

11.—*Contributions to the Crustacean Fauna of South Africa.*—By
K. H. BARNARD, M.A., *Assistant.*

(Plates XV–XVII.)

No. 6.—FURTHER ADDITIONS TO THE LIST OF MARINE ISOPODA.

THE present report deals with 73 species, of which 45 are described as new to science and 12 have not hitherto been recorded from South African waters.

The greater part of the material is derived from the rich collections made by the Cape Government trawler s.s. “Pieter Faure.” That the material has not been available sooner is due to the fact that many large bottles labelled “Varia—to examine” had never been examined, and consequently contained a mixed assortment of Sponges, Hydroids, Alcyonaria, Polychaets, Crustacea, etc.

Moreover, while going through the collection of sponges for the purpose of extracting the spongiicolous barnacles (*Acasta* and *Balanus* spp.) many Isopods and Amphipods inhabiting galleries and burrows in the sponges were brought to light.

The Amphipods cannot be dealt with on this occasion, but so far as the Isopods are concerned this paper may be regarded as a final report on the “Pieter Faure” material preserved in the Museum.

The fauna-list of South African marine Isopods now includes close on 170 species, so far as recorded in the reports of Mr. Stebbing and myself, including the present paper. But that this is not a complete list of the fauna is shown by the fact that the German South Polar Expedition,* during its very brief stay in these waters, captured the following 5 additional new species:

Heterotanais (?) *capensis*.

Eurydice natalensis.

Astacilla setosa.

Antias uncinatus.

Microniscus ornatus.

Moreover, it is probable that the list will be further increased when the report on the Isopods collected by the German Deep-sea Expedition is published. For in other groups of marine animals the “Valdivia” collected material of great importance for the study of the South African fauna. Other reports dealing with the Isopodan fauna, which may be expected to follow, are those on the collections of Dr. L. Schultze and Dr. W. Michaelsen.

* Vanhöffen, Deutsche Südpolar Exp. Bd. 15, Hft. 4, Isopoden, 1914. This paper I have not been able to consult.

The most interesting feature of the material herein dealt with is the presence of 2 species, heretofore only known from the North Atlantic, namely, *Sphyrapus malleolus* N. & S. and *Agathotanais ingolfi* Hansen. Other examples of "bipolarity" among the Isopods and Amphipods have already been recorded in previous papers.

The specimens of these 2 species were sorted out from about 120 c.c. of plankton taken in "coarse tow-net on beam-trawl, Cape Point N. 89° E. distant 36 miles, 700 fathoms, August 20, 1903." This small quantity of material contained, besides numbers of minute Gasteropods, Pteropods, Chaetognaths, larval Polychaets, Ostracods, Copepods and many Amphipods, the following species of Isopods:

<i>Apseudes australis</i> n. sp.	. . . . .	2 specimens.
<i>Sphyrapus malleolus</i> N. & S.	. . . . .	3 "
<i>Agathotanais ingolfi</i> Hansen	. . . . .	1 "
<i>Gnathia</i> sp.	. . . . .	4 "
<i>Neoarcturus oudops</i> Brnrd.	. . . . .	48 "
<i>Haploniscus dimeroceras</i> n. sp.	. . . . .	68 "
<i>Eugerda</i> sp.	. . . . .	2 "
<i>Macrostylis spiniceps</i> n. sp.	. . . . .	1 "
<i>Rhabdomesus bacillopsis</i> n. sp.	. . . . .	2 "
<i>Ilychthonos capensis</i> n. g. et sp.	. . . . .	6 "
<i>Pseudomunnopsis beddardi</i> (Tatt.)	. . . . .	5 "
<i>Ilyarachna affinis</i> n. sp.	. . . . .	4 "
,, <i>crassiceps</i> n. sp.	. . . . .	2 "
<i>Eurycope sulcifrons</i> n. sp.	. . . . .	10 "
,, <i>quadrata</i> n. sp.	. . . . .	9 "
,, <i>fusiformis</i> n. sp.	. . . . .	3 "

Of these, *Haploniscus*, *Eugerda*, *Rhabdomesus*, *Ilychthonos*, *Pseudomunnopsis*, *Ilyarachna* and *Eurycope* are genera new to the South African region; and the 2 specimens of *Rhabdomesus* are the first complete specimens discovered since the "Challenger" obtained the first fragmentary examples of the genus.

On the previous day the "Pieter Faure" had dredged in nearly the same locality *Pseudanthura lateralis* Richardson, an aberrant Anthurid only known from deep water off the West African coast.

The haul on August 20 was probably often surpassed as far as actual number of species is concerned, but scarcely in respect of interest and importance. It shows what vast possibilities still remain for increasing our knowledge of the fauna of South Africa, especially of the denizens of the deep water off the Cape Point.

In this connection the remarks made by Hansen* in discussing the

* Dan. Ingolf Exp. vol. 3, 3; Crust. Malacostr. 2, p. 3, 1913.

extraordinary results obtained by a system of careful sieving on board the Danish exploring vessel "Ingolf" may be quoted:

" . . . a considerable quantity of the mud hauled up by dredge or trawl . . . was sifted under water in smaller portions in a sieve clothed with silk gauze No. 7 used by millers. . . . In this way hundreds of small animals as *Tanaidacea*, *Asellota*, etc., were gathered. Other deep-sea expeditions could certainly have arrived at corresponding results if their methods of dealing with the bottom material had been more satisfactory; it may be considered quite certain that hundreds of species of small Crustacea, etc., lived in the bottom material hauled up by the "Challenger" and later great European and North American expeditions, and were flushed again into the sea."

In connection with the subdivision of the *Valvifera* some general remarks are made on the morphology of the male sexual appendages.

In conclusion I would beg indulgence for any slips which may have crept in. The paper has been prepared during the period of the war, when it has been impossible to avail myself of the kindness of my friends and correspondents in England and elsewhere, who have helped me so much in the preparation of my previous papers by copying figures and descriptions from works not to be found in this country.

The MS. of this paper was completed before Hansen's 1916 paper reached me, and therefore the discussion of several points of morphological interest has had to be postponed for a future occasion.

FAMILY APSEUDIDAE.

1880. *Apseudidae* Sars, Arch. Naturg. Christian, vol. 7, p. 6.
1910. ,, Stebbing, Tr. Linn. Soc. Lond. zool. vol. 14, pt. 1,
 p. 85 (references).
1913. ,, Nierstrasz, Siboga Exp. monogr. 32a, p. 3.

GEN. APSEUDES Leach.

1814. *Apseudes* Leach, Edinb. Encycl. vol. 7, p. 404.
1914. ,, Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 327 a
 (references).
1914. ,, Vanhöffen, Deutsch. Südpol. Exp. vol. 15, pt. 4, p. 461.

APSEUDES AVICULARIA Brnrd.

1914. *Apseudes avicularia* Barnard, l.c. p. 329a, pl. 27A.

Since this species was described from a single ♀ specimen, two ♂ specimens have come to light. They agree with the original specimen

in the peculiar character of the 6th pleon segment and telson, and in the appendages except the 1st peraeopod (gnathopod).

Side-plate of 1st free segment quadrate but not produced. Flagellum of 1st antenna 5-jointed, of 2nd 3-4-jointed.

The 1st peraeopod is very stout and robust, 2nd joint oval, nearly as broad as long, 4th and 5th short and stout, together equal to the 2nd, 6th a little longer than 2nd, inner margin of thumb with a tubercle in the middle and a crenulate cutting-plate nearer the apex, finger indistinctly denticulate with a larger tubercle in the middle and another nearer the hinge; no exopod.

Male appendage on 7th segment a small, knob-like process.

In neither of the specimens could any pleopods be found, except the 1st pair in one of them. If this were indeed a normal characteristic the species would require a new genus for its reception; but I am unwilling to do this until more material has been collected. Live specimens would be the best, but as the only 3 specimens I have so far come across have been picked out of a multitude of various Amphipods, Isopods, Polychaets, *débris*, etc., after a day's collecting, only by a very fortunate chance will a live one be secured.

Length: 2 mm.

Colour: White, eyes black.

Locality: Buffel's Bay (False Bay). 1/3/15. (K.H.B.) 2 ♂♂.
(S.A.M. No. A3307.)

APSEUDES AGULHENSIS n. sp.

(Plate XV. Fig. 1.)

Body very narrow and elongate. Carapace longer than broad, lateral margins evenly sinuous, rostrum broader than long, triangular with slightly sinuous margins and acute apex. Ocular lobes not spiniform but ending in a minute acute point.

Peraeon segments 2 and 3 wider than long, 4-7 subquadrate, only 5 and 6 with a small acute point on the antero-lateral angles. Side-plate of segment 2 acutely produced.

Pleon segments 1-5 laterally obtuse, 6 not quite as long as 1-5 together, twice as long as broad, scarcely tapering, apex obtuse.

First antenna, 1st joint 5 times as long as wide, margins entire, 2nd equal to width of 1st, 3rd shorter, flagellum 8-jointed, equal to 1st peduncular joint, accessory flagellum half length of main one, 3-jointed.

Second antennae a little longer than peduncle of 1st, 2nd joint linear, scale linear, half length of 2nd joint, 4th and 5th subequal, flagellum equal to 3rd-5th peduncular joints, 6-jointed.

Epistome unarmed.

First peraeopods both lost.

Second peraeopod, 4th-6th joints moderately expanded, 6th not wider than 4th or 5th, 4th and 5th with one spine, 6th with 2 spines on outer apex, 4th with one spine on inner apex, 5th with 2, 6th with 4 on inner margin, finger $\frac{3}{4}$ length of 6th; exopod not seen.

Peraeopods 3-7 moderately slender.

Uropod slender, outer ramus twice length of peduncle, 3-jointed, inner ramus as long as pleon, ca. 16-jointed.

Length: 3 mm.; *breadth*: .5 mm.

Colour: White, eyes apparently not pigmented.

Locality: Cape St. Blaize N. by E., distance 73 miles. 125 fathoms. 1 (? ♂). s.s. "Pieter Faure." 21/12/99. (S.A.M. No. A3836.)

Very close to *A. intermedius* Hansen, 1895, but distinguished by the shorter rostrum, the presence of lateral points on segments 5 and 6 only, and by the absence of the epistomal spine.

APSEUDES AUSTRALIS n. sp.

(Plate XV. Fig. 2.)

Body elongate, slender, glabrous. Carapace longer than broad, widening posteriorly, rostrum simple, triangular with a very slender acute apex, ocular lobes triangular with spiniform apices, eyes absent; lateral margins biconvex, with a shallow rounded notch marking the limits of 1st peraeon segment, dorsal surface with shallow grooves.

Second (1st free) segment with rounded lateral portions and a shallow transverse dorsal groove; segment 3 narrower than 2, with a shallow transverse dorsal groove, antero-lateral angles rounded, postero-lateral angles shortly but acutely produced; segment 4 a little longer than 3 but narrower, antero-lateral angles produced in outstanding spiniform processes, postero-lateral angles rounded; segments 5 and 6 similar, longer than broad, narrow in front and widening posteriorly, side margin with an outstanding spiniform process, postero-lateral angles rounded; segment 7 shorter and narrower than the preceding, widening distally, with rounded postero-lateral angles but without spiniform processes.

Side-plates distinct, on segment 2 produced forwards as spiniform processes, on 3 much smaller but forming little acute points on antero-lateral angles of the segment, on 4-6 forming small acute points on postero-lateral angles, on 7 extremely small and not visible dorsally.

Pleon segments 1-5 laterally produced in spiniform processes, directed straight outwards on the first 3, slightly recurved on the last

2 segments. Telson as long as all the preceding pleon segments together, narrow, parallel-sided, slightly widening before the insertion of the uropods, then tapering rapidly to a subacute apex.

Ventral surfaces of peraeon segments 1-7 and pleon segment 1 each with a long straight spiniform process.

First antenna, 1st joint elongate, narrow, 2nd half length of 1st, 3rd very short, flagellum shorter than peduncle, ca. 11-jointed, accessory flagellum 4-jointed.

Second antenna equal to peduncle of 1st, 2nd joint narrow, linear, with a narrow, linear scale, 5th shorter than 4th, flagellum 6-jointed.

Epistome with a prominent straight spine.

First peraeopod moderately slender, 5th joint equal to 2nd, 4th shorter, 6th slender, thumb long and narrow, inner margin faintly crenulated, setulose, finger matching thumb, evenly curved, nail on both thumb and finger rather long; exopod with 2 linear joints, 2nd with 4 setae.

Second peraeopod slender, the distal joints narrower than the proximal ones, 5th and 6th both shorter than 4th, both linear; exopod as in 1st peraeopod.

Third to 6th peraeopods slender, distal joints moderately setose.

Seventh peraeopod short, 3-jointed, 2nd longer than 1st, 3rd very short, unarmed; absent altogether in the smaller (2.5 mm.) specimen.

Uropod, only one ramus present, probably the outer, 4-jointed.

Length: 5 mm.; *breadth*: .75 mm.

Colour: In spirit white.

Locality: Cape Point N. 89° E., distance 36 miles. 700 fathoms. 2 immature specimens. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4136.)

This is evidently an immature form, as shown by the small undeveloped 7th peraeopod in the large specimen. The species to which it seems nearest is *A. simplicirostris* Norm. & Stebb. (Tr. Linn. Soc. Lond. vol. 12, 1886, p. 91, pl. 18, fig. 1) from the North Atlantic, 1263 fathoms. There is a close resemblance in the general body form and the structure of the individual segments, in the antennae, the narrow linear distal joints of the 2nd peraeopod, and the armature in the 3rd-6th peraeopods.

On the other hand there are distinct differences: in the Cape specimens the carapace is broader across the front, the rostrum lacks the bulbous projections at its base, the ocular lobes are much longer, the side-plate on segment 2 is acutely produced, and there is a greater relative difference between the anterior and posterior width of the 5th-7th peraeon segments.

TRICHAPSEUDES n. g.

Carapace composed of fused head and 1st peraeon segment. Ocular lobes distinct. Pleon composed of 6 segments. Antenna 2 with scale at end of long 2nd joint. Mandible normal but with very large 3-jointed palp fringed with plumose setae. Maxilliped with plumose setae on 4th-6th joints. Peraeopods 1 and 2 normal, both with exopods, that on the 2nd relatively large. Peraeopods 3-7 normal. Pleopods reduced to the 3 anterior pairs, each with 2 narrow, uniarticulate rami. Uropod with outer ramus much longer than inner.

This genus bears a strong likeness to *Kalliapseudes* Steb., 1910, in having a large mandibular palp and in the development of plumose setae on the palp of the mandible and maxilliped. In other respects, however, it is allied to the typical *Apseudes* except in having only 3 pairs of pleopods. In this latter feature it is paralleled only by *Pagurapseudes* Whitelegge, 1901, in which there are never more than 3 pairs, often only one or even none (cf. also *Apseudes avicularia* Brnrd. supra).

TRICHAPSEUDES TRIDENS n. sp.

(Plate XV. Figs. 3-8.)

Body moderately stout, with short setae developed sparingly on the anterior segments, more numerous on the posterior segments and pleon.

Carapace a little longer than broad, rostrum tridentate, the median tooth longest; ocular lobes distinctly defined, apically acute, dorsal surface with moderately deep grooves, postero-lateral margin fringed with plumose setae.

First 3 free peraeon segments subequal, with the lateral portions distinctly marked off by dorsal grooves and notches on posterior margins; segments 4 and 5 (free) subequal, a little longer than the anterior ones; segment 6 a little longer than half the length of 5. Side-plates distinct on all the segments.

Pleon segments 1-5 subequal, together a little longer than peraeon segment 5, lateral portions with outstanding plumose setae; telson about as broad as long, triangular, tapering to a bifid apex.

Antenna 1, 1st joint elongate, inner margin with 3 sharp teeth in middle, 2nd half length of 1st, 3rd shorter than 2nd, inner and outer flagella with at least 12 and 17 joints respectively, inner with plumose (?), outer with simple setae.

Antenna 2, 1st joint produced on inner side, twice as broad as long, with plumose setae on inner margin, 2nd elongate, with plumose setae

and 2 teeth on inner margin, scale a little longer than 3rd, apex acute, with 3-4 setae, 3rd-5th joints slightly increasing in length and decreasing in width, flagellum at least 10-jointed, with plumose setae.

Epistome with a long thin spine arising from the middle; upper lip bilobed.

Lower lip, lobes broad, apically truncate, with a setose 2nd joint inserted on outer apex, outer margin denticulate.

Mandible, cutting-edge 4-dentate, secondary cutting-edge tridentate, spine-row with ca. 5 bifid spines arising from a projecting process, molar well developed, palp very large and strong, 3-jointed, 2nd longest, 3rd longer than 1st, all the joints fringed on inner margin with long plumose setae.

Maxilla 1 normal, inner plate with 3 apical setae, palp with 1 long and 4 shorter apical setae.

Maxilla 2 normal.

Maxilliped, 2nd joint broader than long, 4th with plumose setae on both margins, 5th longer than 4th, 6th subequal to 4th, 5th and 6th fringed with plumose setae on inner margins; no epipod was found.

Peraeopod 1 (gnathopod) large and stout, similar in both sexes, 2nd joint not twice as long as broad, posterior margin fringed with plumose setae, 4th triangular, lower margin with plumose setae and 3 spines on apex, 5th triangular, larger than 4th, 6th large, ovoid, a little broader than long, anterior margin evenly curved, palm transverse with 2 strong teeth in middle, lower margin concave, with 4 acute teeth on basal half, finger matching palm, closing on inside of the palmar teeth, with a tooth about in middle of its inner margin; exopod not very large, 2nd joint ovate and carrying about 7 plumose setae around its margin.

Peraeopod 2, 2nd joint with anterior margin densely fringed with plumose setae, 2 spines at base, lower margin with 2-3 plumose setae, 4th with plumose setae on both margins, anterior apex with a long spine, 5th with 1 stout dentiform spine on both upper and lower apex as well as spine-setae and setae, 6th equal to 5th but narrower, lower margin with 3 stout spine-teeth, upper and lower apices with 1 stout spine, 7th shorter than 6th, with stout secondary unguis and a tooth in middle of lower margin; exopod very large, 2nd joint ovate, its margin closely and deeply indented, with a plumose seta arising from each intervening denticle.

Peraeopods 3 and 4, 2nd joint with several plumose setae on both margins, 4th and 5th with 1 stout spine-tooth on lower apex and a plumose seta on upper apex, 6th longer than 5th, lower margin with 6

(3rd peraeopod) or 7 (4th) spine-teeth, upper margin setose, 7th $\frac{2}{3}$ length of 6th, curved, a seta in place of the secondary unguis.

Peraeopods 5 and 6 similar to the preceding, 4th joint with 3 spine-teeth on lower apex, 5th with 2 rows of 4 and 5 spine-teeth on lower margin, 6th equal to 5th, lower margin with 5 spine-teeth, upper apex with several serrulate setae, 7th $\frac{2}{3}$ length of 6th, as in the preceding peraeopods.

Peraeopod 7 similar but no teeth on 4th and 5th joints, lower margin of 6th with 4 spine-teeth.

Pleopods reduced to the 3 anterior pairs, each biramous, the rami narrow, uniarticulate, inner a little longer than outer, both fringed with plumose setae.

Uropod, peduncle short, outer ramus 3-jointed, inner at least 9-jointed.

Length: 6 mm.; *breadth*: 1.25 mm.

Colour: In spirit pale brownish or yellowish, eyes dark.

Locality: 33° 6' S., 28° 11' E. (off East London). 85 fathoms. ♂♂, ovigerous ♀♀ and juv.; Umkomaas River NW. by W. $\frac{1}{2}$ W., distant 5 miles. (Natal) 40 fathoms. 1 juv.; Hood Point N. by W. $\frac{1}{2}$ W., distant 11 miles. 49 fathoms. 1 ovigerous ♀; Nanquas Peak N. $\frac{3}{4}$ W., distant 21 miles (Algoa Bay), 63 fathoms. 1 ♂, 1 juv.; between Roman Rock and Cape Recife. 17 fathoms. 1 ♂; s.s. "Pieter Faure." 28/1/99, 31/12/00, 15/7/01, 23/9/01 and 12/12/98. (S.A.M. Nos. A4122-4, A4176 and A4553.)

Besides the outstanding features mentioned in the diagnosis of the genus, there is one other which is almost equally remarkable, namely, the exopod of the 2nd peraeopod. This is very much larger than in any other species in the family, although *Pagurapseudes spinipes* Whitelegge makes a somewhat near approach in this respect.

The large size in the present species is evidently due to the environment. The specimens were taken amongst sponges on muddy ground and all were coated and clogged with a very fine deposit. Especially so was this in the case of the setae, making it sometimes difficult to say whether the setae were plumose or simple, as it is quite impossible to remove the deposit completely.

In such surroundings the branchial cavity would soon become choked and useless, were it not for the effective strainers at its entrance. The inhalent current has to pass through 4 series of plumose setae before reaching the branchial cavity; first the fringe of setae on the postero-lateral margin of the carapace, then that on the *posterior* (upper in the natural flexed position of the limb) margin of the 2nd joint of the 1st peraeopod, then that on the *anterior* margin

of the 2nd joint of the 2nd peraeopod, and lastly the plumose 2nd joint of the exopod on the latter peraeopod.

Another point of interest is the complete absence of a deposit on the pleopods. This is due to their being enclosed in a kind of cavity formed by the folding under of the terminal part of the pleon, similar to what has happened in the *Brachyura*. This cavity is protected laterally by the fringe on the pleon segments themselves and by the development of plumose setae on both margins of the 2nd joint of peraeopods 5-7. The recurved uropods follow the dorsal curve of the pleon. The animal bears a strong likeness to an Amphipod of the genus *Corophium*.

GEN. SPHYRAPUS N. & S.

1886. *Sphyrapus* Norman & Stebbing, Tr. Linn. Soc. Lond. vol. 12,
p. 97.
1896. „ G. O. Sars, Crust. Norw. vol. 2, p. 8.

SPHYRAPUS MALLEOLUS N. & S.

1886. *Sphyrapus malleolus* Norman & Stebbing, l.c. p. 98, pl. 22,
figs. 2, 3.
1896. „ „ Bonnier, Ann. Univ. Lyons, vol. 26,
p. 665, pl. 31, fig. 1.
1905. „ „ Richardson, Bull. U.S. Nat. Mus. no. 54,
p. 52, fig. 40.

The specimens call for no remarks on structure, since they agree, even to details, with the original description and figures.

The occurrence of this species in deep water off the Cape is another example of so-called "Bipolarity." Other instances among the Isopoda are *Aega monophthalma* Johnst. and *Pseudanthura lateralis* Richards (infra), and among the Amphipoda *Epimera cornigera* and *Byblis gaimardi*. It is nearly certain that this phenomenon is due in large measure to the incompleteness of our oceanographical investigations and will tend to disappear as these become more extensive and complete.

Length: ♂ 4 mm., ♀ 4.5 mm.; *breadth*: ♂ 1 mm., ♀ 1 mm.

Colour: In spirit pinkish white, surface glistening.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. 2 ♂♂, 1 nonovigerous ♀. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4135.)

Geogr. Distribution: S. of Cape Farewell, Greenland, 1450 fathoms (Norm. & Stebb.).

FAMILY TANAIIDAE.

1853. *Tanaidae* (part) Dana, U.S. Expl. Exp. vol. 13, p. 792.
1913. „ Hansen, Dan. Ingolf Exp. vol. 3, pt. 3, Crust. Malac.
2, p. 18.
1913. „ Nierstrasz, Siboga Exp. monogr. 32a, p. 20.
1914. „ Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 197 (refer-
ences).

GEN. PARATANAIS Dana.

1852. *Paratanais* Dana, U.S. Exp. vol. 13, p. 799.
1884. „ Sars, Arch. Math. Naturv. vol. 7, p. 32.
1884. „ Haswell, Proc. Linn. Soc. N.S.W. vol. 9, p. 1042.
1886. „ Norman & Stebbing, Tr. Linn. Soc. Lond. vol. 12,
p. 107.
1896. „ Sars, Crust. Norw. vol. 2, p. 16.
1913. „ Nierstrasz, Siboga. Exp. monogr. 32a, p. 38.

PARATANAIS EUELPIS n. sp.

Body cylindrical. Head plus 1st peraeon segment longer than broad, anterior margin straight with a minute median point, eyes and ocular lobes distinct. Peraeon segment 2 slightly shorter than 3, 3 and 4 subequal, 5 and 6 subequal, 7 slightly shorter than 6, the extreme anterior portion of each segment narrower than the rest and marked off by a distinct transverse furrow. Pleon of same width as peraeon, equal to last 2 peraeon segments together, the 6 segments distinct, telsonic segment broader than long, apically obtuse.

Antenna 1 stout, 1st joint twice as long as broad, 2nd and 3rd broader than long, flagellum 1-jointed, tipped with several setae, no sensory filaments.

Antenna 2, 1st joint short, upper surface of 2nd and 3rd flat with a sharp inner edge, the two antennae fitting closely together, inner edge in 3rd apically produced into an acute tooth, lower surface of 2nd and 3rd also keeled, 4th (? 1st flagellar joint) nearly as long as 2nd, 5th shorter than 4th, tipped with setae and with obscure indications of a minute 6th joint.

Mouth-parts in ♂ not aborted.

Epistome not very prominent.

Lower lip, lobes rather narrow ovate, apices subacute.

Mandibles normal, cutting-edges bifid, a strong secondary cutting-edge in left.

Maxilla (1), outer plate with 8-9 spines.

Maxilliped, 2nd joint not very long, inner plate large, subquadrate, 2 obtuse teeth and a seta on truncate distal margin near inner angle, distal margin near outer angle finely serrulate and setulose, epipod short, ovate.

Peraeopod 1 (gnathopod), similar in both sexes, incisive process on thumb of 6th joint rising distally to a rounded bifid apex, 7th smooth, moderately stout, evenly curved.

Peraeopod 2 slender, 3rd joint very small, 4th longer than 5th, 6th longer than 4th, 7th plus unguis equal to 6th, very slender, the unguis twice the length of joint itself.

Peraeopods 3 and 4 similar but stouter, 4th and 5th joints subequal, their hinder apices produced.

Peraeopods 5-7, 2nd joint stout, 4th and 5th subequal, 6th only a little longer than 5th, but more slender, hinder apices of 4th-6th and distal margin of 5th with a recurved unciform process, inferior margin of 5th convex and finely setose, 7th $\frac{1}{2}$ length of 6th, unguis shorter than joint, curved.

Pleopods developed well in both sexes, rami subequal and furnished with long plumose setæ.

Uropod short, peduncle as long as broad, inner ramus twice length of peduncle, 2-jointed, 2nd joint rather shorter than 1st, outer ramus not quite equal to 1st joint of inner ramus, 1-jointed (perhaps 2-jointed, but suture very obscure and doubtful).

Length: Littoral specimens 4 mm., deeper water specimens 6 mm.; *breadth*: .5 mm. and .75 mm. respectively.

Colour: Littoral specimens in life yellowish-white, eyes black; deeper water specimens in spirit dirty pink, eyes reddish-brown.

Locality: Sea Point near Cape Town. 26/2/14. (K.H.B.) 1 ♂, 1 ovigerous ♀, 8 juv.; Cape St. Blaize N. by E., distant 73 miles. 125 fathoms. 3 specimens; Lion's Head SE. $\frac{1}{4}$ E., distant 32 miles (Table Bay). 126 fathoms. 9 specimens living in a sponge covering the gastropod *Argobuccinum murrayi* (Smith). s.s. "Pieter Faure." 21/12/99 and 8/3/00. (S.A.M. Nos. A2697, A3824 and A3833.)

This species is very likely synonymous with Vanhoffen's *Heterotanaus* (?) *capensis* 1914. Up to the present I have not been able to consult Vanhoffen's paper.

Distinguished from *P. batei* Sars by the stout peræopod I with shorter finger and thumb and stronger incisive process on the latter; from *atlanticus* Dollfus by the finger and thumb being shorter than the rest of the hand; and the latter distinction applies to *elongatus* Dana, though on the whole this species is nearest to the Cape species. *P. ignotus* Chilton has a 5-jointed inner ramus of the uropod.

GEN. AGATHOTANAIS Hansen.

1913. *Agathotanais* Hansen, l.c. p. 63.

AGATHOTANAIS INGOLFI Hansen.

1913. *Agathotanais ingolfi* Hansen, l.c. p. 64, pl. 6, figs. 5a-5o.

A single specimen agrees with Hansen's description and figures. The carapace is perhaps a trifle broader posteriorly, with slightly more rounded postero-lateral angles, and the grooves between the pleon segments seem a little more pronounced; but beyond these unimportant details I can detect no differences.

As specific differences are not likely to be found in the 2nd maxillæ and as the specimen was very stiff and brittle, I did not attempt to dissect out these appendages and thus cannot supply the only detail missing in Hansen's diagnosis of the genus.

Length : 2.5 mm. ; *breadth* : .5 mm.

Colour : In spirit chalky white.

Locality : Cape Point N. 89° E., distant 36 miles. 700 fathoms. 1 ♂. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4137).

Geogr. Distribution.—S. of Iceland and Greenland, 788-1199 (Danish) fathoms.

GEN. LEPTOCHELIA Dana.

1849. *Leptochelia* Dana, Amer. J. Sci. ser. 2, vol. 8, p. 425.

1866. ,, Bate & Westwood, Br. sess. Crust. vol. 2, p. 132.

