eighteen joints as against twenty-two given by Dana.

(5) Dana's description and figures of the telson in his species suggest that it is longer and more truncate than in my specimen. He gives no detail of the armature of either telson or uropods.

The general resemblance between my specimen and Dana's description is sufficiently close to warrant its being referred to Dana's species, at any rate until more material is forthcoming.

Sub-family CYMOTHOINAE.

Genus CERATOTHOA, Dana.

20. *Ceratothoa impressa* (Say).

Glossobius linearis, Schioedte and Meinert, 1881–83, p. 301, tab. XII, figs. 1,2.
Ceratothoa impressa, Richardson, 1905, p. 234, text-figs. 236–240 (with full synonymy).

Occurrence.—12.5.1913, from the branchial chamber of a flying fish, *Exocoetus*, which flew on board the "Terra Nova"; one female, 38 mm., one male, 11 mm. From the list of stations, it would appear that on this date the "Terra Nova" was in about 5° S., 27° 15′ W., in the Tropical Atlantic.

21. *Larval Cymothoid*, gen. et sp. (?).

Occurrence.—Station 133, Spirits Bay, near North Cape, New Zealand, plankton, one specimen.

Remarks.—It is not possible to name this larva, but it seems to belong to this sub-family, and indeed probably to the genus *Ceratothoa* or its relative, *Meinertia*. It is in the second stage of larval development, and the dactylus of the three anterior pairs of limbs is armed with five teeth. Four species of the genus *Meinertia* are known from New Zealand waters, and it is probably to one of these that this larva should be referred.

Family SPHAEROMIDAE.

Sub-family LIMNORIINAE.

Genus LIMNORIA, Leach.

22. *Limnoria antarctica*, Pfeffer.

L. antarctica, Pfeffer, 1887, p. 96, pl. II, figs. 12, 13, pl. V, figs. 2–22; Stebbing, 1904, p. 714; Calman, 1910, p. 185; Richardson, 1913, p. 8; Chilton, 1914, p. 382, pl. XVII, fig. 8; Chilton, 1914, p. 448.

Occurrence.—Cumberland Bay, S. Georgia. December, 1913, collected by P. Stammwitz, one.

Sub-family PLAKARTHRIINAE.

Genus PLAKARTHRIUM, Chilton.

23. *Plakarthrium typicum*, Chilton.

P. typicum, Chilton, 1883, p. 74, pl. I, figs. 5–5*k*; Thomson and Chilton, 1886, p. 159; Hutton, 1904, p. 263; Hansen, 1905 (1), p. 115.

Occurrence.—Station 135, Spirits Bay, near North Cape, New Zealand, plankton, one male.

Remarks.—The specimen measures 4 mm. in length, and agrees very closely with Chilton's description. As Hansen notes, the species is very closely allied to *P. punctatissimum*, Pfeffer; but I have been able to examine a specimen of the latter species in the collections at the British Museum identified by Prof. Chilton from collections made by Dr. W. S. Bruce at the South Orkneys, and I am convinced that the two species, though very closely related, are distinct, and readily separable by one important character. This is the form of the thoracic legs, and a comparison of the original descriptions of both species brings out the fact that both Pfeffer and Chilton have accurately described the thoracic legs in their respective species. Pfeffer states that in *P. punctatissimum* "Die Beine sind nach zwei ganz verschiedenen Typen gebildet. Das 1, 2 und 7 Paar sind schlank, haben lange Femora und 2 Endklauen; die übrigen sind kürzere und feste Klammerfüsse mit ganz kurzen Femur und einfacher, grosser Endklaue." Chilton's original description of *P. typicum* reads: "First two pairs of legs slender, three following pairs short and stout, last two pairs slender,

similar to the first two, all ending in strong curved claws." That is to say, using the terminology now in vogue for the appendages of Crustacea, that in *P. typicum* the second, third, seventh and eighth thoracic limbs are similar in general form, and form a sharp contrast with the fourth, fifth and sixth, while in *P. punctatissimum* the second, third and eighth are similar, and in contrast with the fourth, fifth, sixth and seventh. The specimens of both species which I have examined bear out these descriptions, and the form of the seventh pair of thoracic limbs forms a valid and sharp specific character.

P. typicum, Chilton, has so far only been recorded from Lyttelton Harbour, and that only once, when discovered by Chilton in 1883.

Sub-family SPHAEROMINAE.

A. SPHAEROMINAE HEMIBRANCHIATAE.

Genus EXOSPHAEROMA, Stebbing, 1900.

24. *Exosphaeroma gigas* (Leach).

E. gigas, Stebbing, 1900, p. 553, pl. XXXIX; Hansen, 1905 (1), p. 118.

Occurrence.—Stations 133, 135 and 136, Spirits Bay, near North Cape, New Zealand, four, quite juvenile.

Remarks.—These specimens are quite small and immature, and are, with doubt, referred to this common New Zealand species.

25. *Exosphaeroma falcatum*, sp. nov. Pl. V, figs. 1–8.

Occurrence.—Station 133, Spirits Bay, near North Cape, New Zealand, plankton, two males and one female (types).

Description.—A hemi-branchiate Sphaeromid, with the body smooth, without granules or tubercles, but presenting a minutely honeycombed appearance dorsally under the microscope. Head with a distinct though small rostral projection, with a distinct excavation at each side of its base, into which the antennules fit and are just visible from dorsal view. Below the rostral process and in front of it projects the large epistome, very prominent in dorsal view. The epistome is figured in pl. V, fig. 8, and in side view is distinctly dorsally recurved, giving a very pug-nosed appearance to the animal. Coxal plates almost hidden in dorsal view, and strongly curved on to the ventral surface. Telson broadly triangular in shape and strongly convex, without tubercles or granules, apex bluntly and rather broadly rounded. Uropods in the male (pl. V, fig. 1) almost reaching the apex of the telson, inner ramus narrowly ovate and bluntly pointed, outer ramus very narrow, curved slightly outwards and sharply pointed; uropods in the female (pl. V, fig. 2) exactly as in the

male except for the outer ramus, which is strongly hooked at the outer distal extremity.

Antennule (pl. V, fig. 3) very slightly longer than the head; first joint of the peduncle stouter and longer than the other joints, about twice as long as wide; second joint shorter than the third, latter not much more than half as long as the first; flagellum shorter than the peduncle, seven-jointed.

Antenna (pl. V, fig. 4) longer than the antennule, but not quite reaching the posterior end of the first somite of the thorax; flagellum a little longer than the peduncle, thirteen-jointed.

Second to the eighth thoracic limbs (pl. V, figs. 5–6) long and slender, progressively increasing in length from the second to the seventh pair, mainly by the increase in length of the meral and especially of the carpal joints; in the second limbs, the carpus is quite small and the merus hardly longer than wide, while in the eighth pair the carpus is not much shorter than the propodus and equal to the merus; the limbs have a varying armature of long setae, especially from the outer distal corner of the meral joints, and the inner margin of the merus and carpus of the posterior limbs has a dense fringe of short setae.

Male stylet on the second pleopod of the male (pl. V, fig. 7) rather more than twice as long as the rami, rather sharply curved towards the finely pointed apex.

Length of male and female types, 2·5 mm. Across the head and first somite of the thorax, and also across the last somite of the thorax and anterior somite of the abdomen, are two bands of dark purple pigment.

This small species may be distinguished by the smooth body, the shape of the outer ramus of the uropods in both sexes, and the long dorsally recurved epistome, giving a snub-nosed effect in lateral view.

Genus ISOCLADUS, Miers, 1876.

26. *Isocladus armatus* (Milne-Edw.). Pl. V, figs. 9–17.

Sphaeroma armata, M.-Edw., 1840, p. 210; Dana, 1852, p. 780, pl. LII, fig. 7.
Isocladus armatus, Miers, 1876 (1), p. 229; Miers, 1876 (2), p. 112; Thomson and Chilton, 1886, p. 155; Hansen, 1905 (1), p. 118; Thomson, 1913, p. 246.
Sphaeroma spinigera, Dana, 1852, p. 780, pl. LII, fig. 8.
Isocladus spiniger, Miers, 1876 (1), p. 229; Miers, 1876 (2), p. 113, pl. III, fig. 4; Thomson and Chilton, 1886, p. 155; Hansen, 1905 (1), p. 118; Thomson, 1913, p. 246.

Occurrence.—Sandy pool between tide marks at Motorua, Bay of Islands, New Zealand, sixteen males and nine females.

Remarks.—I have figured (pl. V, figs. 9–11) the adult male, adult female and young male of this species, to show the sexual differences and the changes in the growth of the young male to fully adult size, and to support my contention that *I. armatus* and *I. spiniger* are really different sexes and growth-stages of the one species, which I regard as the *Sphaeroma armata* of Milne-Edwards.

Milne-Edwards' original description says nothing about the length of the process from the seventh thoracic somite. He merely stated, "Septième segment du thorax surmonté d'une dent conique médiane dirigée en arrière."

Dana, in 1853, described two species from the Bay of Islands, one of which he referred to *S. armata*, M.-Ed., with "seventh thoracic segment having a tooth behind, the tooth sometimes obsolescent"; and the other, which he describes as a new species, *S. spinigera*, having the "tooth of the seventh thoracic segment elongate, spiniform, longer than half the abdomen." Dana also states that in his *S. armata* the caudal lamellae do not quite reach the apex of the telson, whereas in *S. spinigera* they extend beyond it. I am of the opinion that Dana's *S. armata*, with the seventh thoracic somite having a tooth behind, is the young male, and those specimens with the tooth obsolescent adult females; and his *S. spinigera*, with the elongate spiniform tooth on the seventh thoracic somite, the fully adult male of the same species, which I regard as the same as Milne-Edwards' species.

Miers founded the genus *Isocladus* on a number of specimens which included both females and adult males, and which he referred to Dana's *S. spinigera* (?). He had not seen any specimens which he could refer to *S. armata*, M.-Ed., and if any young males occurred among the specimens which he examined he probably regarded them as merely growth stages of *I. spinigera*, without considering whether they agreed with Milne-Edwards' description of *S. armata*.

There seems to be some confusion as to the identity of this species in the minds of the New Zealand zoologists who have collected specimens. Thomson and Chilton (1883) record *I. armatus* from the Bay of Islands on the authority of Thomson, and *I. spiniger* from Lyttelton on the authority of Chilton; Thomson adding a note to the latter record, "I do not think I know this form."

Thomson (1913) records both species from Otago Harbour, but seems doubtful of his record of *I. spiniger*, since he adds, "Several specimens collected near Dunedin appear to belong to this species."

The figures here given will show the general form of the body in the adult and young male and in the adult female. The body is strongly convex, and capable of being rolled up into a ball. It is smooth and without tubercles of any kind. The last segment of the abdomen is strongly convex in the centre, with a flatter marginal portion. There is a median shallow groove or depression in the central convex portion, which gives the impression that the latter is made up of two obscure bosses. The spiniform process from the seventh thoracic somite of the male reaches backward nearly to the apex of the telson. In the young male it appears as a short tooth, and is absent in the female.

The uropods in the adult male extend slightly beyond the apex of the telson; inner ramus broad and ovate, with a truncate tip; outer ramus scythe-like, curving slightly outwards; apex pointed. In the female the uropods are smaller than in the male, and do not reach the apex of the telson, but are otherwise of the same general

type. In the young male the uropods just reach the apex of the telson. The scythe-like curved outer uropods are characteristic of all stages of growth of this species, and essentially of the same type throughout, though larger and more emphasised in the adult male.

The figures (pl. V, figs. 12–15) of the antennules and antennae, the second and eighth thoracic limbs and epistome will convey a sufficient idea of the character of these appendages in this species. The stylet in the second pleopods of the male (pl. V, fig. 16) is long and sharply pointed, nearly twice as long as the inner ramus. The epistome (pl. V, fig. 17) is constricted somewhat at the centre, and has the anterior margin convex. It projects slightly beyond the head, and is visible in dorsal view. The upper lip is triangular, with the distal margin convex. Length of an adult male, 8 mm.; of an adult female, 7 mm.; and of a young male, 6·5 mm.

Three species of *Isocladus* are known: *I. tristensis*, Leach, *I. integer*, Heller, and the present species. *I. armatus* may be distinguished from the other two by the shape of the outer ramus of the uropods, and by the form of the upper lip and epistome.

Genus CYMODOCE, Leach.

27. *Cymodoce hodgsoni*, n. sp. Pl. VI, figs. 1–8.

Occurrence.—Station 96, 7 miles East of North Cape, New Zealand, 70 fathoms, bottom fauna, one male, 9 mm.

Description.—Body (pl. VI, fig. 1) about twice as long as broad and capable of being partially rolled up into a ball, more or less covered, but not closely, with short fine setae. On the thoracic segments these setae occupy a band running across the posterior half of each segment, and though nearly all worn off, the pits from which they arise are clearly to be seen. The hairs are much more numerous on the abdomen, and more evenly and regularly distributed. They are rubbed off dorsally but still remain laterally.

Head somewhat highly vaulted, anterior margin produced between the bases of the first antennae into a short spatulate rostral process, in front of which projects the blunt epistome. The latter is a conspicuous object in dorsal view even when the animal is not fully straightened out, as in the figure here given (pl. VI, fig. 1). On each side of the head, slightly in front of and below the eye, there is a broad groove, the margins of which are strengthened by a ridge, into which the anterior forwardly directed part of the coxal plate of the first free thoracic somite slides when the creature rolls itself up into a ball.

Thorax with the first free somite much the largest, and the remainder more or less sub-equal. The form of the coxal plates is shown in pl. VI, fig. 2. The last four somites of the thorax have four obscure tubercles each, those nearest the median line being more clearly defined.

Abdomen (pl. VI, fig. 1) with a proximal segmented portion and a terminal

unsegmented portion. The proximal segmented portion would appear to be formed of four somites. The suture marking off the first segment is visible in the middle line, and on each side just behind the junction of the seventh thoracic tergum with its coxa but not in between, nor does it extend to the lateral margins. The two succeeding sutures are incomplete in the mid-dorsal line, but extend to the lateral margins. The suture marking the fourth somite is complete. The posterior margin of the fourth segment is produced backwards into a broad stout process the apex of which is truncate or even slightly emarginate in dorsal view. On each side there are two small processes or tubercles, the outer of which is the larger. The unsegmented terminal portion of the abdomen has a single prominent lateral tubercle on each side above the base of the uropods. The apex is trilobed, the median tongue-like process only slightly shorter than the lateral ones. On the dorsal surface of the median lobe, at its base, is a short, blunt, forwardly directed tubercle, which in dorsal view shows two quite small tubercles, one on each side of its base, giving the whole a trident-like form.

Uropods (pl. VI, fig. 7) with the endopod fused to the sympod, the whole forming a stout rigid bar the inner edge of which is grooved and fitting over and under the lateral margins of the abdomen in the familiar groove and tongue fashion known to the carpenter. The outer uropod is much smaller than the inner, with its apex acute.

Epistome of the form shown in pl. VI, fig. 3, very prominent both laterally and dorsally.

Antennules (pl. VI, fig. 4) reaching the posterior margin of the second free thoracic somite; basal joint of the peduncle rather broad, second joint small, third joint as long as the first but much narrower; flagellum composed of about eleven or twelve joints.

Antennae (pl. VI, fig. 5) a little longer than the antennules; joints of the peduncle all narrow except the first small joint, fifth joint the longest; flagellum of about sixteen to eighteen joints.

Second thoracic limbs (pl. VI, fig. 6) much shorter and stouter than any of the others, the merus, carpus and propodus all armed with stout spines, the dactylus bi-unguiculate.

In the succeeding thoracic limbs the merus is not so stout and is without strong spines, the carpus and propodus successively becoming longer and the dactylus bi-unguiculate.

The processes on the sternum of the seventh thoracic somite of the male are rather long and lie close to one another.

The pleopods are of the usual hemi-branchiate type. The stylet on the second pair is longer than the rami, strongly curved, and acute at the tip (pl. VI, fig. 8).

Of all the species of *Cymodoce* hitherto described, this species approximates most closely to *C. australis*, Hodgson, described from specimens taken on the "Southern Cross" Expedition in 8 fathoms, off Cape Adare. It is indeed very closely allied to the latter, and I hesitated for a long time whether to describe it as a new species.

After an examination of Hodgson's type in the British Museum, I have come to the conclusion that the two forms are distinct and that *C. hodgsoni* may be distinguished from *C. australis* by the following characters :—

(1) It is not so hairy.

(2) The big process on the anterior part of the abdomen is broader, and the apex truncate instead of pointed.

(3) The small recurved spine-like tubercle at the base of the median tongue of the apex of the telson is shorter, less acute, and broader at the base. In *C. australis* the tubercle is longer and more pointed, and has not the trilobed appearance in dorsal view that it has in *C. hodgsoni*.

(4) In *C. australis* the median lobe at the apex of the abdomen is much shorter than the lateral lobes. In *C. hodgsoni* they are more nearly of the same size.

(5) *C. hodgsoni* has the outer uropod of proportionately smaller size and more acute at the apex.

Hansen, 1905 (1), does not mention *C. australis*, Hodgson, or express any opinion as to its exact place in the family. From my examination of the type and the above specimen of a closely allied species, I believe it has been correctly referred to the genus *Cymodoce*, where I would, at least provisionally, retain both species. In his key to the genera of the Cymodocini (Hansen, 1905 (1), p. 104) the author defines the genus *Cymodoce* as "in the male the anterior part of the abdomen is without mesial process, and the endopod of the uropod is generally moderately well developed." *C. australis* and *C. hodgsoni*, which both have mesial processes on the anterior part of the abdomen, can hardly be said to come within the above definition. On the other hand, they can just as little be placed in the genera *Cilicaea* or *Cilicaeopsis*, which are both described as having the endopod of the uropod very short or quite rudimentary. Hansen has already commented on the very slight value of the latter two genera, and the species now under discussion lend support to his opinion.

28. *Cymodoce bituberculata*, Filhol (?). Pl. VI, figs. 9–15.

Cymodoce bituberculata, Filhol, 1885, p. 457, pl. LV, fig. 2 ; Hutton, 1904, p. 263.

Occurrence.—Stations 133, 135 and 136, Spirits Bay, near North Cape, New Zealand, plankton, nine specimens.