1886. ,, Norman & Stebbing, Tr. Linn. Soc. Lond. vol. 12, p. 108.

1896. *Dolichocheilia* Stebbing, Ann. Mag. Nat. Hist. ser. 6, vol. 17, p. 49.

1896. *Leptochelia* id. ibid. p. 156.

1898. ,, Dollfus, Mem. Soc. zool. Fr. vol. 11 [1897], p. 40.

1900. ,, Stebbing in Willey's Zool. Res. pt. 5, p. 614 (references).

1902. ,, Moore, Bull. U.S. Fish. Comm. vol. 20 [1900], p. 165.

1902. ,, Richardson, Tr. Conn. Ac. Sci. vol. 11, p. 279.

1905. ,, id. Bull. U.S. Nat. Mus. No. 54, p. 22.

1905. ,, Stebbing in Herdman's Ceylon Pearl Fish. Suppl. Rep. 23, p. 5.

1905. ,, Smith, Mitt. Stat. Neapel. vol. 17, p. 335.

1909. ,, Hansen, Nath. Meddel, 1909, p. 227.

LEPTOCHELIA SAVIGNYI (Kröyer).

1900. *Leptochelia lifuensis* Stebbing, l.c. p. 616, pl. 54 C (♀), D (♂),
and pl. 55 B (♂).
1900. „ sp. Borradaile, Proc. Zool. Soc. Lond. 1900, p. 797,
pl. 51, figs. 2-2c.
1905. „ *lifuensis* Stebbing, l.c. p. 7, pl. 1c (♂ ♀).
1907. „ „ Nobili, Mem. R. Ac. Sci. Torino, ser. 2,
vol. 57, p. 414.
1910. „ „ Stebbing, J. Linn. Soc. Lond. vol. 31,
p. 216.
1918. „ *dubius* id. Ann. Durban Mus. vol. 2, pt. 2, p. 62,
pl. 9 A.

The specimens are nearest to the Ceylon specimens as regards the 1st peraeopods (gnathopods) and the 1-jointed outer ramus of the uropod.

In the Durban specimen the gnathopod is much more strongly developed than in the Cape specimens so far discovered.

Length: 3-3.5 mm.

Colour: Yellowish-white, posterior margins of the segments rather deeper in tint, eyes blackish-brown.

Locality: St. James and Buffel's Bay (both in False Bay). 15/2/14 and 29/9/13. (K.H.B.) 2 ♂♂; Buffel's Bay. 1/3/15. (K.H.B.) 6 ♀♀; Durban. 19/7/15. (H. W. Bell-Marley) 1 ♂. (S.A.M., Nos. A2691, A3092, A3306 and A3849.)

Geogr. Distribution: Loyalty Islands and Isle of Pines (Stebbing); Funafuti (Borradaile); Ceylon (Stebbing); Tuamotu Archipelago and Gambier Islands, 1-8 metres, amongst Corallines and pearl oysters (Nobili); Red Sea, Suez (Stebbing), etc.

FAMILY GNATHIIDAE.

GEN. GNATHIA Leach.

For references to the family and genus see Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 200, 1914; and add:

1914. Vanhöffen, Deutsche Südpol. Exp. vol. 15, pt. 4, p. 487.
1916. Cooper, Ann. Mag. Nat. Hist. (8), vol. 18, p. 124.

GNATHIA SPONGICOLA n. sp.

(Plate XV. Fig. 9.)

Male.—Head concave in front, anterior margin with two small

bosses some little distance apart, the margin between these being at a lower level and having a minute median point, the oblique ridges from the eyes to the posterior margin each bearing 3-5 small tubercles, the largest being just above the posterior margin of eye and itself minutely denticulate; in some specimens there are also one or two fine setules. Eyes prominent.

Peraeon segments 2 and 3 (1st and 2nd free) subequal in length, not quite as wide as head, the lateral portions somewhat swollen, more prominent in some specimens than in others; segment 4 slightly longer and narrower, not separated by a marked constriction from segment 3, its lateral portions also rather swollen; segment 5 nearly separated into two lateral, rather swollen portions on account of the anterior margin of segment 6 almost meeting segment 4; segment 6 with rather swollen lateral portions.

Pleon nearly as long as peraeon, normally carried bent beneath the body, telson with slightly convex sides, apex acute, with two setae.

Female.—Twice as long as broad. Head with a slight notch on anterior margin. Fifth peraeon segment a little longer than 4th or 6th.

Larva.—Head truncate, eyes prominent.

Labrum acutely pointed.

Antenna 1 ♂, 3rd joint longest, flagellum 5-jointed, its third joint longest.

Antenna 2 ♂, 5th joint subequal to 4th, flagellum 8-jointed.

Mandible ♂, greatest breadth less than, though in some specimens nearly equal to, length, apex acute, inner margin straight, denticulate almost to the apex, tooth on outer margin very prominent.

Maxilliped, 2nd joint produced on inner distal angle, 4th joint of palp not incurved.

Peraeopod 1 ♂, 1st joint tapering, inner margin setose, 2nd joint oval, tipped with setae; in ♀ apparently only 2-jointed but with a nick in 1st joint indicating the fusion of 2 joints.

Peraeopods 2 and 3 ♂, 2nd joint sparsely tuberculate on upper anterior margin, 3rd scabrous and setose in peraeopod 2 but tuberculate in peraeopod 3 on lower (hind) margin, 4th and 5th with large tubercles on lower margin, 6th with numerous close-set serrations and 2 larger spine-setae, one in the middle of, the other at the apex of the lower margin.

Peraeopods 4-6 similar but the tubercles on the 2nd joints are on the upper posterior margin and those on the 3rd-5th joints are stronger.

In the ♀ the peraeopods are without tubercles except slight ones on

4th and 5th joints of the anterior peraeopods; in other respects similar to those of the ♂ though more slender.

Pleopods with 2 hooked setae on inner margin of peduncle, and narrow subequal rami.

Uropod, outer ramus shorter and narrower than inner, both with plumose setae.

Length: ♂ 5 mm., ♀ 4 mm.; *breadth*: ♂ and ♀ 2 mm.

Colour: In spirit pinkish or yellowish, eyes reddish, mandibles white.

Locality: Table Mountain S. by E. $\frac{3}{4}$ E., distant 58 miles. 190 fathoms. 6 ♂♂, 2 ♀♀, 2 juv.; Cape Point NE. $\frac{1}{4}$ N., distant 18 miles. 135 fathoms. 15 ♂♂, 15 juv.; Lion's Head N. 67° E., distant 25 miles. 130 fathoms. 1 ♂. s.s. "Pieter Faure." 3/4/02, 27/2/02 and 28/3/00. In large Hexactinellid sponges. (S.A.M. Nos. A4147-9.)

GNATHIA SPONGICOLA var. MINOR n.

The only points of difference between these specimens and the typical form are the smaller size, the smaller and more numerous tubercles on the head, the nearly obsolete lateral swellings of the peraeon segments, the stouter antennae and peraeopods, the absence on the 6th joints of the peraeopods of the fine serrations.

The oblique ridges on the head bear a row of rather regularly arranged little tubercles or granules.

These small differences may be ascribed to habitat. The variety lives in burrows in a branching sponge, the branches of which are 4-7 mm. in diameter, whereas the typical form inhabits galleries in large massive sponges.

Each burrow is about 5 mm. long and a little over 1 mm. broad, and is occupied by a ♂ and an ovigerous ♀. The ♂ was found either sitting in the mouth of the burrow with the mandibles just projecting or clasping the ♀. In this latter position the hinder part of the ♂ overlies the anterior part of the ♀, which is clasped by the 3 posterior pairs of peraeopods of the ♂.

Length: ♂ and ♀ 3 mm.; *breadth*: ♂ 1.25 mm., ♀ 1.5 mm.

Colour: In spirit yellowish, posterior peraeon segments in ♂ purplish, eyes dark, mandibles white.

Locality: Buffel's Bay (False Bay). 30 fathoms. s.s. "Pieter Faure." 4/10/98 and 26/4/00. (S.A.M. Nos. A4150 and A4151.)

GNATHIA DISJUNCTA n. sp.

(Plate XV. Fig. 10.)

Male.—Head concave in front, anterior margin with 2 small

setiferous lobes close together on the median line, the oblique ridges with a low rounded tubercle just above the posterior margin of eye and another larger and forwardly directed further back; behind these tubercles the surface of the head shows a number of points, which do not appear to be granules but are very distinct. Eyes not very prominent.

Peraeon segments 2 and 3 subequal in length, equal to head in width; segment 4 slightly narrower, not separated by a constriction from segment 3; segment 5 completely separated into two lateral portions by the meeting of segments 4 and 6 in the middle line; none of the segments swollen laterally.

Pleon not as long as peraeon, telson with slightly convex sides, apex acute, with 2 setae.

Female.—Nearly twice as long as broad. Head with a very slight notch on anterior margin. Peraeon segments ruptured, relative lengths of the segments consequently impossible to determine.

Antenna 1 ♂, 3rd joint slightly the longest, flagellum 4 jointed, 2nd joint much the largest.

Antenna 2 ♂, 4th and 5th joints subequal. Flagellum 4-jointed.

Mandible ♂, greatest breadth less than length, apex not slender, subacute, inner margin gently convex, quite smooth; tooth on outer margin very prominent, its front margin slightly denticulate.

Maxilliped, 2nd joint produced on inner distal angle, 4th joint of palp not incurved.

Peraeopod 1 ♂, semicircular, not tapering, outer margin slightly emarginate, inner margin setose, 2nd joint rather elongate oval, tipped with setae; in ♀ 2-jointed, with a nick in 1st joint.

Peraeopods 2 and 3 ♂, 3rd–5th joints strongly tuberculate on lower margins, 6th joint with 1 apical spine and 1 in middle of lower margin.

Peraeopods 4–6 similar, but the tubercles not quite so large as in the anterior peraeopods

Peraeopods in ♀ more slender than in ♂, with only a single apical tubercle on the 4th and 5th joints

Pleopods with 2 hooked setae on peduncle and narrow subequal rami.

Uropod, outer ramus narrower and stouter than inner, both with plumose setae.

Length: ♂ 3.5 mm., ♀ 3 mm.; *breadth*: ♂ 1.5 mm., ♀ 1.75 mm.

Colour: In spirit yellowish, eyes dark, mandibles white.

Locality: Knysna Heads NE. $\frac{3}{4}$ E., distant 3 miles. 40 fathoms. 2 ♂♂, 1 ♀. s.s. "Pieter Faure." 11/10/00. (S.A.M. No. A4152.)

This species is closely allied to the preceding. In both the medio-

dorsal constriction of the 5th peraeon segment is peculiar, though foreshadowed by the longitudinal groove, more or less broad, in certain other species, notably *G. dentata* Sars and *abyssorum* Sars; but in no other species does the 6th segment approach the 4th.

GNATHIA sp.

Female.—Body not quite twice as long as broad. Head with rounded entire anterior margin. The lateral margins of the head show a slight bulging in the place where the eye should be, but there is no trace of pigment or corneal lenses.

Antennae as described for Larva 1.

Maxilliped, inner distal angle of 2nd joint acutely produced, 4th joint of palp not incurved.

Peraeopod 1 apparently only 1-jointed, the sutures between the normal 3 joints being impossible to trace.

Telson much longer than its basal width, sides slightly concave, apex subacute, with 2 setae.

Larva 1.—4 mm. \times .75 mm. Head triangular, broader at base than long, lateral margin straight, antero-lateral angles excavated for the insertion of the antennae, front margin truncate between the antennae. No trace of eyes.

Telson as in ♀.

Head, pleon and all the parts of the peraeon which are strongly chitinised are covered with little specks more opaque than the rest of the integument.

Peraeon segments 2 and 3 subequal; 4th chitinised laterally and in the middle, where there is a large rounded plate; 5th chitinised laterally only; 6th chitinised nearly for the whole width but not on the anterior margin.

Antennae not much longer than greatest width of head, in antenna 1 3rd joint longest, flagellum 5-jointed, 1st very short, 2nd longest; in antenna 2 5th joint considerably longer than 4th, flagellum 5-jointed.

Labrum long, ovoid, apex emarginate.

Larva 2.—5 \times 1 mm. Similar to the last but more swollen.

Larva 3.—5 \times 1.5 mm. Similar, but the antennae are here twice as long as the greatest width of the head, the joints proportionately the same in length, though more slender. Peraeopod 1, 3rd and 4th joints subequal, 6th longest, unguis strong and curved, no recurved denticles or serrations.

Length: ♀ 5 mm.; *breadth*: 3 mm.

Colour: In spirit ♀ colourless, larvae yellowish, the two largest having the swollen middle segments brown.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. 1 "spent" ♀, 3 larvae. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4138.)

Owing to the absence of the ♂ it is impossible to assign a specific name to these specimens.

FAMILY ANTHURIDAE.

1814. *Anthuridae* Leach, Edinb. Encycl. vol. 7, pp. 387, 433.
1910. ,, Stebbing, Tr. Linn. Soc. Lond. vol. 14, pt. 1, p. 90
(references).
1914. ,, Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 334a.

GEN. ANTHURA Leach.

1814. *Anthura* Leach, l.c. p. 404.
1868. ,, Bate & Westwood, Br. sess. Crust. vol. 2, p. 157.
1880. *Haliophasma* Haswell, Proc. Linn. Soc. N.S.W. vol. 5, p. 476.
1881. *Anthura* Chilton, Tr. N.Z. Inst. vol. 14, p. 172.
1882. ,, id. ibid. vol. 15, p. 72.
1886. ,, Norman & Stebbing, Tr. Zool. Soc. vol. 12, p. 121.
1893. ,, Stebbing, Hist. Crust. p. 331.
1900. ,, id. in Willey's Zool. Res. pt. 5, p. 619.
1914. ,, Sexton, J. Mar. Biol. Ass. vol. 10, pt. 2, p. 236.

One of the chief distinguishing characters of this genus is the 3-jointed maxilliped. This has been well figured by Mrs. Sexton (l.c. p. 241, figs. 7, 8). In fig. 6 Mrs. Sexton has figured an abnormal maxilliped in which the terminal joint still shows a distinct suture, so that there appear to be 4 joints in all. The present specimen exhibits the same peculiarity, though as there is only the one specimen it is impossible to say whether this is normal or not. But it shows the danger, as pointed out by Mrs. Sexton, of dividing the family into genera according to the number of joints in the maxillipeds when only a limited amount of material is at hand.

In this genus there is only one species which is at all thoroughly known—namely, *A. gracilis* Mont. *A. flagellata* Chilton, 1882, from New Zealand, agrees with *gracilis* in having a truncate telson. *Haliophasma maculata* Haswell, 1881, from Australia, has been redescribed by Chilton in 1881 under the name of *Anthura affinis*. This species has a linguiform telson and is closely allied to the species described

below, presuming that the mouth-parts, which are as yet unknown, are like those of the typical *A. gracilis*.

Haswell's other species, *Haliophasma purpurea*, 1880, also from Australia, is easily distinguished by the 3 longitudinal ridges on the telson; the true systematic position of this species is also still uncertain.

ANTHURA LINGUICAUDA n. sp.

Male.—Body narrow, smooth. Head longer than broad, with minute median point. Eyes well developed. Peraeon segments nearly flat dorsally, rounded ventrally, 1–5 subequal, 6 and 7 subequal and shorter than the others, 4–6 each with a rounded pit.

Pleon segments 1–5 together nearly equal to peraeon segments 6 and 7, sutures distinct. Telson ovate, tapering to a narrowly rounded apex, sparsely fringed with simple setae.

Antenna 1, 1st joint slightly the largest, 2nd and 3rd subequal, flagellum extending to end of 3rd peraeon segment, ca. 22-jointed, with dense whorls of long setae.

Antenna 2, 2nd joint largest, grooved, 3rd–5th joints increasing in length, flagellum a little longer than 5th, 4-jointed, sparsely setose.

Mandible, 1st and 3rd joints of palp subequal.

Maxilliped, 3rd joint slightly narrower than 2nd, showing at about $\frac{1}{4}$ of its length from the base a distinct transverse suture, indicating a coalesced joint. Apex of terminal joint truncate and slightly emarginate, with 5–6 setae. Epipod half length of 2nd joint, oval.

Peraeopod 1 stout, 5th joint with apex bluntly projecting, 6th broadly ovate, palm convex at base, excavate distally, setose, finger plus unguis impinging against apex of 5th, inner margin with 2 small lobes.

Peraeopods 2 and 3 moderately stout, 5th joint underriding 6th, 6th equal to 3rd, parallel-sided, inferior margin setose.

Peraeopods 4–7 similar, but 5th joint not underriding 6th; peraeopod 7 not shorter or more slender than the preceding ones.

Pleopod 1, outer ramus not indurated, inner ramus not much smaller than outer.

Pleopod 2, inner margin of peduncle with 4 hooked setae, stylet arising half way along inner margin of inner ramus, straight, apex blunt, not reaching apex of ramus.

Uropod, inner ramus nearly reaching telsonic apex, 2nd joint nearly twice as long as broad, oval, fringed with long setae, outer ramus not very widely separated from its fellow, ovate, outer distal margin slightly concave, apex subacute, margin fringed with long setae.

Length: 10.5 mm.; *breadth*, 1 mm.

Colour: In spirit pinkish, eyes red.

Locality: Umhlangakulu River NW. by N., distant 7 miles (Natal). 50 fathoms. 1 ♂, amongst sponges. s.s. "Pieter Faure." 14/3/01. (S.A.M. No. A4172.)

GEN. APANTHURA Stebb.

1900. *Apanthura* Stebbing, in Willey's Zool. Res. pt. 5, p. 621.

1910. ,, id. l.c. p. 93.

1914. ,, Barnard, l.c. p. 340a.

This genus possesses normally a 5-jointed maxilliped. The following species, however, while agreeing in all other respects with the diagnosis, possesses a 6-jointed maxilliped. Moreover there are indications that the 4th joint is really composed of 2 joints, this being the only case known of an Anthurid exhibiting the full number of joints normal in the Isopoda.

APANTHURA SERRICAUDA n. sp.

(Plate XV. Figs. 11, 12.)

Body moderately elongate. Head $\frac{3}{4}$ length of 1st peraeon segment, about as broad as long. Eyes small, oval.

Peraeon segment 1 shorter than the following segments, 7 shorter than 1. Pleon segments distinct in both sexes, short, all 5 together equal to 6th peraeon segment. Telson increasing in width distally, apex semicircularly rounded, serrate and setose.

Antenna 1 short and stout, 1st joint a little larger than 2nd, 2nd and 3rd about equal in length, flagellum equal to 3rd joint, obscurely 2-jointed.

Antenna 2, 3rd and 5th joints subequal, 4th shorter, flagellum equal to 5th joint, very obscurely 3-jointed.

Maxilliped narrow, 1st joint obscure, 3rd short, 4th nearly as long as 2nd with obscure indications of a suture across the middle, 5th half as long as 4th, 6th minute, tipped with setae, inner plate as long as 2nd joint, epipod $\frac{3}{4}$ length of 2nd joint, narrow, oval.

Remaining mouth-parts as described for *A. africana* Brnrd.

Peraeopod 1, 5th joint with a very small produced point on inner apex, 6th ovate, palm perfectly straight and entire, 7th plus unguis nearly as long as palm.

Peraeopods 2 and 3 similar to 1st but weaker, palm with a spine near the apex.

Peraeopods 4-7 more slender than the preceding, 5th joint under-riding 6th, inner margin of 5th with 2 spines, of 6th with 1 apical spine, margins of 6th smooth.

Uropod, lower ramus as long as telson, 2nd joint as long as broad, rounded, distal margin serrate and setose; upper ramus longer than 1st joint of lower ramus, broadly ovate, apex blunt, outer margin serrate and setose.

Length: 5 mm.; *breadth*, .5 mm.

Colour: Uniform yellowish-white, eyes black.

Locality: Sea Point, near Cape Town. 29/11/13 and 26/2/14. (K.H.B.) 1 ♂, 1 ♀ with embryos, 12 juv.; St. James and Buffel's Bay (False Bay). 15/2/14 and 1/3/15. (K.H.B.) 1 ♂, 1 ♀ with embryos. (S.A.M. Nos. A2620, A2698, A2692 and A3303 respectively.)

GEN. EXANTHURA Brnrd.

1914. *Exanthura* Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 336a.

No further specimens of the type-species *E. macrura* have up to the present been found, but two other specimens have been discovered among the "Pieter Faure" material. One of these is an ovigerous ♀, the other is without definite sexual characters, but seems to be an immature ♂. The spiniform process of the 1st antenna may prove to be a male character in this genus.

EXANTHURA FILIFORMIS (Lucas).

1849. *Anthura filiformis* Lucas, Anim. Artic. de l'Algérie, p. 63, pl. 5, fig. 8.

1886. " " Norman & Stebbing, Tr. Zool. Soc. vol. 12, p. 130.

Male (?).—Body very narrow, head and dorsal surface of peraeon pitted. Head longer than broad, with a minute median point. Eyes well developed. Peraeon segments dorsally flat, with a low but distinct lateral keel, segments gradually increasing in length to 5th. 6th a little shorter than 5th, 7th half length of 6th, segments 3-6 each with a narrow longitudinal pit. Ventral surface rounded.

Pleon segments 1-5 subequal to 7th peraeon segment, fused but with distinct sutures dorsally and laterally; no trace of keels but the dorsal surface is flat; telson half as long again as pleon segments 1-5, parallel-sided in its basal half, then tapering, the tapering becoming more rapid on approaching the subacute apex, a median longitudinal keel extending from base to apex, distal margin sparsely clothed with plumose setae.

Antenna 1, 1st joint largest, outer margin produced in a large recurved, spiniform process, 2nd and 3rd subequal, flagellum not quite as long as peduncle, 6-jointed, 1st joint very short, 2nd longest, 6th and 7th minute.

Antenna 2, 2nd joint largest, grooved, 3rd-5th joints gradually increasing in length, flagellum shorter than 5th joint, 3-jointed. Flagella of both antennae sparsely setose.

Upper lip triangular, apically incised.

Lower lip, lobes apically tapering, with a small apical projection.

Mandibles, cutting-edge obscurely crenulate, cutting plate with recurved teeth, molar not very prominent, palp stout, 1st and 3rd joint subequal, 2nd longer, 3rd apically setose.

Maxilla 1 6-toothed.

Maxilliped 4-jointed, 1st not very distinct, 3rd largest, 4th short, rounded, with a few apical setae, epipod short, oval.

Peraeopod 1 stout, 2nd joint widening rapidly from a narrow base, without distal projection, 5th small, triangular, inferior apex subacute, not projecting, 6th large, oblong, scarcely narrowing distally, palm short, slightly concave in distal half, sparsely setose, finger plus unguis longer than palm, overlapping apex of 5th, inner margin finely denticulate.

Peraeopods 2 and 3 fairly stout, third joint $\frac{2}{3}$ length of 2nd, 4th distally as wide as long, 5th underriding 6th, which is equal to 3rd, slightly ovate, inferior margin sparsely setose, with a stout apical spine, finger shorter than 6th.

Peraeopods 4-7 similar but 5th joint not underriding 6th, with a spine on inferior apex; peraeopod 7 not appreciably shorter or more slender than the preceding ones.

Pleopod 1 large, outer ramus opercular, indurated, outer surface with one median longitudinal groove and another just within the outer margin, the surface between the grooves pitted, distal margin densely fringed with plumose setae, inner ramus thin, scarcely half as wide as outer ramus.

No stylet showing on pleopod 2.

Uropod, inner ramus not quite reaching telsonic apex, ventral surface of 1st joint strongly keeled, 2nd shorter than 1st, subtriangular, longer than its basal width, apex rounded, inner margin straight, outer margin straight or slightly concave, densely fringed with plumose setae, outer ramus not meeting its fellow, reaching just beyond apex of 1st joint of inner, ovate, outer distal margin concave, apex acute, whole of outer margin densely fringed with plumose setae.

Ovigerous ♀.—Body not very narrow, dorsal surface of head and peraeon pitted. Head as broad as long, with minute median point. Eyes well developed. Peraeon segments dorsally slightly convex, segment 2 longest, segments 3–6 shorter than the preceding, subequal, a little longer than broad, 7 half length of six, a slight circular pit on segments 3–6.

Pleon segments 1–5 longer than peraeon segment 7, fused, but with the sutures distinct dorsally and laterally, 2 low rounded dorsal submedian longitudinal ridges; telson about as long as rest of pleon plus peraeon segment 7, lanceolate, swelling slightly in basal third, then tapering gradually to the subacute apex, a median longitudinal keel extending from base to apex, swelling out at the base where there is a deep oval median pit; distal margin densely clothed with long plumose setae.

Antenna 1, 1st joint largest but not swollen, 2nd and 3rd subequal in length, flagellum not quite as long as peduncle, 7-jointed, 1st joint short, 2nd largest, 6th and 7th minute.

Antenna 2, 2nd joint largest, grooved, 3rd–5th joints gradually increasing in length, flagellum a little longer than 5th peduncular joint, 5-jointed, 5th joint minute. Flagella of both antennae sparsely setose.

Mouth parts as described above.

Peraeopod 1 stout, 2nd joint very narrow at base, swelling very rapidly, without distal projection, 5th small, subtriangular, inferior apex bluntly projecting, 6th large, oval, produced backwards almost to level of base of 3rd, narrowing distally, palm straight, sparsely setose, finger plus unguis as long as palm, inner margin denticulate.

Peraeopods 2–7 and pleopod 1 as described above.

Uropod as described above, but 2nd joint of inner ramus oval, inner and outer margins convex.

Length: ♂ 23 mm., ♀ 13 mm.; *breadth*: head 1 mm., 6th peraeon segment ♂ 1.5 mm., ♀ 2 mm.

Colour: In spirit ♂ brownish, eyes dark, ♀ yellowish, eyes reddish.

Locality: Lion's Head SE. $\frac{1}{4}$ E., distant 50 miles (off Cape Peninsula). 230 fathoms. 1 ♂; Cape St. Blaize N. by E., distant 73 miles. 125 fathoms. 1 ovigerous ♀. s.s. "Pieter Faure." 2/4/02 and 21/12/99. (S.A.M. Nos. A4012 and A3825.)

Geogr. Distribution: Algeria (Lucas).

The "male" specimen agrees so exactly with Lucas's description that, in spite of the brevity of the latter, it seems impossible to assign this specimen to any other species. Some future student may be in a position to compare Algerian (or Lucas's type) specimens with the

present description, and if necessary will rename the South African specimens. For the present, problematical differences cannot be used as a reason for separating the forms.

E. filiformis is easily distinguished by its keeled telson. No other species in the family has a keeled telson except *Haliophasma purpurea* Haswell, and this species (whose generic position is still uncertain) has 3 longitudinal keels. *E. macrura* Brnrd. has slight indications, at the base, of 3 keels or rather of 2 submedian grooves, but they are very indistinct and do not reach more than half way towards the apex.

GEN. PARANTHURA Bate & Westw.

1866. *Paranthura* Bate & Westwood, Br. sess. Crust. vol. 2, p. 163.
1914 „ Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 347a
(references).

PARANTHURA PUNCTATA (Stimps.).

1855. *Anthura punctata* Stimpson, Proc. Ac. Nat. Sci. Philad. vol. 7,
p. 392.
1914. *Paranthura* „ Barnard, l.c. p. 348a, pl. 29 c.

A fine specimen from the “Pieter Faure” collection leaves no doubt that the specimens mentioned in my previous paper were rightly assigned to Stimpson’s species. The specimen came from just outside False Bay and is yellowish with black speckling on the dorsal surface. The sex is not apparent, but it is probably an immature female.

Length : 15 mm. ; *breadth* : 1.5 mm.

Locality : Cape Hangklip N. by E., distant 12 miles. 73 fathoms.
1 specimen. s.s. “Pieter Faure.” 19/11/03. (S.A.M. No. A4168).

The specimen was found in the central cavity of a calcareous sponge of the genus *Leuconia*.

GEN. PSEUDANTHURA Rich.

1911. *Pseudanthura* Richardson, Bull. Mus. d’Hist. Nat. Paris, 1911,
No. 7, p. 523.

This genus was instituted to receive an Anthurid collected off the coast of Dakar in deep water by the “Talisman.” It is characterised by the rudimentary outer ramus of the uropod—a feature quite unique in the family. Although two specimens were found, the nature of the mouth parts was left undetermined. Moreover for purposes of specific

determination Richardson's description is lacking in detail, *e. g.* the 1st peraeopod is described as "prehensile with a large propodus." Nor has the species been figured.

In spite of this, I think there can be little doubt that the Cape specimens are specifically the same as the "Talisman" specimens.

The genus belongs to that section of the *Anthuridae* which has styliform mouth-parts, these appendages being somewhat similar to those of the genus *Calathura* N. & S.

PSEUDANTHURA LATERALIS Rich.

(Plate XV. Figs. 13-16.)

1911. *Pseudanthura lateralis* Richardson, l.c. p. 524.

Miss Richardson's description applies to the Cape specimens, but in addition the following details may be given.

The specimens are smaller, but the relative lengths of the head and peraeon and pleon segments are the same as given for the type-specimens. The sex of the latter is not mentioned, but they seem to have been females to judge by the description of the 1st antenna. The male possesses the same ventral process on the 1st peraeon segment and the 2 dorsal tubercles on segments 2 and 3.

Antenna 1 ♂, 1st joint larger than 2nd plus 3rd, 2nd and 3rd shorter and stouter than in ♀, flagellum of 10 distinct joints, of which the first 4 are swollen and broader than long, the rest slender and longer than broad, the first 6 joints densely setose.

Antenna 2, 2nd joint the stoutest, but 5th longest, flagellum in ♂ 10-jointed.

Upper lip tapering to a subacute apex.

Lower lip with acute apices.

Mandibles stout and not very elongate, apices acute, palp stout, 1st joint shortest, 3rd a trifle shorter than 2nd, distal half of its margin with a regular row of setae.

Maxilla 1 long, slender, apically serrulate.

Maxilliped, 2nd joint produced acutely on inner apex, palp composed of 1 or possibly 2 joints; epipod small, oval.

The mouth-parts bear a strong likeness to those of *Calathura norvegica* as figured by Sars in Crust. Norw. vol. 2, pl. 19.

Peraeopod 1 alike in both sexes, but rather stronger in the ♀, surface of all the joints scaly, 2nd equal to 3rd-5th joints together, narrow proximally, swelling rapidly, 3rd $\frac{2}{3}$ length of 2nd, 4th strongly produced on anterior margin so that breadth is here twice length, 5th

small, subtriangular, with 4-5 spinules on inferior margin, 6th large, as long as 2nd, regularly oval, no tooth or projection at base of inferior margin, which is spinulose, finger reaching to apex of 5th, slender, curved, limits of finger and unguis not distinct.

Peraepods 2 and 3 slender, 4th joint $\frac{1}{4}$ length of 3rd, 5th half 4th, underriding 6th, which is longer than 4th plus 5th, but shorter than 3rd, inner margin with 8-9 stout, cilium-bearing spines, 7th a little more than $\frac{1}{2}$ length of 6th.

Peraepods 4-6, 5th joint a little longer than 4th, not underriding 6th, inner margin with 2-3 spines, 6th a little longer than 5th, inner margin with 3-5 spines, 7th equal to 5th.

Peraeopod 7 conspicuously shorter than the preceding, the proportions of the joints the same, inner margin of 6th with 3 spines.

Pleopod 1 operculiform, outer ramus indurated, with straight inner margin and convex setose outer margin, apex acute, inner ramus delicate, only $\frac{1}{3}$ as long and as wide as outer, tapering to a fine point.

Pleopod 2 in ♂, inner ramus a little shorter than outer, male stylet twice length of inner ramus, apically curved, with the tip acute and uncinately recurved.

Uropod, inner ramus folding under and reaching to the apex telson, inner margin with a long seta in a small notch towards the apex, outer distal margin serrate, apex subacute, outer ramus on the outer margin of the basal third of inner ramus, movable but small and scale-like, with 2-3 apical setules.

Length : ♂ 16 mm.; ♀ 18 mm.

Colour : In spirit dirty white.

Locality : Cape Point N. 86° E., distant 43 miles. 900-1000 fathoms.

1 ♂, 2 ♀ ♀. s.s. "Pieter Faure." 19/8/03. (S.A.M. No. A3832.)

Geogr. Distribution : Near Dakar, W. Africa, 930-3200 metres.

FAMILY EURYDICIDAE.

1905. *Eurydicidae* Stebbing in Herdman's Ceylon Pearl Fish. Suppl.

Rep. 23, p. 10.

1914. ,, Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 350a.

GEN. CIROLANA Leach.

1818. *Cirolana* Leach, Dict. Sci. Nat. vol. 12, p. 347.

1914. ,, Barnard, l.c. p. 351a (references).

1914. ,, Vanhöffen, Deutsche Südpol. Exp. vol. 15, pt. 4, p. 496.

CIROLANA CRANCHII Leach.

1818. *Cirolana cranchii* Leach, Dict. Sci. Nat. vol. 12, p. 347.
 1890. „ „ Hansen, Vid. Selsk. Skr. ser. 6, vol. 5, pp. 321, 341, pl. 3, figs. 3-3l.
 1914. „ *vicina* Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 351a, pl. 30B.
 1917. „ *cranchii* Stebbing, ibid. vol. 17, pt. 1, p. 15.

Stebbing has expressed the opinion that *vicina* and also *parva* Hansen might well be merged into *cranchii*. With regard to *vicina*, after having examined further specimens, I am disposed to agree, but not with regard to *parva*, which seems to be distinguished by the frontal lamina and the more broadly rounded telsonic apex.

CIROLANA FLUVIATILIS Stebb.

(Plate XV. Fig. 19.)

1902. *Cirolana fluviatilis* Stebbing, S. Afr. Crust. pt. 2, p. 52.

Since the frontal lamina is an important character in distinguishing the species of this genus and was not described by Stebbing, a description and figure of it are given here.

In a co-type from Stebbing the frontal lamina is twice as long as broad, very slightly broader anteriorly than posteriorly, sides straight, anterior margin semicircularly rounded. It does not meet the anterior margin of the head, the bases of the first antennae being contiguous.

Three specimens from East London (R. M. Lightfoot, 1914, S.A.M. No. A2849) and several from Zwartkops River, Port Elizabeth (Mrs. T. V. Paterson, S.A.M. No. A2254), have the crenulations on the hind margins of the peraeon segments and the tubercles on the pleon segments almost or quite obsolete and the interrupted keels on the telson very indistinct.

On the other hand two more specimens from Zwartkops River (Mrs. Paterson, S.A.M. No. A2268) show these features very clearly, and the keels on the telson are composed of 5 or 6 separate elongate tubercles; consequently in this case there is a strong temptation to unite this species with *C. pleonastica* Stebb.

The colour of fresh specimens is a clear semi-transparent lemon-yellow, but the animals are usually much coated with mud; eyes black.

CIROLANA LITTORALIS n. sp.

(Plate XV. Fig. 17.)

Body smooth. Head with a very narrow median point separating

the 1st antennae. Frontal lamina meeting the rostrum, about as broad as long, anterior margin obtusely pointed, a prominent and outstanding *transverse* ridge across the middle, but not produced into a horn.

Peraeon and pleon segments not denticulate on posterior margin. Fifth pleon segment without free margins.

Telson a little longer than broad, triangular, lateral margins straight, apex subacute, with 8 short, stout spines and a few plumose setae.

Antenna 1 reaching to end of peduncle of antenna 2, flagellum 13-jointed.

Antenna 2 reaching to 3rd peraeon segment, flagellum 26-jointed.

Mouth-parts normal.

Peraeopod 1, 3rd joint with 1 spine on inner margin, 4th with 6 stout apically truncate spines on inner margin, inner apex of 5th with 1 spine-seta set between 2 tubercles, 6th with 4 spines alternating with small rounded tubercles.

Peraeopod 2, 3rd joint with 3 apical and 2 smaller subapical spines on inner margin, outer apex bluntly produced, with 3 stout spine-setae, 4th with 9-10 stout blunt spines on inner margin, outer apex with 1 spine, inner apex of 5th with 3 spines and a tubercle below them, inner margin of 6th with 4 spines alternating with 4 small rounded tubercles.

The other peraeopods moderately slender, 2nd joint of 5th-7th peraeopods not expanded or furnished with long setae.

Uropod, inner ramus reaching apex of telson, distal margin with a few short plumose setae and 8 stout spines, apex subacute, outer distal margin with a few short plumose setae and 3 spines, outer ramus a little shorter, ovate, apex bifid, outer margin with 6 stout spines, inner distal margin with 4 stout spines and some plumose setae, inner apex of peduncle reaching half-way along inner ramus.

Length: 12-13 mm.; *breadth*: 4 mm.

Colour: Yellowish-white speckled with dark grey, eyes black.

Locality: Saldanha Bay. 5/9/12. (K.H.B.) 1 specimen; Dyer's Island. April, 1915. (J. Drury.) 1 adult and 1 juv. (S.A.M. Nos. A2465 and A3383.)

In the shape of the frontal lamina this species closely resembles *C. schiödtei* Miers, 1884, from the Arafura Sea, but lacks the two setose tracts on the telson which are so conspicuous in Miers' figure, although not mentioned in his description.

CIROLANA MEINERTI n. sp.

(Plate XV. Fig. 18.)

Body smooth. Head with a minute median point, not reaching the frontal lamina and not (or only partially) separating the 1st antennæ.

Frontal lamina pentagonal, twice as long as broad, apex acute, distal oblique margins shorter than the straight side margins.

Peraeon segment smooth, microscopically and sparsely punctate.

Pleon segment 4 with ca. 12 indistinct little denticles on posterior margin, segment 5 without free margins and with ca. 12 little denticles, of which the 2 central ones are the largest, on the posterior margin.

Telson longer than broad, triangular, margins slightly convex, apex subacute, distal margins set with plumose setae and 7-8 rather slender and widely separated spines; dorsal surface with a patch of short setae on either side of the middle line near the apex.

Antenna 1 reaching to end of peduncle of antenna 2, 1st and 2nd joints indistinct, flagellum 22-jointed.

Antenna 2 reaching to end of 3rd peraeon segment, 4th and 5th joints subequal, flagellum 32-jointed.

Mouth-parts normal.

Peraeopod 1, 3rd joint with 2 spine-setae on outer apex, 4th with 4 short stout spines at base and 2 at apex on inner margin, inner margin of 6th with 4 spines, of which the 4th is at the apex and much larger than the others, margin between the spines strongly denticulate.

Peraeopod 2, 3rd joint with 2 long spines on outer apex and 3 short stout ones on inner apex, 4th with 3 long spines on outer apex, inner margin with 5 stout spines near base and 3 on apex, 5th with 3 spines on inner apex, inner margin of 6th with 4 spines, the 4th at the apex and much larger than the others, margin between the spines feebly denticulate.

Peraeopods 5-7 moderately slender, well armed with spines, 2nd joint not setose, inner distal margin indistinctly serrulate.

Male appendages on 7th segment short, stout, apically blunt, their distance apart more than the width of one of them.

Pleopod 2, inner margin of peduncle with 4 hooked setae, stylet in ♂ a little longer than ramus, straight, tapering to an acute apex, minutely setulose.

Uropod, inner ramus reaching to telsonic apex, apex subacute, distal margin with ca. 8 slight notches, each with a rather slender spine, and thickly fringed with plumose setae, outer margin with plumose setae

and distally ca. 4 spines, outer ramus a little shorter, both margins with plumose setae, inner distal margin with 3-4 spines.

Length: 20 mm.; *breadth*: 6.5 mm.

Colour: In spirit dirty pinkish.

Locality: Cape Morgan N. $\frac{1}{2}$ W., distant 10 miles. 77 fathoms.
1 ♂. s.s. "Pieter Faure." 26/7/01. (S.A.M. No. A3837.)

This species resembles *C. schiödtei* Miers in having 2 setose tracts on the telson, and is named after Schiödte's collaborator. In respect to the frontal lamina this species differs widely from *schiödtei*, but is closely allied to *cranchii* Leach, in which, however, the dorsal surface is perfectly smooth.

CIROLANA PALIFRONS n. sp.

(Plate XV. Figs. 20, 21.)

Body strongly convex, smooth, minutely granular on the posterior portions of the peraeon segments and on the side-plates. Head moderately immersed in 1st peraeon segment, anterior margin strongly convex, produced over and hiding the bases of 1st antennæ. Eyes moderately large.

Peraeon segment 1 longest, segments 2-6 subequal, 7th a little shorter than 6th, 5th-7th each with a shallow groove on the posterior margin. Side-plates on segments 2-4 quadrangular, on segments 5-7 produced beyond posterior margins of their segments, apices subacute, that on segment 5 with 1, those on segments 6 and 7 with 2, oblique keels.

Pleon segment 1 completely hidden under last peraeon segment, segment 2 not produced, 3 and 4 laterally produced, 4 overlapping 5, posterior margins of 2-5 crenulate.

Telson triangular, apex subacute, 2 small tubercles at the base on either side of 2 median keels; the right-hand keel runs straight to the apex, the other diverges to a lobe on the left margin, evidently the result of an injury, so that it is impossible to say how close together the two keels are normally; lateral margins and apex densely fringed with plumose setae.

Frontal lamina pentagonal, longer than broad, anterior margin biconcave with median point, which just meets the median point on front of head, side margins straight, slightly converging to the straight base.

Antenna 1, 1st and 2nd joints short, distinct, 3rd a little longer, flagellum 7-jointed.

Antenna 2 incomplete.

Mouth-parts normal.

Peraeopods much broken, apparently without distinctive features, 1-3 with stout blunt spine-tubercles on inner margins of 3rd-5th joints, 2nd joints of peraeopods 5-7 without fringes of setae.

Male appendages on 7th segment a little distance apart, curved towards one another, short, stout.

Pleopod 1, outer ramus twice as broad as inner ramus.

Pleopod 2, outer ramus considerably broader than, but not twice as broad as, inner ramus, stylet in ♂ $\frac{1}{4}$ as long again as ramus, slightly incurved distally, tapering evenly.

Uropod, inner apex of peduncle produced, margins of both rami with dense fringe of plumose setae, outer apex of inner ramus subacute.

Length: 9 mm.; *breadth*: 3.5 mm.

Colour: In spirit yellowish, eyes dark.

Locality: 33° 6' S., 28° 11' E. (off East London). 85 fathoms. 1 ♂. s.s. "Pieter Faure." 28/1/99. (S.A.M. No. A4125.)

The specific name from *pala* (a shovel), in allusion to the projecting front of the head.

CIROLANA CINGULATA n. sp.

(Plate XV. Figs. 22, 23.)

Body strongly convex, glabrous. Head nearly completely immersed in 1st peraeon segment, anterior margin not strongly convex, 5 transverse grooves across the whole width of head, including the eyes, the hindermost one only punctate-striate. Eyes moderately large.

Peraeon segment 1 longest, 2-6 subequal, 7 a little shorter; segment 1 with a transverse groove on posterior margin with 3 rows of punctae in front of it, inferior lateral margin with 2 grooves; segment 2 with 1 transverse groove and 2 rows of punctae, segment 3 with 2 grooves with an intervening row of punctae, segment 4 with 4 grooves (2 of them being really only punctate-striate), segments 5-7 each with 4 grooves, the last groove in each case having its anterior margin minutely crenulate. Side-plates on segments 2-4 quadrangular, each with 1 oblique ridge, on segments 5-7 slightly produced, with subacute apices and 2 oblique ridges with an intervening groove.

Pleon segment 1 completely hidden under last peraeon segment, segment 2 visible only laterally, not produced, segments 3 and 4 laterally produced, 4 overlapping 5, 2-5 each with a transverse row of granules or denticles.

Telson triangular, apex subacute, 2 small tubercles at base on either side of a broad median ridge which runs to apex and is ornamented with 2 punctate-striate grooves, rest of the surface with scattered

granules; lateral margins and apex densely fringed with plumose setae; there are indications also of spines on the apex, but these have been broken off.

Frontal lamina about as long as broad, anterior margin convex, projecting freely and not meeting the median point of head; anterolateral angles rounded, sides straight.

Antenna 1, 1st and 2nd joints short, distinct, 3rd a little longer, flagellum shorter than peduncle, 5-jointed.

Antenna 2, flagellum 15-jointed.

Mouth-parts normal.

Peraeopods very much broken, but apparently without distinctive features, 2nd joints of peraeopods 5-7 without fringes of setae.

Male appendages on 7th segment a little distance apart, curving towards one another, short, stout.

Pleopod 1, outer ramus very broad, more than twice as wide as inner.

Pleopod 2, outer ramus not twice as wide as inner, stylet $\frac{1}{4}$ as long again as ramus, slightly incurved distally, tapering evenly.

Uropod, inner apex of peduncle produced, margins of both rami densely fringed with plumose setae, distal margin of inner ramus also with strong spines, outer apex of inner ramus sub-bifid.

Length: 9 mm.; *breadth*: 3 mm.

Colour: In spirit greyish, eyes dark.

Locality: 33° 6' S., 28° 11' E. (off East London). 85 fathoms. 1 ♂. s.s. "Pieter Faure." 28/1/99. (S.A.M. No. A4126.)

GEN. CONILORPHEUS Stebb.

1905. *Conilorpheus* Stebbing in Herdman's Ceylon Pearl Fish. Suppl. Rep. 23, pp. 11, 13.

1908. „ id. S.A. Crust. pt. 4, p. 46.

CONILORPHEUS SCUTIFRONS, Stebb.

1908. *Conilorpheus scutifrons* Stebbing, l.c. p. 46, pl. 31.

In the original description of the genus Stebbing made the narrowness of the head and body one of the distinguishing features of the genus; but when describing the second species he remarked that only the narrowness of the head could be considered as distinctive. Up to the present only one male of both species has been known.

The "Pieter Faure" collection contains a specimen of both sexes, so that I am able to describe the female, thereby showing that the width of the body relatively to its length is largely a sexual feature.

The ♂ measures 9 mm. × 3 mm. The head is longer and squarer than in Stebbing's figure (dorsal view) and has 3 transverse rugae between the eyes. The anterior peraeopods are broken off at the 2nd joints. As in Stebbing's figure, the 1st pleon segment is distinct, the 2nd showing very faint traces of tubercles, in other respects agreeing with Stebbing's description.

The ♀ measures 6 mm. × 3 mm. It agrees with the ♂ in general, the head being as described above. The transverse grooves on segments 1-3 and those on the posterior side-plates and the tubercles on segments 5-7 much more pronounced than in the ♂. There are also distinct traces of tubercles on segments 3 and 4. The tubercles on the pleon and telson are likewise much more prominent, pleon segment 2 with a row of small but distinct tubercles. Pleon segment 1 is completely hidden under the last peraeon segment.

Locality: 33° 53' S., 25° 51' E. 26 fathoms. 1 ♂; Umkomaas River NW. by W. $\frac{1}{2}$ W., distant 5 miles. 40 fathoms. 1 ♀. s.s. "Pieter Faure." 6/12/98 and 31/12/00. (S.A.M. Nos. A4081 and A4083.)

GNATHOLANA n. g.

Head narrow, immersed in 1st peraeon segment, with a small median process. Frontal lamina not distinct, being fused with the median process of head. Pleon segment 1 completely hidden under last peraeon segment, 4th overlapping 5th. Antenna 1 with 1st and 2nd joints indistinctly separated. Epistome, upper lip and mandibles directed forwards. Mandibles very stout, the cutting process much produced, conical, apically acute, secondary cutting-edge, molar and palp normal. Maxilla 1 with outer plate unusually large. Maxilliped with inner plate very small, with 1 coupling hook. Pleopod 1 not indurated, peduncle not longer than broad, inner ramus half width of outer. Pleopod 2 with male stylet arising from base of ramus. Uropod with peduncle internally produced, outer ramus much smaller than inner.

This genus is remarkable for the great development of the mandibles. It is distinguished from *Hansenolana* and *Conilorpheus*, the other genera with relatively narrow head immersed in 1st peraeon segment, by the absence of a distinct frontal lamina.

GNATHOLANA MANDIBULARIS n. sp.

(Plate XV. Figs. 24, 25.)

Body strongly convex. Head scarcely half the width of the body, a little broader than long, deeply immersed in 1st peraeon segment,

anterior margin slightly convex on either side between the eyes and the short, squarish median process. Eyes moderately large, on the lateral margins.

Peraeon segment 1 embracing the head, nearly twice as long as 2, segments 2-5 increasing slightly in length, 6 and 7 shorter; segments 3-6 with a slight transverse groove across the middle of the segment, all the segments except the 1st with the posterior margin setose, more strongly so on the posterior segments, segments 5-7 in addition with a transverse row of pointed tubercles on the posterior margin.

Side-plates on segments 2-4 quadrangular, as long as their segments, those on segments 5-7 moderately produced, apically subacute.

Pleon segment 1 entirely concealed by 7th peraeon segment; segment 2 bounded laterally by the last pair of side-plates, segments 3 and 4 produced laterally, 4 overlapping 5, segments 2-5 each with a transverse row of granules and setae.

Telson about as broad as long, triangular, margins sinuous, apex narrowly rounded, with long plumose setae and 6 spines, dorsal surface irregularly and not densely granulate, setose.

Frontal lamina completely fused with the median process of head.

Epistome and upper lip projecting forwards, both broader than long, upper lip a little longer than epistome, distal margin emarginate, lateral angles rounded.

Antenna 1 reaching to middle of peraeon segment 1, 1st and 2nd joints rather indistinctly separated, together a little longer than 3rd, flagellum subequal to peduncle, 9-jointed.

Antenna 2 reaching to end of peraeon segment 1, 4th and 5th joints subequal, flagellum scarcely as long as peduncle, 14-jointed.

Mandible very stout, projecting forwards, cutting process strongly chitinised, brown, acute, slightly incurved, secondary cutting-edge (proportionately) very small, 4 dentate, molar normal, serrate, palp small, 1st and 2nd joints equal, 3rd shorter.

Maxilla 1, outer plate large, with 13 spines, the largest ones faintly denticulate, inner plate much smaller than outer, with 3 very stout plumose setae.

Maxilla 2, outer and middle plates subequal, inner considerably shorter, its innermost setae stouter than the rest.

Maxilliped, 2nd joint longest, but not elongate, 4th and 5th broadest, 6th and 7th much narrower than 5th, inner plate very small, with 1 coupling-hook.

Peraeopod 1, 4th joint scarcely produced on anterior apex, 5th small, underriding 6th, 6th cylindrical, twice as long as broad, inner margins of 4th-6th with respectively 9, 3, 14 strong curved spines.

Peraeopods 2 and 3 similar, but 3rd and 4th joints stouter, 4th produced on anterior apex, inner margins of 4th-6th with respectively 6, 2, 3 spines, those on 4th stout and short, the others more slender but not as long as those on peraeopod 1, inferior apex of 3rd also with 2 stout spines.

Peraeopods 5-7 increasing in length, 2nd joint without plumose setae, 3rd-6th rather strongly armed with spines.

Male appendages on 7th peraeon segment short, a little distance apart.

Pleopod 1 not indurated, peduncle broader than long, inner margin with 5-hooked setae, outer ramus broadly ovate, inner ramus only half the width of outer.

Pleopod 2, inner ramus broader than in pleopod 1, but not nearly as broad as outer ramus; stylet attached at base, $\frac{1}{3}$ as long again as ramus, tapering gradually to a subacute apex.

Uropods large in proportion to telson, peduncle produced on inner apex, inner ramus broadly ovate, outer ramus much smaller, ovate, both rami with the dorsal surface setose and the margins strongly armed with spines and plumose setae.

Length : 5.5 mm. ; *breadth* : 2.5 mm.

Colour : In spirit yellowish-brown, eyes black.

Locality : 33° 6' S., 28° 11' E. 85 fathoms. 1 ♂. s.s. "Pieter Faure." 28/1/99. (S.A.M. No. A4118.)

FAMILY CORALLANIDAE.

1890. *Corallanidae* (part) Hansen, Vidensk. Selsk. Skr. ser. 6, vol. 5, pt. 3, p. 280.
 1914. ,, Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 357a (references).

GEN. LANOCIRA Hansen.

1890. *Lanocira* Hansen, l.c. pp. 313, 391, 395.
 1914. ,, Barnard, l.c. p. 359a (references).

LANOCIRA CAPENSIS Brnrd.

1913. *Lanocira* sp? Tattersall, Tr. Roy. Soc. Edinb. vol. 49, pt. 4, p. 880.
 1914. ,, *capensis* Barnard, l.c. p. 359a, pl. 31A.

Although in the original description certain characters were pointed out in which this species differed from *L. gardineri* Stebb., there yet remained the possibility that it might be found later to be identical

with the Indian Ocean species. Further specimens are now available which render possible a more complete definition of the Cape species, proving that this species is distinct from any of the other species of the genus.

In the ♂ previously examined the characteristic features were so slightly developed that they were overlooked, but with the clue afforded by the new specimens they can be just distinguished; the two lots of specimens are thus undoubtedly conspecific. In the original description mention was made of the horn on the head and the 2 ocular tubercles; there is in addition a slight concavity on the 1st peraeon segment, being a continuation of that on the head. In the fully developed ♂ there is a tubercle on either side of this hollow and also a short transverse ridge-like median tubercle on the posterior margin of the same segment (1st). Thus there are altogether *six* elevations on the head and 1st peraeon segment. This is the diagnostic feature of the species.

In the ♀ the median point of the head is prominent and margined but not upturned; behind it is a very shallow median longitudinal cavity.

The surface of the body in both sexes is rather coarsely pitted, the setae arising from these pits; the pitting remains the same irrespective of the setose covering. This pitting causes the posterior margins of the 7th peraeon segment and 1st and 2nd pleon segments, especially the lateral portions of the latter segment, to appear as if crenulate or denticulate.

The ♀ is always more densely setose than the ♂.

The frontal lamina is somewhat variable in shape and proportions, but appears to be at least as long as broad, usually a little longer than broad, the lateral margins slightly thickened and raised, converging to a narrow base.

Maxilla 1 in the adult ♂ and the larger ♀ ♀ is stronger, in some cases very like that of *zeylanica* Stebb.

The ♂ appears to assume its full complement of dorsal tubercles at a length of about 7.5 mm. and grows to a length of 10 mm. Oviparous ♀ ♀ range from 7.5 mm. to 11 mm. in length. Specimens taken between tide-marks do not seem to grow as large as those from deeper water.

Colour: Spirit specimens are dull pinkish, with a few black pigment specks still visible.

Additional localities: Kalk Bay. 1 immature ♂ (R. M. Lightfoot), low tide. Bakkoven Rock NW. by W., distant 2 miles. 24 fathoms. 1 ♂, 2 oviparous ♀ ♀; Buffel's Bay. 30 fathoms. 1 ♂; Cape

Hangklip N. by E., distant 12 miles. 13 fathoms. 1 ♂, 2 juv.; off Cape Hangklip. 2 ovigerous ♀♀. s.s. "Pieter Faure." 11/11/02, 26/4/00, 19/11/03, and April, 1898. (S.A.M. Nos. A2709, A3827, A3885, A4076 and A4117 respectively.)

All the localities are situate in False Bay. The specimens from the "Pieter Faure" collection were all taken out of galleries in various kinds of sponges, one being also found in the central cavity of a *Leuconia*-like sponge.

The following specimens are kept separate for these reasons: they appear to be exactly like the typical form, but differ in the shape of the frontal lamina. This has the basal portion rather deeply set and more or less covered by the epistome, so that it appears *wider than long*. It thus presents a very different appearance from that of the typical specimens. In these latter the *whole* of the frontal lamina can be seen without depressing the epistome, and moreover it is considerably narrower. As in the typical form a certain amount of variation can be observed, so that a perfect transition from one to the other may yet be found.

Unfortunately no adult ♂ was found amongst these specimens, so their specific identity must for the present remain doubtful.

In the ♀ the front margin of the head is not quite so prominent and is less distinctly margined, and the dorsal surface shows not the slightest trace of a longitudinal concavity.

Length: Ovigerous ♀, 9–11.5 mm.; *breadth*: 4.5–5 mm.

Colour: As noted above.

Locality: 34° 7' S., 25° 43' E. (off Cape Recife). 56 fathoms. 1 immature ♂; Umkomaas River NW. by W. $\frac{1}{2}$ W., distant 5 miles (Natal). 40 fathoms. 1 juv. ♂, 3 ovigerous ♀♀, 1 juv.; Rockland Point NW. $\frac{1}{4}$ N., distant 2 miles (False Bay). 1 ovigerous ♀, 1 juv.; 33° 53' S., 25° 51' E. (Algoa Bay). 26 fathoms. 1 ovigerous ♀; Seal Islands SW. $\frac{1}{2}$ S., distant 1 mile (False Bay). 11 fathoms. 2 ovigerous ♀♀; Bakkoven Rock NW. by W., distant 2 miles (False Bay). 24 fathoms. 1 ovigerous ♀; Tugela River N. by W. $\frac{3}{4}$ W., distant 15 miles (Natal). 40 fathoms. 2 juv. s.s. "Pieter Faure." 14/11/98, 31/12/00, 8/6/00, 6/12/98, 12/11/02, 11/11/02, and 10/1/01. (S.A.M. Nos. A3891, A4077, A4079, A4080, A4084, A4178–9 respectively.)

CRYPTONISCAN PARASITE.

On one of the specimens A4084 were found 2 Cryptoniscan larvae, which may be referable to the genus *Clypeoniscus* (see p. 431), but as no female was present their correct identification remains uncertain.

Eyes absent. Basal joint of antenna 1 with 6-8 teeth. Antenna 2-5-jointed. Side-plates tectinate. Peraeopods as in *Clypeoniscus*.

FAMILY CYMOTHOIDAE.

For references see Stebbing, S.A. Crust. pt. 1, p. 55 ; and Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 371.

GEN. CYMOTHOA Fabr.

1793. *Cymothoa* Fabricius, Entomol. Syst. vol. 2, p. 503.
1884. „ Schiödte & Meinert, Naturh. Tidsskr. ser. 3, vol. 14,
p. 223.
1903. „ Lanchester, Proc. Zool. Soc. Lond. 1902, pt. 2, p. 377.
1905. „ Richardson, Bull. U.S. Nat. Mus. No. 54, p. 247.

CYMOTHOA BORBONICA Sch. & Mein.

1884. *Cymothoa borbonica* Schiödte & Meinert, l.c. p. 282, pl. 10, figs.
7-10.
1904. „ „ Stebbing, in Gardiner's Fauna Mald. &
Lacc. Arch. vol. 2, pt. 3, p. 709.

A single specimen answering to the description and figures of Schiödte & Meinert.

Length : 27 mm. ; *breadth* : 11 mm.

Colour : In spirit, uniform yellowish.