Remarks.—The specimens are all quite small, measuring from 1 to 4 mm., and none of them are sexually mature. My identification of them is therefore accompanied by a strong element of doubt. I have figured the whole animal from the side, the epistome, and more important appendages, in the hope that the adult animal may some day be found and satisfactorily identified.

The body is granular and glabrous, without any distinctive armature except on the last abdominal somite (telson), which has two well-marked bosses separated in the median line by a groove. The relative height and contour of these bosses may

be judged from the figure of the animal in side view (pl. VI, fig. 9). The apex of the telson has a semi-circular notch, not very visible in dorsal view but somewhat deep viewed from behind. In one of the specimens, which I suspect to be a male, though it had no stylet on the second pleopods or any appendages on the sternum of the last thoracic somite, the notch in the apex of the telson is completely hidden in dorsal view by a short obtuse blunt process on the dorsal surface of the telson (pl. VI, fig. 10). This is the only difference I could find between the sexes, supposing my presumption that the latter specimen represents the male sex be true. The uropods are sub-equal in length, with truncate apices. The anterior margin of the head is produced between the bases of the first antennae into a short but well-marked rostral process, which meets the anterior end of the epistome. The latter is figured on pl. VI, fig. 11, and is of quite characteristic shape, with a distinct tubercle on the central portion. The first and second antennae (pl. VI, figs. 12, 13) have flagella of eight and twelve joints respectively. The second to eighth thoracic limbs (pl. VI, figs. 14, 15) are all bi-unguiculate, the second pair with three larger spines on the inner margin of the merus, two on the carpus, and three on the propodus, with smaller spinules in between. The thoracic limbs become successively longer, but the general form and the armature remain of the same type throughout. The pleopods are of the usual hemi-branchiate type, with the exopod of the third pair two-jointed.

Filhol's specimens were taken in Cook Strait and on the shores of Stewart Island. His original description, which I quote in full, is very short and unsatisfactory : "Cette espèce, que j'ai recueillé dans le détroit de Cook et sur la côte est de l'Ile Stewart, se différencie du *Cymodocea granulata* par le lobe postero-latéral du dernier segment thoracique qui ne se contourne pas en arrière pour se terminer par une courte épine dirigée en haut, par la présence de deux tuberosités sur la portion médiane du dernier anneau abdominal, par la disposition des appendices caudaux qui ont la même grandeur." The present specimens agree with that description as far as it goes, and, as the specific name indicates, the chief character of the species is the presence of two prominent bosses on the telson. This character alone has led me to regard my specimens as belonging to Filhol's species.

B. SPHAEROMINAE EUBRANCHIATAE.

Genus CYMODOCELLA, Pfeffer.

29. *Cymodocella tubicauda*, Pfeffer.

C. tubicauda, Pfeffer, 1887, p. 110, pl. II, fig. 8, pl. VI, figs. 11, 12 ; Richardson, 1908, p. 4 ; Hodgson, 1910, p. 31 ; Chilton, 1909, p. 657 ; Richardson, 1913, p. 6.
Sphaeroma (?) *egregia*, Chilton, 1892, p. 269.
C. egregia. Hansen, 1905 (1), p. 126 ; Richardson, 1906, p. 6.
Cymodocea antarctica, Hodgson, 1902, p. 243, pl. XXXII, fig. 2.

Occurrence.—Station 220, off Cape Adare, 45–50 fathoms, bottom fauna, three specimens, 7–8 mm.

Station 331, off Cape Bird Peninsula, 250 fathoms, bottom fauna, one specimen, 7·5 mm.

Cumberland Bay, South Georgia, collected by P. Stammwitz, December, 1913, eight specimens, 2–10 mm.

Genus DYNAMENELLA, Hansen, 1905.

30. *Dynamenella eatoni* (Miers).

Dynamene eatoni, Miers, 1875, p. 73; Miers, 1879, p. 203, pl. XI, fig. 2.
Dynamenella eatoni, Hansen, 1905 (1), p. 125; Vanhöffen, 1914, p. 515.

Occurrence.—Cumberland Bay, South Georgia, December, 1918, collected by P. Stammwitz, two males.

Remarks.—The specimens are both apparently immature, and measure 11 mm. and 13·5 mm. Though the male appendages on the seventh thoracic somite are present and well developed, the stylet on the second pleopods is not yet visible externally. Chilton (1909) has already called attention to the close similarity between this species and *D. huttoni* (G. M. Thomson).

Genus CASSIDINOPSIS, Hansen, 1905.

31. *Cassidinopsis emarginata* (Guér.).

Cassidina emarginata, Guérin, 1843, p. 31; Cunningham, 1871, p. 499, pl. LIX, fig. 4; Miers, 1879, p. 204; Studer, 1884, p. 19; Pfeffer, 1887, p. 103, pl. II, figs. 9, 10, pl. V, figs. 23–30, pl. VI, figs. 1–10; Stebbing, 1900, p. 562.
Cassidinopsis emarginata, Hansen, 1905 (1), p. 128; Stebbing, 1914, p. 351; Vanhöffen, 1914, p. 514.
Cassidina latistylis, Dana, 1852, p. 784, pl. LII, figs 12*a–e*.

Occurrence.—King Edward Cove, S. Georgia, November, 1913, collected by P. Stammwitz, fifteen specimens.

Remarks.—The largest male specimen measured 32 mm. in length and 21 mm. in breadth; the largest female, 22 mm. long, 11 mm. broad. This difference in the relative proportions of the sexes has already been commented on by Studer, Miers, and Vanhöffen. The stylet on the second pleopod of the male is a little longer than the rami.

Genus EUVALLENTINIA, Stebbing, 1914.

Vallentinia, Stebbing, 1914, p. 351.
nec *Vallentinia*, E. T. Browne, 1902 (Medusa).
,, *Vallentinia*, Norm. and Scott 1906 (Copepoda).

Stebbing instituted this genus in 1914, on the recommendation of Hansen, for the species previously known as *Dynamene darwinii*, Cunningham, or *Cymodocea darwinii*, Cunningham. Finding that the name he originally proposed, *Vallentinia*, had been

used twice previously, he changed the name to *Euvallentinia*. His diagnosis is quoted here in full :—

"A member of the Sphaerominae eubranchiatae, near to *Paracerceis*, Hansen, 1905, but distinguished by not having the basal joint of the first antennae produced into an acute process, the mandibles of the female not coalesced with the head, the exopod of the uropods much shorter and narrower than the endopod, first gnathopod prehensile in the male."

In 1906 (1) Miss Richardson instituted a new genus, *Cassidias*, the type species of which is *C. argentinea*, Richardson. To this genus Miss Richardson says that *Cymodoce darwinii*, Cunningham, should be referred, and she proceeds to point out the differences between the two species. It seemed at first, therefore, as if the genera *Cassidias* and *Euvallentinia* were synonymous, but, on going into the matter further, certain difficulties appeared in the way of my accepting Miss Richardson's interpretation of the generic position of *C. darwinii*, and as a result of my observations I have been led to uphold the validity of Stebbing's genus. If the diagnoses of Richardson and Stebbing for their two genera are compared, two points require further elucidation. Richardson says of *Cassidias*, "mouth parts of the female metamorphosed," and her figures of the first maxilla and maxilliped of the female of *C. argentinea* support her statement. Stebbing in defining *Euvallentinia* says, "the mandibles of the female not coalesced with the head." This statement is not inconsistent with a metamorphosis of the mouth-parts in egg-bearing females, for it is only in some few genera that the metamorphosis is so complete as to lead to a complete fusion of the mandibles with the head, such as Hansen describes in the genera *Cerceis* and *Dynamene*. Stebbing's statement is included, I take it, in his diagnosis to indicate a point of difference between *Euvallentinia* and *Paracerceis*, the genus to which Hansen had suggested that *C. darwinii* was most closely related. In the latter genus, the metamorphosis of the mouth-parts in the egg-bearing female is very complete, and includes a fusion of the mandible with the head. Stebbing had only one specimen at his command, and that appears from his remarks to have been a female. He gives no information on the state of its maturity, and no further information on the mouth-parts except to state that they are "much as in *Cymodoce*."

In the material I have examined there are two adult males, one immature male and three adult females, which I refer with some confidence to the *Cymodoce darwinii* of Cunningham. The three females have three pairs of well-developed marsupial lamellae, which overlap in the median line, but none of them has eggs in the marsupium. Two of the females, however, are carrying eggs in internal pouches, though I have not been able to make out the number of these pouches or the position of their external openings. I have carefully compared the mouth-parts of one of these egg-bearing females with those of an adult male and can discern no difference whatsoever.

In *C. darwinii*, therefore, the mouth-parts of the egg-bearing female are not

metamorphosed, and this character is of sufficient importance to constitute, in my opinion, a generic difference between *C. darwinii* and *C. argentinea*.

The second point in the diagnosis of Richardson and Stebbing which requires notice is the structure of the fourth pleopod. Richardson says "both branches of the fourth pair of pleopods are similar—fleshy, with transverse folds and without marginal setae"; and from the figure of the fourth pleopods of *C. argentinea* we gather that the exopod is without a terminal joint. Stebbing, in his remarks on *Euvallentinia darwinii*, though not actually in his diagnosis of the genus, states that "the exopod of the fourth pair is clearly two-jointed." I can confirm Stebbing's statement, and venture to think that this character can be regarded as of generic value.

I am therefore led to remove *C. darwinii* from the genus *Cassidias* to which Miss Richardson would refer it, and to uphold the validity of the genus *Euvallentinia*, Stebbing, a genus of Sphaerominae Eubranchiatae, having both sexes very similar in external aspect, without processes on the thorax; basal joint of the first antennae not expanded into a free plate nor produced into an acute process; mouth-parts similar in both sexes, not metamorphosed in the egg-bearing females; uropods similar in both sexes, with an exopod which is much shorter than the endopod; exopods of pleopods three and four two-jointed; female with marsupial lamellae which overlap in the median line, young developed in internal pouches; male with an appendix masculina on the second pleopod.

To this diagnosis may perhaps be added, as Stebbing has done, second thoracic limb of the male prehensile. Whether this character is of generic or specific significance is a matter of opinion, but it is at least interesting in view of Hansen's statement that "in no case has any sexual difference been observed" in the anterior two pairs of thoracic legs among the genera of the Eubranchiate Sphaeromids.

In only one other genus of Eubranchiate Sphaeromidae, *Scutuloidea*, Chilton, is the exopod of the fourth pleopods two-jointed, but this genus differs from *Euvallentinia* in having the exopod of the third pleopod unjointed, and in having the uropods without exopods.

32. *Euvallentinia darwinii* (Cunningham).

Cymodocea darwinii, Cunningham, 1871, p. 499, pl. LIX, figs. 1–1*b*; Studer, 1884, p. 18, pl. II, figs. 6–6*b*; Beddard, 1886 (2), p. 150; Dollfus, 1891, p. 65, pl. VIII, figs. 8–8*b*; Ortmann, 1911, p. 649.
Dynamene darwinii, Miers, 1881, p. 79; Hansen, 1905 (1), p. 135.
Cassidias darwinii, Richardson, 1906 (1), p. 22, fig. 27.
Vallentinia darwinii, Stebbing, 1914, p. 351.
Euvallentinia darwinii, Stebbing, 1914, p. 944.

Occurrence.—Station 38, 52° 23′ S., 63° 50′ W., 125 fathoms, bottom fauna, three males and three females.

Remarks.—Two of the males were adult, and measured 13 mm. The third, measuring only 10 mm., was immature. The females, all adult and two carrying eggs, measure

only 9 mm. There is thus a considerable difference in size between adults of both sexes. There are other interesting sexual differences in this species. In the adult male the base of the propodus of the second thoracic limb bears a rather long and stout blunt process, which makes this appendage in the male a prehensile limb. The process is quite absent in the female and only slightly developed in the immature male specimen. This character is interesting, as no other genus of Eubranchiate Sphaeromids exhibits such a sexual difference.

Further, on the third to the eighth pairs of thoracic limbs of the male the carpus and merus bear on their inner margins a dense pad of short stout setae just like a brush. These are not present in the female and only slightly developed in the immature male.

The stylet on the second pleopod of the male is about half as long again as the inner ramus.

C. SPHAEROMINAE PLATYBRANCHIATAE.

Genus CASSIDINA, Milne-Edw., 1840.

33. *Cassidina typa*, M.-Edw.

C. typa, M.-Edw., 1840, p. 224, pl. XXXII, figs. 10–16 ; Hansen, 1905 (1), p. 129.
C. neo-zealanica, G. M. Thomson, 1888, p. 264, pl. XIV, figs. 1–4 ; Stebbing, 1900, p. 562 ; Hutton, 1904, p. 263 ; Thomson, 1913, p. 247.

Occurrence.—Station 134, Spirits Bay, near North Cape, New Zealand, 11–20 fathoms, bottom fauna, one female.

Remarks.—The single specimen measures 6 mm. in length and about 4 mm. in breadth. Hansen has identified *C. neo-zealanica*, Thomson, with Milne-Edwards' species, and with this opinion I am in agreement. My specimen agrees more closely with Milne-Edwards' figures than with Thomson's. For instance, the latter author figures the abdomen as consisting of two somites only, whereas in my specimen four somites are indicated, the suture marking off the first somite not visible in the centre and not reaching the lateral margins, while that marking off the second segment is not complete in the median dorsal line but does extend to the lateral margins. This condition agrees absolutely with Milne-Edwards' figure. The body generally is clothed dorsally with short hairs, which are more numerous laterally than in the centre of the body. Between the bases of the hairs the surface of the body is microscopically honeycombed. The proportions of the first and second antennae and the form of the epistome agree very well with Milne-Edwards' figures, and differ somewhat from those of Thomson. The first antenna is slightly longer than the head, and quite reaches the end of the peduncle of the second antenna. The flagellum has eight joints. The second antenna reaches a little beyond the posterior border of the first free thoracic somite, and its peduncle is as long as the head. The flagellum has twelve joints. These differences are small, and considering the many points of close resemblance between Milne-Edwards' and Thomson's accounts, and the fact that both species are found in New

Zealand waters, I think that there can be little doubt that the species are synonymous. Hansen's re-description of the genus and species is sufficient for easy recognition. The type of *C. typa* came from New Zealand, Thomson's specimens from the Bay of Islands, and Hansen has recorded the species from Akaroa Harbour.

Family SEROLIDAE.

Genus SEROLIS, Leach.

34. *Serolis schythei*, Lütken.

S. schythei, Lütken, 1858, p. 98, pl. I, figs. 12, 13; Grube, 1875, p. 220, pl. V, fig. 1, pl. VI, fig. 1; Beddard, 1884, p. 40, pl. II, figs. 5–13.

Occurrence.—Station 38, 52° 23′ S., 63° 50′ W., near the Falkland Islands, 125 fathoms, Agassiz trawl, bottom fauna, two males, four females and eighteen juveniles.

Remarks.—Both male specimens measure 22 mm. in length and 25 mm. in greatest breadth, while the females, with eggs, measure 21 mm. long and the same in greatest breadth. Adult males are therefore proportionately broader as compared with females. The first four free thoracic somites (3–6 thoracic somites) have their coxae marked off from the terga by a distinct suture. Lütken, Grube and Beddard have all noted the differences between the sexes in this species. In the male the coxae of the seventh thoracic somite reach backward some considerable way beyond the apex of the last abdominal somite, while the coxae of the sixth thoracic somite and the pleura of the second abdominal somite extend backward equally to the apex of the last abdominal somite. In the female, the coxae of the seventh thoracic somite reach, and those of the sixth thoracic somite and the pleura of the second abdominal somite fall some considerable way short of the apex of the last abdominal somite. The dactylus of the second thoracic limb in the female has a comb of short spines on the distal half of the inner edge.

Richardson (1911, p. 396, fig. 1) has recently described a species of *Serolis*, *S. polaris*, which is very closely related to *S. schythei*, but apparently differs in that the pleura of the second abdominal somite are longer than the coxae of the seventh thoracic somite, whereas in *S. schythei* the reverse obtains, and the transverse carina on the last abdominal somite is of different form in the two species. *S. polaris* is recorded from the South Sandwich Islands. *S. schythei* is confined to the waters off Patagonia and the Falkland Islands.

35. *Serolis septemcarinata*, Miers.

S. quadricarinata, White, 1847, p. 106.
S. septemcarinata, Miers, 1875, p. 116; Miers, 1879, p. 206, pl. XI, fig. 3; Studer, 1884, p. 8; Beddard, 1884, p. 47, pl. II, fig. 14, pl. VIII, figs. 3–5; Pfeffer, 1887, p. 63, pl. II, figs. 5, 6, pl. III, figs. 1–26, pl. IV, fig. 6; Collinge, 1918, p. 74, pls. III, IV, figs. 1–13.
S. ovalis, Studer, 1879, p. 24, pl. III, figs. 8–10.

Occurrence.—Cumberland Bay, S. Georgia, December, 1913, collected by P. Stammwitz, two females.

Remarks.—The two specimens respectively measure 12 mm. long by 9·5 mm. broad, and 11 mm. long by 8·5 mm. broad. There is nothing to add to Pfeffer's detailed and careful description, or to the more recent account of this species given by Collinge. One point only requires remark. Collinge describes and figures only one kind of sensory spine on the inner margin of the propodus of the second thoracic limb. Pfeffer, however (*loc. cit.*, pl. III, figs. 13–15), gives detailed figures showing both kinds of sensory spines. My own observations agree absolutely with those of Pfeffer, whose account of this species has evidently been overlooked by Collinge.

36. *Serolis glacialis*, n. sp. Pl. VII, figs. 1–5.

Occurrence.—Station 194, off Oates Land, 69° 43′ S., 163° 24′ E., 180–200 fathoms, bottom fauna, one male, 17 mm. long, 14·5 mm. broad.

Description.—Body (pl. VII, fig. 1) broadly oval, slightly longer than broad, the breadth being about $\frac{5}{7}$ of the length, rather flattened and semi-translucent, especially laterally.

Head (pl. VII, fig. 1) very nearly twice as wide as long, shield-shape in outline, convex, with a small but well-marked pointed rostral process between the bases of the antennules; behind the rostrum there is a well-marked transverse keel or ridge, which runs laterally to the sides of the cephalosome; behind this again, between and in a line with the anterior end of the eyes, there is a short transverse well-marked ridge, immediately posterior to which is a deep groove; the portion of the head between the eyes is very convex, and divided into three more or less equal oval prominences, the posterior margins of which are much more sharply defined than the anterior, where the prominences merge in the general surface of the body; this portion of the cephalosome is roughened by irregular anastomosing ridges.