Locality : Durban. 1 ♀. s.s. "Pieter Faure." 14/2/01. (S.A.M. No. 15097.)

Geogr. Distribution : Isle of Bourbon (Schiödte & Meinert) ; Maldives, from gills of a parrot-fish (Stebbing).

GEN. LIVONECA Leach.

1818. *Livoneca* Leach, Dict. Sci. Nat. vol. 12, p. 351.
1884. „ Schiödte & Meinert, l.c. p. 340.
1892. „ Kölbel, Ann. Naturh. Hofmus. vol. 7, No. 3, p. 105.
1905. „ Richardson, Proc. U.S. Nat. Mus. vol. 29 [1906], p. 445.
1909. „ id. ibid. vol. 37 [1910] p. 87.
1910. „ id. Wash. Bur. Fish. Doc. 736, p. 23.
1911. „ id. Bull. Mus. d'Hist. Nat. 1911, No. 7, p. 526.
1912. „ id. Proc. U.S. Nat. Mus. vol. 42, p. 173.

LIVONECA RAYNAUDI M. Edw.

1840. *Livoneca raynaudii* M. Edwards, Hist. Nat. Crust. vol. 3, p. 262.
 1846. „ *novæ-zealandiæ* White, List Crust. Brit. Mus. p. 106
 (descr. nulla).
 1884. „ *raynaudii* Schiödte & Meinert, l.c. p. 367, pl. 15, figs.
 9-13.
 1901. „ „ Whitelegge, Sci. Res. "Thetis," pt. 3, p. 236.
 1910. „ „ Stebbing, Gen. Cat. S.A. Crust. p. 425.

An adult ♂ and ♀ and an immature specimen were taken from the mouth and gills of a Sucker-fish (*Chorisochismus dentex* Pall.) caught at low-water near Cape Town. Both ♂ and ♀ are quite symmetrical.

Length : ♂ 18 mm., ♀ 30 mm. (S.A.M. No. A2856.)

Geogr. Distribution : Cape of Good Hope (M. Edwards); New Zealand, Tasmania, Japan (Schiödte & Meinert); New South Wales, 32-78 fathoms (Whitelegge).

FAMILY SPHAEROMIDAE.

For references see Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 374, and add :

1909. Chilton, Subantarctic Is. N. Zealand Crust. p. 653.
 1910. Richardson, Wash. Bur. Fish. Doc. 736, p. 30.
 1914. Stebbing, Proc. Zool. Soc. Lond. 1914, pp. 351 and 944.

GROUP HEMIBRANCHIATAE.

GEN. SPHAEROMA Bosc.

1802. *Sphaeroma* Bosc. Hist. Nat. Crust. vol. 2, p. 182.
 1908. „ Stebbing, S.A. Crust. pt. 4, p. 49.
 1909. „ Budde-lund, in Völtzkow, Reise in Ost-Afrika, vol. 2,
 pt. 4, p. 303.
 1910. „ Richardson, Proc. U.S. Nat. Mus. vol. 38 [1911], p. 81.
 1911. „ Stebbing, Rec. Ind. Mus. vol. 6, pt. 4, p. 181.

SPHAEROMA TEREBRANS Bate.

1866. *Sphaeroma terebrans* Bate, Ann. Mag. Nat. Hist. (3), vol. 17,
 p. 28, pl. 2, fig. 5.
 1866. „ *vastator* id. ibid. p. 28, pl. 2, fig. 4.
 1897. „ *destructor* Richardson, Proc. Biol. Soc. Wash. vol. 2,
 p. 105, text-figs.

1904. *Sphaeroma terebrans* Stebbing, Spolia Zeylan. vol. 2, pt. 5,
p. 16, pl. 4.
1905. „ *destructor* Richardson, Bull. U.S. Nat. Mus. no. 54,
p. 282, figs. 294–298.
1908. „ *terebrans* Stebbing, c. p. 49.

Two specimens were kindly given to me by Mr. E. C. Chubb, the Curator of the Durban Museum, who had obtained a goodly number at Isipingo on the Natal coast.

The following points may be noted as bearing on the question of the above synonymy and the difference of opinion between the different authorities: in the smaller (σ) specimen, measuring 9 mm., there are indications of a transverse ridge on the 2nd and 3rd peraeon segments, and a strong ridge on the 4th, but not so prominent as in the Ceylon specimens; there are 4 distinct series of tubercles on peraeon segments 5–7 and the anterior fused portion of the pleon, the 2 submedian tubercles on the telson are flanked on either side by a tubercle and *the whole surface of the telson is irregularly granular*.

In the other (ρ) specimen, measuring 10 mm., only the 4th and 5th peraeon segments have transverse ridges, the 6th and 7th segments with 4 tubercles each. The two submedian tubercles on the 5th segment in the σ and the 6th in the ρ are transversely elongate, not circular, as if they were in process of forming a transverse ridge or represented the remains of a former complete ridge. The anterior part of the pleon in the ρ is crushed, but the telson is similar to that of the σ .

A larger series would probably show a greater amount of variation, but the above two specimens are enough, it seems to me, to break the force of Miss Richardson's arguments that *destructor* is a valid species. The granulated telson of the present specimens is exactly represented in Richardson's (1905) fig. 297 of the telson, and the description, "tuberculated with low but distinct tubercles, each one surmounted by a small tuft of stiff hairs or bristles," is surely applicable to Stebbing's figure of the Ceylon specimens. As Stebbing remarks, the coating of dirt obscures the structure, and in cleaning this off the hairs are almost certain to disappear to a large extent.

Moreover the sides of the telson are stated to be incurved in Stebbing's specimens but straight in the Florida specimens. Here again it is difficult to see any difference between the figures of the respective specimens except that in the latter the apex is a little more broadly rounded, but the sides appear to be equally incurved.

As regards the serrations on the outer ramus of the uropods, the

present ♀ specimen has 4, the ♂ only 3, not counting the apical one. This therefore is also a variable feature.

The epistome has not yet been described by either author. In the present specimens it is triangular, nearly equilateral, the greatest width across the arms being about equal to the lateral margin, which is slightly emarginate, the upper lip is not sunk in so far as to reach the middle of the epistome, the apex is bluntly rounded and the surface granular and rugulose.

Male stylet on pleopod 2 not developed.

Both specimens were infested with *Iais pubescens* (Dana).

SPHAEROMA WALKERI Stebb.

1905. *Sphaeroma walkeri* Stebbing in Herdman's Ceylon Pearl Fish. Suppl. Rep. 23, p. 31, pl. 7.
 1910. „ „ id. J. Linn. Soc. Lond. vol. 31, p. 220.
 1917. „ „ id. Ann. Durb. Mus. vol. 1, pt. 5, p. 444, pl. 23.

These specimens correspond with Stebbing's Ceylon specimens. Flagellum of antenna 1 ca. 10-jointed, that of antenna 2 12-16-jointed, with the basal joints more strongly setose than in Stebbing's figure, especially in the ♂. The raised rim around the telsonic apex is very well marked.

Pleopod 2 in ♂ with stylet half as long again as inner ramus, scarcely tapering, apex blunt. Male appendages on 7th peraeon segment close together but not contiguous, stout, apically blunt. Outer ramus of uropod with 4-6 teeth, not counting the apical tooth, 5 being the usual number.

Length : 7 mm.

Colour : Mottled grey on a lighter ground, the base of the telson usually free from markings.

Locality : Durban, July, 1915 (H. W. Bell-Marley). 2 ♂♂, 4 juv.; Durban, 5 fathoms. 1/5/17 (H. W. Bell-Marley). ♂♂ and ♀♀. (S.A.M. Nos. A3847 and A4575.)

Geogr. Distribution : Ceylon and Suez (Stebbing).

On one of the adults a specimen of *Iais pubescens* (Dana) was found.

GEN. ZUZARA Leach.

1818. *Zuzara* Leach, Dict. Sci. Nat. vol. 12, pp. 341, 344.
 1840 „ M. Edwards, Hist. Nat. Crust. vol. 3, p. 211.

1874. *Cyclura* Stebbing, J. Linn. Soc. Lond. vol. 12, p. 146 (nom. preocc.).
1878. *Cycloidura* id. Ann. Mag. Nat. Hist. (5), vol. 1, p. 36.
1905. *Zuzara* Hansen, Q. J. Micros. Sci. vol. 49, pt. 1, pp. 103, 104, 119.
1906. „ Richardson, Proc. U.S. Nat. Mus. vol. 31 [1907], p. 12.
1910. *Cycloidura* Stebbing, Gen. Cat. S.A. Crust. p. 431.
1910. *Zuzara* Baker, Tr. Roy. Soc. S. Austral. vol. 34, p. 83.
1914. *Cycloidura* Vanhöffen, Deutsche Südpol. Exp. vol. 15, pt. 4, p. 511.

Vanhöffen in the paper cited has discussed *C. perforata* and *Stimpsoni*, retaining them in the genus *Cycloidura*. In the same year I instituted the genus *Parisocladus* for these two species. As I have not been able to consult Vanhöffen's paper, the discussion as to the correct genus for these same species must be postponed.

ZUZARA FURCIFER n. sp.

(Plate XV. Figs. 26, 27.)

Male.—Body non-setose, minutely granulate, chiefly on the posterior margins of the peraeon segments. Head with a small median tubercle on the anterior margin, flanked on either side by 3 other inconspicuous tubercles. Peraeon smooth, 7th segment with a long median process reaching back to $\frac{3}{4}$ length of the telson, apically bifid. Two tubercles on the posterior margin of the lateral portions of 7th segment. Side-plates nearly vertical, 2-5 not greatly narrowed below, postero-inferior angles subacute, a low keel at the junctions of segments 5-7 with their side-plates.

Pleon segments 2-4 distinct though closely fused. Telson convex, 2 pairs of small tubercles near the base, 2 more pairs a little beyond the middle and more widely separated, apex ending in a projection with a rounded notch on either side. The points bounding these notches as well as the median projection apically blunt. The latter is about $\frac{1}{3}$ length of the process on the 7th peraeon segment, and bears a small tubercle on its upper surface at the base and is raised some little way above the lateral points, so that there is a distinct ventral groove.

Antenna 1 reaching to end of 1st peraeon segment, 1st joint twice as long as broad, 2nd $\frac{1}{3}$ length of 1st, flagellum equal to peduncle, 10-jointed.

Antenna 2 reaching to end of 3rd peraeon segment, 5th joint a trifle longer than 4th, flagellum equal to peduncle, 11-jointed.

Epistome tapering proximally to a subacute apex, lateral margins concave.

Maxilliped, 4th-6th joints lobed, inner plate with 1 coupling-hook.

Peraeopod 1, inner apex of 4th and 5th joints with 1, of 6th with 2, stout apically bifid spines, inner margin of finger denticulate, secondary unguis and seta well developed. Outer margin of 3rd joint of peraeopods 2-7 with a few rather long setae. Inner margin of 4th-6th joints of all the peraeopods furry, less so on 6th joint of peraeopod 7.

Male appendages on 7th peraeon segment fairly stout, apically blunt, their distance apart equal to the width of one of them.

Pleopods 1-3 with 4-hooked setae on inner apex of peduncle. Male stylet on pleopod 2 nearly twice length of ramus, tapering evenly.

Pleopods 3-5 with 2-jointed outer ramus. Outer margin of outer ramus of 4th and outer margins of both rami of 5th pleopod with short regularly spaced setae.

Uropods large, lamellate in ♂, inner ramus reaching just beyond apex of telsonic process, outer ramus a little further beyond that, both rami ovate, margins entire and non-setose.

Length: 5.75 mm.; *breadth* (across peraeon segment 7): 3 mm.

Colour: Uniform greyish-white.

Locality: Port Elizabeth. January, 1915. (Mrs. T. V. Paterson.)

1 ♂. (S.A.M. No. A3084.)

GEN. CYMODOCE Leach.

1814. *Cymodoce* Leach, Edinb. Encycl. vol. 7, p. 433.

1914. ,, Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 386
(references).

This genus is very well represented in South African waters, no fewer than 10 species having been recorded; the present paper adds 6 more. The value of the new material lies in the fact that in 4 cases the ♂ and ♀ could be definitely correlated. The specimens were taken out of galleries and borings in sponges, as a rule only one ♂ and one ovigerous ♀ inhabiting each burrow. This is an exceedingly valuable method of collecting and the sponges obtained on any expedition should be thoroughly examined. Unless the ♂ and ♀ are found together, it is next to impossible to correlate the sexes with any certainty.

For this reason it is greatly to be regretted that a fine ♂ of *Cilicæa latreillei* Leach was found in a burrow unaccompanied by its ♀. The sponge was a globular form of the genus *Hircinia*, and contained a spherical chamber about 1½ inches in diameter with an opening to

the exterior only just wide enough to accommodate the crustacean ($\frac{1}{2}$ inch). It would be interesting if experiments could be instituted, say with some of the common European species of *Cymodoce*, to discover if these "dwellings" are constructed as a normal means of protection, or only by a pair for the special purpose of hatching a brood in safety.

To be determined also is the manner in which they are made, for they are undoubtedly made by the crustaceans themselves. In the above case, moreover, the dwelling was made deliberately, not a mere taking advantage of a chance crevice or hollow in the sponge.

White has described a *Sphaeroma spongiosum* which, according to Hansen, has been assigned to *Cymodoce* in the British Museum collection by Miers. The species comes from Australia and presumably was found inhabiting sponges, but I have not been able to consult the original description.

CYMODECE SETULOSA (Stebb.).

1902. *Exosphaeroma setulosa* Stebbing, S.A. Crust. pt. 2, p. 68, pl. 12B.

1914. *Cymodoce setulosa* Barnard, l.c. p. 389.

In 1914 I expressed the opinion that this "species" could not be regarded as the ♀ of *valida*, as Hansen thought, on account of there being other ♀ specimens more in accordance with the ♂ of *valida*. I have since been able to examine 2 co-types of *setulosa* received back from Stebbing. One of them is a ♂ having the appendages on the 7th peraeon segment well developed and the stylet on pleopod 2 also quite distinct though not separated from the ramus. Evidently therefore the specimen is nearly full grown and probably no great change would occur in the ornamentation after the final moult. *C. setulosa* must consequently be regarded as a perfectly good species, the diagnostic features being as mentioned by Stebbing and founded on a ♂ specimen.

The other specimen is smaller and may be either ♂ or ♀ as far as one can tell. It does not help much in deciding what are the characters of the ♀.

CYMODECE TUBERCULOSA Stebb. var. TRIPARTITA Rich.

(Plate XV. Fig. 28.)

1873. *Cymodoce tuberculosa* Stebbing, Ann. Mag. Nat. Hist. (4), vol. 12, p. 95, pl. 3, fig. 1.

1902. " " Whitelegge, Sci. Res. "Thetis," pt. 4, p. 258, fig. 28 (maxilliped).

1908. *Cymodoce tuberculosa*, Baker, Tr. Roy. Soc. S. Austral. vol. 32,
p. 140, pl. 3, figs. 12-15.
1910. " " id. ibid. vol. 34, p. 76, pl. 21, figs. 1-20.
1910. " " var. *bispinosa* id. ibid. p. 78, pl. 21,
figs. 21-23, pl. 22,
figs. 1-7.
1910. " *tripartita* Richardson, Wash. Bur. Fish. Doc. 736,
p. 29, fig. 27.

For the sake of comparison the following description may first be given.

Male.—Body strongly convex, nearly parallel-sided, minutely granular, setulose, more especially laterally. Head with the anterior margin rounded and minutely denticulate, median process prominent, completely separating the 1st antennae and meeting the epistome, with a small knob, sometimes bifid, on its upper surface. Head and 1st peraeon segment without additional sculpturing. Segments 2-6 each with 2 transverse rows of small tubercles; segment 7 also with 2 rows, but the rows not so distinctly separated from one another; tubercles larger on segments 6 and 7 than on the others.

Pleon segment 4 with 2 *widely separated*, pointed processes, curving slightly inwards and downwards and reaching to just beyond the middle of telson, both inner and outer margins fringed with stiff setae; lateral portion of segment 4 also with a fringe of stiff setae on hind margin.

Telson broader than long, surface covered with granules which are rather larger than those on the rest of the body, in the middle 2 submedian white upstanding glabrous tubercles, somewhat chisel-shaped; apex deeply notched, the lateral lobes bifid and reaching a little beyond the narrowly rounded, entire median lobe; all the lobes with long setae, distal margin with a small tooth just internal to the insertion of the uropods.

Antenna 1, 1st joint with 5 marginal teeth, increasing in size distally, another rather larger tooth immediately ventral to the 1st tooth, flagellum 6-jointed.

Antenna 2, 4th and 5th joints with several long setae on outer margin, flagellum ca. 10-jointed.

Epistome with the process obscurely bifid, or sometimes with indications of 4 teeth.

Maxilliped as figured by Whitelegge.

Male appendages on 7th peraeon segment close together, elongate, slender, tapering to acute apices.

Pleopod 2 as figured by Baker.

Pleopod 3, outer ramus with a distinct though incomplete transverse suture.

Pleopod 4, 2nd joint of outer ramus with 1 plumose seta on apex.

Pleopod 5 with the usual squamose patches on outer apex.

Uropod, outer ramus reaching very little, inner ramus very far, beyond telsonic apex, the former deeply bifid, the latter with the 3 little curved teeth on the apex as described by Baker (1908).

Length: 5 mm.; *breadth*: 2.5 mm.

Colour: In spirit yellowish.

Locality: Umhloti River N. by W. $\frac{1}{2}$ W., distant 8 miles. 40 fathoms. 1 ♂; Umkomaas River NW. by W. $\frac{1}{2}$ W., distant 5 miles. 40 fathoms. 7 ♀♀; Port Shepstone N., distant 8 miles. 36 fathoms. 1 ♂. s.s. "Pieter Faure." 18/12/00, 31/12/00 and 14/3/01. (S.A.M. Nos. A4155-6-7 respectively.) In each case found inhabiting siliceous sponges.

Geogr. Distribution: Australia (Stebbing: *tuberculosa*); New South Wales, 25-50 fathoms (Whitelegge); South Australia, in sponges (Baker: *tuberculosa* and var. *bispinosa*); Philippine Islands, inside a pearl oyster (Richardson: *tripartita*).

From the above description it will be seen that the South African specimens belong to the form described by Miss Richardson as *tripartita*. The similarities are the *widely* separated processes on pleon segment 4, and the additional tooth on the lower margin of 1st joint of 1st antenna. The fact that in some of the specimens there are indications of 4, though in most cases only of 2, teeth on the epistomial ridge shows the variability of this feature and consequently its unimportance. With regard to differences, these specimens lack the 2 larger granules on the inner ramus of the uropod, the inner ramus and the processes of the 4th pleon segment are considerably longer, and the median lobe of the telson is distinctly separated from the lateral lobes.

The last three differences might well be ascribed to differences in age; judging from the figure the Philippine specimens were about 3.5 mm. in length, as against 5 mm. in the present examples. A comparison with the figure of *tripartita* leaves little doubt that the Philippine specimens are merely a younger stage.

It may be noted that, whereas the figure is labelled "male" and the description corresponds with the figure, it is stated that "two males and two females were collected" without any indication whether the females resembled the males or, if not, in what respects they differed.

There remains the further question of the relationship of this form

to Baker's var. *bispinosa*. The differences lie in the extra tooth on the 1st joint of the 1st antenna, the bifid lateral lobes of the telsonic apex, and the less widely separated processes on pleon segment 4. None of these appear to me to be sufficiently important as specific characters to separate *tripartita* from *tuberculosa*. But I have thought it useful to retain the former name as a varietal name to indicate the difference in position of the processes, which is the most noticeable feature.

It seems quite possible, even probable, that when a larger series is available the typical form will be found to be the not fully adult stage of *bispinosa*, in spite of Baker's opinion. The only valid variety will then be *tripartita*.

CYMODECE JAPONICA Rich. var. NATALENSIS n.

(Plate XVI. Figs. 1, 2.)

1906. *Cymodoce japonica*, Richardson, Proc. U.S. Nat. Mus. vol. 31
[1907], p. 7, fig. 11 (male).
1906. „ *affinis*, id. ibid. p. 11, fig. 15 (female).
1910. „ *japonica* id. ibid. vol. 37, p. 92.
1910. „ „ id. Wash. Bur. Fish. Doc. 736, p. 28.
1910. „ „ Thielemann, Abh. Bay. Ak. Wiss. II, Suppl.
Bd. 3 Abh. p. 53, figs. 48-51.

Besides *C. japonica* and *C. affinis* Miss Richardson is also the authoress of *C. acuta* (1904, Proc. U.S. Nat. Mus. vol. 27, p. 38, figs. 8-10, Japan), and has had the opportunity of comparing the actual specimens. When uniting *affinis* with *japonica* in 1910 Miss Richardson expressed the opinion that *acuta*, though very much like the ♀ of *japonica* (i.e. *affinis*), is the ♀ of an unknown ♂ probably similar to *japonica*.

Were it not for this expression of opinion, I should unhesitatingly have made both *japonica* and *affinis* synonyms of the earlier *acuta*. From the figures and descriptions no differences can be observed between *acuta* and *affinis* except the presence of 2 points on the 4th pleon segment in the former and their absence in the latter. These, however, may have been so poorly developed as to have been overlooked (*cf.* remarks by Thielemann, l.c. p. 56).

C. acuta is about 10 mm. in length, *affinis* and *japonica* 17½ mm. A "small specimen" of a ♂ is doubtfully referred to this species (1910, l.c. p. 92), distinguished by longer uropods and the *thick* (*sic*) hairs on the body.

In comparison with these the South African specimens are almost

dwarfs, the ♂ measuring only 6.5 mm. The body is thickly clothed all over with *longish* hairs, the telson being more sparsely covered than the rest; the young ♂ and the ♀ are glabrous except for a few short hairs, mostly on the lateral margins.

In the adult ♂ the anterior pair of tubercles on the telson are larger than represented in the figure of *japonica*, transversely oval, and when the body is unrolled fit closely against the pair on the 4th pleon segment, the adjacent margins of the respective tubercles being straight. The posterior tubercles on the telson are flat-topped and setiferous. Telsonic apex and the median lobe broader than in Richardson's figure. Uropod with both rami projecting beyond the telsonic apex. Maxilliped with the lobes on 5th-7th joints very elongate and narrow, as in *C. tuberculosa* Stebb. Male appendages on 7th peraeon segment close together, long and slender. Male stylet on 2nd pleopod half as long again as ramus, slightly tapering, apex subacute.

Ovigerous ♀ with the telson apically blunter than in the figure of *affinis*, and the inner ramus of uropod reaching a little beyond telsonic apex. Both rami of uropod apically blunt. The 2 tubercles on 4th pleon segment as well as those on the telson small but distinct. Mouth-parts modified.

Immature ♂ resembling the ♀ but with the tubercles a little more strongly developed.

In other respects the specimens agree with Richardson's descriptions, so that apart from the smaller size and the relative lengths of the telson and uropods in both sexes there are no very marked characters separating the South African from the Japanese specimens.

A further comparison may also be instituted with *C. bicarinata* Stebb. (1904, Gardiner's Fauna Mald. & Lacc. Archip. vol. 2, pt. 3, p. 712, pl. 52B, and 1905, Herdman's Ceylon Pearl Fish. Suppl. Rep. 23, p. 42, pl. 10c). In size there is scarcely any difference. The apex of the telson, at least in the Ceylon specimen, closely resembles that of the Natal specimens. The differences are as follows: *bicarinata* has 2 distinct longitudinal keels on the telson, ending in bosses, and a median swelling at the base of the median lobe, and also lacks the distinct tubercles on the 4th pleon segment and at base of telson; whereas in the Natal specimens the telson can scarcely be said to be keeled, there is no swelling at the base of the median lobe, and the 2 anterior pairs of tubercles are very distinct and characteristic. Further the lobes of the distal joints of the maxilliped are much more elongate in our specimens than in the figures of *bicarinata*.

Both *bicarinata* and *japonica* are stated to be very closely allied to *C. pilosa* M. Edw. (1840, Hist. Nat. Crust. vol. 3, p. 213), and the question arises whether it would be better to "lump" all the forms together, with or without varietal names for the local forms, or to separate them under distinctive names. At present, however, the published information about all the forms is inadequate; for instance, neither Richardson nor Thielemann have described the maxilliped in *japonica*. It is on the form of the maxilliped and the presence of the *four* tubercles on the telson that I have relied in assigning the Natal specimens to *japonica* rather than to *bicarinata*. The variety is characterised by the *anterior* pair on the telson being *stronger* than the posterior pair.

Length: ♂ 6.5 mm., ♀ 5.5 mm.; *breadth*: ♂ and ♀ 3 mm.

Colour: In spirit yellowish, the tubercles in the adult ♂ white.

Locality: Umkomaas River N.W. by W. $\frac{1}{2}$ W., distant 5 miles (Natal). 40 fathoms. 1 adult and 1 immature ♂, 1 ovigerous ♀, in sponges. s.s. "Pieter Faure." 31/12/00. (S.A.M. No. A4160.)

Geogr. Distribution: Japan and Korea, surface, 59 and 846 fathoms (Richardson); Philippine Islands (Richardson); Japan (Thielemann).

C. bicarinata has been recorded from the Maldivé Archipelago and Ceylon; *C. pilosa* from the Mediterranean.

CYMODOCE CRYPTODOMA n. sp.

(Plate XVI. Figs. 6, 7.)

Body strongly convex, parallel-sided, minutely granulose, more especially posteriorly, sparsely setulose, the setae mostly developed on the lateral and posterior portions. Head with anterior margin rounded, with a small triangular median point. Head and anterior peraeon segments without additional sculpturing. Peraeon segments 6 and 7 with two transverse rows of small conical tubercles.

Pleon segment 4 entire.

Telson in ♂ with 2 submedian broad ridges or longitudinally elongated bosses, both posteriorly truncate with the margins so formed denticulate, dorsally with a median moderately sharp keel, feebly denticulate, setose and in profile convex, following the curve of the telson; in ♀ with 2 low rounded submedian bosses; apex deeply notched in ♂, the median lobe reaching the same level as the lateral lobes, a semicircular row of granules just anterior to the base of the median lobe, distal margin minutely denticulate; in ♀ apex feebly notched, the median lobe scarcely or not projecting beyond the lateral lobes, distal margin not denticulate.

The granulose sculpturing everywhere much less distinct in the ♀ than in the ♂.

Flagella of 1st and 2nd antennae respectively 7- and 10-jointed.

Male appendages on 7th peraeon segment close together, stout, apically subacute.

Pleopods 1-3, peduncle with 3-hooked setae; male stylet on 2nd half as long again as ramus, tapering very little, apex blunt, both margins minutely spinulose all along.

Uropod in ♂, outer ramus ovate, apex acute, outer margin with 1-2 obscure teeth, inner margin with 3 distinct teeth, inner ramus extending well beyond telsonic apex, ovate-lanceolate, apex acute, outer margin denticulate, both margins of both rami setulose; in ♀ outer ramus short, ovate, apically acute, inner margin with 2 denticles, inner ramus reaching to telsonic apex, oblong, apically truncate, outer distal angle subacute, distal margin obscurely crenulate.

Length: ♂ and ♀ 6.5 mm.; *breadth*: 2.5 mm.

Colour: In spirit pinkish-white.

Locality: Umhloti River N. by W. $\frac{1}{2}$ W., distant 8 miles. (Natal.) 40 fathoms. 1 ♂, 4 ♀ ♀, in sponges. s.s. "Pieter Faure." 18/12/00. (S.A.M. No. A4158.)

CYMODOCE TETRATHELE n. sp.

(Plate XVI. Fig. 3.)

Male.—Body strongly convex, nearly parallel-sided, minutely granular and densely covered on the head, anterior peraeon segments and telson with short setae, posterior peraeon and anterior pleon segments comparatively free from setae, these being present mainly on the lateral portions. Head with anterior margin rather strongly angular, minutely granular just above insertion of 1st antennae, with a minute median point. Head and anterior peraeon segments without additional sculpturing. Segment 5 with 2 more or less distinct transverse rows of tubercles; segments 6 and 7 with 2 distinct rows of tubercles, though on segment 7 the 2 rows are not so clearly separated.

Pleon segment 4 with 2 more or less distinct transverse rows of granules.

Telson broader than long, with 2 transverse rows of minute white granules immediately behind the posterior margin of the 4th pleon segment, central portion raised into 2 submedian conical bosses, setose especially on the outer side, each with a pointed glabrous white apical tubercle; behind these bosses 2 contiguous white glabrous conical

tubercles; apex moderately deeply notched, the median lobe reaching about to the level of the lateral lobes.

Flagella of antennae 1 and 2 respectively 18- and 20-jointed.

Male appendages on 7th peraeon segment close together, tapering to subacute apices.

Pleopods 1-3, peduncle with 3-hooked setae; male stylet on 2nd half as long again as ramus, very slightly tapering, minutely spinulose all over, apex subacute.

Uropod, both rami extending well beyond telsonic apex, inner ramus subulate, apically acute, outer ramus narrow, a little shorter than inner, apically bifid, both rami setulose all over.

Length: 15 mm.; *breadth*: 8 mm.

Colour: In spirit yellowish.

Locality: 33° 9' S. 28° 3' E. (off East London). 47 fathoms. 2 ♂♂ in sponges. s.s. "Pieter Faure." 28/12/98. (S.A.M. No. A4159.)

CYMODOCE CAVICOLA n. sp.

(Plate XVI. Figs. 4, 5.)