Eyes large, about half as long as the head, reniform, pigment black.

As in all Serolidae, the second thoracic somite united with the head, the lateral portion with two transverse ridges on each side, the anterior one commencing at the point at which the anterior ridge of the head meets the lateral margin of the head, the second one commencing some little way behind this point, and both running at first transversely and finally outward and backward, fading away into the lateral margins; third to seventh somites with well-developed coxal plates, those of the third to fifth somites marked off by distinct sutures; in the median dorsal line each of the third to the seventh thoracic somites is produced into a short but distinct median dorsal spiniform process; the coxal plates of the seventh thoracic somite are much more produced than those of any of the other thoracic somites, and extend about to the level of the basal joint of the uropods.

Abdomen (pl. VII, fig. 1) with three free somites and a large terminal one, each of the free somites with a short median dorsal spiniform process in continuation of those of the thorax; pleural plates of the second somite well produced backwards and extending posteriorly beyond the coxal plates of the seventh thoracic somite; pleural plates of the third somite *shorter* than those of the second, and reaching the same level as the coxal plates of the seventh thoracic somite; terminal segment with a well-developed spine in the anterior median line, followed by a median dorsal keel which extends to the extremity; on each side of the median keel there are two lateral oblique keels, terminating in small spines some way from the lateral margins, which are slightly turned down and infolded.

First and second antennae (pl. VII, fig. 1) rather long, reaching backwards almost to the posterior margin of the third free segment of the mesosome; peduncle of the first antenna four-jointed, first two joints small, third joint the longest, three times as long as the fourth, flagellum of thirty-five joints; peduncle of the second antenna longer than that of the first by the entire length of the fifth joint, fourth and fifth joints long and narrow and equal to each other, flagellum of about seventeen joints, shorter than the last peduncular joint.

The second, third and fourth thoracic appendages are shown in the figures (pl. VII, figs. 2–5). The second is stoutly built, with the propodus greatly expanded, having its outer distal corner somewhat pointed, and its inner margin armed with a row of about forty-five broad triangular tooth-like processes alternating with peculiar stout spines. The distal edge of the carpus is crenulate and bears two stout spines. The third thoracic appendage is much smaller than the second, with the propodus modified and bearing on its inner border several short stout spines and larger and more slender setae. Each of the sternal plates of the first three abdominal segments has the median posterior border produced into a spine, increasing in length from the first to the third.

The appendix masculina on the second pleopod of the male reaches about two-thirds of the way towards the apex of the metasome.

Uropods not extending beyond the metasome; endopod and exopod narrowly oval in shape, the exopod scarcely more than half the length of the endopod, margins of both finely serrated and sparsely setose.

This species appears to be most nearly related to *S. septemcarinata*, Miers, which has been recently redescribed and figured by Collinge (1918). I have compared the single type specimen with examples of Miers' species in the present collection and have noted the following points of difference.

(1) *S. glacialis* is more flattened, less compact and more transparent than *S. septemcarinata*. It should be remarked, however, that the "Terra Nova" specimen has every appearance of having been frozen before preservation, and this may account for its translucent appearance.

(2) The eyes are larger in *S. glacialis* than in *S. septemcarinata*.

(3) The first and second antennae in *S. glacialis* are longer than in *S. septemcarinata*. In *S. glacialis* the peduncle of the first antenna is equal to the first four joints of the peduncle of the second antenna, and the whole first antenna is if anything slightly longer than the second. In *S. septemcarinata* the peduncle of the first antenna reaches only about half-way along the fourth joint of the peduncle of the second, and the whole first antenna is considerably shorter than the second antenna.

(4) In *S. glacialis* each of the thoracic and first three somites of the abdomen has the median dorsal posterior border produced into a spine-like process, which is absent in *S. septemcarinata*.

(5) In *S. glacialis* the coxal plates of the seventh thoracic segment extend backwards as far as the pleural plates of the third abdominal somite, and not quite so far as those of the second abdominal somite. In *S. septemcarinata* the coxal plates of the seventh thoracic segment are much shorter than the pleural plates of the third abdominal segment, which in turn are equal to those of the second.

(6) In *S. glacialis* the last somite of the abdomen bears anteriorly a prominent median dorsal spine, which is not present in *S. septemcarinata*. The latter has seven carinae on the last segment of the abdomen, while *S. glacialis* has but five. Moreover, the shape of the abdomen differs considerably in the two forms.

(7) In *S. glacialis* the outer branch of the uropods is much shorter than the inner. In *S. septemcarinata* the two branches are much more equal in size and broader than in *S. glacialis*.

S. glacialis, like the majority of species of the genus, has the terga of the first three free thoracic somites separated by a suture from their coxal plates. This character serves to separate it from *S. schythei*, Lütken, *S. paradoxa*, Fabr., and *S. polaris*, Rich., which have the first four free thoracic coxal plates separated by a suture, and from *S. gracilis*, Bedd., and *S. latifrons*, White, in which the number is five and six respectively.*

S. glacialis is also separated readily from the Australian group of species, *S. tuberculata*, Grube, *S. pallida*, Bedd., *S. australiensis*, Bedd., *S. elongata*, Bedd., *S. longicaudata*, Bedd., *S. minuta*, Bedd., and *S. bakeri*, Chilton, in that the tergum of the fourth free thoracic somite is not unduly narrow, and that of the fifth free thoracic somite is not obsolete in the middle dorsal region. From the remaining species of the genus the characters of the last abdominal segment and of the uropods will serve as distinguishing marks.*

The armature of the inner palmar margin of the propodus of the second thoracic appendages in this genus seems to be a matter that is not quite clear. Beddard, speaking generally, states that there are two kinds of peculiarly formed spines regularly

* *See* Calman (1920) for a suggested re-grouping of the species of this genus based on the structure of the uropods and the segmentation of the thorax. *S. glacialis* belongs to Calman's group of *S. paradoxa*. The Australian species form a distinct group, and the third group comprises *S. latifrons* and Calman's new species *S. beddardi*.

alternating with one another, and for the species *S. neaera*, *S. convexa*, *S. minuta*, and *S. pallida* he figures such an arrangement. Hodgson, in describing *S. trilobitoides*, Eights, gives as one of the specific characters "special spines on the propodus of the second thoracic appendage consisting of sensory teeth alternating with broad leaf-like sensory structures, of which the blade is unequally developed on the two sides of the shaft." Hodgson gives figures of each of these spines, showing each to possess a mid-rib terminating in a peculiar sensory structure. Collinge, on the other hand, speaking of *S. septemcarinata*, states that he was unable to find more than one kind of spine, which he describes as terminating in three or four finger-like processes. My own observations agree with those of Beddard and Hodgson. I have examined the five species in this collection from this point of view, and in all five I have found the propodus of the second thoracic limb to be armed with two kinds of sensory spines regularly alternating with one another and having essentially the general structure indicated by Hodgson. The shape of the spines varies somewhat in each species, particularly those which Hodgson calls "leaf-like organs," which are sometimes leaf-shaped and sometimes longer and narrower as figured by Beddard for some of his species. I found both kinds present in *S. septemcarinata* (pl. VII, fig. 3), though Collinge was only able to find one kind, the rod-like, more obviously spine-like type.

S. glacialis is here recorded from a locality which is further South than that at which any species of the genus has been taken before. It is thus a true Antarctic species.

37. *Serolis pagenstecheri*, Pfeffer.

S. pagenstecheri, Pfeffer, 1887, p. 73, pl. II, figs. 1, 2, pl. IV, figs. 1–3.

Occurrence.—Leith Harbour and Cumberland Bay, South Georgia, December, 1913, collected by P. Stammwitz, two females.

Remarks.—The specimens respectively measure 45 mm. long by 37 mm. broad, and 37 mm. long by 33 mm. broad. I have nothing to add to Pfeffer's description and figures of this species, which are sufficient for its ready identification. The species belongs to that group of the genus having the coxae of the first three free thoracic segments separated by a distinct suture from their terga. The species has not been recorded since Pfeffer described it, and the present specimens are from the type locality.

38. *Serolis polita*, Pfeffer. Pl. VII, fig. 6.

S. polita, Pfeffer, 1887, p. 81, pl. II, figs. 3, 4, pl. IV, fig. 4; Richardson, 1906 (2), p. 7; Richardson, 1911, p. 396.

Occurrence.—King Edward Cove and Cumberland Bay, South Georgia, November and December, 1913, collected by P. Stammwitz, five males and one female.

Remarks.—The male specimens measure 15–17 mm. in length by 14–16 mm. in breadth; and the female, 12 mm. by 10·5 mm. The first three free thoracic somites

have their coxae separated by a distinct suture from the terga; but in the fourth and fifth free thoracic somites the coxae and terga are completely fused. Pfeffer's figure is therefore inaccurate in this respect, as he shows all five free thoracic somites with a coxal suture. I may add to Pfeffer's otherwise accurate description a note on an interesting difference in the sexes. The inner margins of the merus and carpus of the third thoracic limb of the male are fringed with dense tufts of long plumose setae (pl. VII, fig. 6). In none of the other species in this collection have I observed a similar sexual difference, but Beddard has figured a similar difference in the male of *S. neaera*. Pfeffer's specimens came from South Georgia, as did the present ones. Richardson has recorded it from Booth-Wandel Island and from the South Sandwich group.

Family ANTHURIDAE.

Genus LEPTANTHURA, G. O. Sars.

39. *Leptanthura glacialis*, Hodgson.

L. glacialis, Hodgson, 1910, p. 9, pl I, figs. 11*g*.

Occurrence.—Station 331, off Cape Bird Peninsula, entrance to McMurdo Sound, 250 fathoms, January, 1912, bottom fauna, one female with eggs in the marsupium, 10 mm.

Remarks.—The single specimen agrees very closely with Hodgson's description and figures, as far as it is possible to see without actual dissection, but is only about half the size of his specimens, though apparently adult, since it carried eggs in the marsupium. None of the other Antarctic expeditions have met with this species.

Genus EISOTHISTOS, Haswell.

40. *Eisothistos antarcticus*, Vanhöffen.

E. antarcticus, Vanhöffen, 1914, p. 494, text-fig. 33.

Occurrence.—Station 339, 77° 5′ S., 164° 17′ E., 140 fathoms, January 24, 1912, bottom fauna, one male, 3·5 mm.

Remarks.—This specimen agrees very closely with Vanhöffen's description and figures. Having only one specimen, I have not thought it advisable to dissect it and examine the mouth-organs in more detail, though it is very desirable that this should be done when more material is available.

Sub-order VALVIFERA.

Family IDOTHEIDAE.

Genus GLYPTONOTUS, Eights.

41. *Glyptonotus antarcticus*, Eights. Pl. IX, figs. 5, 6.

G. antarcticus. Eights, 1853, p. 331, 2 pls.; Miers, 1881, p. 11; Pfeffer, 1887, p. 115, pl. II, fig. 7, pl. VI, figs. 13–27; Tait, 1917, p. 246, 22 text-figs.; Collinge, 1918, p. 65, pls. I, II, figs. 1–12.

Occurrence.—Cumberland Bay, South Georgia, December, 1913, 0–15 fathoms, collected by P. Stammwitz, two males, 57 and 62 mm., one female, 59 mm., and twenty-one juvenile, 12–35 mm.

Stromness Harbour, South Georgia, January, 1914, collected by P. Stammwitz, one male, 52 mm.

41A. *Glyptonotus antarcticus*, Eights, *var.* acutus, Richardson. Pl. IX, figs. 3, 4.

G. acutus, Richardson, 1906 (2), p. 10, pl. I, figs. 2–4; Hodgson, 1910, p. 45, pl. VII; Richardson, 1913, p. 17; Vanhöffen, 1914, p. 527.

Occurrence.—Station 220, off Cape Adare, mouth of Robertson's Bay, 45–50 fathoms, bottom fauna, one female, 86 mm., one male, immature, 62 mm., one cast shell and three juvenile, 8 mm.

Station 316, off Glacier Tongue, about 8 miles N. of Hut Point, McMurdo Sound, 190–250 fathoms, bottom fauna, one immature, 26 mm.

Station 355, 77° 46′ S., 166° 8′ E., 300 fathoms, bottom fauna, three immature, 18, 39 and 53 mm.

Station 356, off Granite Harbour, entrance to McMurdo Sound, 50 fathoms, bottom fauna, six immature, 20–56 mm.

March 1, 1911, washed up on North Bay, one male, 99 mm.

,, 29, 1912, trawl in North Bay, one male, 92 mm.

Remarks.—The differences between these two supposed species are difficult to translate into words. They are differences of degree rather than differences of structure. Richardson (1906) says that in *G. antarcticus* the body is less than twice as long as broad, the metasome shorter than broad and its extremity obtusely pointed; while in *G. acutus* the body is two and a half times as long as broad, the metasome longer than broad and its extremity prolonged into a very acute point. Collinge says that *G. antarcticus* differs from *G. acutus* in its more ovoid form and shorter metasome, which terminates much less acutely. These differences in the proportions of the body and of the metasome simply hinge on the degree of prolongation of the extremity of the metasome. It should be remarked at the outset that Miss Richardson's statements of the dimensions of the two species are somewhat erroneous. From measurements of her own figure of *G. acutus*, I make the length only 2·2 times the breadth; and according to Pfeffer's figure of *G. antarcticus*, which is one of the authorities for Miss Richardson's remarks on that species, the metasome is 1·16 times as long as broad.

The collections I have examined contain both species at all sizes from about 20 mm. upwards, and from a series of measurements I have made, it is clear that the proportions of the length to the breadth vary with age in both species. The young specimens are proportionately longer than broad, and in both species the metasome is more pointed and produced in young specimens than in old.

In a series of *G. antarcticus*, twenty-two in number and varying in size from

20 mm. to 59 mm., I find that the length varies from 2·2 times the breadth in the smallest specimens to 1·9 times the breadth in adult specimens, and that, allowing for individual variation, there is a progressive change between these proportions as the animal grows to the adult condition. In the same way, the length of the metasome in these specimens varies between 1·5 times the breadth in the smaller specimens to 1·2 in the largest.

Similarly in *G. acutus*, the length of the body varies between 2·45 times the breadth in young specimens measuring about 20 mm. to 2·2 times the breadth in fully grown specimens of 99 mm. In the same specimens the metasome is twice as long as broad in small specimens, and only 1·55 times as long as broad in the largest specimens.

It will be seen from these measurements that the proportions of the body and of the metasome in *young G. antarcticus* are almost exactly the same as those of *old G. acutus*, and the degree of "pointedness" of the metasome is very nearly the same. So that if we only had young of *G. antarcticus* and fully grown specimens of *G. acutus* before us, it would be almost natural to assume that the one would grow into the other. On the other hand, young *G. acutus* and fully grown *G. antarcticus* are very easily distinguishable. In the one, the prolongation of the point of the metasome is at its maximum, and in the other it is almost obsolete.

Size for size, therefore, the two forms are distinct, and may be identified from the measurements I have given. *G. acutus* is a stretched or drawn-out form of *G. antarcticus*.

A more constant distinction is to be found in the proportions of the joints of the posterior thoracic legs. Hodgson gives as one of the specific characters of *G. acutus*, "legs very long and slender," and a study of the figures given by him and Richardson for *G. acutus* and the comparison of those figures with the ones given by Pfeffer and Collinge to illustrate *G. antarcticus* will bring out the differences in the proportions of the joints of both forms. The difference is even more obvious in the actual specimens. The legs in *G. antarcticus* are certainly shorter and stouter than in *G. acutus*. But, again, the differences are those of degree and not of structure. I give the actual measurements of the last three joints of the last thoracic limbs of *G. antarcticus* and *G. acutus*, taken from specimens of comparable size, 58 mm. and 55 mm. respectively. I had no specimens of *G. antarcticus* larger than 59 mm. in the collections I examined.

G. antarcticus.—Carpus, 9 mm. long, 4 mm. broad at its widest point; propodus, 9 mm. long; dactylus, 4·5 mm. long.

G. acutus.—Carpus, 10·5 mm. long, 2 mm. broad at its widest point; propodus, 10·5 mm. long; dactylus, 6 mm. long.

These measurements give, in effect, the chief difference between the two forms. In *G. acutus*, while the joints are actually longer than in *G. antarcticus*, their very much narrower width emphasises the difference in length and makes the joints appear much longer and more slender in comparison than they actually are.

Other differences between the two forms have been pointed out by Collinge, in the degree of insertion of the cephalon into the first segment of the mesosome and in the

maxillae and maxillipeds. As to the first of these, Collinge's statement is based on Hodgson's figure, and I find the difference in this respect not so great in actuality and negligible from a specific point of view.

With regard to the maxillae, Collinge states that there are eleven spines on the outer lobe of the first pair in *G. antarcticus*, and only eight (or nine) in *G. acutus* according to Hodgson. It has not been possible for me to examine all my specimens with regard to this character, but in one specimen of *G. acutus* I found eight spines on the outer lobe of the first maxilla, and in another specimen ten spines, so that the number would appear to be subject to some variation.

One other difference may be mentioned for what it is worth. Pfeffer figures the appendix masculina on the second pleopod of the male of *G. antarcticus* as extending backwards to the level of the end of the rami of the third pleopods. The only adult male of this species available in the material at my command agrees with Pfeffer's figure in this respect. In the two adult males of *G. acutus* in this collection the appendix masculina on the second pleopod is relatively much longer, and extends as far backwards as the tip of the outer branch of the uropods.

It may here be noticed that *G. acutus* appears to mature later than *G. antarcticus*, and eventually to reach a larger size. In a male *G. antarcticus* of 52 mm. the penial appendages on the sternum of the first abdominal somite are present, but there is no appendix masculina on the pleopods. A male measuring 58 mm. is fully adult in both respects. A male specimen of *G. acutus*, 62 mm., is still without the appendix masculina on the second pleopods. Unfortunately, I have no males between this size and 92 mm., so that I am unable to say at what size it really becomes fully mature.

My largest specimen of *G. antarcticus* is an adult female measuring 59 mm. Pfeffer's longest specimen was 62 mm., but Collinge gives the length of his largest specimens as 88 mm. On the other hand, the largest specimen of *G. acutus* in this collection is 99 mm. Hodgson gives the maximum length of his specimens as 119 mm., 30 mm. larger than the biggest *G. antarcticus* yet recorded.

As Tait (1917) has already noted, *G. antarcticus* is a shallow water form. The "Scotia" specimens were invariably taken in water of less than 12 fathoms, while the specimens in the present collection are from depths of less than 15 fathoms. On the other hand, Richardson records *G. acutus* from the shore to 38 fathoms; the "Scotia" collected it in 161 fathoms; Hodgson gives the depth as 20–125 fathoms; Vanhöffen examined a single specimen from 208 fathoms; while the specimens I have examined were obtained in depths varying from 45–300 fathoms.

As a result of these considerations I think that we can best express the relationships of these two forms by regarding *G. acutus* as a variety of *G. antarcticus*, inhabiting colder and deeper water, growing to a somewhat larger size and maturing later, and distinguished in general form by its less robust proportions, slenderer legs and more pointed apex to the metasome. It is in that light that I have regarded it here.

Family ARCTURIDAE.

Genus ANTARCTURUS, zur Strassen.

This genus seems to be separated from the genus *Arcturus* by the following characters:—(1) The coxal plates of the first free thoracic segment are not produced downwards and forwards to cover the mouth-parts and the bases of the first two thoracic limbs; and (2) the dactylus of the second to the fifth thoracic limb is long and well developed, whereas in *Arcturus* it is quite small.

In the light of Hansen's recent work on the Northern forms belonging to this family, I may state that I have found four pairs of incubatory lamellae in *A. polaris*, Hodgson, *A. franklini*, Hodgson, *A. hiemalis*, Hodgson, and *A. furcatus*, Studer.

Of the other species present in the collection there was not sufficient material to make an investigation on this point. It may be noted, however, that Miss Richardson found four pairs in the genus *Dolichiscus*. Hansen's surmise, that four pairs of incubatory lamellae will be found to be a very general character of the group, therefore receives considerable support from the Antarctic species. I have also found the sexual differences, noted by Hansen in the maxillipedes of *Astacilla*, occurring in each of the four species I have mentioned above.

The curious structure of the exopods of the first pleopods of the male in this genus does not appear to have been adequately noticed. In all the species I have examined the exopod of the first pleopod in the male (pl. VIII, figs. 1, 2) has, on its inner or posterior surface, an oblique groove or channel, running from the inner proximal corner to the outer distal corner; the channel tends to become closed in distally to form a distinct tube, and the aperture or outlet is roofed over by a peculiar process on the outer distal corner of the outer or anterior surface. The pair of penial filaments usually found on the sternum of the last thoracic somite of the male in Isopods are in this family fused into a single tapering process showing faint traces of its two component parts distally and situated on the first abdominal somite*. In this genus the process extends to the distal end of the basal joint of the first pleopods. The oblique groove on the inner face of the exopods is, I take it, merely a channel for the passage of spermatozoa from the penial filament; and the appendage is comparable in this respect to the first pleopod of the male in crayfishes, which is an appendage modified into tubular form to act as a passage for the male sexual elements. In the crayfishes, however, the first pleopod of the male is a simple styliform process consisting of the fused protopodite and endopodite. Here it is the exopod which is modified in connection with the sexual apparatus. In *Dolichiscus* the exopod of the first pleopod of the male is rather more specialised. The inner face is very concave and the distal portion bent inwards, so that the whole exopod looks like a spatula or

* Barnard (1920) has recently pointed out that in the Valvifera the penial processes are situated on the first abdominal somite and not on the last thoracic somite as in all other Isopoda.

elongate spoon. The oblique groove is very well marked. This interesting structure has not been noted previously in this family of Isopods, but Barnard's figure of the first pleopod of the male in *Antarcturus kladophoros* (1914, pl. XVIII *B*, *plp. I*) makes it fairly obvious that a similar modification is present in that species, and his figure of the same appendage in *Neoarcturus oudops* (1914, pl. XIX *B*, *plp. I*) suggests a similar structure. I have found it in all the species of *Antarcturus* and *Dolichiscus* in the present material.

Ohlin (1901) has instituted the family Pseudidotheidae* for the species *Pseudidothea bonnieri*, Ohlin, entirely on the grounds of the modification of the first pleopods of the male as accessory sexual organs. An examination of his figure shows a structure which is in every way similar to that described above for the genus *Antarcturus*, the groove on the lower surface of the exopod being well shown. It is a fact of considerable interest that the same modification of the first pleopods of the male should be developed in two distinct families.

42. *Antarcturus polaris* (Hodgson). Pl. VIII, figs. 3, 4.

Arcturus polaris, Hodgson, 1902, p. 247, pl. XXXIV, fig. 2, pl. XXXV.
Antarcturus polaris, Richardson, 1913, p. 9.

Occurrence.—Station 220, off Cape Adare, mouth of Robertson's Bay, 45–50 fathoms, bottom fauna, over seventy specimens, the largest male 43 mm., the largest female 38 mm.

Station 294, Ross Sea, 74° 25′ S., 179° 3′ E., 158 fathoms, bottom fauna, one adult female, 33 mm.

Station 314, 5 miles N. of Inaccessible Island, McMurdo Sound, 222–241 fathoms, bottom fauna, two males, 40 and 42 mm.

Station 355, 77° 46′ S., 166° 8′ E., 300 fathoms, bottom fauna, one male, 36 mm., sixteen immature.

Station 356, off Granite Harbour, McMurdo Sound, 50 fathoms, bottom fauna, one male, 28 mm.

Remarks.—The essential spiny armature of this species can be seen in pl. VIII, figs. 3 and 4, representing a young male, 20 mm. The fully grown specimens differ from this figure only in the greater development of small spines or spiny tubercles on different parts of the body, especially between and around the lateral and coxal spines of the first four free thoracic somites and on the dorsal and lateral surfaces of the abdomen. These differences can be seen on a comparison of my figure with that given by Hodgson. The large spines arming the body remain more or less constant in position and number throughout life, but with the more robust form of the adult they

* Collinge has doubted the validity of this family, and I was inclined to agree with him, but Barnard (1920) has recently given further reasons for its maintenance. He has described a second genus and species belonging to the family, *Holidotea unicornis*, which has the first pleopod of the male modified in a similar manner to that here described.

appear smaller than in the young. Miss Richardson has noted similar differences in the specimens she examined, and has rightly interpreted them as due to age. The specimen I have figured agrees very well with the small specimen mentioned by Hodgson from 60 fathoms, off Duke of York Island. There does not appear to be any well-marked difference in the armature of the male and female.

The terminal spines of the abdomen in this species are about one-tenth of the length of the body. There is a well-marked pre-ocular spine on the lateral corners of the head.

The second antennae in fully grown specimens are about equal to the length of the body. The second joint of the peduncle is short, and bears a spine on the dorsal surface of the anterior margin, a stronger and longer spine on the outer distal corner and a smaller spine behind the latter. The third joint is less than half as long as the fourth joint, and bears three small spines on the inner margin and three larger spines on the outer margin, including the spine on the outer distal corner, which is the strongest and largest of the series. The fourth joint has the outer distal corner produced into a prominent spine. The fifth joint is one and a quarter times as long as the fourth joint, and equal in length to the flagellum, which is composed of thirteen joints.

The third thoracic limb has the outer corners of the fourth and fifth joints produced into a spine. The fourth and fifth thoracic limbs have similar spines on the third, fourth and fifth joints. The second joint of these limbs has at least one prominent spine and generally two or three small spines on its outer surface.

The sixth, seventh and eighth thoracic limbs have a few stout spines on the outer face of the second joint, a strong spine on the hinder distal corner of the third joint, a similar spine on the outer distal corner of the third joint, a double row of small spinules on the front edges of the third, fourth and fifth joints, and a single row of about eight small spines on the front edge of the sixth joint.

The largest specimens reach a length of 43 mm., which is 6 mm. larger than the specimens recorded by Hodgson. It is the most abundant species in the present collection, and appears to have the centre of its distribution in comparatively shallow water, about 50 fathoms, at which depth it was most abundant. It is a matter of some surprise that no specimens were collected by the "Discovery"; and, indeed, only one other expedition, the "Pourquoi Pas?" has met with this species.

43. *Antarcturus furcatus* (Studer). Pl. VIII, figs. 1, 2.

Arcturus furcatus, Studer, 1882, p. 57; Studer, 1884, p. 12, pl. I, figs. 3*a–e*; Beddard, 1886 (2), p. 85.

Antarcturus furcatus, zur Strassen, 1902, p. 686.

Occurrence.—Station 220, off Cape Adare, mouth of Robertson's Bay, 45–50 fathoms, bottom fauna, one male, 29 mm., one juvenile, 24 mm.

Station 314, 5 miles N. of Inaccessible Island, McMurdo Sound, 222–241 fathoms, bottom fauna, twenty specimens, largest female 40 mm., largest male 32 mm.

Station 348, off Barne Glacier, McMurdo Sound, 200 fathoms, bottom fauna, two females and one male, 26–33 mm.

Station 355, 77° 46′ S., 166° 8′ E., 300 fathoms, bottom fauna, fifteen females and ten males, 24–38 mm.

Remarks.—This species is very closely related to *A. polaris*, Hodgson, but may be distinguished from that species by the different armature of the body, the longer second antennae, and the longer terminal spines on the abdomen.

In *A. furcatus* the longest and most conspicuous spines on the body are those on the head, on the coxal plates and on the basal joint of the thoracic limbs. There are no specially large spines on the thorax, as in *A. polaris*, but the thorax and abdomen are much more densely covered by small, sharp, backwardly directed spines than in Hodgson's species. Studer's figure gives a very good general idea of the arrangement of these small spines. On the head there is a pair of long flattened and outwardly directed spines, behind which is a row of small spinules. There is a prominent preocular spine on the antero-lateral corner of the head.

The terminal spines of the abdomen are about one-sixth of the total length of the body and equal to the terminal unsegmented portion of the abdomen. They are therefore considerably longer, and in consequence more slender, than in *A. polaris*, and rather longer than Studer's figure shows them.

The second antennae are longer than the body, about one-sixth to one-fifth longer. In a female measuring 38 mm. without the terminal spines of the metasome, the second antennae measure 45 mm., the third joint measuring 5·5 mm., the fourth 12 mm., and the fifth 14·5 mm.

These measurements give a very fair idea of the general proportions of the second antenna in this species, from which it will be seen that it is proportionately longer than the same appendage in *A. polaris*. The second joint has a spine on the dorsal face of the anterior margin and the outer distal corner produced into a strong spine. There are three smaller spines about half-way along the joint on the dorsal and outer face. The third joint has five small spines on the inner margin and five stronger spines on the outer margin, in addition to the very strong spine on the outer distal corner. The fourth joint has the outer distal corner produced into a strong spine. The flagellum is composed of about fifteen joints. The third thoracic limbs have one large and two smaller spines on the front margin of the second joint, the front distal corner of the third, fourth and fifth joints produced into a strong spine, that of the fourth the largest, the fifth joint with a smaller spine about half-way down. In the fourth thoracic limb there are three spines on the second joint, and in the fifth five. In the sixth to the eighth thoracic limbs, the second joint has about seven spines on the inner posterior margin, and six on the outer posterior margin. The third joint has two rows of small spines on the inner front margin, about eight in number. The inner lower distal posterior corner is produced into a long spine, and there are three smaller spines on the outer posterior margin. The fourth and fifth joints have two rows of

eight small spines on the first margin and the inner hinder distal corner produced into a strong spine. The sixth joint has a single row of eight spines on the front margin, and two prominent spines on the outer hinder margin. On the seventh joint there is a small secondary spine near the tip of the dactylus.

There are four pairs of incubatory lamellae in the female, and the exopod of the first pleopod of the male is modified as I have described it under the genus *Antarcturus* (pl. VIII, figs. 1, 2).

This species comes very near to *A. glacialis*, Bedd., but the latter has no pre-ocular spines on the antero-lateral corner of the head, and the spines arming the body are smaller, finer and much more numerous.

I have compared my specimens with those identified as *A. furcatus* by Beddard from the "Challenger" collections, and find the following differences. In the "Challenger" specimens the spines of the body are more erect, especially the two prominent ones on the cephalon, and on the abdomen there is a specially prominent spine about half-way down on each side which is conspicuously larger than the rest. In my specimens there is no outstanding spine of this kind on the abdomen, and Studer shows none in his figure. Moreover, both Studer's figure and the present specimens agree in the flattened outwardly spreading form of the cephalic horns. On the other hand, the "Challenger" specimens agree with mine and with Studer's figures in the general details of the armature of the body, the position of the spines and their general arrangement. The present specimens are in closer agreement with Studer's figures than the "Challenger" specimens, and the only really vital difference is in the length of the terminal spines of the metasome, which are longer than Studer shows and more nearly resemble those figured by Beddard in *A. glacialis*.

A. furcatus is nearly as common in this collection as *A. polaris*, but in Antarctic waters at any rate appears to be a deeper water form with the maximum of distribution at about 200 fathoms. Studer's specimens were from Kerguelen, and the "Challenger" records it from two or three localities near there, and from one place in the Southern Ocean at a depth of 1,675 fathoms.

44. *Antarcturus franklini*, Hodgson.

Arcturus franklini, Hodgson, 1902, p. 250.
Antarcturus franklini, Hodgson, 1910, p. 38, pl. V, figs. 2, 3; Richardson, 1913, p. 10.

Occurrence.—Station 314, 5 miles N. of Inaccessible Island, McMurdo Sound, 222–241 fathoms, bottom fauna, three males and three females, 18–25 mm.

Station 318, hole in the ice between Cape Evans and Inaccessible Island, 95 fathoms, bottom fauna, one male, 16 mm.

Station 355, 77° 46′ S., 166° 8′ E., 300 fathoms, bottom fauna, two females, 20 mm.

Remarks.—A smaller species than the last, and having the centre of its distribution in deeper water. Unlike *A. polaris*, the two sexes are quite different in external aspect, so much so that Hodgson at first described each sex as a separate species.

45. *Antarcturus hiemalis*, Hodgson.

A. hiemalis, Hodgson, 1910, p. 41, pl. VI, figs. 1–1*e*.

Occurrence.—Station 314, 5 miles N. of Inaccessible Island, McMurdo Sound, 222–241 fathoms, bottom fauna, sixteen specimens, largest male 35 mm., largest female 40 mm.

Station 355, 77° 46′ S., 166° 8′ E., 300 fathoms, bottom fauna, one male, 34 mm., one female, 32 mm.

Remarks.—This is a very distinct and easily recognisable species. There are no well-marked sexual differences. Hodgson has already noted the growth of Hydroids, Polyzoa, worm-tubes, etc., on the bodies of this species. The present specimens show similar growths, and indicate a species of almost sedentary habits. With such animal-growths all over the body and with its decoration of long fine hairs the animal must be very well concealed in its environment.

46. *Antarcturus lilliei*, n. sp. Pl. IX, fig. 1.

Occurrence.—Station 220, off Cape Adare, mouth of Robertson's Bay, 45–50 fathoms, bottom fauna, one female, 15 mm.

Station 355, 77° 46′ S., 166° 8′ E., 300 fathoms, bottom fauna, one male, 14 mm. (type).

Description.—The general form and sculpture of the body will be seen from the figure of the male (pl. IX, fig. 1). The female is slightly more vaulted and swollen in the thoracic region, owing to the development of the marsupial pouch. The body is widest at the fifth free thoracic somite, which is markedly swollen at each side above the insertion of the legs of that somite. The body is covered by minute granules, which extend to the antennules and antennae. On the lateral parts of the last two thoracic somites, and on the abdomen, there are also coarser tubercles as shown in the figure. The head is excavated in front and bears two cephalic horns, short, conical in lateral view, more or less quadrangular in outline in dorsal view, and situated between the eyes. There is no spine on the antero-lateral corners of the head in front of the eyes. The terminal spines of the abdomen are quite short, stout and blunt, and do not project beyond the tip of the abdomen.

The second antennae are not quite as long as the body, the proportion being as 9 is to 10. The second joint bears a prominent spine dorsally and at the antero-lateral distal corner. The third joint has four tooth-like spines on its outer margin. The fourth joint is nearly twice as long as the third, and the fifth joint one and one-third times as long as the fourth. Both joints are without prominent spines. The flagellum is about one-half times the length of the fifth joint, and composed of seven joints.

The third, fourth and fifth thoracic limbs have the outer distal corners of their second, third and fourth joints spiniform, and their front margins clothed with long setae. The sixth, seventh and eighth thoracic limbs are shorter and stout in build,

with one or two blunt spines on the hind margin of the second joint, the outer and hinder corner of the fourth joint spiniform, a row of small spines on the inner front margins of the third, fourth, fifth and sixth joints, and a small claw at the tip of the seventh joint. There are four pairs of incubatory lamellae in the female, and the exopod of the first pleopods of the male is modified in the way I have described for the genus as a whole.

This species is most nearly allied to *A. coppingeri*, Miers, and *A. antarcticus*, Bouvier. It is distinguished from both these species by its smaller size, by the presence of two distinct though small cephalic horns, and by the greatly reduced length of the terminal spines of the abdomen.

47. *Antarcturus horridus*, sp. nov. Pl. IX, fig. 2.

Occurrence.—Station 314, 5 miles N. of Inaccessible Island, McMurdo Sound, 222–241 fathoms, bottom fauna, two males, 18 mm. (types).

Station 355, 77° 46′ S., 166° 8′ E., 300 fathoms, bottom fauna, one male, 16 mm.

Description.—This species is best described by a reference to pl. IX, fig. 2. It is a very spinous species, and it is difficult to describe the arrangement of the spines. The most prominent feature is the pair of large upright forwardly directed cephalic horns between the eyes, each of these horns bearing several secondary spines and spinules. There is a prominent spine on each of the side-plates of the segments, and in general a row of larger spines on the dorsal surface of each segment; but the great profusion of secondary spinules obscures the main arrangement. The pair of processes at the posterior end of the abdomen are rather short, but like the cephalic horns they bear secondary spines and spinules.

The first antennae are rather long, almost reaching the end of the third joint of the peduncles of the second antennae. The first joint of the peduncle has a spine on the anterior dorsal margin. The second joint is longer than the third, and the flagellum is equal to the second and third peduncular joints combined.