Body in both sexes with very short and sparse setae, chiefly on the posterior part of the body, and more noticeable in the young than the adult; entire surface of head (including epistome and basal joints of 1st antennae), peraeon and pleon finely and closely pitted, the pits being most noticeable on the telson.

Head with moderate-sized median point. Peraeon segments, in addition to the pitting, each with a transverse band of small granules on the posterior margin, more distinct on the posterior segments than on the anterior ones, and not quite so noticeable in the ♀ as in the ♂.

Pleon segments 1-4 also with a few minute granules in addition to the pitting; segment 4 not produced or lobed.

Telson in ♂ with 2 submedian bosses in the centre, distal margin finely crenulate, apical notch rather wide, but shallow, median lobe triangular, extending as far as the lateral lobes, and, like them, terminating in a tiny point, the points on the lateral lobes curved outwards; in ♀ like that of the ♂ except that the distal margin is scarcely perceptibly crenulate and the apical lobes are blunt.

Antenna 1, basal joints entire, flagellum ca. 14-jointed.

Antenna 2, flagellum ca. 8-jointed.

Maxilliped, lobes on 5th-7th joints not greatly elongate. Mouth-parts in ♀ modified.

Peraeopod 1, spines on inner margin of 4th-6th joints respectively 2, 3 and 4.

Male appendages on 7th peraeon segment contiguous, moderately long, tapering to subacute apices.

Pleopods 1-3, peduncle with 3-hooked setae; male stylet on 2nd one-third as long again as ramus, not tapering much, apex blunt.

Uropod in ♂, inner ramus scarcely reaching level of telsonic apex, widest across the middle, outer margin therefore angular, apex narrowly truncate, outer distal margin crenulate, outer ramus very short, ovate, outer margin crenulate, upper surface of both rami pitted; in ♀ similar but outer apical angle of inner ramus more acute, and the crenulations on both rami less distinct.

Length: 14 mm.; *breadth*: 5.5 mm.

Colour: In spirit pinkish.

Locality: Rockland Point NW. $\frac{1}{4}$ W., distant 2 miles (False Bay). 23 fathoms. 1 ♂, 1 ovigerous ♀, and 1 juv., in a calcareous sponge. s.s. "Pieter Faure." 8/6/00. (S.A.M. No. A4162.)

CYMODOCE EXCAVANS n. sp.

(Plate XVI. Figs. 8, 9.)

Body covered all over with very short and thick pubescence. Head with a moderate-sized median point. Peraeon segments not sculptured. Pleon segments 1-4 also not sculptured, segment 4 not produced or lobed. Telson in ♂ with 2 submedian conical tubercles in the middle, apical notch deep, median lobe reaching to level of the lateral lobes, tapering to a narrowly rounded apex, apices of the lateral lobes blunt; in ♀ with only 2 barely discernible elevations in place of the tubercles, apical notch very shallow, all 3 lobes apically obtuse and of the same length.

Antenna 1, basal joints entire, flagellum ca. 10-jointed. Flagellum of antenna 2 ca. 12-jointed.

Maxilliped, lobes of 5th-7th joints rather elongate, but not so greatly as in *tuberculosa*.

Mouth-parts in ♀ modified.

Pereopod 1, spines on inner margin of 4th-6th joints respectively 4, 3 and 4.

Male appendages on 7th peraeon segment close together, short, apically acute.

Pleopods 1-3, peduncle with 3-hooked setae; male stylet on 2nd one-third as long again as ramus, apically subacute.

Uropod in ♂, outer ramus extending beyond telsonic apex, ovate-lanceolate, apex acute, outer distal margin crenulate, outer ramus extending to level of telsonic apex, ovate-lanceolate, apex acute, both

margins crenulate; in ♀ rami comparatively shorter than in ♂, inner ramus only just extending to telsonic apex, both rami more ovate.

Length: 10 mm.; *breadth*: 4.5 mm.

Colour: In spirit pinkish or yellowish.

Locality: Cape Hangklip N. by E., distant 12 miles (False Bay). 13 fathoms. 1 ♂ and 1 ovigerous ♀ in a gallery in a sponge; Rockland Point NW. $\frac{1}{4}$ W., distant 2 miles (False Bay). 23 fathoms. 1 ♂. s.s. "Pieter Faure." 19/11/03 and 8/6/00. (S.A.M. Nos. A4163 and A4174.)

GROUP EUBRANCHIATAE.

GEN. CYMODOCELLA Pfeffer.

1887. *Cymodocella* Pfeffer, Jahrb. Wiss. Anst. Hamb. vol. 4, pp. 18, 20, 69.

1914. „ Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 421 (references).

CYMODOCELLA CANCELLATA n. sp.

(Plate XVI. Figs. 10-14.)

Male.—Body without setae or pilosity, surface between the segments with very minute honeycombed reticulation. Head with anterior margin nearly straight, thickened, with a small projecting point separating 2 circular pits for the insertion of the 1st antennae, a transverse ridge between the eyes, obscurely quadrituberculate. In front of this ridge are 2 submedian tubercles and a median group of 3, of which the middle one is the largest; a tubercle on inner margin of eye and 2 submedian ones just above the front margin of head. Rest of the surface minutely granular. Eyes normal in size.

Peraeon segment 1 with antero-inferior angles reaching well forward, inferior margin thin; centre of segment with a transverse row of 6 large round-topped tubercles; posterior margin with a raised transverse ridge, swelling out into 10 rounded tubercles; rest of the surface irregularly granulate.

Peraeon segments 2-6 each with a raised transverse ridge across the centre, swelling out into 10 rounded tubercles, the outermost being just above the junction with side-plate; a more or less regular row of granules in front of and behind the ridge on each segment.

Peraeon segment 7 with a similar ridge forming the hind margin and somewhat projecting, especially the two submedian tubercles, anterior portion of the segment granular.

Side-plates deep, narrowing to a subacute apex, 6th somewhat blunter, the sutures with segments fairly well marked, each with a ridge which is a continuation of that on the segment, swelling out into a large rounded tubercle at the junction with the segment and thence narrowing to the apex.

Pleon granular, except the first segment, which is smooth, bilobed and partly concealed, suture of 2nd and 3rd segments not easily distinguished among the granules, posterior margin of 4th finely tuberculate, 2 submedian tubercles being more prominent than the rest; a large lateral round-topped tubercle and a smaller adjacent one appear to belong to the 4th segment and not to the telson, but the suture is difficult to trace.

Telson of the normal *Cymodocella* type, but with 2 large submedian apically acute projections; whole surface of telson deeply pitted, each projection with a large triangular pit on upper surface with several granules in it.

Antenna 1 inserted into a rounded pit on anterior margin of head, 1st and 2nd joints thickened and indurated, roughly quadrangular in section, 2nd nearly half length of 1st, 3rd shorter than 2nd, more slender and inserted at right angles to 2nd, flagellum a little more than twice length of 3rd joint, 6-jointed.

Antenna 2 longer than 1st, peduncular joints increasing in length, flagellum equal to peduncle, 9-jointed.

Epistome rather large, proximal end blunt, lateral margins gently concave; upper lip not projecting much from the arms of the epistome, distal margin setose.

Lower lip as in *C. sublevis* Brnrd. (l.c. pl. 36B).

Mandibles, cutting-edge obscurely bidentate, secondary cutting-edge in left only, bidentate, spine-row with 1 spine in left, 3 in right, molar strong, denticulate, palp slender with both 2nd and 3rd joints a little longer than 1st.

Maxilla 1 with 8 spines on outer plate and 3 plumose setae on inner.

Maxilla 2 with 8 spine-setae on outer and middle plates; inner plate setose with 2 stout plumose setae on inner distal margin.

Maxilliped with 4th-6th joints more produced internally than in the figure of that of *C. sublevis*.

Peraeopods similar to those of *sublevis*, but rather stouter, fur on margins of 4th-6th joints thicker, armature of the joints similar; peraeopod 2 not greatly longer or more slender than 1.

Male appendages on 7th peraeon segment contiguous at base, but slightly separated distally, stout, apically subacute and excavate on inner distal margin.

Pleopods 1-3, peduncle with 3 hooked setae; inner ramus in 1st and 2nd half as long again as outer; rami in 3rd subequal; male stylet on 2nd $2\frac{1}{2}$ times as long as ramus, apically enlarged into an ovate spatulate form, the inner margin with recurved serrations.

Uropods not reaching telsonic apex, inner ramus subtriangular, widening distally, distal margin excavate, outer ramus much smaller than inner, ovate, apically blunt.

Length: 5 mm.; *breadth*: 2.5 mm.

Colour: In spirit, whitish-brown, the tubercles and telsonic processes whiter than the rest.

Locality: Cove Rock NE. by E. $\frac{1}{2}$ E., distant 4 miles (off East London). 22 fathoms. 1 ♂. s.s. "Pieter Faure." 6/8/01. (S.A.M. No. A3831.)

This pretty species is named after the cancellate appearance of the sculpturing on the peraeon segments. A somewhat similar development of dorsal tubercles is found in two other South African Sphaeromids: *Exosphaeroma porrectum* Brnrd. and *Sphaeramene polytylotos* Brnrd.

GEN. CASSIDIAS Rich.

1916. *Cassidias* Richardson, Proc. U.S. Nat. Mus. vol. 31 [1907], p. 20.

1910. „ Thielemann, Abh. K. Bay. Ak. Wiss. II. Suppl. Bd. 3
Abh. p. 56.

1914. *Vallentinia* Stebbing, Proc. Zool. Soc. Lond. 1914, p. 351 (nom. preocc.).

1914. *Euvallentinia* id. ibid. p. 944.

In 1905 Hansen suggested that a new genus was necessary for Cunningham's *Cymodocea darwinii* and in 1914 Stebbing acted on this suggestion, apparently overlooking the fact that Miss Richardson had already in 1906 instituted a suitable genus, and indeed had placed *C. darwinii* in it. This genus is *Cassidias*, of which the type-species is *C. argentinea* Rich.

Richardson's definition of the genus is as follows: "Mouth-parts of ♀ metamorphosed. Seventh segment of thorax not produced backwards in any process. Abdomen composed of 2 segments, the 1st of which is not produced backward in a median process. Terminal abdominal segment with a narrow notch, which is sometimes concealed dorsally, but a groove is formed beneath by the infolding of the margins. Both branches of the 4th pair of pleopods are similar, fleshy, with transverse folds and without marginal setae. The exopod of the 3rd pleopod is 2-jointed. The branches of the uropods are similar, the outer one being capable of folding under the inner one."

It must be noted that this definition is based on the female only; for the sexual differences one must turn to *C. darwinii*. Here the male seems to differ from the female in the greater development of the boss on the telson, the swelling of the lateral portions of the 5th peraeon segment, and the development of a tooth on the base of the hand of the 1st peraeopod (gnathopod).

Here a difficulty arises in regard to the present species. The sexual differences are very much more pronounced than in *C. darwinii*. In fact, the rudimentary character of the inner ramus of the uropods might even be thought to necessitate the erection of a new genus. And this may indeed become necessary in the future, but for the present I prefer to place the new species in the genus *Cassidias* because the male of the type-species remains unknown. Very probably when it is discovered it will be found to resemble that of *darwinii* more or less closely, and a new genus can then be made for the species described below.

In 1910 Thielemann described a third species—*C. trituberculata* from Japan. This also is known only from the female, and in the character of the telsonic apex differs rather conspicuously from the type-species. In other respects it seems to be a true *Cassidias*, the unmodified mouth-parts possibly being due, as Thielemann remarks, to immaturity. Nevertheless, when the male is discovered, it would not be surprising if it had to be removed to another genus.

Both *C. argentinea* and *darwinii* inhabit the southern portions of Southern America and the neighbouring islands.

CASSIDIAS AFRICANA n. sp.

(Plate XVI. Figs. 15–17.)

Body strongly convex, nearly parallel-sided, anteriorly (at least) almost smooth, glabrous. Head with anterior margin slightly angular, with a short blunt median process. Head and 1st peraeon segment minutely shagreened. Peraeon segments with the posterior margins becoming increasingly more granulose posteriorly, the granules on segments 5 and 6 being more or less distinctly segregated into 2 transverse rows. Each side-plate with a little tuft of soft setae.

Pleon segment 4 entire, its posterior margin granulose, the lateral sutures also marked with granules, one tuft of setae on the lateral portion of segment 4 and another submedianly.

Telson broader than long, surface granulose, the central portion in ♂ produced into a long, though stout, median process, apically sub-acute, reaching back considerably beyond the telsonic apex; in ♀ a similar though very much smaller process, not nearly reaching the

telsonic apex; distal margin in ♂ minutely serrulate, apex with a simple narrow slit similar in both sexes.

The ♂ is everywhere more strongly granulose than the ♀.

Antenna 1, 1st joint stout, anterior apex not produced along 2nd joint, flagellum ca. 8-jointed.

Antenna 2, flagellum ca. 2-jointed.

Mouth-parts in ♀ modified. Maxilliped in ♂ with 4th–6th joints lobed.

Peraeopods with a few pectinate spines on inner margins of 4th–6th joints, these joints also minutely setulose on inner margins, but not furry.

Male appendages on 7th peraeon segment short, stout and apically blunt, their distance apart equal to the width of one of them.

Pleopod 1, peduncle very broad, inner apex with 3 hooked setae; inner ramus much broader than long, triangular, outer ramus longer than broad, oblong, apically truncate.

Pleopod 2 similar to 1st, male stylet inserted near the apex of inner ramus, equal in length to the ramus, consequently extending considerably beyond the ramus, rather stout, apically blunt.

Pleopod 3 similar, but inner ramus larger, outer ramus 2-jointed.

Pleopods 4 and 5, both rami with strong transverse folds, outer margin of outer ramus of 4th pleopod with fine setules.

Uropod in ♂ with the inner ramus reduced to a mere point on the peduncle, outer ramus elongate, stout, cylindrical, but flattened on the inner surface and widening distally, rather strongly granulose, especially distally, where 2–3 of the granules are like little teeth projecting inwards, setose chiefly on the outer distal margin; in ♀ the rami not altered, inner ramus oblong, outer ramus rather smaller, ovate, both rami apically truncate, with their margins sparsely setulose.

Length: ♂ 5.5 mm., ♀ 5 mm.; *breadth*: ♂ 2.5 mm., ♀ 2 mm.

Colour: In spirit, yellowish.

Locality: Umkomaas River NW. by W. $\frac{1}{2}$ W., distant 5 miles. 40 fathoms. 3 ♂♂, 6 ovigerous ♀♀; Tugela River N. by W. $\frac{3}{4}$ W., distant 15 miles. 40 fathoms. 2 ♂♂, 2 ♀♀. s.s. "Pieter Faure." 31/12/00 and 10/1/01. In both cases living in sponges. (S.A.M. Nos. A4153 and A4154.)

GROUP PLATYBRANCHIATAE.

ARTOPOLES n. g.

Body elliptical, depressed, the margin ciliate. Head laterally enclosed by the 1st peraeon segment. Peraeon segment 7 not as

wide as segment 6 and not forming part of the lateral margins. Telson apically obtuse. Epistome produced forwards between the 1st antennae as a narrow spiniform process. 1st and 2nd joints of antenna 1 expanded. Maxilliped with 4th–6th joints inwardly produced, 7th joint neither long nor slender. Peraeopods normal, the anterior ones without natatory setae and with the 6th joint not enlarged, 4th joint of peraeopod 1 not produced. Inner ramus of pleopod 1 twice as long as broad. Outer ramus of pleopod 3 undivided. Uropod with peduncle and inner ramus fused, lamellate, outer ramus rudimentary, minute, tubercular.

This genus is closely allied to *Paracassidina* Baker, but differs in the 1st peraeopod and the narrow 7th peraeon segment. The degeneration of the outer ramus of the uropod has been carried further, and the antero-lateral angles of the 1st peraeon segment are more produced.

In general shape there is a striking though superficial likeness between the present species and the South Australian *Amphoroidella elliptica* Baker, belonging to the Eubranchiate group.

Wishing to dedicate this genus to Mr. W. H. Baker, who has very materially increased our knowledge of the South Australian Sphaeromids, and finding that with various suffixes the name is pre-occupied, I have taken the liberty of translating it into Greek.

ARTOPOLES NATALIS n. sp.

Female.—Body depressed, the central portion slightly convex, elliptical, the margins finely ciliate, dorsal surface minutely shagreened. Head embraced laterally by the 1st peraeon segment, anterior margin slightly arcuate with a small blunt median point. Eyes moderately prominent.

Peraeon segment 1 produced forwards laterally, where it is more than twice as long as in the centre. Segments 2–4 short dorsally and laterally; segment 5 considerably longer laterally than dorsally; segment 6 shorter laterally than segment 5, segment 7 not reaching the lateral margins.

Pleon segments 2–4 (the 1st is invisible) fused, only segment 2 reaching the lateral margins.

Telson basally forming part of the lateral margin, then rapidly narrowing to the broadly rounded, subtruncate apex, central portion slightly vaulted dorsally.

Epistome projecting forwards between the 1st antennae as a narrow spiniform process.

Antenna 1 with first 2 joints expanded, 1st longer than broad,

2nd as long as 1st on its anterior margin, the anterior (outer) margin longer than the inner, 3rd joint slender, extending as far as outer apex of 2nd, flagellum a trifle longer than 3rd peduncular joint, 5-jointed, with sensory setae.

Antenna 2 extending to end of 1st peraeon segment, 1st-3rd joints subequal, 4th and 5th slightly longer, subequal, flagellum subequal to peduncle, 7-8-jointed.

Mouth-parts normal. Maxilliped with 4-6 joints equally produced internally, 7th joint rather short and stout, almost obovate, apex rounded.

Peraeopods rather stout, subequal; peraeopods 1 and 2 similar, 1 a little stouter, with the 4th joint broader, outer apex of 4th with a very strong apically pectinate spine, inner apex of 4th and 5th in peraeopod 1 with a smaller pectinate spine, in peraeopod 2 with a seta, unguis strong, secondary unguis at apex of 7th joint tubercular; peraeopods 3 and 5, outer apex of 4th joint with a strong pectinate spine; peraeopod 4, apices of 4th and 5th joints with a strong pectinate spine; peraeopod 6 similarly armed, with 2 similar spines on each side of the median one on 5th joint; peraeopod similarly armed, but the median spine on 5th joint long, extending to apex of unguis and flanked with 4 spines, 5th joint relatively longer than in the preceding peraeopods; inner margins of 4th-6th joints in all the peraeopods smooth.

Pleopod 1, inner ramus twice as broad as long, outer margin concave, setae on both rami long.

Pleopods 2 and 3, outer ramus narrower than inner. Inner apex of peduncle in pleopods 1-3 with 3 hooked setae. Outer ramus of pleopod 3 undivided.

Pleopod 4, both rami thin, nonsetose, undivided.

Pleopod 5, rami thin, nonsetose, outer ramus divided, squamiferous processes not prominent.

Uropod, peduncle and inner ramus completely fused, lamellate, as long as telson, outer ramus a minute but distinct tubercle inserted in a notch quite near the base of the outer margin.

Length: 4 mm.; *breadth*: 3.25 mm.

Colour: Pale straw, with scattered irregular pigment-specks, eyes black.

Locality: Natal coast, 6 fathoms, off coral. 1 non-ovigerous ♀, 2 juv. (H. W. Bell-Marley), May, 1917. (S.A.M. No. A4566.)

This interesting form was received too late for figuring in the present paper.

TRIBE VALVIFERA.

This tribe contains two main families, the *Astacillidae* and *Idoteidae*, with two other families, the *Pseudidoteidae* and *Amesopodidae* intermediate in characters between them. The differences between these families consist in the shape of the body, the structure of the anterior peraeopods, the proportional size of the ramus of the uropod and the presence or absence of a second (rudimentary) ramus, the structure of the first pair of pleopods, and a feature to be mentioned below. As regards the first pleopods the *Idoteidae* have a short peduncle with soft, simple, unornamented rami; the *Astacillidae* have a long peduncle with the rami frequently transformed in shape and modified, and more or less strongly chitinised.

Of the intermediate families the *Pseudidoteidae* combine the Idoteid shape and anterior peraeopods with the Astacillid uropod and first pleopod; the same is true of the *Amesopodidae* except that the body-shape is intermediate and the character of the first pleopod is unknown.

Turning to the features distinguishing this tribe from all the others I may mention one which has not, so far as I am aware, been insisted on—the position of the opening of the vasa deferentia in the male. In Isopods generally (and in Amphipods) the vasa deferentia open on the *seventh peraeon* segment, either about the middle of the segment or on the posterior margin.

In the *Valvifera*, however, the openings have shifted on to the *first pleon* segment. The two positions can be well seen by comparing a Sphaeromid with an Idoteid.

Bate and Westwood (Brit. Sess. Crust. vol. 2, pp. 368, 380) quite correctly describe the *position* of the male-stylets (through which the vasa deferentia open) in *Arcturus longicornis* and (with figure) *Idotea tricuspidata* (= *baltica*). On the other hand Gerstaecker (Bronn's Thierreich, Bd. 5, Abt. 2, p. 101) does not mention specially for the *Valvifera* the position of the openings of the vasa deferentia in the text, but figures them for *Idotea* (*Mesidotea*) *entomon* on the first pleon segment (pl. 4, fig. 12). Sars represents the male-stylets of *Idotea baltica* as on the seventh peraeon segment (pl. 32).

In all the examples of *Valvifera* that I have examined the male-stylets open on the *first pleon* segment, although I have been guilty of carelessness in this respect in my recent descriptions of South African *Valvifera*.

So much for the *position* of the openings of the vasa deferentia. In the majority of Isopods they do not open flush with the ventral surface

but at the apices of two processes called penes—penial filaments or male-stylets. Gerstaecker (l.c. p. 102) gives *Idotea* and *Aega* as examples in which such processes are absent, and his figure of *I. entomon* supports this. But this is certainly wrong for *Idotea*, unless *I. entomon* is an exception, for in all the species of *Idoteidae* which I have examined (all those recorded from South Africa and Plymouth) these processes are very evident. As can be seen by dissection they are traversed by the vasa deferentia.

Thus it may be stated that in the *Valvifera* the vasa deferentia open at the end of styliform processes on the first pleon segment.

But within the tribe the two main families are sharply divided by the fact that the processes are separate in the *Idoteidae** and united into a single process in the *Astacillidae*. At any rate this latter statement is correct for all the South African species, for *Astacilla longicornis*, *Arcturella danmonensis*, *A. dilatata*, *Arcturus baffini*, *Antarcturus antarcticus* and *A. meridionalis*. I am indebted to Dr. Calman for examining the last four species. Thus I am unable to understand Bate and Westwood's statement (l.c. p. 368) that in *A. longicornis* "there is a pair of minute organs terminated by two somewhat cultrate plates"; in the specimens I have examined there is only a single median process tapering slightly to a blunt apex.

Similarly when Koehler (Bull. Inst. oc. Monaco, No. 214, p. 18), describing the male of *Arcturoopsis senegalensis*, says: "entre les deux pleopodes [de la première paire] se trouve le double penis habituel," and again (l.c. p. 52) for *Astacilla mediterranea*, "le penis . . . a la forme habituelle," there must be some mistake in this author's observation. Calman also in 1909 (Lankester's Treatise Crust. p. 212) states that there is only the single penis in the *Arcturidae* (= *Astacillidae*).

The vasa deferentia still remain separate throughout their whole length and open by separate orifices at the apex of the fused processes. The coalescence of the two processes in the *Astacillidae* is most probably to be ascribed to the narrowing of the body.

Unfortunately the published accounts of *Amesopous richardsonae* Stebb. and *Pseudidotea bonnieri* Ohlin gave no indication of the character of the copulatory processes in these intermediate families. From the character of the first pleopod and the uropod in *P. bonnieri* I feel sure that there is a single median process; such is also probably the case in *A. richardsonae*, but of this one cannot be certain. On applying to Mr. Stebbing for light on this point, he very kindly re-

* *Synidotea hirtipes* forms an exception, having a single process, which is, however, not narrow as in the *Astacillids* but broad and apically blunt.

examined the type-specimen of *Amesopous* but failed to find the organ in question, owing possibly, so he says, to the specimen not being fully adult.

Coming now to the new genus described below, *Holidotea*, we find a form which in general facies is a true Idoteid, apparently belonging to the group with dorsal eyes containing *Mesidotea* and *Chiridotea*, but without the cleft margins of the head characteristic of these genera. Rather unexpectedly, however, it has only a single median process and a modified first pleopod, and is therefore far removed from the true Idoteids. On the other hand, peraeopods 2-4 are Idoteid in structure and resemble somewhat those of *Pseudidotea bonnierii*.

The relationships between the families are set out in the following table:

	<i>Idoteidae.</i>	<i>Pseudidoteidae.</i>	<i>Amesopodidae.</i>	<i>Astacillidae.</i>
Body form .	Flattened	Flattened	Flattened	Cylindrical
Peraeon segment 4	Never elongate	Never elongate	Not elongate	Often elongate
Peraeopod 1 .	Prehensile, often subchelate	Prehensile	Stout, setiferous	Slender, setiferous
Peraeopods 2-4	Stout	Stout (moderately)	2 stout, 3 and 4 absent	Slender, setiferous
Penis . . .	Double	Single (at least in <i>Holidotea</i>)	?	Single
Pleopod 1 .	Soft, simple	Chitinised, modified	?	Frequently chitinised and modified
Ramus of uropod	Large	Small	Small	Small
Second ramus of uropod	Absent	Present	Present	Present

FAMILY PSEUDIDOTEIDAE.

1901. *Pseudidoteidae* Ohlin. Svenska Exp. Magellan. vol. 2, p. 276.

1905. „ Stebbing in Herdman's Ceylon Pearl Fish. Suppl. Rep. 23, p. 43.

HOLIDOTEA n. g.

Head with lateral margins not cleft. Eyes dorsal. Side-plates distinct on all segments except first. Pleon composed of a single segment with two incomplete basal grooves. Flagellum of second antenna 2-jointed. Inner plate of first maxilla with 3 plumose setae.

Maxilliped 7-jointed. First peraeopod stout, 6th joint ovate. Second to fourth peraeopods longer and more slender, 6th joint slender, finger straight. Fifth to seventh peraeopods stout. Uropod with a minute ramus. Vasa deferentia opening by a single median process on first pleon segment.

The first portion of the generic name refers to the unclleft lateral margins of the head.

HOLIDOTEA UNICORNIS n. sp.

(Plate XVI. Figs. 18-23.)

Body smooth but with a thick felty covering of dirt and often Diatoms and Vorticella; more convex in ♂ than ♀. Head twice as broad as long, anterior margin broadly excavate, lateral margins entire, straight or slightly emarginate, antero- and postero-lateral angles quadrate; central portion of head convex and gibbous, simple in ♀ but armed in ♂ with a large flat triangular tooth or horn arising from the posterior margin, the posterior face of the tooth concave, apex subacute, sides denticulate. Eyes prominent, dorsal, circular.

Peraeon segments 1-4 subequal in length, 2 and 3 wider than 1 and 4, segments 5-7 decreasing in width, 5 abruptly narrower than 4, all the segments dorsally smooth except 5-7 in ♂, each of which bears 2 obscure submedian tubercles. Side-plates distinct on all the segments except 1st, those on 2-4 subtriangular in ♂, the antero-lateral angles being prominently produced and subacute, quadrate and not so produced in ♀, 5-7 in both sexes shallow, with rounded margins. Segment 4 in ♂ with a median ventral spiniform projection.

Pleon ovate, widening slightly and then tapering to a subacute apex, lateral margins evenly convex, with 2 little notches at the base indicating the 2 incomplete basal sutures, both rather indistinct; dorsal surface in ♂ with 2 short submedian keels (being a continuation of the ornamentation on the peraeon segments 5-7) and a circular median tubercle just beyond the centre, in ♀ smooth.

Antenna 1 reaching to middle of 3rd joint of antenna 2, 1st joint stout, 2nd nearly as long but more slender, 3rd much shorter than 2nd, flagellum as long as 2nd, tipped with setae.

Antenna 2 reaching to end of 2nd peraeon segment, 2nd joint stout, 3rd-5th becoming successively more slender and a little longer, 2nd and 3rd joints triangular in section, the three margins denticulate, more strongly so in ♂ than ♀; surface of 4th, especially towards apex, scabrous, flagellum subequal to 5th joint, 2-jointed, 2nd joint a little shorter than 1st and tipped with a few setae and a gently curved spine.

Upper and lower lips and mandible normal; molar rather prominent.

Maxilla 1, inner plate with 3 plumose setae, outer plate with 9 almost simple spines.

Maxilla 2, outer and middle plates each with 3 setae.

Maxilliped 7-jointed, 5th joint largest (except 2nd), 7th small, inner plate broad, apically truncate, coupling-hook apparently absent, epipod ovate-lanceolate.

Peraeopod 1 rather stout, subchelate, 4th joint abruptly wider than 3rd or (to a less extent) 5th, inner margin of 4th-6th joints crenulate and armed with spine-setae, 6th ovate, finger straight with small accessory unguis and a transverse row of setae near the base.

Peraeopods 2-4 longer and more slender than 1st, 4th joint abruptly wider than 5th and (to a less extent) 3rd, outer apical angle denticulate, 6th longest (except 2nd), narrow, finger $\frac{2}{3}$ length of 6th, slender, with small accessory unguis.

Peraeopods 5-7 stout, 3rd-5th joints subequal, their outer surfaces denticulate, 6th equal to 4th plus 5th, its outer margin, especially apically, scabrous or denticulate, finger stout, gently curved, with a slender spine in place of the accessory unguis.