The second antennae are longer than the body, the third joint of the peduncle nearly three times as long as the second, the fourth joint twice as long as the third but considerably less stout, the fifth joint very long and slender, more than one and a half times as long as the fourth; flagellum broken in all the specimens, but composed of more than eight rather long and slender joints. The first four joints of the peduncle are very spinous, but the fifth joint is without spines. The general arrangement of the spines can be seen in the figure.

The thoracic limbs are rather long and slender and very spinous, but they are quite typical of the genus, and the figure shows the essential details of their form and armature.

Remarks.—This species may be distinguished from all other described species of the genus by the great development of the spines arming the body, by the large pair

of cephalic horns with secondary spines, by the short terminal horns on the abdomen, also with secondary spines, and by the very long, slender and spinous antennae. Only male specimens occur in the collection, and they were all obtained in deep water in the Antarctic Ocean near the Ice Barrier.

Genus DOLICHISCUS, Richardson.

48. *Dolichiscus meridionalis*, Hodgson.

Antarcturus meridionalis, Hodgson, 1910, p. 43, pl. VI, fig. 2.
Dolichiscus meridionalis, Richardson, 1913, p. 17.

Occurrence.—Station 314, 5 miles N. of Inaccessible Island, McMurdo Sound, 222–241 fathoms, bottom fauna, one adult male, 38 mm.

Remarks.—I suspect *Dolichiscus pfefferi*, Richardson, will prove to be the adult female of this species. Richardson had only a female specimen at her disposal, and both Hodgson's single specimen and my own are males. The differences between the two species may quite well be sexual. It should, however, be noted that there is no trace in the above specimen of the long processes from the basal joints of the fourth pair of thoracic legs, almost meeting in the centre, which Richardson gives as one of the characters of the genus *Dolichiscus*.

Genus NEASTACILLA, nov.

Diagnosis.—Agreeing with the genus *Astacilla*, Cordiner, except that (1) the second thoracic somite is fused with the head, and its lateral parts are not expanded downwards and forwards to cover partially the mouth-organs; (2) the abdomen is unsegmented, all the segments being fused into one piece. Type, *Astacilla falclandica*, Ohlin.

An examination of the figures given in Sars' Crustacea of Norway to illustrate the genus *Astacilla* will show that in this genus the second thoracic somite is, as in the majority of Isopods, quite free from the cephalothorax and marked off distinctly by an articulation. Moreover, its lateral parts are expanded downwards and forwards so as partly to cover the oral area. Furthermore, Sars' figures show, and his description states that in this genus the abdomen is composed of two somites.

In his account of the "Challenger" Isopoda, Beddard describes a species, *Astacilla marionensis*, in which the second thoracic somite is fused with the head and not expanded laterally to cover partially the mouth-parts, but the abdomen is described as composed of three segments, though these segments are not shown in Beddard's figure. Vanhöffen has described a species, *A. kerguelensis*, which is very closely allied to, if not identical with, Beddard's species; and, in his figure, the abdomen is shown to be composed of three segments, thus bearing out Beddard's description. These two species are closely allied to *Astacilla falclandica*, Ohlin, but the composition of the pleon will not allow them to be referred to my new genus.

Astacilla falclandica and *A. magellanica* were described by Ohlin in 1901, and in both species the head is stated to be fused with the first segment of the thorax, and the segments of the pleon all fused together. In the present collection there is a single female specimen, from New Zealand waters, which I am unable to distinguish from *A. falclandica*, Ohlin, and an examination of its characters has led me to decide that the fusion of the true second thoracic somite with the cephalothorax, the fact that its lateral parts are not expanded to cover the oral area, and the unsegmented nature of the abdomen are characters of generic importance. I have, therefore, instituted the genus *Neastacilla* for its reception, and would refer *A. magellanica* to the same genus.

The genus *Neastacilla* agrees with *Astacilla* in having the flagellum of the second antenna composed of three joints, in having the seventh joint of the third to the fifth thoracic limbs represented only by a short nail, in having the last three thoracic limbs robust and bi-unguiculate, and in having four pairs of marsupial lamellae.

49. *Neastacilla falclandica* (Ohlin). Pl. X, figs. 1–3

Astacilla falclandica, Ohlin, 1901, p. 266, pl. XX, fig. 1; Stebbing, 1914, p. 353.

Occurrence.—Station 96, 7 miles E. of North Cape, New Zealand, 70 fathoms, bottom fauna, one ovigerous female, 8·5 mm.

Remarks.—I can find no valid characters to separate this specimen from *A. falclandica*, Ohlin. The only difference I can find is that, whereas Ohlin describes his specimen as without tubercles or spines, I can detect a few obscure tubercles on the elongate somite of the thorax in mine, which I have attempted to indicate in the figure. The whole body in my specimen is very transparent, and it is with great difficulty that the tubercles can be seen at all. They are very low and not at all prominent. Otherwise the specimen agrees absolutely with Ohlin's description, even to the presence of black pigment-spots all over the body. I have figured the fifth and eighth thoracic limbs to show their general form and structure. Stebbing has already called attention to the minute dactylus on the third, fourth and fifth pairs. The latter author is of the opinion that *A. magellanica*, Ohlin, is synonymous with this species. According to Ohlin, *A. magellanica* differs from *A. falclandica* in its smaller eyes, shorter and stouter second antennae, and the absence of black pigment-spots. These differences may be sexual, but Ohlin's specimens of both species were very small, and he does not give the sex. *N. falclandica* differs from *Astacilla mariomensis*, Beddard, and *A. kerguelensis*, Vanhöffen, in having the abdomen unsegmented and without a prominent spine half-way down its lateral margin.

The species provides further evidence of the wide distribution of some of the Crustacea found in New Zealand waters.

Genus PSEUDARCTURELLA, nov.

Diagnosis.—Body of the usual Arcturid form, with a marked bend between the fifth and sixth thoracic somites; second to eighth thoracic somites clearly marked off

and none of them elongated; side-plates well developed on all the free thoracic somites, but those of the second thoracic somite not expanded to cover partially the oral area; abdomen of two segments, but two further segments indicated laterally by grooves; first antenna relatively long and stout, with a regular series of sensory filaments in pairs all along the lower margin of the flagellum; second antenna not very long, rather stout, flagellum of two joints terminated by a strong spine and not pectinate; mouth-parts very similar to those of the genus *Arcturella*, but I could not find any coupling hooks on the maxillipedes; second thoracic limb with the proximal part of the dactylus narrow and linear; third to fifth thoracic limbs with the fourth joint not specially elongate, dactylus distinct though small; sixth to eighth thoracic limbs not bi-unguiculate but having two strong setae on the inner margin of the dactylus near the tip; first pleopods of the male modified, having a secondary lobe on the inside of the exopod. Type, *Pseudarcturella chiltoni*, Tattersall.

This interesting genus is distinguished from all the other genera of the Arcturidae by the peculiar modification of the first pleopod of the male. I know of nothing quite like it in other Isopoda, and it is a modification of quite a different order from that found in the genus *Antarcturus*.

Pseudarcturella approaches the genera *Arcturus*, *Antarcturus* and *Nearcturus* in having the fourth free somite of the body not appreciably longer than any of the other segments.

It differs from *Arcturus* in the reduced flagellum of the second antenna and in the non-expansion of the side-plate of the second thoracic somite to cover the oral area. In the last character it agrees with *Antarcturus*, but the latter agrees with *Arcturus* in the form of the antennal flagellum.

Pseudarcturella agrees with *Neoarcturus* in the characters of the segmentation of the thorax, in the reduced flagellum of the antennae, and in the coxal plates of the second thoracic segment; but *Nearcturus* has four segments in the abdomen, is without eyes, and the body is not geniculate, while the first pleopod of the male is not modified.

In the reduced flagellum of the antennae *Pseudarcturella* approaches the *Astacilla* group of genera, and among this group it approaches the genus *Arcturella* in the form of the second thoracic limbs with their linear dactylus. But from this group of genera it is at once distinguished by not having the fourth free somite of the thorax elongated. Altogether the genus is a quite peculiar one, combining characters of the *Astacilla* group with those of the *Arcturus* group and strongly marked off from both by the extraordinary form of the first pleopod of the male.

50 *Pseudarcturella chiltoni*, sp. nov. Pl. X, figs. 4–11.

Occurrence.—Station 135, Spirits Bay, near North Cape, New Zealand, 3 metres, tow-net at night, one male, 4·5 mm.

Description.—Body of the usual Arcturid-like shape, geniculate at the junction of the fourth and fifth free thoracic somites; head with the anterior margin quite straight and not excavated; eyes prominent and bulging, pigment black; head with a pair of small cephalic conical horns; last seven thoracic somites clearly marked off, none of them elongate or differing in size markedly from the others, without spines or tubercles; side-plates present on all the thoracic somites, those of the second somite not expanded to cover the oral area; abdomen (pl. X, fig. 4) of two somites, but two other somites indicated laterally by grooves; terminal somite with a well-marked keel on each side of the median line, terminating some way in front of the apex in small spines, the area between the keels flat, and the lateral and terminal portions of the abdomen sloping sharply down from the keels, so that in lateral view the pleon resembles the inverted keel of a flat-bottomed boat.

First antennae (pl. X, fig. 5) rather long and robust, extending almost to the end of the third joint of the peduncle of the second antennae; flagellum as long as the peduncle, and with sensory setae arranged in regular pairs, ten in number, the whole way along the lower margin.

Second antennae (pl. X, fig. 6) robust, two and one-fifth times as long as the first; fourth joint of the peduncle one and a half times as long as the third, fifth joint one and a quarter times as long as the fourth; flagellum two-thirds as long as the fifth joint of the peduncle, composed of two joints terminated by a strong spine, none of the joints pectinate on the inner margin.

Mouth-parts very much as in the genus *Arcturella* as figured by Sars, except that I could not find any coupling hooks on the maxillipedes.

Second thoracic limb (pl. X, fig. 7) with the inner distal corner of the carpus produced into a short blunt spine-like process; proximal portion of the dactylus linear as in *Arcturella*, and not expanded as in *Astacilla*.

Third to fifth thoracic limbs (pl. X, fig. 8) with the fourth joint not elongated, fifth joint shorter than sixth, dactylus distinct though small.

Sixth to eighth thoracic limbs (pl. X, fig. 9) robust, dactylus not bi-unguiculate but with two spiniform setae on the inner margin near the tip.

First pleopod of the male (pl. X, fig. 10) with a specially modified lobe on the inside of the exopod. This lobe is expanded at the base and tapers to a point, and is only slightly shorter than the rami of the pleopods. On its inner margin it bears seven long plumose setae near the base, and the tip shows several transverse thickenings of the chitin.

Second pleopod in the male (pl. X, fig. 11) with the stylet on the endopod long and pointed, nearly twice as long as the rami.

Remarks.—I have discussed the affinities of this species under the genus. There is only one specimen, a male measuring 4·5 mm., but, judging from the pleopods at least, sexually mature.

Sub-order GNATHIIDEA.

Family GNATHIIDAE.

Genus EUNEOGNATHIA, Stebbing.

51. *Euneognathia gigas* (Beddard).

Anceus gigas, Beddard, 1886 (1), p. 120; Beddard, 1886 (2), p. 137, pl. XVIII, figs. 8–10.
Euneognathia gigas, Stebbing, 1893, p. 338, pl. XIV; Hodgson, 1910, p. 15, pl. I, figs. 3–3*b*.

Occurrence.—Station 294, Ross Sea, 74° 25′ S., 179° 3′ E., 158 fathoms, January 15, 1913, bottom fauna, one adult male, 12 mm., one Praniza larva, 12 mm.

Genus GNATHIA, Leach.

52. *Gnathia antarctica* (Studer).

Anceus antarcticus, Studer, 1884, p. 4.
Gnathia polaris, Hodgson, 1902, p. 241, pl. XXXII.
Gnathia antarctica, Richardson, 1906 (2), p. 3; Richardson, 1908, p. 3; Hodgson, 1910, p. 11, pl. I, fig. 2; Vanhöffen, 1914, p. 486, text-figs. 23 and 24.

Occurrence.—Station 331, off Cape Bird Peninsula, entrance to McMurdo Sound, 250 fathoms, January 14, 1912, bottom fauna, 10 males, one female, five larvae.

Cumberland Bay, South Georgia, collected by P. Stammwitz, one male, four larvae.

Remarks.—In his report on the Isopoda of the German South Polar expedition, Vanhöffen (1914) has named two varieties of this widely distributed form, *G. antarctica continentalis*, a deep-water form with pale eyes found generally in deep water off the Antarctic continent, and *G. antarctica insularis*, a form with darkly pigmented eyes found in shallow water among the Sub-antarctic Islands. The specimens I have examined do not quite bear out this rigid demarcation. It is true that the specimens from South Georgia all have dark, almost black eyes, but among those from Station 331 the larvae are all pale-eyed, but the males show considerable variation in the pigment of the eyes, some specimens having it quite dark and of only slightly less intensity than the shallow-water specimens from South Georgia.

53. *Gnathia hodgsoni*, Vanhöffen.

G. hodgsoni, Vanhöffen, 1914, p. 448, text-fig. 25.

Occurrence.—Station 331, off Cape Bird Peninsula, entrance to McMurdo Sound, 250 fathoms, January 14, 1912, two males.

Remarks.—Among the numerous specimens of *Gnathia* collected at Station 331, I detected two males which agree completely with Vanhöffen's description of *G. hodgsoni*. Vanhöffen separated this specimen from *G. antarctica*, Studer, on (1) the longer curved pre-ocular lobes with their armature of subsidiary spinules; (2) the more spiny contour of the head and the first three somites of the body; (3) the coarser

spinules covering the anterior part of the body generally; (4) the more scanty clothing of setae on the body. The two specimens I have referred to this species bear out Vanhöffen's description. They were very easily picked out from the dozen or so *G. antarctica* which accompanied them.

54. *Gnathia calva*, Vanhöffen. Pl. XI. figs. 1–3.

G. calva, Vanhöffen, 1914, p. 449, text-fig. 26.

Occurrence.—Station 314, 5 miles N. of Inaccessible Island, McMurdo Sound, 222–241 fathoms, Jan. 23, 1911, one female.

Station 331, off Cape Bird Peninsula, entrance to McMurdo Sound, 250 fathoms, Jan. 14, 1912, five males.

Remarks.—Five males of this species were detected among the *Gnathia antarctica* and *G. hodgsoni* collected at Station 331. They measured from 5·5 mm.–6·5 mm., and are thus slightly larger than Vanhöffen's types. I have given a new figure (pl. XI. fig. 1) of one of these specimens for comparison with Vanhöffen's figure, since the spinulation of the body seems scarcely so pronounced and rather finer than Vanhöffen shows it to be. Otherwise the specimens are in complete agreement with Vanhöffen's description. The species may be distinguished from the other Antarctic species of *Gnathia* by the absence of hairs on the body generally, by the absence of pre-ocular processes, by the shape of the anterior margin of the head, by the relatively longer peduncles of the antennae and antennules, and by the form of the mandibles (pl. XI. fig. 2).

From Station 314 I obtained a single female *Gnathia*, which I regard as the female of this species. It measures 5 mm. in length and is devoid of hairs on the body. It may be distinguished at once from the females of *G. antarctica* by the form of the frontal process, which is very much longer and more prominent, with parallel sides and emarginate apex. A comparison of the figure here given (pl. XI. fig. 3) of the front part of the present female specimen with Vanhöffen's figure (1914), p. 487, text-fig. 24*b*, will bring out this distinction.

It is a matter of interest that all the three species of *Gnathia* in this collection were collected together at the same station.

PRANIZA LARVAE.

Praniza larvae were collected at the following Stations, but have not been identified with any known species.

Station 317, hole in ice between Cape Evans and Inaccessible Island, 74 fathoms, June 7, 1911, from *Trematomus* sp., one.

Station 338, 77° 13′ S., 164° 18′ E., 207 fathoms, Jan. 23, 1912, one.

Station 339, 77° 5′ S., 164° 17′ E., 140 fathoms, Jan. 24, 1912, one.

INCERTAE SEDIS.

Genus RHABDOCHEIRUS, Bonnier.

55. *Rhabdocheirus incertus*, Bonnier. Text-figs. 3, 4, pl. XI, figs. 4–13.

R. incertus, Bonnier, 1898, p. 198, text-figs. 1 and 2.

Occurrence.—Station 66, 25° 35′ N., 34° 10′ W., at surface, several specimens, ·5 mm.

Remarks.—I am indebted, for the opportunity of examining these specimens, to Dr. Calman, who detected them in the *débris* of the plankton from this station, and who forwarded them to me with the suggestion that they were specimens of *Rhabdocheirus incertus*, Bonnier. This proved to be the case. This extraordinary little Isopod was described by Bonnier twenty years ago. His two specimens were found in exactly similar circumstances among the *débris* of a bottle of plankton taken in the North Atlantic, 34° N., 10° 30′ W., at the surface. I am not able to add much to the elucidation of the species, and I cannot suggest to what family it should be referred. Having a large number of specimens, I have been able to dissect out the antennae and thoracic appendages and to figure them in detail. But beyond a pair of appendages, which I take to be maxillipedes, the mouth-parts have eluded my search.

As Bonnier's account of this form is not readily accessible, I quote it here in full and reproduce his figures :—

"Le petit Crustacé qui fait l'objet de cette note ne rentre dans aucune des subdivisions actuellement admises dans la famille des Isopodes. Je n'en ai trouvé que deux exemplaires seulement en examinant de très près les résidus d'un bocal contenant le produit d'une pêche pélagique exécutée au filet de surface par le Prince de Monaco, l'année dernière, au large des côtes du Maroc. C'est en cherchant les larves cryptonisciennes d'un Épicaride d'espèce nouvelle (*Aspidophryxus frontalis*) parasite de *Sirella norvegica*, G. O. Sars, qu'au milieu des débris de ce Schizopode, de larves de Crustacés Décapodes, de poissons pélagiques, de fragments de Salpes solitaires ou en chaine, que je rencontrai ce type singulier qu'au premier abord, par la forme ramassée de son corps et le développement de quatre de ses paires de pattes, on aurait pu prendre pour un Acarien.