Marsupial plates on 2nd-4th segments large, overlapping.

Male appendage or penis attached to 1st pleon segment between the bases of 1st pleopods, slender, apex bilobed, reaching to the end of the peduncle of 1st pleopods.

Pleopod 1 in ♂, peduncle long with 3 hooked spines near the base of inner margin, inner ramus reduced, shorter than peduncle, feebly setose, outer ramus not quite twice length of peduncle, tapering, curved outwards at the apex; inner margin straight and smooth, outer concave before the bent apex and set with spines, which become more closely set and longer distally; apex with a little notch hidden in setules; the peduncle and outer ramus are more strongly chitinised and have a yellowish tinge.

Pleopod in ♀ considerably smaller than 2nd, peduncle with 3 hooked spines in middle of inner margin, outer margin setose, inner ramus reduced, shorter than peduncle, inner margin setulose, outer ramus a little longer than peduncle, tapering to a blunt apex, outer margin setose.

Pleopod 2, peduncle short, without hooked spines, rami equal in length, outer broader than inner, apices truncate, apices and outer margin of outer ramus with long plumose setae; stylet in ♂ as long as inner ramus, straight, distal half narrower than basal half, apex subacute, margins distally minutely crenulate.

Pleopods 3-5 ovate-lanceolate.

Uropod tapering, inner margin straight, outer evenly convex, setose ramus very small, tipped with a spine and setules; the presence or absence of a second, concealed, ramus could not be determined owing to the impossibility of removing the dirt.

Length: ♂ 5.5 mm., ♀ 6.25 mm.; *breadth*, ♂ 2.5 mm., ♀ 3 mm.

Colour: In spirit dirty pinkish, eyes reddish.

Locality: Walker Point (near Knysna) NE. by N. $\frac{1}{2}$ N., distant 7 miles. 47 fathoms. ♂♂, ovigerous ♀♀ and juv.; Knysna Heads N., distant 10 miles. 52 fathoms. ♂♂, ♀♀ and juv.; Cape Seal W. by N. $\frac{1}{2}$ W., distant 7 miles. 39 fathoms. 1 ♀; Agulhas Bank (without more exact locality, depth or date). 1 ♂, 5 ♀♀. s.s. "Pieter Faure." 11/10/00, 2/7/02 and 20/4/06. (S.A.M., Nos. A3863, A4116, A4188 and A4189 respectively).

FAMILY ASTACILLIDAE.

For references see Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 206, 1914, and add:

1913. Richardson, 2me Exp. Antarc. franç. Isopodes, p. 14.

It is with great regret that, on the vexed question of the number of marsupial plates in the members of this family, I find myself in opposition to Prof. Koehler. This author (1911, Bull. Inst. oc. Monaco, No. 214) has stated that in all the species examined by him the number of pairs of marsupial plates is *constantly three*. Amongst these species was *Astacilla longicornis* (Sow.).

A. longicornis is a common species at Plymouth, and is found both on Hydroids and among the spines of *Echinus esculentus*. I have recently examined nearly 50 female specimens of this species in various stages and in every case I have been able to find *four* pairs of marsupial plates. In the immature nonovigerous stage the pair on the 1st segment are quite as clearly defined as in the ovigerous stage. This pair does not increase in size so much as the 2nd and 3rd pairs and does not take any part in the formation of the actual brood chamber. The two plates overlie the "vibratory plates" of the maxillipeds, and, like these, evidently help to aërate the brood chamber.

In the nonovigerous specimen of *A. mediterranea* mentioned below all 4 pairs of plates are very distinctly seen. They have not reached their full size yet, and the 1st pair embrace the vibratory plates instead of overlapping them.

In this latter specimen the 1st-3rd pairs are very easy to observe (without any dissection), because they are in an early stage of development. They are more sac-like than the fully developed plates and

contain a large amount of coagulated granular matter. At a later stage, as seen in *A. longicornis*, this granular matter becomes greatly reduced and is restricted to the basal and central portion of the plate, which has become very much thinner and is surrounded by a perfectly transparent border. In fact, in the 1st plate of *A. longicornis* by far the greater portion of the plate is transparent. Consequently, I believe, it is due to this transparency and the fact that the plate lies flat against the ventral surface that this 1st pair of plates has been overlooked.

Possibly also the method of preservation may account for it. At any rate, Koehler's statement must be regarded as incorrect.

In *Arcturella corniger* (Stebb.) there are also definitely four pairs of marsupial plates, as I have previously recorded in the description of *A. hirsutus*, which proves to be a synonym of *corniger* (see below). But in the species of *Arcturella* described below I believe there are truly only three pairs of plates present.*

On a further point also I am obliged to differ from the said author.

The genus *Arcturoopsis* was founded to receive certain forms which were closely allied to *Arcturella*, but were said to differ in the presence of a ventral process on the 3rd (or in one species on the 5th) peraeon segment in the ♂. This process was developed to a varying degree, and was stated to occur in no other Astacillid ("il ne se rencontre chez aucun autre Arcturidé"). When describing *Arcturoopsis hirsutus* in 1914, I placed it in this genus on account of a small tubercle on the 3rd segment in the ♂, which, though not developed to any such size as in Koehler's species, was evidently homologous.

On revising, however, all the species of Astacillids at my command for the present paper, I found an exactly similar process on the 3rd segment in *Arcturella danmonensis* (Stebb.) and in *Astacilla longicornis*. I then applied to Prof. G. O. Sars to know if such a process was present in the type-species of the genus, *Arcturella dilatata* Sars. Prof. Sars kindly examined his specimens and corroborated my belief that *A. dilatata* did possess a process, albeit only "small, somewhat conical, anteriorly pointing" (Sars. in litt. 5/8/16). He also confirmed my observation of its presence in *A. longicornis*.

Dr. Calman, to whom also I mentioned the matter, kindly examined some species in the British Museum collection with the result that he

* Note to p. 191 in Hansen, Dan. Ingolf. Exp., iii, 5, 1916. The presence of a 5th pair of marsupial plates in *Arcturus baffini* is rather astonishing in view of the strongly prehensile nature of the 5th peraeopods and the position assumed by the body. Hansen found 5 pairs also in two species of *Pleuroprion*; but this is less remarkable as this genus is more Idoteid in shape.

confirmed Sars' report of the presence of a process in *A. dilatata* and also in *Arcturus baffini*; "but it is so small in the latter case that it can hardly be regarded as of systematic importance" (Calman in litt. 31/7/16). Calman states that it is absent in *Antarcturus antarcticus* and *meridionalis*. It is also absent in the specimens I described in 1914 as the male of *Antarcturus kladophoros* Stebb., in *Astacilla bacillus* n. sp. and in the only two of the new species assigned to *Arcturella* of which the male is known.

It seems, therefore, that no great importance can be attached to the presence or absence of such a process, and that it cannot be used to delimit the genera in this family. But its presence in *Arcturella dilatata* renders unnecessary the genus *Arcturoopsis*, which must therefore sink into synonymy.

But Koehler described one species in which the process was on the *fifth* segment—namely, *A. melitensis*; he did not, however, think that a new genus was necessary for this species and so placed it in *Arcturoopsis*. On the contrary, I think he might well have instituted another genus for it, and I propose here, since *Arcturoopsis*, void ab initio, cannot be used, the name—

ARCTOPSIS n.g.

Like *Arcturella* Sars, but with a ventral process on the *fifth* peraeon segment in the male.

One species: *A. melitensis* (Koehler) 1911.

GEN. ASTACILLA Cordiner.

1795. *Astacilla* Cordiner, Singular Subjects of Nat. Hist. sect. Astacillae.
 1893. „ Stebbing, Hist. Crust. p. 370.
 1897. „ Sars, Crust. Norw. vol. 2, p. 87.
 1901. „ Ohlin, Svenska Exp. Magellan, vol. 2, p. 266.
 1905. „ Stebbing in Herdman's Ceylon Pearl Fish. Suppl. Rep. 23, p. 46.
 1905. „ Richardson, Bull. U.S. Nat. Mus. No. 54, p. 323.
 1911. „ Koehler, Bull. Inst. oc. Monaco, No. 214, pp. 1, 44, etc.
 1914. „ Vanhöffen, Deutsche Südpol. Exp. vol. 15, pt. 4, p. 523.

ASTACILLA BACILLUS n. sp.

Body perfectly smooth, non-granular, nonsetose. Limits of head and peraeon segment I scarcely visible. Eyes horizontally pear-

shaped, narrowing posteriorly. Antero-lateral angles of 1st peraeon segment subacute. Peraeon segments 2 and 3 subequal. Peraeon segment 4 in ♂ exceedingly elongate and slender, a little over half the total length (11 mm.), in ♀ moderately slender, a little less than half the total length (4 mm.), the antero-lateral angles slightly projecting. Segment 5 larger and deeper than segments 6 and 7, which are subequal. No ventral process on either 3rd or 5th segment in ♂.

Pleon longer than last 3 peraeon segments together, composed of 2 short segments in advance of the telson, which has an angular tooth on the lateral margin and a subacute apex.

Antenna 1, 2nd and 3rd joints both shorter than 1st, flagellum longer than peduncle.

Antenna 2, flagellum 2-jointed, with terminal unguis, lower margin with one row of denticles situate on inner side.

Peraeopod 1 geniculate between 2nd and 3rd joints, 3rd and 4th joints subequal, 5th equal to 3rd plus 4th, 6th a little shorter than 5th, 7th short without unguis but tipped with setae, 5th and 6th densely setose.

Peraeopods 2-4 increasing in length, projecting straight in front, not geniculate, 4th and 5th joints subequal, 6th a little longer, all three with long plumose setae.

Three pairs of marsupial plates. The inset-piece of that on the 4th segment can here scarcely be called an "inset" piece for it is equal in length to $\frac{1}{4}$ of the total length of the plate, subtriangular in shape, and separated from the main portion by a slightly angular suture, nonsetose. The plate is probably not fully developed, but any further development would probably affect only the transverse width and not the relative lengths of the anterior and posterior margins.

Male appendage on 1st pleon segment narrow-pyriform, tapering to an acute apex.

Pleopod 1, peduncle with 4 hooked spines on middle of inner margin, rami subequal, not modified in ♂.

Pleopod 2 in ♂, stylet half as long again as ramus, stout as far as apex of ramus and then narrowing rapidly to the deeply bifurcate apex.

Uropod, concealed ramus with 2 apical setae.

Length: ♂ 20 mm., ♀ 10 mm.; *breadth:* ♂ 1 mm., ♀ 1 mm.

Colour: In spirit pale yellowish, eyes reddish.

Locality: Walker Point, NE. by N. $\frac{1}{2}$ N., distant 7 miles (off Knysna). 47 fathoms. 1 nonovigerous ♀; O'Neil Peak, NNW. $\frac{1}{4}$ W.,

distant 8 miles (Zululand). 55 fathoms. 1 ♂. s.s. "Pieter Faure." 11/10/00 and 28/2/01. (S.A.M. Nos. A3862 and A4129.)

This species is named after the extraordinarily slender form of the male. I see no reason to doubt that the male and female are conspecific.

The structure of the marsupial plate on the 4th segment is quite different from that of *A. longicornis*, *deshayesii* or *mediterranea* as figured by Koehler.

ASTACILLA MEDITERRANEA Koehler.

1911. *Astacilla mediterranea* Koehler, l.c., p. 44, figs. 25-29.

The single female agrees so well with Koehler's description that I think there can be no doubt as to the specific identity. In one or two details there is a slight difference, and in one point a comparison is not possible because Koehler does not mention it. A future comparison of South African specimens with the types may therefore possibly lead to the former being separated as a *variety*, though scarcely I think as a new species.

In the first place there are scarcely any setules developed on the tubercles, in which connection see the remarks on the variability of a similar feature in *Arcturella corniger* infra. The tubercles on the head and 1st peraeon segment curve gently forwards. The tubercle on the 3rd peraeon segment is much smaller than in Koehler's figure, and there is in addition a similar, though even smaller, tubercle on the 2nd segment; both these tubercles curve backwards and are merely the slightly more developed forms of the granules or "squamules" which are distributed generally over the whole surface.

The median tubercle on the 4th segment is not symmetrical in profile as in Koehler's figure, but has a more gradual anterior, a steeper and more abrupt posterior, slope. Of the posterior median tubercle (anterior to the one on the posterior margin) only one is developed, and that immediately in front of and almost contiguous with the large one on the posterior margin. On either side of this latter tubercle, *i. e.* on the upper postero-lateral angles of the segment, is a small conical process which may correspond with that which Koehler describes as on the *inferior* angle.

Secondly, the point on which Koehler is silent: the lateral margin of the 4th segment is slightly turned out horizontally instead of continuing in the same plane as the rest of the segment, forming a very shallow groove which is quite smooth and free from granules. On the margin itself, however, is a very regular row of granules, and

a further similar row runs along the extreme upper margin of the side-plate.

Assuming that these two rows are absent in the Mediterranean form, this feature and the conical processes on the posterior margin would seem to be a valid reason for giving a varietal name to the South African form.

Eyes subtrigonal rather than oval.

Flagellum of antenna 2-3-jointed; 3rd joint very small, without any row of denticles along the lower margin. In Koehler's specimens the flagellum was serrulate.

Four pairs of marsupial plates, that on the 1st segment very distinct and almost as large as those on segments 2 and 3, which have probably not reached their full development, that on segment 4 also not fully developed since in the anterior part they scarcely meet in the middle line, but posteriorly they are fused in the middle line so that the presence of an inset-piece is not determinable.

The specimen contains several irregular masses of yolk-granules representing maturing ova, and shows in the appendages the new skin developing under the old, so that the next moult will see the full development of the marsupial plates.

Length: 7.5 mm.; *breadth*: 1 mm.

Colour: In spirit yellowish, eyes reddish.

Locality: Umkomaas River, NW. by W. $\frac{1}{2}$ W., distant 5 miles. 40 fathoms. 1 nonovigerous ♀ on the Gorgonacean *Villogorgia mauritiensis* Ridley. s.s. "Pieter Faure." 31/12/00. (S.A.M. No. A4144.)

Geogr. Distribution: Villefranche, Mediterranean (Koehler).

GEN. ARCTURELLA Sars.

1897. *Arcturella* Sars, Crust. Norw. vol. 2, p. 92.

1904. ,, Norman, Ann. Mag. Nat. Hist. (7), vol. 16, p. 448.

1908. ,, Stebbing, S. A. Crust. pt. 4, p. 51.

1911. ,, Koehler, l.c. pp. 4, 39.

1911. *Arcturoopsis* id. ibid. p. 8.

Reasons have already been given for merging *Arcturoopsis* in the earlier *Arcturella*. There seems to be no essential difference between them unless one considers the relative lengths of the 4th segment in the male; in *A. dilatata* and *danmonensis* it is not longer than the rest of the body posterior to it, though it varies somewhat, being much shorter in the former, but in the latter only a little shorter, or even, in one Plymouth specimen I have seen, equal to the rest of the body

behind it. In Koehler's species of *Arcturoopsis*, on the other hand, the 4th segment is greatly elongate, exceeding in length the rest of the body behind it. Opinions may differ as to this being of generic importance, but it seems scarcely necessary to consider it so, for there always remains the possibility of discovering transitional forms. In fact *lineata* and *corniger* are examples, the former having the 4th segment equal to, the latter a little longer than, the posterior portion of the body.

Sars' definition must be slightly modified; flagellum of antenna 2 1-3-jointed, with 2 rows of denticles on the lower surface; 3rd peraeon segment in male with (typically), but sometimes without, a ventral process, when present more or less strongly developed; outer ramus of pleopod 1 in male not modified.

In the course of studying the specimens belonging to this genus, I have been confronted in one case with a difficulty similar to that which arose in the case of the genus *Cymodoce*, namely that of correlating the male and female. The facts were as follows:

A ♂ and ♀ were taken from a bottle, P.F. No. 15817, the contents of which were all dredged on the same day and in the same spot. These were the only Astacillids taken in that haul, and would be regarded as conspecific under the usual working hypothesis and unless evidence to the contrary were forthcoming.

In fact this ♂ agrees perfectly in structure with the ♂♂ here assigned to *lineata* which were taken in association with the ♀♀ entirely different from the ♀ from bottle 15817. Since then it is better to presume that the sexes are similar rather than dissimilar, even in a family in which sexual dimorphism is a common phenomenon, the following morphological reason points against the ♂ and ♀ from bottle 15817 being conspecific; the ornamentation of the 4th peraeon segment in the ♂♂ and ♀♀ of *lineata*, taken in the same haul, consists in both cases of 2 mediodorsal tubercles.

Key to the South African Species of Arcturella.

A. Width of 4th peraeon segment in ♀ less than length, in ♂ very much less. Body in both sexes subcylindrical.

Flagellum of antenna 2, 2- or 3-jointed.

- i. A small ventral process on 3rd segment in ♂. Body in ♀ normally hirsute and strongly tuberculate . . . *corniger* (Stebb.).
- ii. No ventral process. Body in ♀ glabrous and feebly tuberculate . . . *lineata* (Stebb.).

B. Width of 4th segment in ♀ greater than length. Body in both sexes depressed. Flagellum of antenna 2 1-jointed.

i. Segment 4 in ♀ tuberculate *pustulata* n. sp.

ii. Segment 4 in ♀ not tuberculate.

a. Outer margin of 2nd joint of antenna 2 entire. Peraeopod 5 (in ♀ at least) with 2nd joint longer than all the other joints together *longipes* n. sp.

b. Outer margin of 2nd joint of antenna 2 notched. Peraeopod 5 with 2nd joint shorter than all the rest together *brevipes* n. sp.

ARCTURELLA CORNIGER (Stebb.).

1873. *Arcturus corniger* Stebbing, Ann. Mag. Nat. Hist. (4), vol. 12, p. 96 (♀).

1908. *Arcturella* (?) ,, id. l.c. p. 51.

1913. *Antarcturus ornatus* Tattersall, Tr. Roy. Soc. Edinb. vol. 49, pt. 4, p. 889, pl., fig. 5 (♀).

1914. *Arcturus* (?) *corniger* Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 207.

1914. *Arcturopsis hirsutus* id. ibid. p. 207, pl. 19A (♂ ♀).

At the time I described *A. hirsutus* I was not aware of the publication of Tattersall's paper, and in comparing the species with Stebbing's *corniger* I pointed out certain characters which then seemed to me to distinguish the two species. Further examples have since been discovered among the "Pieter Faure" collections which enables me to establish the above synonymy.

In the first place a comparison of the figures of *ornatus* and *hirsutus* leaves no doubt that they are conspecific.

Secondly, the new material shows the extreme variability of the dorsal tubercles and setae on the 4th peraeon segment of the ♀, thus affording a series uniting all three forms.

Setae in ♀ seem to be normally present, though varying in quantity, but frequently the body is perfectly glabrous. The anterior median tubercle is not as large in any of my specimens (except one from Sebastian Bluff) as in Stebbing's example, but is usually present, though absent in the specimens described as *hirsutus*. The apices of all the tubercles vary from pointed to blunt. The three posterior tubercles show the greatest amount of variation. They may be low, rounded-topped knobs, or moderately high blunt tubercles or high spini-form projections. This last form is shown in the figure of *hirsutus*,

but may reach an even greater development; *ornatus* shows a very moderate development of tubercles. Or again, the two tubercles on the posterior margin may coalesce to form a rounded transverse ridge which occasionally develops a third (median) tubercle between the two normal ones.

The tubercle on the 1st segment is usually more prominent than those on the 2nd and 3rd segments.

In the specimen from Sebastian Bluff the two posterior tubercles on the head are equal in height to the length of the head, but normally all 4 tubercles are not at all prominent.

The tubercles on the 4th marsupial plate vary from 2 to 7.

The flagellum of antenna 2 in both sexes has 2 rows of denticles on the under surface, not only the one on the inner margin as in my original description. Tattersall could not see any in his specimen of *ornatus*, but I think they must have been present; they are rather difficult to make out sometimes, especially the row on the *outer* inferior margin. The suture between the 2nd and 3rd joints is also very obscure sometimes, the third joint appearing to consist merely of the apical tooth or unguis.

The male appendage, which I described as situate on the 7th peraeon segment, is really on the 1st pleon segment.

Of the variety *subglaber* no further examples have come to light. Nor have I found any transitional forms between this and the typical form, so that I still keep it as a variety.

Additional Localities: Bakkoven Rock NW. by W., distant 2 miles (False Bay). 24 fathoms. 2 ♂♂, 3 ♀♀; Walker Point (near Knysna), NE. by N. $\frac{1}{2}$ N., distant 7 miles. 47 fathoms. 10 ♂♂, 3 ♀♀; Sebastian Bluff W. by N. $\frac{3}{4}$ N., distant 6 miles. 28 fathoms. 1 ♀. s.s. "Pieter Faure." 11/11/02, 11/10/00 and 5/7/00. Also several ♂♂ and ♀♀ from the previously recorded locality off Robben Island.

ARCTURELLA LINEATA (Stebb.).

1873. *Arcturus lineatus* Stebbing, Ann. Mag. Nat. Hist. (4), vol. 12, p. 97, pl. 3A, fig. 3 (♂).
 1875. " " id. ibid. (4), vol. 15, p. 187.
 1914. " (?) " Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 207.

Body glabrous, minutely granular in ♂, subcylindrical. Head not broader than long, antero-lateral processes rounded with a point on outer margin near apex, surface smooth. Peraeon segments 2 and 3 slightly widening in ♀; segment 4 much longer than wide, in ♂ 18:8,

in ♀ 12:8, in ♂ coffin-shaped, with a small medio-dorsal tubercle in the anterior half and another near the posterior margin, the latter hook-shaped and pointed backwards, some granules larger than the rest along the lateral margins, in ♀ slightly wider anteriorly than posteriorly, sides nearly straight, a low rounded medio-dorsal tubercle in the anterior half and another on the posterior margin, the posterior margin itself somewhat thickened and elevated; segments 5 and 6 with rounded side-plates only partly visible in dorsal view, segment 5 in ♂ with a small median tubercle on both anterior and posterior margins, segment 6 in ♂ with one on the posterior margin only, segment 7 with subacute side-plates.

Pleon segments 1-3 slightly widening, but 3 not laterally projecting, its posterior margin distinctly trilobed, telson tapering to a truncate apex.

Antenna 2, 2nd joint toothed on outer margin, 3rd and 4th in adult ♂ tuberculate on inner lower surfaces, 1 or 2 tubercles also on 5th, this latter joint in ♀ with very minute denticles on lower inner margin; flagellum 2-jointed, with 2 rows of small denticles on lower surface.

Peraeopods 2-4 relatively long.

Peraeopod 5, 2nd joint scarcely equal to width of segment 4 and shorter than all the other joints together.

Marsupial plates, three pairs, inset piece of that on 4th segment extending along whole posterior margin, setulose.

Male appendage on pleon segment 1 apically blunt.

Pleopod 2, male stylet half as long again as ramus, rather stout, apex deeply bifurcate in adult, acute in immature specimens.

Concealed ramus of uropod with 3 setae.

Length: ♂ 11 mm., ♀ 9 mm.; *breadth*: ♂ and ♀ 1.5 mm.

Colour: In spirit, largest specimen yellowish, eyes reddish; other specimens pinkish-brown or whitish, covered with minute dark pigment-specks, eyes reddish or black.

Locality: False Bay. 1 juv. ♀ on *Gorgonia flamma*; (?) Agulhas Bank. 1 ovigerous ♀ and 2 juv. ♀♀ on *Gorgonia albicans*. (L. J. Irvine.) 1915; Algoa Bay. 20 fathoms. 1 ♂; 34° 19' S., 25° 52' E. 100 fathoms. 1 ♂, 2 juv. ♂♂, 3 ovigerous and 1 juv. ♀♀; False Bay. 22 fathoms. 1 ♂. s.s. "Pieter Faure." 12/12/98, 1/11/98 and 30/10/02. (S.A.M. Nos. A3072, A4140, A4141, A4142 and A4059 respectively.)

Stebbing received his specimen from Port Elizabeth.

In this species there is some variation, albeit slight, in the development of the dorsal tubercles, especially on segments 5 and 6 in ♂;

in some specimens these are quite distinct and pointed, in others blunt and very indistinct.

The ♂ of this species closely resembles in general appearance that of *A. corniger*, but may be easily distinguished by the absence of any ventral process on the 3rd peraeon segment and by the hook-like shape of the posterior tubercle on the 4th segment.

ARCTURELLA PUSTULATA n. sp.

(Plate XVI. Fig. 24.)

Female.—Body glabrous, moderately depressed. Head wider (across the eyes) than long, antero-lateral angles subacute, with a minute point in the middle of outer margin, front margin strongly concave, dorsal surface quite smooth. Eyes large, oval. Peraeon segment 1 without visible suture separating it from the head; segments 2 and 3 gradually widening; segments 1–3 quite smooth; segment 4 wider (across the anterior margin) than long, lateral margins not greatly expanded, nearly straight, converging posteriorly, smooth except for the tubercles in the posterior half, which are arranged thus: 2 in each of the postero-lateral angles, a small one immediately in front of a larger one, a little in front of these 2 large submedian tubercles, the extreme postero-lateral angles also bluntly tubercular; side-plate on segment 4 quadrangular.

The relative development of the tubercles, however, is subject to some variation as in *corniger*. The 10 mm. long ovigerous ♀ No. A4145 has only very faint traces of the 2 submedian tubercles, and the smaller postero-lateral ones are entirely absent, whereas the pair of large ones is strongly developed, being at least $\frac{1}{2}$ mm. in height.

Young specimens up to 7 mm. are quite smooth dorsally. A specimen 8 mm. long shows the 2 submedian tubercles and the 2 large postero-lateral ones; another also 8 mm. long shows only the 4 postero-lateral tubercles.

The tubercles are low and rounded; even when strongly developed they are apically blunt.

Segment 5 longer than either 6 or 7; side-plates on these 3 segments pendulous, not completely visible in dorsal view.

Pleon with the first 3 segments very slightly wider than the telson, the 3rd not laterally prominent, all the sutures very indistinct, telson without any lateral teeth or projections, apex subacute, shallowly notched.

Antenna 2, 2nd joint with strong tooth on outer margin, 5th with a row of very minute denticles along lower inner margin, flagellum of

a single joint, with 2 rows of denticles along the lower margin, that on inner side containing a larger tooth about half-way along, a large stout tooth on the lower margin at base of the terminal unguis.

Peraeopods 2-4 relatively long, apex of 5th joint of peraeopod 4 nearly reaching apex of antero-lateral angle of head.

Peraeopod 5, 2nd joint $\frac{2}{3}$ length of segment 4, shorter than all the other joints together.

Three pairs of marsupial plates, that on 4th segment with a setulose inset-piece extending nearly the whole length of the posterior margin.

Concealed ramus of uropod with 5 unequal setae.

Length: Ovigerous ♀ 8.25-10 mm.; *breadth*: 2.25 mm.

Colour: In spirit yellowish or pinkish, eyes dark reddish.

Locality: Umkomaas River NW. by W. $\frac{1}{2}$ W., distant 5 miles. 40 fathoms. 1 ovigerous ♀ on the Gorgonacean *Villogorgia mauritiensis* Ridley; Durnford Point NE. by E., distant 9 miles. 13 fathoms. 12 juv. ♀ ♀. s.s. "Pieter Faure." 31/12/00 and 8/2/01. Natal coast. 6 fathoms. 1 ovigerous ♀, 3 juv. "on coral." (H. W. Bell-Marley.) May, 1917. (S.A.M. Nos. A4145, A4143 and A4567.)

ARCTURELLA LONGIPES n. sp.

(Plate XVI. Figs. 25, 26.)

Body glabrous, minutely shagreened, greatly depressed, especially in ♀. Head, together with peraeon segment 1, as wide as long, the lateral projections not produced beyond the antero-lateral point, dorsal surface with 2 small acute tubercles between the eyes in ♂, smooth in ♀. Eyes large, oval. Peraeon segment 1 with moderately distinct suture separating it from head; segments 2 and 3 widening gradually in ♀, segments 1-3 apparently each with a small median tubercle in ♂, but these portions rather bruised, smooth in ♀; segment 4 longer than broad (10 : 8) in ♂, broader than long in ♀ (width equal to combined length of segments 3 and 4), in ♂ oblong with equal posterior and anterior margins and nearly straight sides, smooth except for one median hook-like tubercle near the posterior margin, directed backwards, in ♀ anterior margin greater than posterior, sides slightly sinuous, entirely smooth; side-plate of segment 4 in ♀ projecting forwards as an acute point; segment 5 not greatly larger than 6 or 7, 5 and 6 with rounded side-plates completely visible in dorsal view, 7 with subacute postero-lateral angles, all 3 segments smooth in both sexes.

Pleon with first 3 segments widening gradually, 3rd projecting

laterally beyond telson, which tapers to a narrow truncate apex, without lateral teeth, dorsal surface smooth.

Antenna 2, 2nd joint with an entire straight outer margin, lower margins of 3rd–5th joints not tuberculate in ♂, flagellum of a single joint with terminal unguis, lower margin with 2 rows of denticles, with a slightly larger denticle at the base of the unguis in ♀ only.

Peraeopods 2–4 relatively long, especially in ♀, 5th joint reaching the lateral process of head.