"Les deux exemplaires étaient identiques et mesuraient 0 mm. 55 dans leur plus grande dimension ; la forme générale du corps régulièrement aplati et la présence de sept paires de pattes thoraciques plus ou moins développées les caractérisent évidemment comme Isopodes ; mais la réduction de la partie pléale et l'absence complète d'appendices dans cette partie du corps, fait qui n'existe dans ce groupe que chez quelques formes mâles dégradées de certains Épicarides, les distinguent nettement des sept tribus qui constituent la famille.

" Les figures ci-jointes, représentant l'animal vu par la face dorsale et régulièrement étalé [fig. 3] et par la face ventrale alors qu'il est légèrement recourbé sur lui-même [fig. 4], donnent une idée suffisante de sa forme générale. La tête, complètement privée d'organes visuels, porte antérieurement une paire de fortes antennules formées de six articles garnis de quelques petites soies ; un peu plus bas est insérée une paire d'antennes tout à fait rudimentaires et réduites à un seul petit article très peu visible. Les pièces buccales forment par leur réunion un rostre proéminent constitué par des appendices d'aspect rudimentaire, et, pour ainsi dire, embryonnaire ; on y distingue, sous une lèvre supérieure, une paire de mandibules, deux paires de maxilles et une paire de maxillipèdes. Le thorax est formé de sept somites à peu près d'égales dimensions, sauf le septième qui est beaucoup plus réduit que les autres. Les deux premières paires de pattes thoraciques sont ramenées sous la face ventrale et, comme les appendices buccaux, sont rudimentaires : elles sont courtes et formées de sept

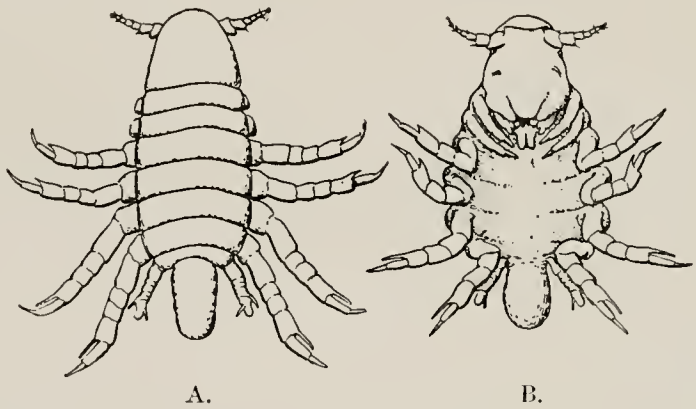

Fig. 2.—*Rhabdocheirus incertus*, Bonnier. A, Dorsal view. B, Ventral view. [After Bonnier.]

articles à peu près semblables, sauf le dernier, le dactylopodite, qui est plus court et plus aigu : les deux paires suivantes sont beaucoup plus robustes et plus de deux fois plus longues ; le basipodite est allongé et le carpopodite se prolonge latéralement par une forte épine chitineuse un peu plus courte que la moitié du propodite ; le dactylopodite allongé se termine par une toute petite griffe. Les cinquième et sixième paires de pattes ont le même aspect et le même développement que les deux précédentes, mais elles s'en distinguent par l'allongement de l'épine du carpopodite qui est ici de la même longueur que l'article suivant. Enfin la septième paire de pattes, quoique encore très robuste, est beaucoup plus courte que les autres : le propodite en est étalé et son extrémité arrondie se projette au delà de l'insertion du dactylopodite. L'abdomen est court, à peu près cylindrique, avec quelques traces encore visibles de sa segmentation primitive ; il est absolument dépourvu d'appendices.

" La morphologie anormale de cet Isopode, l'état rudimentaire des antennes, des pièces buccales, des deux premières paires de pereiopodes, la forme si spéciale des

suivants, surtout de ceux de la septième paire, la réduction de la partie pléale, semblent bien indiquer, à défaut d'autres renseignements éthologiques, que nous sommes en présence d'un type dégradé par la vie parasitaire et qui, sans doute, aura été détaché de son hôte au moment de sa capture. L'absence d'organes et de produits génitaux font penser à une forme jeune, mais d'autre part la régression de certains appendices, comme la spécialisation si caractérisée de certains autres, montre bien que c'est un type sinon adulte, du moins déjà parfaitement adapté à un genre de vie bien particulier.

"Je désignerai cet Isopode sous le nom de *Rhabdocheirus incertus* pour rappeler et la conformation caractéristique des cinq dernières paires de pereiopodes et l'incertitude où nous sommes de son genre de vie."

My examination of this species on the whole confirms Bonnier's description. The only point in which I differ from him is in the interpretation of the antennules and antennae. The single-jointed appendages which Bonnier calls the antennae, I should interpret as the antennules. The head appears to me to be folded downwards and backwards, and this curious bending of the head has led to the antennules appearing on the ventral surface of the head and actually behind the antennae. It follows, therefore, that the appendages called antennules by Bonnier, I believe to be the antennae.

The figures (pl. XI, figs. 4–13) which I give herewith of the appendages show their essential structure in detail, and bear out Bonnier's account. They show specially the sub-cheliform appearance of the dactylus of the fourth to seventh thoracic limbs and the curious form of the last pair of appendages.

The animals are, I think, almost certainly immature, and will probably prove to be young specimens of one of the Epicaridea parasitic on some of the Pelagic Decapoda or Mysidacea. If so, however, the adult must probably belong to a type of Epicaridea hitherto undiscovered, for *Rhabdocheirus* differs widely from any young stage of Epicaridea yet known.

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PLATE I

Tanais novae-zealandiae, G. M. Thomson (?).

FIG. 1.—Second thoracic limb of male. × 20.
FIG. 2.—Third ,, ,, ,, × 20.
FIG. 3.—Fifth ,, ,, ,, × 20.
FIG. 4.—Eighth ,, ,, ,, × 20.
FIG. 5.—Uropod. × 20.

Janira longicauda, Chilton.

FIG. 6—Ovigerous female, dorsal view. × 25.

Ianthopsis, sp.

FIG. 7.—Male, dorsal view. × 17.
FIG. 8.—Second thoracic limb. × 35.
FIG. 9.—Distal part of the median lamellae of the operculum of the male.
FIG. 10.—Endopod of the second pleopod of the male. × 35.

Munna maculata, Beddard (?).

FIG. 11.—Distal part of the second thoracic limb of the female. × 95.
FIG. 12.—Uropod. × 660.
FIG. 13.—Median lamellae of the operculum of the male. × 95.
FIG. 14.—Distal part of the second thoracic limb of the male. × 74.

Haliacris antarctica, Pfeffer.

FIG. 15.—Distal part of the second thoracic limb of a young male from St. 220. × 74.
FIG. 16.—Second thoracic limb of a sub-adult male from S. Georgia. × 24.

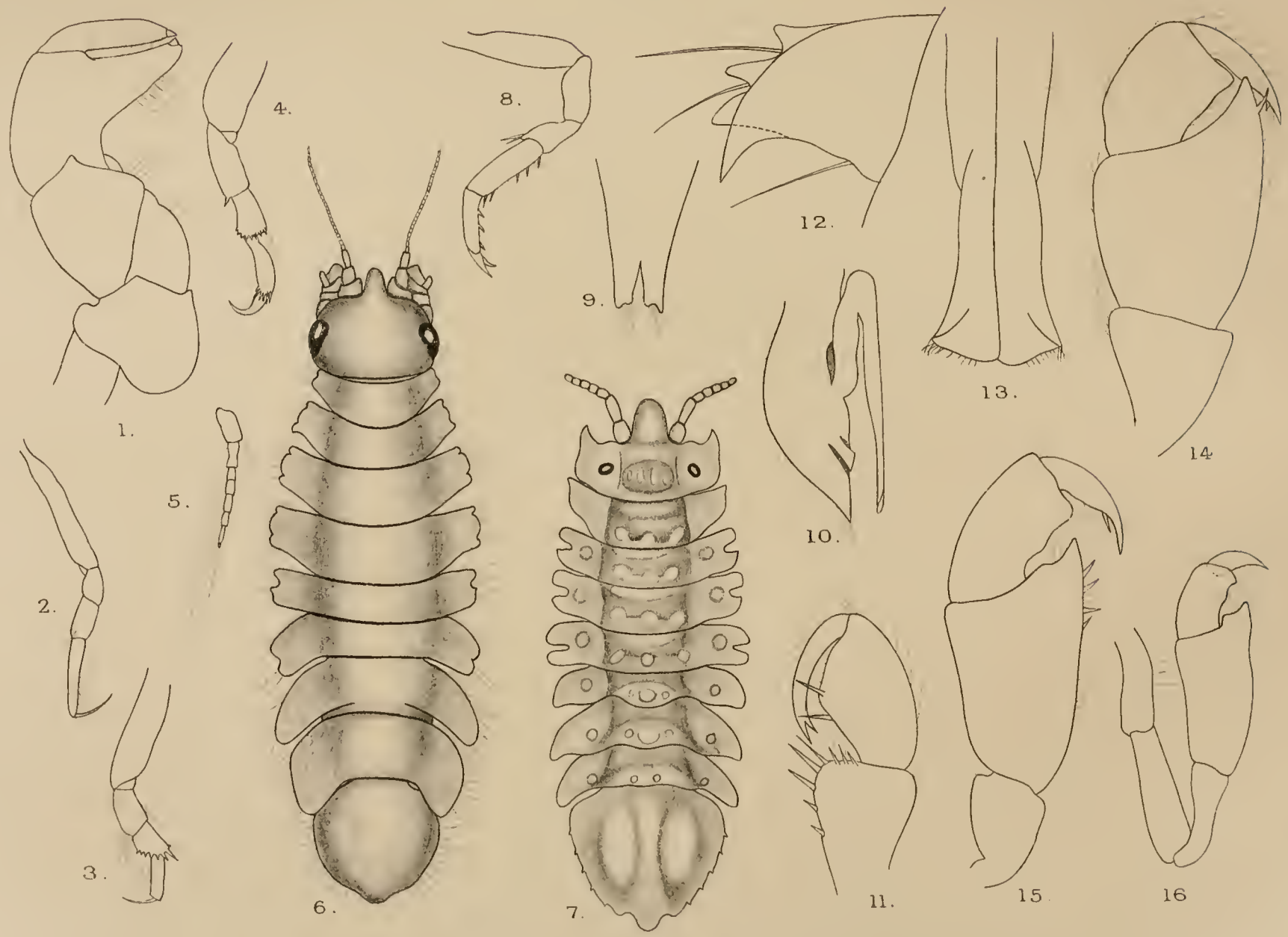
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PLATE II.

Haliacris antarctica, Pfeffer.

Fig. 1.—Second thoracic limb of an adult male from S. Georgia. × 24
Fig. 2.—Uropod. × 495.
Fig. 3.—Median lamella of the operculum of the male. × 74.

Cirolana pellucida, n. sp. [St. 130.]

Fig. 4.—Adult female, dorsal view. × 7·5.
Fig. 5.—Antennule. × 40.
Fig. 6.—Antenna. × 40.
Fig. 7.—Second thoracic limb. × 20.
Fig. 8.—Eighth ,, ,, × 20.
Fig. 9.—Telson and uropods. × 22.
Fig. 10.—Second pleopod of the male. × 16.

Cirolana japonica, Hansen. [St. 110.]

Fig. 11.—Antennule of the female. × 20.
Fig. 12.—Antenna ,, ,, × 12.
Fig. 13.—Second thoracic limb of the female. × 25.
Fig. 14.—Eighth ,, ,, ,, × 25.
Fig. 15.—Second pleopod of the male. × 40.
Fig. 16.—Telson and uropods of the female. × 25.

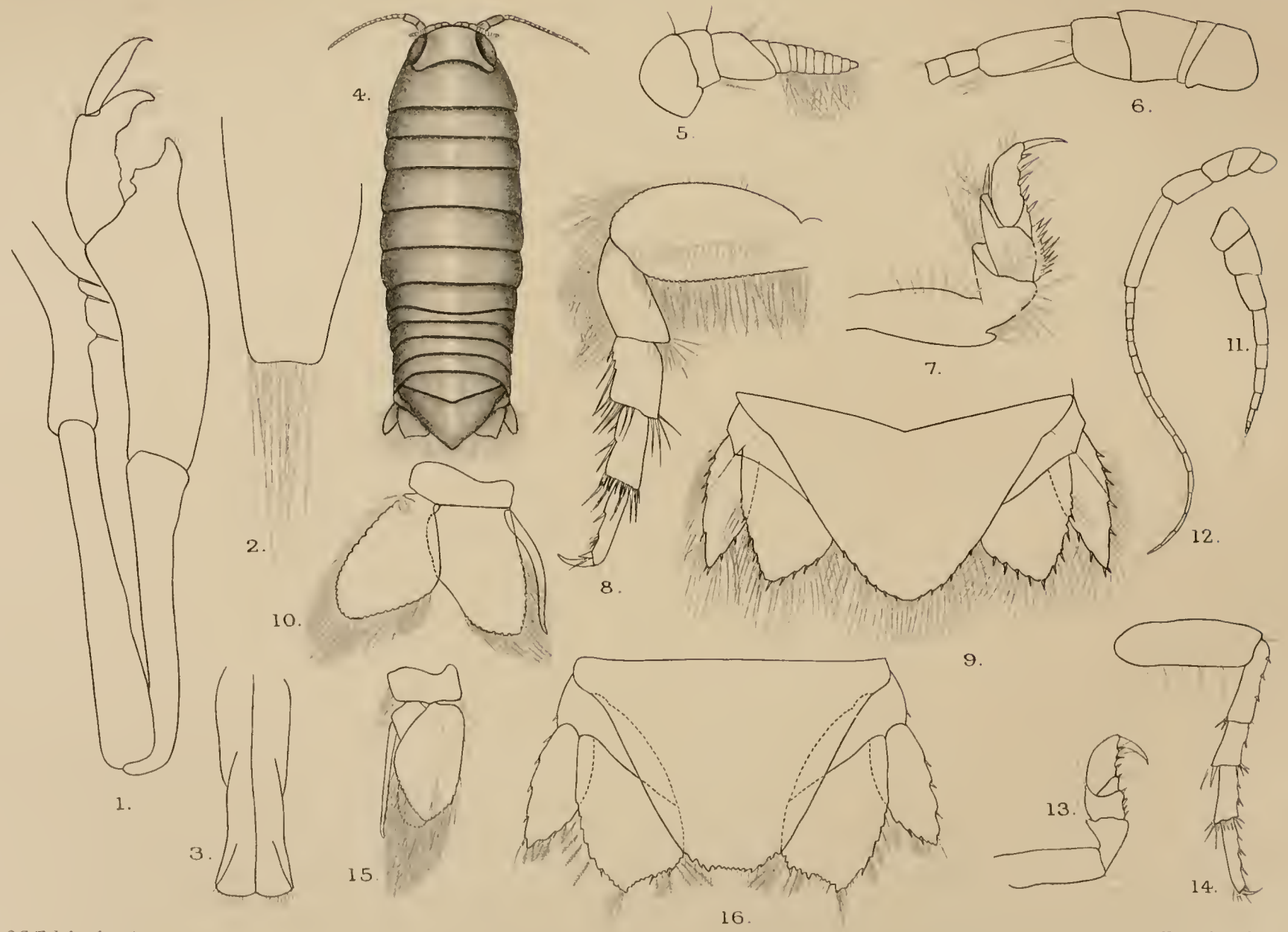

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PLATE III.

Cirolana canaliculata, n. sp. [St. 134.]

FIG. 1.—Lateral view of the female. × 17.
FIG. 2.—Antennule of the female. × 40.
FIG. 3.—Antenna ,, ,, × 40.
FIG. 4.—Second thoracic limb of the female. × 40.
FIG. 5.—Eighth ,, ,, ,, × 40.
FIG. 6.—Second pleopod of the male. × 40.
FIG. 7.—Epistome.
FIG. 8.—Telson and uropods of the female. × 40.

Eurydice subtruncata, n. sp. [St. 89.]

FIG. 9.—Antennule of the female. × 40.
FIG. 10.— ,, ,, male. × 40.
FIG. 11.—Peduncle of the antenna of the female. × 40
FIG. 12.—Second thoracic limb of the female.
FIG. 13.—Eighth ,, ,, ,,
FIG. 14.—Second pleopod of the male. × 40.
FIG. 15.—Uropod of the female. × 40.
FIG. 16.—Epistome (clypeus).
FIG. 17.—Telson of the female. × 40.

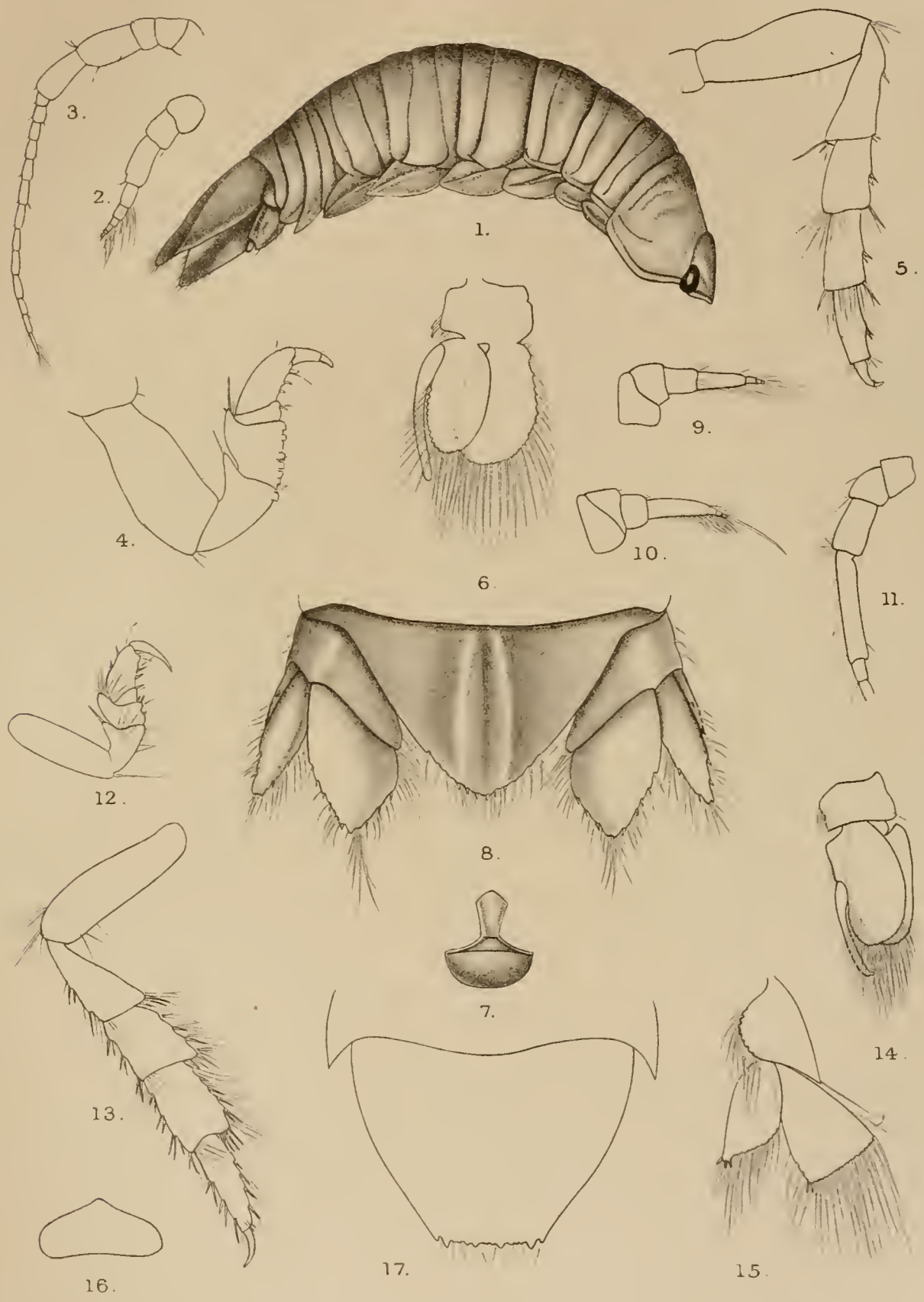

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PLATE IV.

Aega glacialis, n. sp. [St. 316.]

FIG. 1.—Female, dorsal view. × 2.
FIG. 2.— ,, lateral view. × 2.
FIG. 3.—Head from in front to show the eyes and the distance between them. × 2
FIG. 4.—Epistome.
FIG. 5.—Peduncle of the antennule.
FIG. 6.— ,, ,, antenna.
FIG. 7.—Maxillipede.
FIG. 8.—Second thoracic limb. × 5.
FIG. 9.—Sixth ,, ,, × 5.
FIG. 10.—Second pleopod of the male.

Aega novi-zealandiae, Dana.

FIG. 11.—Maxillipede. × 20.
FIG. 12.—Second thoracic limb. × 10.
FIG. 13.—Eighth ,, ,, × 10.
FIG. 14.—Telson and uropods. × 10.

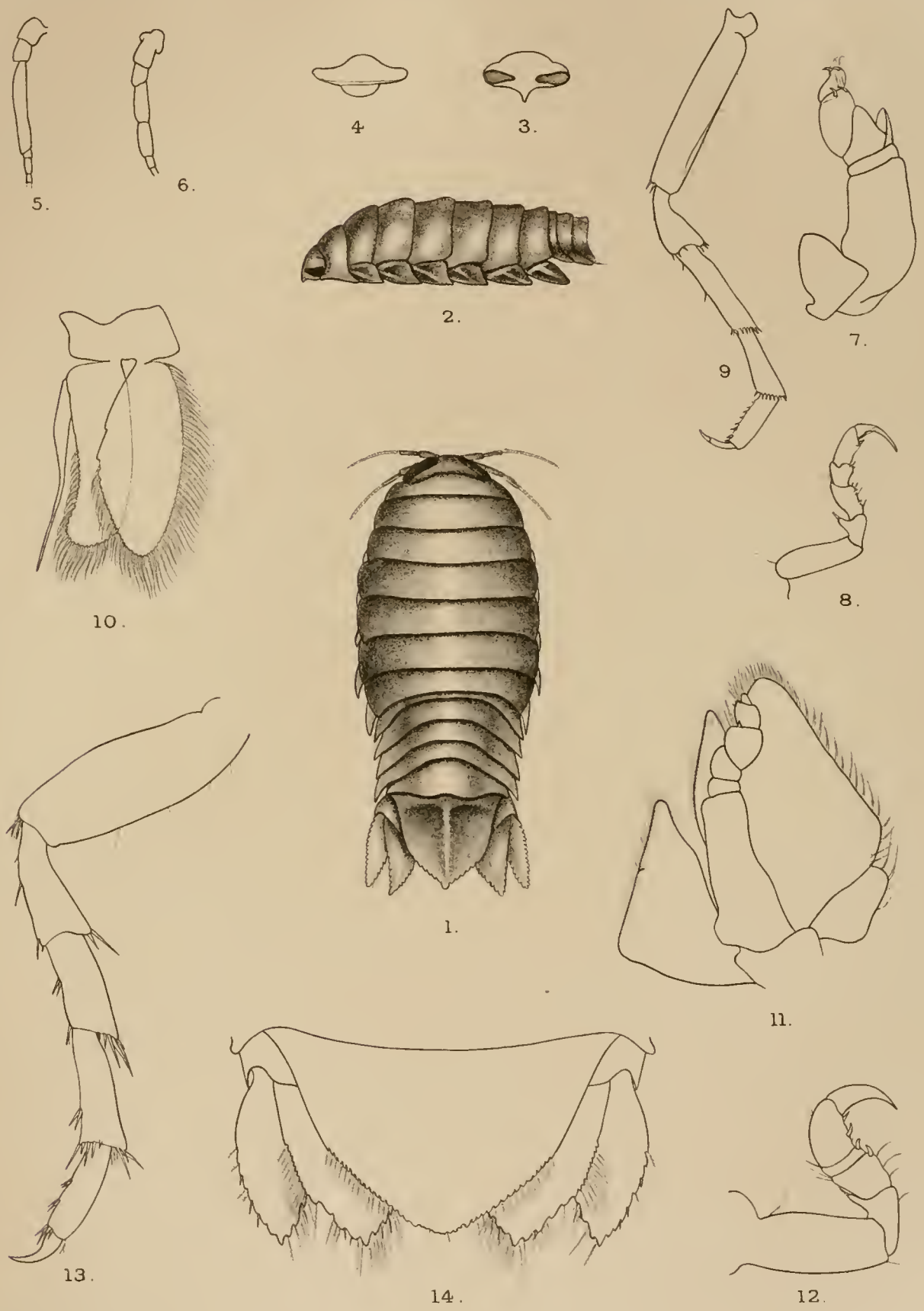

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PLATE V.

Exosphaeroma falcatum, n. sp.

FIG. 1.—Male, dorsal view. × 40.
FIG. 2.—Telson and uropods of the female. × 40.
FIG. 3.—Antennule. × 40.
FIG. 4.—Antenna. × 40.
FIG. 5.—Second thoracic limb. × 40.
FIG. 6. Eighth ,, ,, × 40.
FIG. 7.—Second pleopod of the male. × 40.
FIG. 8.—Epistome.

Isocladus armatus (Milne-Edw.).

FIG. 9.—Adult male, dorsal view. × 8.
FIG. 10.— ,, female, ,, ,, × 8.
FIG. 11.—Young male, ,, ,, × 8.
FIG. 12.—Antennule. × 13.
FIG. 13.—Antenna. × 13.
FIG. 14.—Second thoracic limb. × 20.
FIG. 15.—Eighth ,, ,, × 20.
FIG. 16.—Second pleopod of the male. × 20.
FIG. 17.—Epistome.

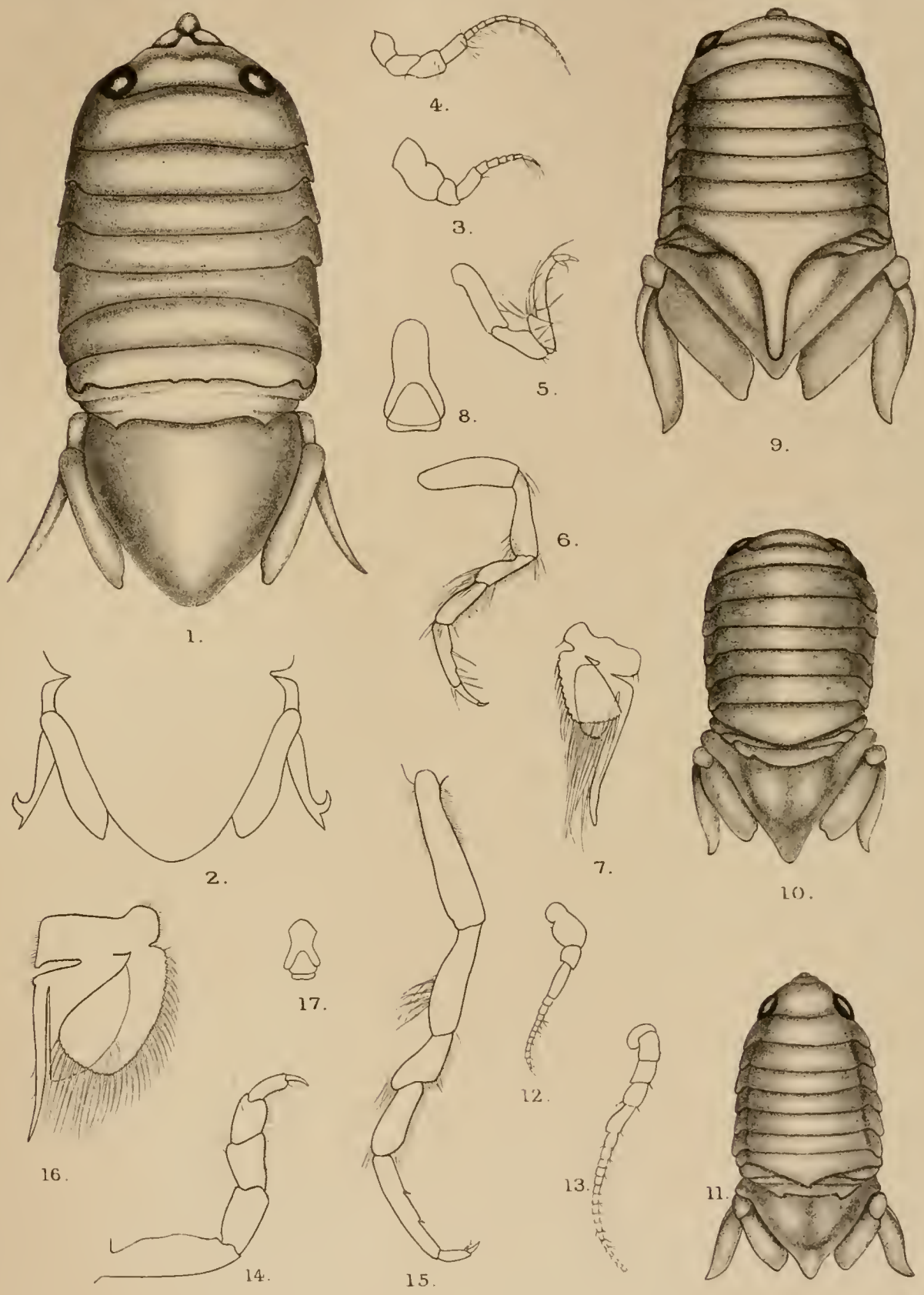

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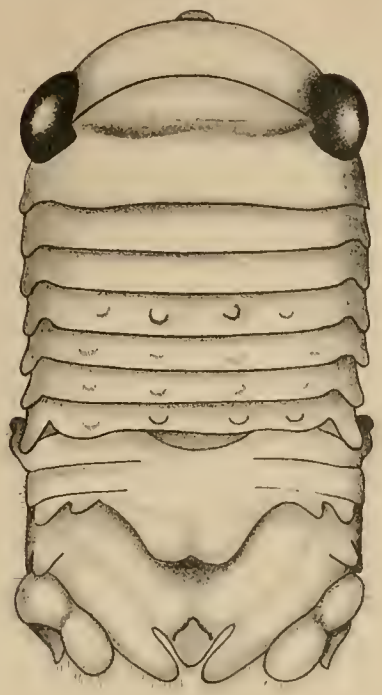
PLATE VI.

Cymodoce hodgsoni, n. sp.

FIG. 1.—Adult male, dorsal view. × 10.
FIG. 2.— „ „ lateral view. × 10.
FIG. 3.—Epistome.
FIG. 4.—Antennule.
FIG. 5.—Antenna.
FIG. 6.—Second thoracic limb.
FIG. 7.—Uropod.
FIG. 8.—Second pleopod of the male.

Cymodoce bituberculata, Filhol (?). [St. 135.]

FIG. 9.—Female, lateral view. × 25.
FIG. 10.—Telson and uropods of the male. × 25.
FIG. 11.—Epistome.
FIG. 12.—Antennule. × 40.
FIG. 13.—Antenna. × 40.
FIG. 14.—Second thoracic limb. × 40.
FIG. 15.—Eighth „ „ × 40.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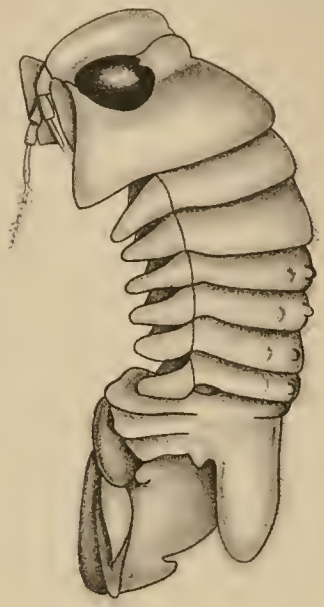
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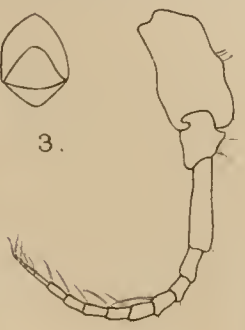
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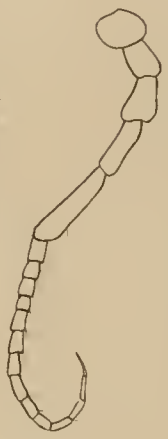
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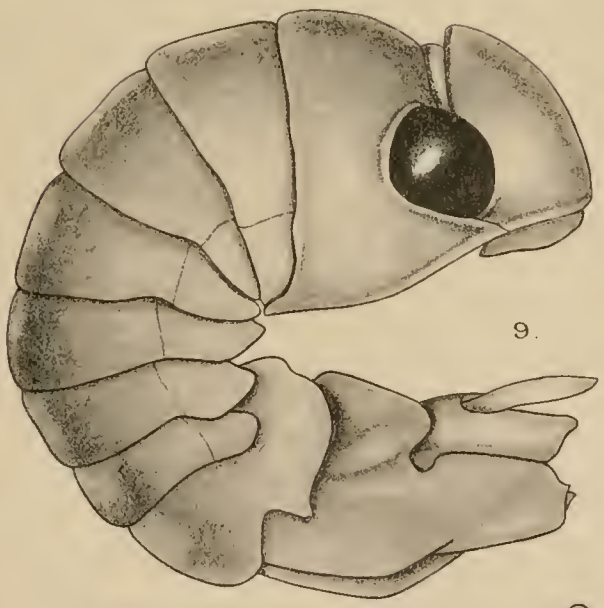
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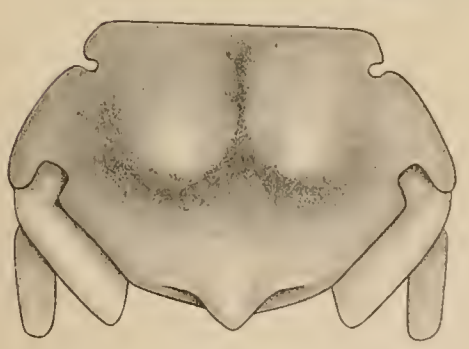
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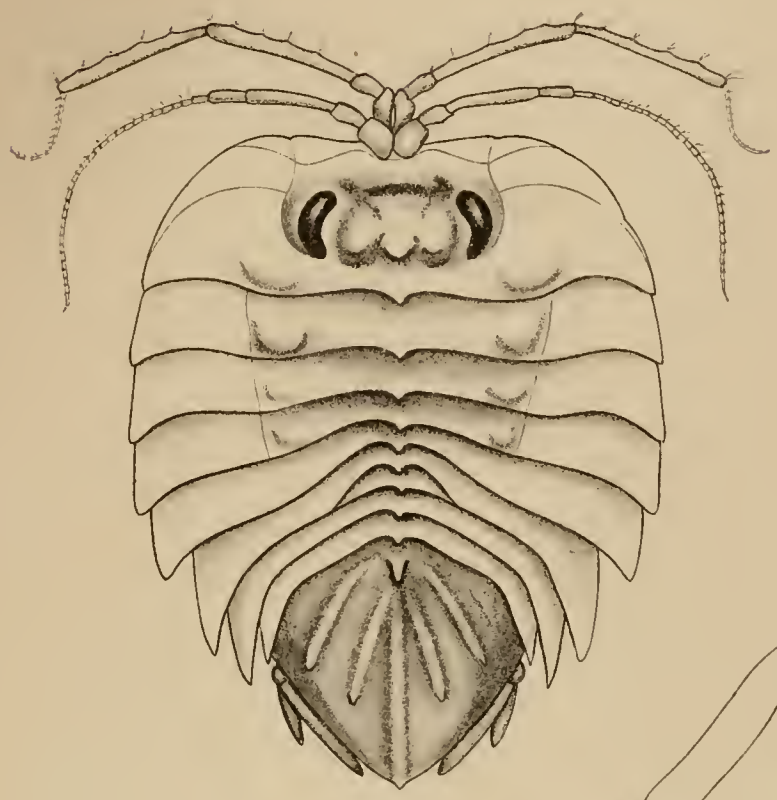
PLATE VII.

Serolis glacialis, n. sp.

FIG. 1.—Adult male, dorsal view. × 5.
FIG. 2.—Second thoracic limb of male. × 10.
FIG. 3.— ,, ,, ,, ,, portion of the palmar margin of the propodus. × 95.
FIG. 4.—Third ,, ,, ,, × 10.
FIG. 5.—Fourth ,, ,, ,, × 10.