Peraeopod 5, 2nd joint in ♀ equal to length of segment 4, longer than all the other joints together, in ♂ lost; peraeopods 5–7 with a small setiferous elevation in the middle of hind margin of 2nd joint, most marked on peraeopods 6 and 7, especially in ♂.

Three pairs of marsupial plates, that on 4th segment with setulose inset-piece extending nearly the whole length of posterior margin.

Pleopods 1 and 2 and male appendage mutilated.

Concealed ramus of uropod with 3 setae in ♂, 3–4 in ♀.

Length: ♂ 10 mm., ♀ 9 mm.; *breadth*: ♂ 2 mm., ♀ 2.5 mm.

Colour: In spirit yellowish, eyes reddish or black.

Locality: Table Bay, 22 fathoms. 1 somewhat bruised and mutilated ♂; Cape St. Francis NE., distant 29 miles. 75 fathoms. 1 ovigerous ♀. s.s. "Pieter Faure." 5/3/00 and 19/2/02. (S.A.M. Nos. A3830 and A4058.)

This species is easily distinguished from the other species by the unnotched 2nd joint of antenna 2, the 2nd joints of peraeopods 5–7 and the laterally projecting 3rd pleon segment, also the acute side-plate on segment 4 in the ♀.

ARCTURELLA BREVIPES n. sp.

(Plate XVI. Fig. 27.)

Female.—Body glabrous, very faintly shagreened, greatly depressed. Head wider than long, lateral processes rounded, with a small point on outer margin near the apex, dorsal surface smooth. Eyes large, oval. Peraeon segment 1 with very indistinct suture separating it from head; segments 2 and 3 gradually widening; segment 4 much wider than long, width across anterior margin being equal to length of segments 1–4 together, narrower posteriorly, sides distinctly sinuous, surface smooth; segments 5 and 6 with rounded side-plates; segment 7 with subacute side-plates; all the segments smooth.

Pleon segments 1–3 very slightly wider than telson, 3rd not projecting laterally, telson tapering to a subacute truncate apex.

Antenna 2, 2nd joint toothed on outer margin, 5th joint smooth, flagellum of a single joint, its lower margin with 2 rows of denticles and a larger tooth at base of unguis.

Peraeopods 2-4 short, 6th joint (not 5th) of peraeopod 4 reaching beyond eyes.

Peraeopod 5, 2nd joint about $\frac{2}{3}$ length of segment 4, but shorter than the other joints together.

Three pairs of marsupial plates, that on 4th segment with setulose inset-piece extending nearly whole length of posterior margin.

Concealed ramus of uropod with 4 setae.

Length: 9 mm.; *breadth*: 3 mm.

Colour: In spirit yellowish, eyes reddish.

Locality: ? Agulhas Bank. 3 ovigerous and numerous juv. ♀♀ on *Gorgonia albicans* (J. L. Irvine). 1915; False Bay. 22 fathoms. 1 ovigerous ♀. s.s. "Pieter Faure." 30/10/02. (S.A.M. Nos. A3884 and A4139.)

This species is named in allusion to the most easily noticeable difference between it and the preceding species.

GEN. NEOARCTURUS Brnrd.

1914. *Neoarcturus* Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 213.

The discovery of the female shows that this genus is remarkably close to *Arcturus*, differing only in the composition of the pleon and the 3-jointed flagellum of antenna 2.

NEOARCTURUS OUDOPS Brnrd.

1914. *Neoarcturus oudops* Barnard, l.c. p. 214, pls. 18c and 19B.

The original description was based on a single male and is confirmed by an examination of the present specimens except in one point: the male appendage was stated to be on the 7th peraeon segment, whereas really it is on the 1st pleon segment.

The female differs in no way from the male except in being broader across peraeon segments 2-4; segment 4 is not longer than the others. The sculpturing is the same, but more prominent than in the male, especially the lateral tubercles on the posterior ridges.

Maxilliped like that of ♂, without vibratory plate.

Peraeopod 2, 2nd joint a little longer than 4th joint.

Three pairs of marsupial plates. Side-plates on segments 2-4 produced backwards and downwards as acute processes supporting the marsupial plates.

Pleopod 1, peduncle with two hooked spines on inner margin and

several denticles on outer, outer ramus a little longer than peduncle, elongate-ovate, apex blunt, inner ramus as long as peduncle and half the width of outer ramus, narrow, apex subacute, apices and outer margin of both rami setose.

Pleopod 2, rami subequal, elongate-oblong, apices rounded-truncate, setose.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. Several ♂♂ and ♀♀ with embryos. s.s. "Pieter Faure." 20/8/03. (S.A.M., No. A4070.)

Although not remarked upon in my original description, this species bears an extraordinary resemblance to *Arcturus myops* Beddard (1886, *Challeng. Rep.* vol. 17, p. 100, pl. 22, figs. 5-8, pl. 25, fig. 8) from 700 fathoms off New Zealand. The two species agree in having only low rounded elevations, unpigmented and unfacetted, in place of eyes and in the sculpturing, but are easily distinguished by the shape of the telson.

FAMILY STENETRIIDAE.

1905. *Stenetriidae* Hansen, *Proc. Zool. Soc. Lond.* 1904, vol. 2, pt. 2, p. 315.

GEN. STENETRIUM Haswell.

1881. *Stenetrium* Haswell, *Proc. Linn. Soc. N.S.W.* vol. 5, p. 478.
 1905. ,, Hansen, l.c. pp. 303, 316.
 1906. ,, Nobili, *Mem. Ac. R. Torino*, ser. 2, vol. 57, p. 414.
 1914. ,, Barnard, *Ann. S.A. Mus.* vol. 10, pt. 7, p. 217.
 1914. ,, Vanhöffen, *D. Südpolar Exp.* vol. 15, pt. 4, p. 546.

Up to the present time only one species of this genus has been known from South Africa—*S. crassimanus* Brnrd. Four additional species are described below, so that the genus is now as well represented in South Africa as in the West Indies.

Moreover, in examining these latter species, I have become aware of a character which is common to all five species, although I had overlooked its presence in *crassimanus*—namely, a median longitudinal ventral keel on all the peraeon segments in both sexes. There is no mention of such a keel in the descriptions of any of the other species, but it would be scarcely correct to presume its absence, for it may not have been considered important enough for the diagnosis of the species. In the South African species, however, there are slight differences which are enough to separate the species without referring to other characters.

The four species here described are named after four Portuguese navigators famous in early Cape history.

STENETRIUM DAGAMA n. sp.

(Plate XVI. Figs. 28 and 29.)

Body with a few long scattered hairs, chiefly on the lateral portions. Antero-lateral angles of head acute, not incurved, rostrum broader than long, antero-lateral angles rounded-quadrate, anterior margin straight. Eyes narrow oblong, curved.

First peraeon segment scarcely longer than second, its antero-lateral angles fairly prominently produced, acute. Ventral keel raised into a rather high process on segments 1-4, acute on 1st, rounded on 2-4, keel not so high on segments 5-7, the posterior angles acute, dentiform. The anterior processes are not so strong in the female, but otherwise the keel is similar.

Pleon about as broad as long, lateral margin with only one tooth, distal margin obscurely trilobed, the median lobe more prominent, subacute.

First antenna, 1st joint largest, 2nd shorter than 3rd, flagellum composed of ca. 15 joints indistinctly separated.

Second antenna, outer apex of 1st joint acute, but not produced or dentiform, with 2-3 setae, 3rd joint longer than 1st plus 2nd, scale broadly ovate, apically setose, 4th very short, 6th a trifle longer than 5th, flagellum longer than peduncle, with many indistinctly separated joints.

Mouth-parts as described for *crassimanus*; upper lip distally feebly emarginate, spine-row with 8 serrate spines in left mandible, ca. 18 in right, 2nd joint of maxilliped not so long, 6th less abruptly narrower than 5th, epipod reaching to middle of 5th, inner plate with 5 coupling-hooks.

First peraeopod ♂, all joints densely clothed with long setae, 3rd and 4th joints strongly produced anteriorly, the apices, however, not very acute, 5th not produced, 6th subtriangular, greatest width equal to length; hind margins scarcely more than $\frac{1}{2}$ length of palm, which is crenulate, with 2 more distinct teeth near the hinge and a fringe of regularly spaced spinules; a large stout spine on the rounded defining angle, finger as long as palm, inner margin regularly spinose. In ♀ similar but smaller.

Second to seventh peraeopods as in *crassimanus*.

First pleopod ♂, peduncle with 2-3 setae at base of each ramus, rami narrow, thrice as long as broad, with marginal setae only and

without the parallel sculpturing found in the other species. Operculum in ♀ tapering to a bifid apex. The other pleopods as in *crassimanus*.

Uropod, outer ramus a trifle shorter than inner, both rami with long simple setae.

Length: 7.5 mm.; *breadth*: 2.25 mm.

Colour: In spirit yellowish-white, eyes brownish.

Locality: Vasco da Gama Peak N. 71° E., distant 18 miles (off Cape Point). 230 fathoms. 4 ♂♂, 6 ♀♀ (with ova and embryos) among the outer spicules of an Hexactinellid sponge (*Pheronema*); Table Mountain S. by E. $\frac{3}{4}$ E., distant 58 miles. 190 fathoms. 2 ♂♂ amongst siliceous sponges. s.s. "Pieter Faure." 4/5/00 and 3/4/02. (S.A.M. Nos. A2855 and A4075.)

In the key given by Hansen (l.c. p. 316) this species comes under B.a.β.; the form of the first peraeopod is somewhat similar to that of *siamense* Hansen, but the absence of lateral projections of the head in this latter species offers a ready mark of distinction.

STENETRIUM DALMEIDA n. sp.

Body nearly smooth, glabrous except for a few isolated setae on the pleon and the antero-lateral angles of the peraeon segments. Head with the antero-lateral angles acutely produced, not incurved, rostrum broader than long, antero-lateral angles quadrate, anterior margin straight. Eyes narrow oblong, curved.

Peraeon segments 1-4 subequal, each with a shallow transverse groove across the middle, antero-lateral angles of 1-3 acutely produced, of 4 quadrate. Ventral keel obsolete on all the segments except 3 and 4, where it forms a blunt process, and on 7, where it forms a backwardly directed spine on the posterior margin.

Pleon very little longer than broad, lateral margin with only one tooth, distal margin arcuate with a fairly prominent acute median lobe.

Antenna 1, 1st joint largest, 2nd shortest, 3rd a little longer than 2nd but more slender, flagellum of 12 joints.

Antenna 2, 1st joint acutely but not strongly produced on outer apex, scale on 3rd ovate, apically setose, 6th a little longer than 5th, flagellum longer than peduncle, multiarticulate.

Mouth-parts normal.

Peraeopod 1 in ♂, 3rd and 4th joints strongly and very acutely produced on outer apex, 5th not produced, 6th sub-triangular, a little broader than long, palm a little oblique with one strong acute tooth in the centre and another near the hinge (both teeth lacking in the smaller ♂, 5 mm. long), one small spine on the defining angle, finger

matching palm, lower margin of 5th and 6th moderately setose; the right limb in the largest specimen is smaller and less developed than the left one, having been perhaps regenerated. In ♀ 3rd and 4th joints apically produced, 5th not produced, 6th longer than broad, palm transverse, shorter than hind margin, setose, defining angle a right angle but rounded, with one strong spine, finger matching palm, spinulose.

Pleopod 1, peduncle without setae, outer margins of the rami evenly convex, length of the rami a little more than twice as long as wide, with surface sculpturing but only marginal setae.

Operculum in ♀ tapering to a subacute entire apex.

Uropods lost.

Length: 7.5 mm.; *breadth*: 2 mm.

Colour: In spirit pinkish, eyes dark red.

Locality: Lion's Head SE. $\frac{1}{4}$ E., distant 50 miles (off Cape Peninsula). 230 fathoms. 2 ♂♂; Cape Point NE. $\frac{1}{4}$ N., distant 18 miles. 135 fathoms. 1 nonovigerous ♀. s.s. "Pieter Faure." 2/4/02 and 27/2/02. (S.A.M. Nos. A4013 and A4121.)

This species is superficially very close to *S. dagama*, but is distinguished by the difference in the ventral keels, the 1st joint of antenna 2, armature of the palm of peraeopod 1, the absence of the dense covering of setae and the very acute apices of the 3rd and 4th joints of the same peraeopod. The 1st peraeopod in the ♀ is also quite different in the two species, on the presumption that the limb in the single ♀ specimen of the present species has reached its full development.

STENETRIUM DIAZI n. sp.

(Plate XVI. Figs. 30-32.)

Body with a few long scattered setae, chiefly on the lateral portions. Antero-lateral angles of head acute, not incurved, teeth forming the inner angles of the sockets for the second antennae somewhat blunt, rostrum broader than long, antero-lateral angles subacute, anterior margin slightly concave. Eyes reniform.

First peraeon segment longer than 2nd, the antero-lateral angles produced forwards to the level of the eyes, acute. Keel on segments 1-4 low, rounded, in each segment surmounted by a small acute denticle, keel on segments 5-7 with the posterior angles in each segment acutely produced.

Pleon about as broad as long, lateral margin with a single tooth, distal margin obscurely trilobed (as in *occidentale* Hansen).

First antenna, 1st joint largest, 2nd and 3rd subequal, each equal to $\frac{1}{2}$ the 1st, flagellum with 10 indistinctly separated joints.

Second antenna, 1st joint acutely produced to end of 2nd, apex with a denticle and 4 setae, 3rd rather longer than 1st plus 2nd, scale of equal width throughout, 4th very short, 6th a trifle longer than 5th, flagellum longer than peduncle, with many joints.

Mouth-parts as in *crassimanus*; upper lip distally feebly emarginate, spine-row with 6 spines in left mandible, 14 in right, 6th joint of maxilliped less abruptly narrower than 5th, inner plate with 6 coupling-hooks.

First peraeopod ♂ elongate, 2nd joint longer than 3rd–5th together, anterior margin with a strong laminar tooth at base in the adult, 3rd anteriorly produced to middle of 4th, 4th likewise produced nearly to end of 5th, 5th not produced, 6th as long as 2nd, oblong, widening very slightly distally, inferior margin slightly sinuous, palm short, transverse, with 2 strong, closely apposed, apically blunt teeth, a smaller tooth near the hinge, defining tooth very strong, apically subacute, palm and hind margin laminar and thinner than rest of joint, as in *crassimanus*, finger projecting beyond defining tooth, inner margin with a few simple spinules, outer margin setose, inferior margins of 4th–6th joints densely setose.

First peraeopod ♀ shorter, 2nd joint without basal tooth, 3rd–5th joints as in male, 6th not longer than 3rd plus 4th, oblong, widening distally, width $\frac{2}{3}$ length, inferior margin straight, palm slightly convex, transverse, nearly as long as inferior margin, with one small tooth in middle, and a series of spinules, defining angle rounded, with one strong spine, finger matching palm, inner margin with serrate spinules, inferior margins of 4th–6th joints densely setose.

Second to seventh peraeopods as in *crassimanus*.

First pleopod ♂, peduncle with one pair of small setae, rami broader than in *crassimanus*, widening for $\frac{2}{3}$ length, then strongly contracting, outer margin thus angular, with surface sculpturing but with marginal setae only. Operculum in ♀ tapering to a bifid apex.

Rest of the pleopods normal.

Uropod, outer ramus shorter than inner, both with long simple setae.

Length: ♂ 6 mm., ♀ 5 mm.; *breadth*: ♂ 1.5 mm., ♀ 1.25 mm.

Colour: Creamy-white, eyes black.

Locality: Buffel's Bay (False Bay). 1/3/15. (K.H.B.) 2 ♂♂, 3 ♀♀ (1 ovigerous), 4 juv. (S.A.M. No. A3309.)

This species comes under A.a. in Hansen's key and is most closely allied to *crassimanus* Brnrd.

STENETRIUM SALDANHA n. sp.

(Plate XVI. Figs 33 and 34.)

Body with a very few setae on the lateral portions only. A low, broad, rounded dorsal ridge runs throughout the peraeon and pleon, most noticeable on the latter but nowhere prominent. Antero-lateral angles of head prominent, acute, not incurved, teeth forming the inner angles of the sockets of the 2nd antenna prominent, acute; rostrum very prominent, longer than broad, tapering to an acute point in ♂, subacute in ♀. Eyes reniform. First segment of peraeon scarcely longer than 2nd, antero-lateral angles fairly prominently produced, acute. Keel on segments 1-4 rather high, with the anterior angles dentiform and subacute, posterior apices of keel on segments 5-7 acute, dentiform, that on segment 7 being very prominent, curved backwards, spiniform.

Pleon distinctly longer than broad, lateral margin with a single tooth, distal margin obscurely trilobed.

First antenna, 1st joint largest, 2nd and 3rd subequal, flagellum of 12 indistinctly separated joints.

Second antenna, outer apex of 1st joint acute, but not produced or dentiform, 3rd equal to 1st plus 2nd, scale obovate, apically setose, distal peduncular joints and flagellum lost in both specimens.

Mouth-parts as in *crassimanus*; upper lip distally feebly emarginate, spine-row with 6 spines in left mandible, 12 in right, maxilliped with 6th joint half width of 5th, inner plate with 5 coupling-hooks, epipod reaching to end of 5th joint.

First peraeopod ♂ stout, 2nd joint subequal to 3rd-5th together, 3rd and 4th acutely produced but not strongly anteriorly, 5th not produced, 6th only a little longer than greatest width, which is across the nearly transverse palm, palm a little shorter than hind margin, straight, with one pointed denticle in middle and a series of stout serrulate spines, the rounded defining angle with one long stout serrulate spine, finger matching palm, inner margin with serrulate spines, 4th-6th joints moderately setose, inferior margin of 6th rather densely setose. In ♀ similar but smaller and weaker, palm without a denticle.

Second to seventh peraeopods as in *crassimanus*.

First pleopod ♂ intermediate between that of *crassimanus* and that of *diazi*, outer margin moderately angular, with surface sculpturing and marginal setae only. Operculum in ♀ tapering to a bifid apex.

Rest of the pleopods as in *crassimanus*.

Uropods lost in both specimens.

Length: ♂ 6 mm., ♀ 5 mm.; *breadth*: ♂ 1.75 mm., ♀ 1.5 mm.

Colour: In spirit whitish, eyes reddish.

Locality: Cape St. Blaize N. by E., distant 73 miles. 125 fathoms. 1 ♂ and 1 nonovigerous ♀; Cape Point NE. $\frac{1}{4}$ N., distant 18 miles. 135 fathoms. 1 ♀. s.s. "Pieter Faure." 21/12/99. (S.A.M. Nos. A3826 and A4120.)

This species also comes under B.a.β. in Hansen's key, and as regards the first peraeopod might form a separate group with *dagama*. The shape of the rostrum, however, is so different from that of any other species in the genus, excepting *crassimanus*, and, to a lesser degree, *chiltoni* Stebb., that it stands quite apart.

STENETRIUM CRASSIMANUS Barnrd.

1914. *Stenetrium crassimanus* Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 217, pl. 20A.

The ventral keel on the peraeon is slighter than in the 3 species just described. In segments 1 and 2 in ♂ it is raised into a spiniform forwardly directed process, in ♀ only feebly raised, in segments 5-7 the posterior apices are feebly dentiform in both sexes.

The inner plate of the maxilliped was originally stated to have only 3 coupling-hooks; on re-examination of the mounted specimen, however, I find there are 5.

FAMILY JAERIDAE.

1910. *Jaeridae* Stebbing, J. Linn. Soc. Lond. vol. 31, p. 224 (references).

GEN. JANIRA Leach.

1814. *Janira* Leach, Edinb. Encycl. vol. 7, p. 434.

1914. „ Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 219 (references), and pt. 11, p. 436.

JANIRA ANGUSTA n. sp.

(Plate XVII. Figs. 1-3.)

Male.—Body dorsally smooth, margins with several stiff, moderately long setae, becoming more numerous on the pleon. Head about as broad as long, antero-lateral angles subquadrate, lateral margins entire, anterior margin slightly sinuous with a minute median point. Eyes rather small, ovate, set within the lateral margins, facets few in number.

Peraeon segment 1 longest, antero-lateral angles acute, 2nd segment similar but with the antero-lateral angles not so much produced and

less acute, 3rd and 4th with antero-lateral angles rounded. Posterior 3 segments well distinguished from the anterior ones, the 7th longest, the postero-lateral angles rounded.

Pleon longer than 7th peraeon segment, longer than broad, oval, slightly tapering distally, lateral margins entire.

Antenna 1 reaching nearly to end of 4th joint of antenna 2, 1st joint largest, 2nd and 3rd together equal to 1st, but not so stout, flagellum 4-jointed, not distinguishable from peduncle.

Antenna 2, 3rd joint with distinct scale, 4th-6th joints subequal, 6th indistinguishable from flagellum, which consists of ca. 18 indistinctly separated joints and is equal to 4th-6th peduncular joints together.

Upper lip rather long, apically rounded.

Lower lip with rather broad lobes, inner apical angles setulose.

Mandibles, cutting-edge 4-dentate, secondary cutting-edge not visible, spine-row apparently absent in left, in right with ca. 8 spines, palp with the 3 joints subequal, 3rd curved and spinulose along inner margin.

Maxillae 1 and 2 as in *J. capensis* Brnrd.

Maxilliped, 2nd joint twice as long as broad, 4th and 5th broad, 6th and 7th much narrower than 5th, inner plate with two coupling-hooks, epipod reaching to end of 4th joint, narrow-lanceolate, outer margin angular.

Peraeopod 1 stout, 2nd joint flask-shaped, 4th shorter than 3rd, 5th oval, enlarged, palm and hind margin subequal, defining angle obtuse and blunt, palm with 6 stout spines, 6th (finger) equal to palm, stout, inner margin straight, unarmed, 7th short, biunguiculate.

Peraeopods 2-7 similar to one another, normal (as in *J. maculosa* Leech, but rather stouter than in Sars' figures in *Crust. Norw.* vol. 2, pl. 40), triunguiculate.

Pleopod 1, peduncle narrowing rapidly from base, thence divided into two divergent branches as long as basal portion, rounded and setose apically. There is no distinction between the basal and distal portions and no suture to indicate the limits of peduncle and ramus (if present).

Pleopod 2 ovate, apically subacute, ramus arising near apex, penial filament longer than peduncle.

Rami of the other pleopods narrow.

Uropod equal to the greatest width of the pleon, outer ramus shorter and narrower than inner, apically acute, inner ramus apically rounded.

Length : 3 mm. ; *breadth* : .5 mm.

Colour : White, eyes black.

Locality: Buffel's Bay (False Bay). 1/3/15. (K.H.B.) 1 ♂. Low-tide. (S.A.M. No. A3372.)

The chief peculiarities of this species are in the 1st pleopods and the 1st peraeopods, the latter bearing at first sight a strong likeness to the gnathopod of an Amphipod.

GEN. HAPLONISCUS Rich.

1908. *Haploniscus* Richardson, Proc. U.S. Nat. Mus. vol. 35 [1909], p. 75.

1914. „ Vanhöffen, Deutsch. Südpol. Exp. xv, 4, p. 557.

1916. „ Hansen, Dan Ingolf Exp. iii, 5, p. 28.

This genus was instituted to receive a species from the Arctic ocean described by Sars as *Nannoniscus bicuspis* but which differed in several respects from the type-species, *N. oblongus*. At the same time Miss Richardson added two new species from deep water off the Atlantic coast of N. America.

There is one interesting feature in this genus which has not been commented upon by either Sars or Miss Richardson, namely, the structure of the telson. The lateral portions of the ventral surface have grown over and completely fused, if one may so express it, so as to form a chamber containing the 3rd-5th pleopods.

This chamber in the species described below is spacious owing to the high vaulting of the ventral surface; in the other species it is impossible to tell from the figures whether this surface is vaulted or not.

A somewhat similar chamber, containing the 2 pairs of maxillae and the mandibles, is formed by the sides of the head and closed in by the maxillipeds with their epipods, leaving a small aperture in front through which the food can enter.

The structure of the telson and probably also of the "buccal" chamber may be interpreted as an adaptation to habitat. All the species of the genus live at great depths, and although the nature of the bottom is not recorded in the case of the previously known species, it may be assumed to be a fine mud as in the case of the present species. Contrary to expectation there are no plumose straining setae round the edges of the operculum. There are a few widely spaced simple setae on the outer margin of pleopod 2 in ♂, and on the operculum in ♀. The anal opening is quite separate from the branchial chamber.

HAPLONISCUS DIMEROCERAS n. sp.

(Plate XVII. Figs. 4-7.)

Body nearly parallel-sided, whole of the dorsal and sternal surfaces minutely and closely pitted. Head about twice as broad as long,

anterior margin nearly straight, with a slight median point, side margins straight or very slightly emarginate in ♂, with the antero-lateral angles rounded but prominent, in ♀ gently convex without prominent antero-lateral angles.

Peraeon segments 1-4 short but gradually increasing in length, antero- and postero-lateral angles of the side plates rounded-quadrate; segment 5 equal to 4 in length, segments 6 and 7 decreasing in length, antero-lateral angles of side-plates on 5 rounded-quadrate, on 6 and 7 rounded, postero-lateral angles on all three segments acute.

Pleon a little narrower at base than peraeon segment 7, about as long as broad in ♂, a little shorter in ♀, narrowing very slightly posteriorly; side margins concave and sinuous in ♂, slightly convex in ♀, apex rounded, postero-lateral angles strongly acute and produced in ♂, nearly equal to $\frac{1}{2}$ length of telson, in ♀ acutely produced but very little beyond the rounded apex. Upper surface in both sexes with 2 minute submedian tubercles in the middle.

The ventral surface of peraeon segments 1-4 in ♂ is moderately convex, of segments 5-7 and of the pleon strongly vaulted; in the ♀ the pleon is vaulted but all the peraeon segments are concave so as to accommodate the developing embryos.

Antenna 1, 1st joint stout, ovate, 2nd as long as 1st but very slender, more so in ♂ than ♀, 3rd $\frac{1}{3}$ in ♂, in ♀ $\frac{1}{2}$ length of 2nd and equally slender, flagellum slender, nearly as long as peduncle, composed of 5 nearly equal joints in ♂, in ♀ of 1 stout and 2 long joints, the apical joint setose.

Antenna 2, peduncle stout, longer and stouter in ♂ than ♀, 3rd joint longer than 1st plus 2nd, with a stout spiniform upstanding dorsal projection at base, 4th short, 5th longer than 4th but shorter than 3rd, 6th equal to 3rd and ending in a narrow subacute point, the suture between 5th and 6th clear but the joints not freely moveable on one another, flagellum inserted before the apex of 6th, extremely slender, not quite as long as 5th plus 6th peduncular joints, composed of 8 setiferous joints.

Mouth-parts as figured by Sars for *H. bicuspis* (Norweg. N. Atlant. Exp. 14, p. 122, pl. 10, 1885), only the mandibular palp a little more slender.

Epistome prominent, triangular, the projecting anterior subacute apex visible from above.

Peraeopods as in *H. bicuspis*, similar to one another, but becoming longer and more slender posteriorly.

Three pairs of marsupial plates attached to segments 2-4, large, without marginal setae.

Pleopod 1 in ♂, the two peduncles closely united throughout their length but with a distinct suture, rami distinct, slightly diverging, apically rounded, a small tooth on outer margin.

Operculum in ♀ broader than long, evenly rounded, margin sparsely setose, surface scabrous.

Pleopod 2 in ♂, peduncle ovate, tapering to a subacute apex, inner margin nearly straight, minutely serrulate distally, inner ramus (stylet) geniculate, 1st joint short, 2nd reaching to apex of peduncle, swelling out in middle, apically blunt.

The other pleopods as figured for *H. bicuspis*.

Uropod uniarticulate, setose.

Length: 2.5 mm.; breadth: 1 mm.

Colour: In spirit chalky white.

Locality: Cape Point, N. 89° E., distant 36 miles. 700 fathoms. Bottom green mud. Several ♂♂ and ovigerous ♀♀. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4069.)

The specific name referring to the marked difference between the peduncle and flagellum of antenna 2, sharply distinguished from all the other species by antenna 2.

In this species the degree to which the postero-lateral angles of the pleon are produced differs in the two sexes, the ♀ resembling *H. bicuspis* (of which only the ♀ is known), the ♂ resembling *H. retrospinis*. Of the latter both sexes are known but there is no sexual difference.

FAMILY MUNNIDAE.

1882. *Munnidae* Sars, Vidensk. Forhl. Christ. No. 18, p. 17.
 1897. „ G. O. Sars, Crust. Norw. vol. 2, p. 105.
 1905. „ Richardson, Bull. U.S. Nat. Mus. No. 54, p. 479.

GEN. PARAMUNNA Sars.

1866. *Paramunna* G. O. Sars, Beretn. Zool. Reise ved. Kyst. Christ. p. 31.
 1897. „ id. l.c. vol. 2, p. 111.
 1910. „ Stebbing, Gen. Cat. S.A. Crust. p. 435.

Stebbing in 1910 described *P. laevifrons* from South Africa, thereby reducing the character of the bilobed head, which Sars regarded as of generic value, to specific value. Tattersall had in 1905 (Fish. Irel. Sci. Inv. 1904, 2, p. 18) instituted the genus *Metamunna* to include a form also without frontal lobes, but which possessed certain features akin to *Pleurogonium* Sars. As he did not dissect out the mandibles

it is uncertain whether *Metamunna* should be regarded as closer to *Paramunna* or *Pleurogonium*. One cannot help feeling that *Metamunna* has a very short 3-jointed palp, and is not really distinct from *Paramunna*. The serrate pleon is very like that of *P. bilobata* Sars, whereas both *laevifrons* and the following species have an entire margined pleon.