Serolis polita, Pfeffer.

FIG. 6.—Third thoracic limb of the male.



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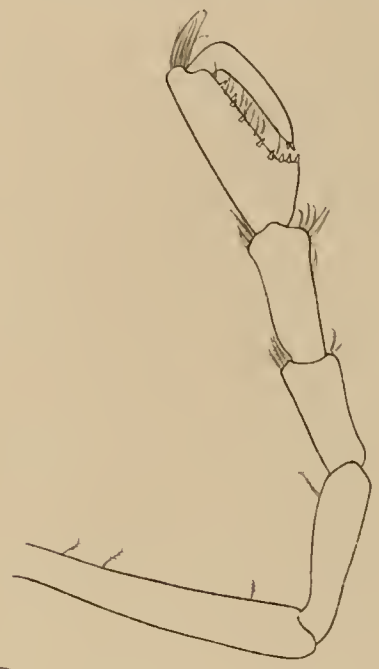

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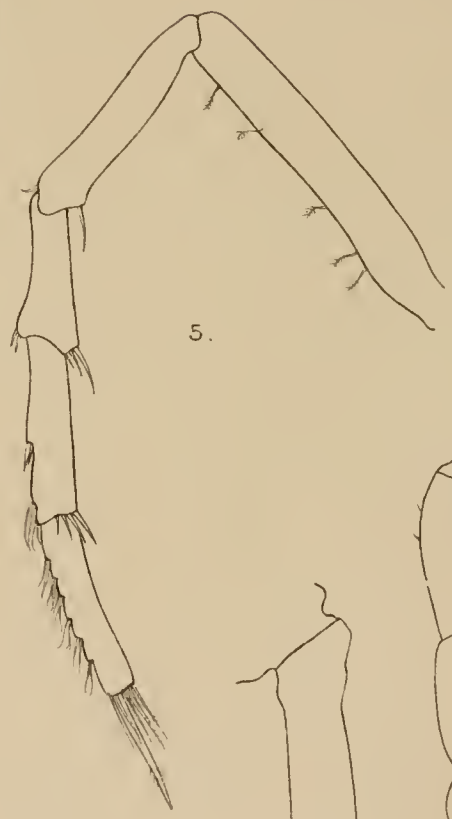

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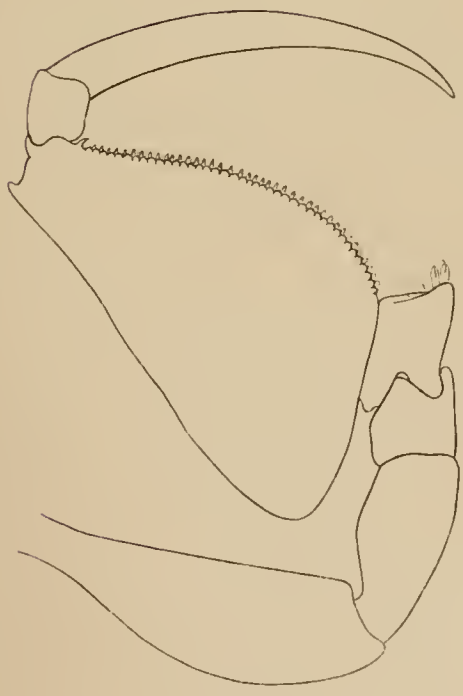

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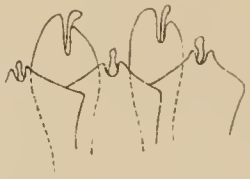

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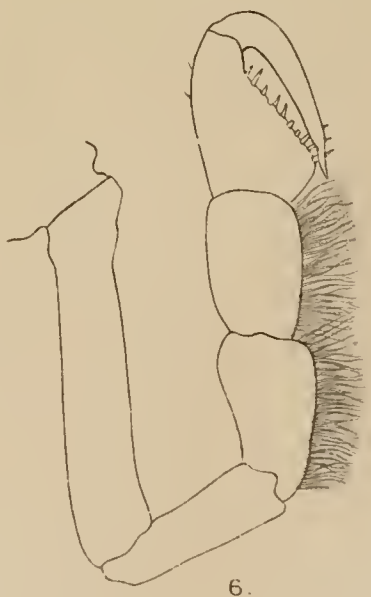

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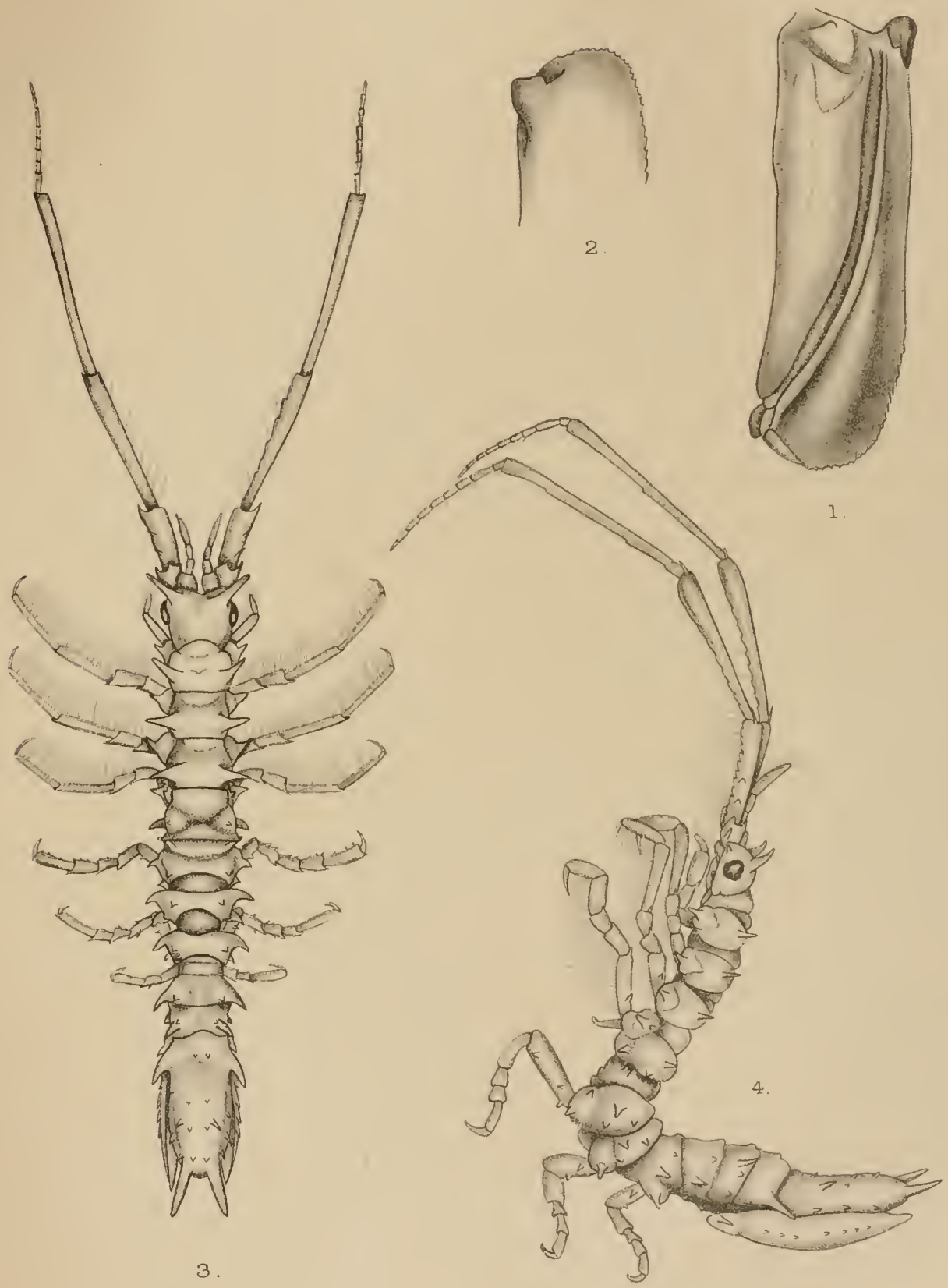
PLATE VIII.

Antarcturus furcatus (Studer). [St. 314.]

FIG. 1.—Exopod of the first pleopod of the male viewed from the lower posterior surface. × 25.
FIG. 2.—Distal portion of the same viewed from the anterior surface. × 25.

Antarcturus polaris (Hodgson). [St. 220.]

FIG. 3.—Immature specimen, dorsal view. × 5.
FIG. 4.— ,, ,, lateral view. × 5.



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Published 1911.

PLATE IX.

Antarcturus lilliei, n. sp. [St. 355.]

FIG. 1.—Male, dorsal view. × 7.

Antarcturus horridus, n. sp. [St. 314.]

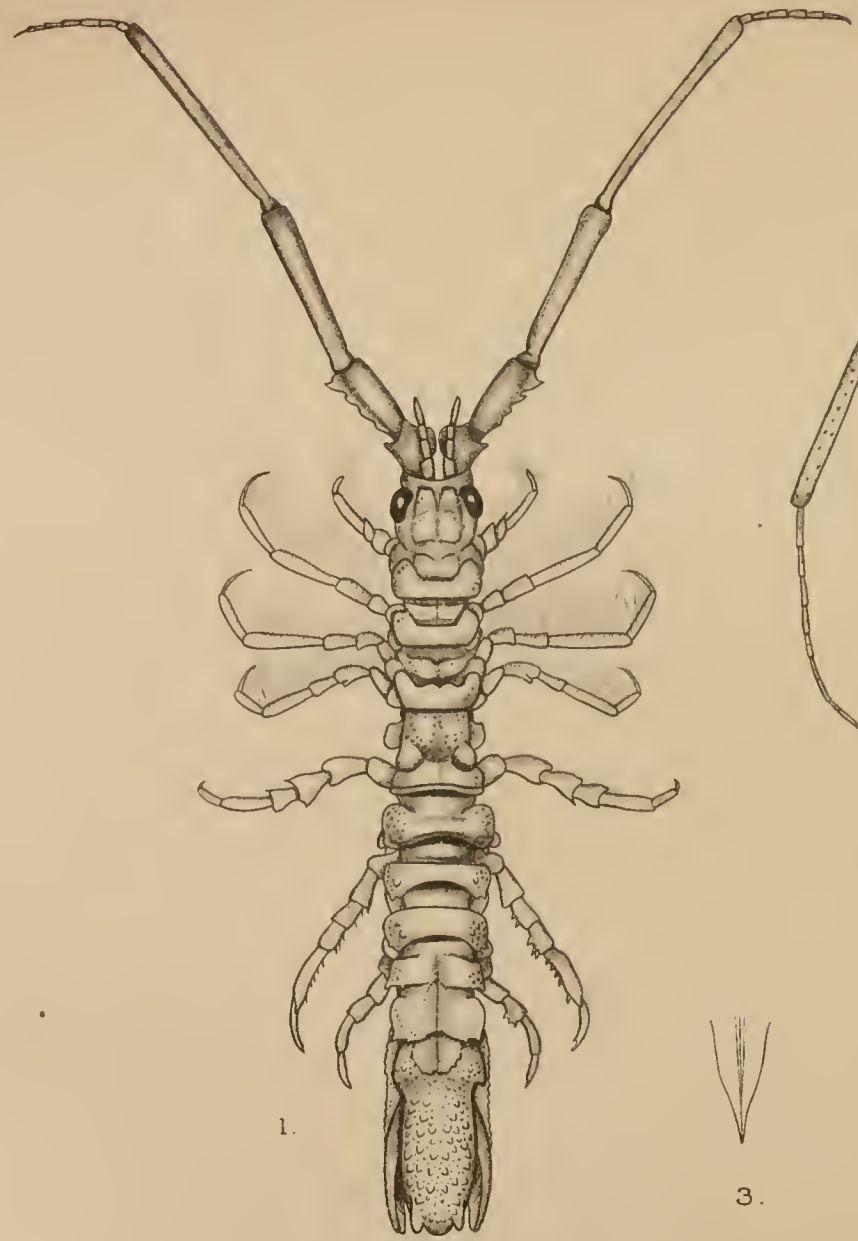
FIG. 2.—Male, lateral view. × 7.

Glyptonotus antarcticus, Eights, var. *acutus*, Richardson.

FIG. 3.—Telson of a young male, 23 mm. [St. 356.] × 2.
FIG. 4.— ,, an adult male, 99 mm. [North Bay.] Natural size.

Glyptonotus antarcticus, Eights. [Cumberland Bay.]

FIG. 5.—Telson of a young male, 12·5 mm. × 2.
FIG. 6.— ,, an adult male, 62 mm. Natural size.



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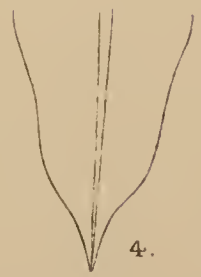

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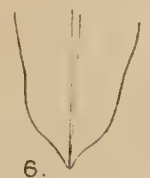

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PLATE X.

Neastacilla falclandica (Ohlin).

FIG. 1.—Adult female, lateral view. × 15.
FIG. 2.—Fifth thoracic limb. × 25.
FIG. 3.—Eighth ,, ,, × 25.

Pseudarcturella chiltoni, gen. et sp. nov.

FIG. 4.—Urosome, lateral view, dorsal side uppermost, uropods omitted. × 33.
FIG. 5.—Antennule. × 33.
FIG. 6.—Antenna. × 33.
FIG. 7.—Second thoracic limb. × 33.
FIG. 8.—Fifth ,, ,, × 33.
FIG. 9.—Eighth ,, ,, × 33.
FIG. 10.—First pleopod of the male. × 33.
FIG. 11.—Second ,, ,, ,, × 33.


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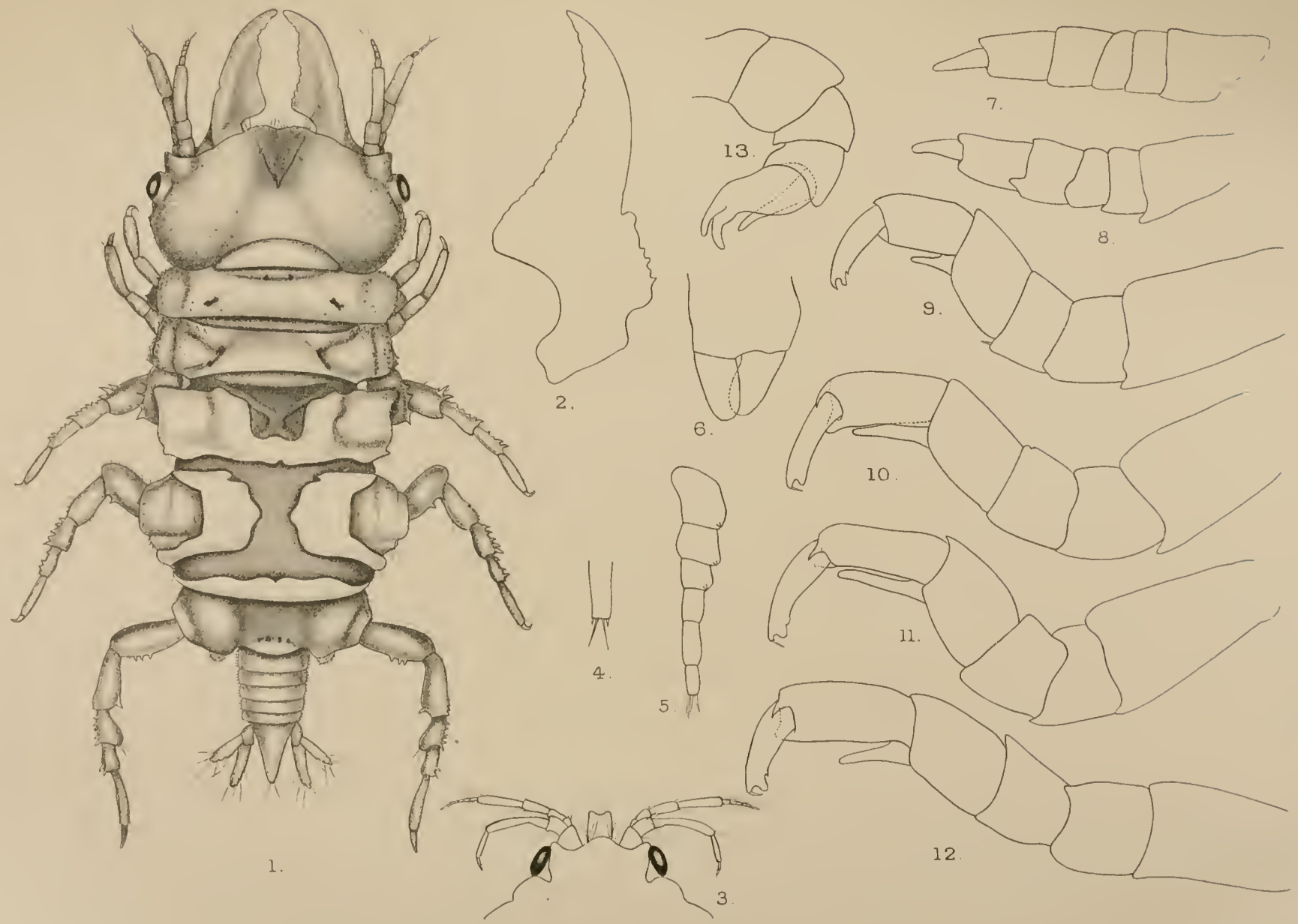
PLATE XI.

Gnathia calva, Vanhöffen.

FIG. 1.—Adult male, dorsal view. [St. 331.] × 20.
FIG. 2.—Mandible of male. × 40.
FIG. 3.—Anterior end of female. [St. 314.] × 20.

Rhabdocheirus incertus, Bonnier.

FIG. 4.—Antennule. × 495.
FIG. 5.—Antenna. × 300.
FIG. 6.—Maxillipedes. × 300.
FIG. 7.—Second thoracic limb. × 300.
FIG. 8.—Third ,, ,, × 300.
FIG. 9.—Fourth ,, ,, × 300.
FIG. 10.—Fifth ,, ,, × 300.
FIG. 11.—Sixth ,, ,, × 300.
FIG. 12.—Seventh ,, ,, × 300.
FIG. 13.—Eighth ,, ,, × 300.



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Crustacea, Part VI, Pl. XI.