PARAMUNNA CONCAVIFRONS n. sp.

(Plate XVII. Figs. 8, 9.)

Head broadly produced in front, anterior margin concave. Eyes situate on the pedunculate lateral portions, rather small. Peraeon oval, gradually decreasing in width posteriorly, the lateral portions of all the segments rounded. Pleon oval, lateral margins entire, apex shallowly bifid.

Antenna 1 6-jointed, the 3rd peduncular joint scarcely distinguishable from the flagellar joints.

Antenna 2, 3rd joint subequal to 5th, 4th small, 5th and 6th elongate, 6th a little longer than 5th, flagellum 10-jointed.

Upper lip rounded distally.

Mandibles, molar prominent, palp very small, 3-jointed.

Maxilla 1, inner plate with 2 setae.

Peraeopod 1 stout, inner apex of 5th joint blunt but prominent, setose, 6th ovate, finger not overlapping apex of 5th, with a prominent accessory unguis.

The other peraeopods fairly slender, 6th joint longest, finger biunguiculate.

Operculum of ♀ pear-shaped, apex truncate.

The pleopods and uropods were not satisfactorily dissected out.

Length: 1-1.5 mm.; *breadth*: ♂ .5 mm., ♀ .75 mm.

Colour: White with peraeon segments 1-4 greyish-brown, eyes black.

Locality: Mouille Point near Cape Town, November, 1913. 1 juv., and 26/2/14, 1 ♂, 1 ovigerous ♀, 1 juv. (K.H.B.); Durban. July, 1915, 1 nonovigerous ♀. (H. W. Bell-Marley.) (S.A.M. Nos. A3080, A3090 and A3838.)

GEN. KUPHOMUNNA Brnrd.

1914. *Kuphomunna* Barnard, Ann. S. A. Mus. vol. 10, pt. 11, p. 438.

KUPHOMUNNA ROSTRATA Brnrd.

1914. *Kuphomunna rostrata* Barnard, l.c. p. 438, pl. 38c (♂).

Since the first description of this species, based on a single ♂ much overgrown with extraneous matter, further specimens have come to light, including the ♀.

Male.—The front margin of the head is really more produced than in the original figure. The rostrate process appears to be the epistome.

Female.—Head of the same shape as in ♂. The epistome not nearly so produced as in ♂, but projecting slightly beyond the front margin of head, simply rounded.

Peraeon segment 1 not enlarged as in ♂, in fact, scarcely as long as segment 2.

Mouth-parts as in ♂. The absence of the mandibular palp was omitted in the diagnosis of the genus.

Peraeopod 1 less stout than in the ♂, 4th joint not apically produced, 5th not much broader than base of 6th, without spines.

Operculum longer than broad, somewhat pyriform, apex truncate.

The other peraeopods, the pleopods and uropods as in ♂.

Length: ♀ 1.75 mm.; *breadth*: 1 mm.

Colour: White, mottled dorsally with grey.

Locality: Buffel's Bay (False Bay). 28/9/13 and 1/3/15. (K.H.B.)
1 ♂, 5 ovigerous ♀♀ and 1 juv. ♀. (S.A.M. Nos. A2543 and A3308.)

FAMILY DESMOSOMIDAE.

1893. *Munnopsidae* (part) Stebbing, Hist. Crust. p. 383.

1897. *Desmosomidae* Sars, Crust. Norw. vol. 2, p. 118.

1908. „ Richardson, Proc. U.S. Nat. Mus. vol. 35 [1909],
p. 81.

1911. „ id. Bull. Mus. d'Hist. Nat. Paris, 1911, No. 7,
p. 530.

GEN. ? EUGERDA Mein.

1890. *Eugerda* Meinert, Crust. Malacostr. Cruise of the "Hauch,"
p. 194.

1897. „ Sars, l.c. pp. 127, 252.

Two mutilated specimens are in the collection, but as they both lack the 1st peraeopods and the uropods it is impossible to ascertain with certainty whether they should be assigned to this genus or to *Desmosoma* Sars. From the character of the 1st peraeon segment

I have decided to place them in this genus but not to assign any specific name, merely giving the following brief description.

Head large, ovoid, not much produced in front. Peraeon segment 1 narrower than head and very short; segments 2 and 3 longer and about as wide as head; segment 4 a little narrower, posterior margin strongly convex, *i. e.* the postero-lateral angles are absent; segments 5 and 6 much narrower than 4, longer than broad, oblong; segment 7 apparently very short and appearing more like a short 1st pleon segment, but it is exactly in this region that the specimens are most mutilated. Side-plates on segments 1-4 acutely but shortly produced. Pleon ovate, apex broadly rounded. Antenna 1, 1st joint oblong, rest of antenna consisting of 4 slender joints, the proximal one inserted apically into 1st. Epipod of maxilliped narrow-lanceolate, apex acute, sides nearly straight. Pleopod 1 in ♂, peduncle not tapering, lateral margin slightly emarginate, apex subacute, ramus distinct, inserted obliquely, apex truncate and setulose. Operculum in ♀ oval, longer than broad. Pleopod 2 in ♂, peduncle nearly semicircular, apex acute, stylet reaching to apex, distal half very slender.

Length: 3.25 mm.; *breadth*: .75 mm.

Colour: In spirit whitish.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms.
1 ♂, 1 ♀. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4067.)

GEN. MACROSTYLIS Sars.

1864. *Macrostylis* G. O. Sars, Vidensk. Selsk. Forhl. Christ. 1863.
1886. „ Beddard, Challeng. Rep. vol. 17, p. 173.
1890. *Vana* Meinert, Crust. Malacostr. Cruise of the "Hauch," vol. 3,
p. 195.
1897. *Macrostylis* Sars, Crust. Norw. vol. 2, pp. 120, 250.
1916. „ Hansen, Dan. Ingolf Exp. iii, 5, p. 75.

MACROSTYLIS SPINICEPS, n. sp.

(Plate XVII. Figs. 10-12.)

Male.—Body smooth, glabrous. Head broader than long, anterior margin not greatly produced, straight, postero-lateral angles acutely produced. Peraeon segments 1 and 2 subequal, postero-lateral angles of 1 acute, of 2 subacute; segment 3 longer, especially at the sides, postero-lateral angles acutely produced; segments 4-7 sharply marked off from the anterior segments, gradually decreasing in width, 4 shortest, 5 and 6 subequal, postero-lateral angles of each produced into acute

spiniform processes. All the segments with a medio-ventral, straight, spiniform process.

Pleon a little longer than broad, lateral margins convex proximally, concave distally, with a few minute setules, postero-lateral angles quadrate, distal margin very slightly produced.

Antenna 1 rather more developed than usual in the genus, stout, the 3 peduncular joints not differing greatly in size, flagellum 2-jointed, 1st shorter, 2nd longer than any of the peduncular joints, both joints with apical tufts of long filamentous sensory setae.

Antenna 2, first 3 joints short, 4th long and slender, 5th a little shorter than 4th, flagellum very slender, a little longer than 4th joint, ca. 10-jointed.

Mouth-parts normal, as figured by Sars for *M. spinifera*. (Crust. Norw. vol. 2, pl. 51.)

Peraeopod 1 as in *spinifera*, but 5th joint subequal to 3rd and 7th only half length of 6th.

Peraeopod 2 as in *spinifera*, but 3rd and 4th joints with setae on lower apices, 5th slender and equal to 3rd.

Peraeopod 3 similar to that of *M. longiremis* (Mein.) (Sars, l.c. Suppl. pl. 2), but 5th joint narrower in proportion to width of 4th, the armature of the joints the same.

Peraeopod 4 as in *longiremis* but 5th joint relatively narrower.

Peraeopods 5 and 6 as in *spinifera*.

Peraeopod 7 as in *spinifera* but 5th joint $\frac{1}{2}$ as long again as 2nd, 6th $\frac{1}{4}$ as long again as 2nd, 7th plus unguis $\frac{1}{2}$ length of 6th.

Pleopod 1 in ♂, peduncles indurated, narrow, tapering slightly to subacute apices, rami narrow, projecting beyond apices of peduncles, slightly expanding, apices rounded and setulose.

Pleopod 2 in ♂, peduncle indurated, narrow, slightly curved, the inner margin being concave, outer margin distally serrulate, with a plumose seta arising from each notch, stylet reaching to, but not beyond, apex of peduncle, basal joint stout, 2nd joint proximally stout then narrowing rapidly to a fine point, outer ramus apparently absent.

Uropods lost.

Length: 3 mm.; *breadth*: 75 mm.

Colour: In spirit chalky white.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. 1 ♂. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4132.)

This species is easily distinguished from the other three species of the genus by the spinous processes of the head and the greater development of the 1st antennae.

GEN. RHABDOMESUS Rich.

1886. *Ischnosoma* (part) Beddard, *Challeng. Rep.* vol. 17, p. 39.
1908. *Rhabdomesus* Richardson, *Proc. U.S. Nat. Mus.* vol. 35 [1909],
p. 81.
1914. „ Vanhöffen, *Deutsche Südpol. Exp.* vol. 15, pt. 4,
p. 560.

The "Challenger" obtained two species of this interesting genus in the Southern oceans: *R. bacillus* (Bedd.) from 1800 fathoms off Melbourne and *R. bacilloides* (Bedd.) from 1450 fathoms off Valparaiso. There was only one specimen of each species and both were fragmentary. Great interest therefore attaches to the two specimens in the "Pieter Faure" Collection, not only because they are from a new locality but mainly because they are complete except for the long and extremely slender peraeopods and 2nd antennae. A description of the mouth-parts can therefore be given and Beddard's description of the pleopods confirmed.

The only example since obtained is *R. inermis*, taken by the "Gauss" in the Antarctic Ocean.

RHABDOMESUS BACILLOPSIS n. sp.

(Plate XVII. Fig. 13.)

Male.—Body very elongate, glabrous. Head broader than long, somewhat immersed in the 1st peraeon segment, anterior margin slightly convex. Peraeon segment 1 shorter than 2, its lateral parts directed forwards and embracing the base of the head. Segments 2 and 3 subequal, the lateral portions prominent and rounded. Segment 4 anteriorly similar to 3, the posterior portion much narrowed, elongate, cylindrical, the whole segment a little longer than segments 1-3 together. Segment 5 longer than 4, anteriorly narrow and cylindrical, posteriorly widening, the lateral portions directed backwards. Segments 6 and 7 subequal, a little shorter than 2 or 3. All the segments, including 7, bear on the lateral portion a strong spiniform projection which is curved forwards on the anterior 4 segments, backwards on the 3 posterior ones.

Pleon segment 1 very short and narrower than segment 2, which is shield-like, ovate, apically rounded.

Antenna 1 reaching back to 3rd peraeon segment, basal joint somewhat triangular, followed by one very slender, elongate and strongly indurated joint, flagellum still more slender, shorter than the preceding long joint, 4-jointed, ending in 2 long unequal setae.

Antenna 2 broken off at the 3rd joint in both specimens.

Mandible, cutting-edge 4-dentate, secondary cutting-edge bidentate, spine-row with 6 spines, molar prominent, palp absent.

Lower lip with the lobes ovate, somewhat incurved, apices rounded, with a tuft of setae.

Maxillae 1 and 2 normal.

Maxilliped, 2nd joint longest, 3rd rather narrow, 4th and 5th broader than 3rd, 6th much narrower than 5th, not strongly lobed internally, 7th narrower than 6th, inner plate with 2 coupling-hooks; epipod reaching to base of 5th, ovate, apex subacute, outer margin straight, angular near the base.

Peraeopods all broken off at the 2nd joint in both specimens; the 2nd joint of all the peraeopods is elongate and very slender.

Pleopod 1 in ♂ strongly indurated, very similar to Beddard's figure of that of *bacilloides*, but apices of peduncles and rami not prominent.

Pleopod 2 in ♂ as in Beddard's figure of that of *bacilloides*, but the stylet apically not tapering so gradually, more abruptly acute.

Uropod 2-jointed, 1st joint short, 2nd a little more than twice length of 1st, tipped with 2 setae.

Length: 7 mm.; *breadth* across broadest part: .75 mm.; across narrow part: .25 mm.

Colour: In spirit porcelain white.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. Bottom green mud. 2 ♂♂. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4066.)

ILYCHTHONOS n. g.

Body moderately elongate. Head nearly globular, not excavate for the insertion of the antennae. Peraeon segment 1 not very short, not embracing the head; segments 4 and 5 not elongate, not much narrower than 3. Pleon consisting of one segment only. Antenna 1 short. Only the basal joints of antenna 2 known. Mouth-parts normal; mandibular palp reduced and feeble, 3rd joint minute, unarmed, molar well developed; 6th joint of maxilliped not lobed internally. Peraeopods 1-4 slender, increasing length, 5th joint in peraeopods 3 and 4 elongate; peraeopods 5-7 a little stouter, moderately spinose. First pleopods in ♂ with peduncles fused basally, rami indistinct. Operculum in ♀ ovate, keeled, apically cleft. Pleopod 2 in ♂ with stylet rather stout, reaching a little beyond apex of peduncle. Uropod uniramous.

This genus is near to the typical genus *Desmosoma*, but differs in having a well-developed molar but a reduced palp on the mandible.

The apically-cleft operculum in the ♀ is unique, also the fused basal portions of the 1st pleopods in ♂.

Perhaps congeneric with *Syneurycope* Hansen, 1916.

ILYCHTHONOS CAPENSIS n. sp.

(Plate XVII. Figs. 14-16.)

Body smooth, glabrous. Head strongly convex in profile, in dorsal view nearly circular, a little broader than long, lateral portions not developed, frontal margin not produced but declivous between the bases of 1st antennae. Peraeon segment 1 a little broader than head, a little more than twice as broad as long, not embracing head; segment 2 a little longer and wider, not twice as broad as long; segments 3 and 4 subequal, posterior margins shorter than anterior margins; antero-lateral angles of all 4 anterior segments rounded; segments 5-7 together not nearly as long as the 4 anterior ones together, segment 5 longer at the sides than dorsally, 6 of equal length throughout, 7 longer dorsally than at the sides, its posterior margin straight. Side-plates on segments 1-4 not very distinct.

Pleon of a single segment, at least without visible suture between the short basal and the longer distal portions, the latter broad proximally, contracting suddenly to a much narrower distal part which is apically subacute.

Antenna 1, 1st joint moderately stout, conical, 2nd inserted apically, a little longer than 1st, 3rd a little longer than 2nd, flagellum equal to 2nd plus 3rd, with ca. 12 indistinctly separated joints.

Only the basal joints of antenna 2 remaining, 1st joint with a spine on lower outer apex.

Upper lip rounded, minutely setulose.

Lower lip, inner apices of lobes quadrate, with a rather strong tuft of setules.

Mandible, cutting-edge 4-5 dentate, secondary cutting-edge bifid, spine-row with 3 fimbriate spines, molar well developed, palp small, unarmed, 1st joint shorter than 2nd, 3rd minute, indistinctly separated from 2nd, tipped with 1 setule.

Maxillae 1 and 2 normal.

Maxilliped, 2nd joint longest, 4th and 5th broad, inner distal margin of 5th with 3 denticles, 6th and 7th small but well developed, 6th not lobed internally, epipod very large, reaching to 5th joint, nearly twice width of maxilliped, ovate, apex narrowly rounded, outer margin angular.

Peraeopods 1-4 slender, increasing in length posteriorly, very feebly

armed, especially peraeopods 3 and 4, in these latter 5th joint very elongate and slender.

Peraeopods 5-7 a little stouter than the anterior ones, slightly decreasing in length posteriorly, 5th and 6th joints with moderately numerous outstanding spines, inner apex of 6th joint in peraeopod 7 with 1 spine almost as long as the 7th joint plus unguis.

First pleopods in ♂, peduncles narrow, apparently set on a completely fused basal portion, apices truncate, rami not distinct.

Operculum in ♀ ovate, apex cleft for $\frac{1}{4}$ its length, keel moderately strong and extending as far as the cleft, outer distal margins with plumose setae.

Pleopod 2 in ♂, peduncle narrow-ovate, apex subacute, outer distal margin with plumose setae, stylet rather stout, straight, reaching a little beyond apex of peduncle, outer ramus small.

Uropod uniramous, 2-jointed, the joints subequal, both tipped with setae.

Length: 5 mm.; *breadth*: 1 mm.

Colour: In spirit chalky white.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. 2 ♂♂, 4 nonovigerous ♀♀. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4030.)

FAMILY MUNNOPSISIDAE.

For references see Barnard, Ann. S.A. Mus. vol. 10, pt. 7, p. 225, and add:

1914. Vanhöffen, Deutsche Südpol. Exp. vol. 15, pt. 4, p. 582.

GEN. PSEUDOMUNNOPSIS Hansen.

1916. *Pseudomunnopsis* Hansen, Dan. Ingolf Exp. iii, 5, p. 160.

PSEUDOMUNNOPSIS BEDDARDI (Tatt.).

(Plate XVII. Figs. 17, 18.)

1905. *Munnopsoides beddardi* Tattersall, Fish. Irel. Sci. Invest. 1904, ii, p. 26, pl. 6, figs. 1-8.

1916. *Pseudomunnopsis* ,, Hansen l.c. pp. 10, 160, pl. 14, figs. 3a-m.

Body glabrous. Head about as broad as long, strongly convex in profile, anterior margin slightly convex. Peraeon segment 1 curving forwards laterally, embracing the basal part of the head, shorter and narrower than segment 2, segments 2-4 subequal in length, 4 a little narrower than 3, all 4 segments with a transverse ridge both on the

posterior and on the anterior margins, the anterior one more prominent than the posterior, especially medianly, and in one ♀ specimen produced into an acute median tooth on segments 1-3; the presence of these teeth is evidently a variable feature but cannot be called discontinuous, as the greater prominence of the ridge in the medio-dorsal line shows clearly how such teeth can be developed. Peraeon segment 5 nearly equal to segments 1-4 together, 6 and 7 very short. Side-plates on segments 1-4 only.

Pleon a little longer than peraeon segment 5, narrow-ovate, widest in the middle, apex bluntly rounded.

Antenna 1 reaching in ♂ to end of 4th, in ♀ to beginning of 3rd peraeon segment, 1st joint stout, conical, apex blunt, 2nd inserted before apex of 1st, only $\frac{1}{2}$ width of 1st at the place where 2nd is inserted, 3rd $\frac{1}{2}$ width and $\frac{1}{2}$ length of second, flagellum longer than peduncle, 9-jointed in ♀, 1st joint very short, 2nd twice as long as any of the following, in ♂ with a short 1st joint and a long 2nd joint, composed of a large number of partly fused joints.

Only the basal joints of antenna 2 remaining.

Mandible conical, tapering to a subacute, feebly bifid apex, molar, spine-row and palp entirely absent.

Maxillae 1 and 2 as figured for *beddardi* Tattersall (l.c. p. 26, pl. 6).

Maxilliped, 2nd joint longest, 3rd very short, 4th broad, inner margin concave, inner apex acute, slightly produced, 5th as broad as but scarcely $\frac{1}{2}$ as long as 4th, inner margin sinuous, inner apex acute, slightly produced, 6th and 7th very slender, 7th a little longer than 6th, epipod reaching to apex of 4th joint, ovate-lanceolate, inner plate with 2 coupling-hooks (termed "sensory processes" in the description of *beddardi*).

Peraeopod 1 short, 2nd joint longest, nearly equal to 3rd-5th together, 4th shortest, broader than long, 5th equal to 3rd, somewhat ovate, inner margin convex, with 3 spine-setae distally, 6th as long as but only $\frac{1}{2}$ width of 5th, 7th scarcely $\frac{1}{2}$ length of 6th.

Peraeopods 2-4 except the 2nd joints, lost in all the specimens.

Peraeopods 5-7 very slender, 2nd and 3rd joints subequal, 4th very short, 5th a little longer than 3rd, apparently without any setae, 6th subequal to 3rd, narrow-ovate, widened slightly distally, setae on one margin only, 7th absent.

Pleopod 1 in ♂ reaching to apex of pleon, peduncles contiguous throughout their entire length, fused but with distinct suture, very narrow, widening slightly before the blunt apex, ramus very small, inserted obliquely on inner apex.

Operculum in ♀ reaching to apex of pleon, nearly circular when flattened out, but in the natural position folded longitudinally, roof-like.

Pleopod 2 in ♂ reaching to apex of pleon, peduncles large, semi-circular, fused along the straight inner margins but with distinct suture, in natural position folded longitudinally, roof-like, slightly diverging distally where the short, geniculate, apically subacute inner rami (stylets) are inserted, the rami not projecting beyond the apices of the peduncles.

Uropod slender, uniramous, 2nd joint a little longer than 1st.

Length: ♂ 3.5 mm., ♀ 4 mm.; *breadth*: across anterior part of body ♂ 1 mm., ♀ 1.25 mm. Another ♀ measures 5.5 × 1.5 mm. and the anterior half of another (ovigerous) ♀ measures 2 × 2 mm.

Colour: In spirit pinkish-white.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. Bottom green mud. 2 ♂♂, 3 ♀♀, 2 fragments. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4068.)

Geogr. Distribution: W. coast of Ireland, 199–382 fathoms (Tattersall); Davis Strait, 1435 fathoms and Faroe Is., 463–515 fathoms (Hansen).

GEN. ILYARACHNA Sars.

1863. *Mesostenus* G. O. Sars, Chr. Vid. Selsk. Forhl. 1863, p. 211
(nom. preocc.).
1870. *Ilyarachna* id. Christ. Fjord. Dybvands Fauna, 1869, p. 44.
1886. „ Beddard, Challeng. Rep. vol. 17, p. 76.
1896. „ Bonnier, Ann. Univ. Lyons, vol. 26, p. 608.
- 1897–8 „ Sars, Crust. Norw. vol. 2, p. 134.
1901. „ Ohlin. Bih. Sv. Vet. Akad. vol. 26, pt. 4, No. 12,
p. 37.
1905. „ Tattersall, Fish. Irel. Sci. Inv. 1904, ii, p. 28.
1911. „ Richardson, Bull. Mus. d'Hist. Nat. Paris, 1911,
No. 7, p. 533.
1914. „ Vanhöffen, Deutsche Südpol. Exp. vol. 15, pt. 4,
p. 591.

ILYARACHNA AFFINIS n. sp.

Body smooth, glabrous. Head broader than long, with a transverse ridge on both anterior and posterior margin. Peraeon segments 1–3 subequal, 4 longer distally, its anterior margin curved forwards, antero-lateral angles, especially those of segment 2, acute, segments

5-7 narrower than 4, gradually decreasing in width, 5 shortest dorsally, 6 shortest laterally, 7 of equal width throughout, all the segments with transverse ridges marking the anterior and posterior margins, the anterior ones on segments 1-3 very faintly denticulate in two of the specimens; side-plates distinct on first 4 segments.

Pleon a little longer than 6th and 7th peraeon segments together, only a little narrower at base than 7th segment, basal margin straight with a transverse ridge, narrowing to a subacute apex, lateral margins straight except for a slight convexity above the insertion of the uropods.

Antenna 1, 1st joint subtriangular, outer apex subacutely produced, with 2 spines, outer margin with 2 spines near base and 1 in middle, inner margin with 3 spines just before insertion of 2nd joint, 3rd more slender than 2nd and a little longer, flagellum about equal to 2nd plus 3rd joints, 6-jointed, 1st joint shortest.

Only the basal joints of antenna 2 remaining.

Mouth-parts as figured by Sars for *I. longicornis* (1897, l.c. pl. 59).

Peraeopod 1 also as in *longicornis*. All the other peraeopods lost.

Operculum in ♀ ovate-lanceolate, with a strong and sharp median longitudinal keel reaching almost to the subacute apex.

Uropods lost.

Length: 5 mm.; *breadth*: 1.75 mm.

Colour: In spirit pinkish-white.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. 4 nonovigerous ♀ ♀. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4065.)

Very close to *longicornis* from the N. Atlantic, but distinguished by having the *outer* angle of the 1st joint of 1st antenna produced instead of the *inner*, and by the 5th peraeon segment being very distinctly narrower than 4th (thereby distinguished also from *plunketti* Tattersall, l.c. p. 28, pl. 7*), with straight or very slightly emarginate, instead of convex, sides. The denticulation on the anterior margins of the first 3 segments is a variable feature (cf. Ohlin's remarks on *hirticeps* and *denticulata* in l.c. supra, p. 36).

ILYARACHNA CRASSICEPS n. sp.

Body smooth, glabrous. Head broader than long, the lateral portions not very pendulous, no transverse ridges on anterior or posterior margins. Peraeon segment 1 narrower than head, very short; segment 2 longer and wider, both 1 and 2 laterally obtuse; segment 3 with acute antero-lateral angles; segment 4 longer than 3,

* But see Hansen, l.c. 1916, p. 122.

lateral angles rounded-quadrate; segment 5 at base distinctly narrower than 4, widening distally, postero-lateral angles rounded, posterior margin concave: segment 6 of the same length laterally as dorsally, the posterior margin therefore concave, slightly narrower than 5; segment 7 slightly narrower than 6, posterior margin straight or very slightly trilobed, segment therefore longer dorsally than laterally. No transverse ridges on any of the segments. Side-plates on anterior segments not very distinct.

Pleon as broad basally as 7th peraeon segment, about as broad as long, lateral margins straight, apex obtuse.

Antenna 1, 1st joint stout, neither outer nor inner apex produced, the other joints lost.

Only the 3 basal joints of antenna 2 remaining.

All the peraeopods, except the 2nd joints, lost.

Pleopod 1 in ♂ narrow, apex of peduncle acute, ramus distinct, very narrow, projecting slightly beyond apex of peduncle, tipped with setules.

Operculum in ♀ with a sharp keel extending nearly to apex, denticulate in profile and setose like the rest of the surface.

Pleopod 2 in ♂, peduncle ovate, inner margin straight, apex acute, stylet reaching to apex of peduncle, the distal quarter of its length very fine.

Length: 2.75 mm.; *breadth*: 1.25 mm.

Colour: In spirit pinkish-white.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. 1 ♂, 1 nonovigerous ♀. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4133.)

GEN. EURYCOPE Sars.

1864. *Eurycope* G. O. Sars, Chr. Vid. Selsk. Forhl. 1863, p. 208.
 1886. ,, Beddard, Challeng. Rep. vol. 17, p. 58.
 1896. ,, Bonnier, Ann. Univ. Lyons, vol. 26, p. 596.
 1897. ,, Hansen, Bull. Mus. Comp. Zool. Harv. vol. 31, no. 5,
 p. 96.
 1897-8. ,, Sars, Crust. Norw. vol. 2, p. 144.
 1901. ,, Ohlin, Bih. Sv. Vet. Akad. vol. 26, pt. 4, no. 12,
 p. 34.
 1905. ,, Tattersall, Fish. Irel. Sci. Inv. 1904, II, p. 30.
 1905. ,, Richardson, Bull. U.S. Nat. Mus. no. 54, p. 490.
 1908. ,, id. Proc. U.S. Nat. Mus. vol. 34, p. 67.
 1908. ,, id. ibid. vol. 35 [1909], p. 84.
 1910. ,, id. ibid. vol. 37, p. 120.

1911. *Eurycope* Richardson, Bull. Mus. d'Hist. Nat. Paris, 1911,
no. 7, p. 532.
1914. „ Vanhöffen, Deutsche Südpol. Exp. vol. 15, pt. 4,
p. 586.
1916. „ Hansen, Dan. Ingolf Exp. iii, 5, p. 137.

EURYCOPE SULCIFRONS n. sp.

(Plate XVII. Figs. 22, 23.)

Body smooth, glabrous. Head short laterally but strongly produced forwards in a moderately broad process, which is apically rounded and dorsally shallowly grooved, a low rounded tubercle in the middle of the head. Peraeon segments 1-4 increasing gradually in width and length, laterally rounded, with rounded side-plates; segments 5-7 decreasing in width posteriorly, 5 longest at the sides, 6 longest dorsally, the anterior margin rather strongly convex, 7 of equal width throughout and about equal to the greatest length of 5, antero- and postero-lateral angles rounded. Pleon as broad as long, antero-lateral angles quadrate, apex rounded.

Antenna 1, 1st joint apically rounded, scarcely produced, 3rd nearly equal to 2nd, flagellum incomplete but at least 14-jointed.

Only the basal joints of antenna 2 remaining.

Maxilliped, 4th joint broader than long, outer apex shortly and acutely produced, 5th broader than long, greatest length on inner margin, which is distally cut into small shallow notches each with a setule, outer margin very short, outer apex acute, 6th strongly lobed internally, epipod reaching to middle of 5th joint, lanceolate, a little more than twice as long as broad, apex acute, outer margin scarcely angular, concentric sculpturing faint.

Peraeopods 1-4 lost. Peraeopods 5-7, 5th joint very strongly expanded, 6th also broadly ovate, not twice as long as broad, 7th $\frac{1}{2}$ width of 6th, straight, narrow-ovate.

Pleopod 1 in ♂, peduncle widest basally, tapering with slightly sinuous margins lateral to a blunt apex bearing a few setules, rami not distinct. Operculum in ♀ nearly circular.

Pleopod 2 in ♂, peduncle semicircular, inner margin slightly concave, stylet inserted about the middle, basal part of 2nd joint rather stout, distal part abruptly narrower, outer ramus between stylet and apex of peduncle.

Uropods lost.

Length: 4 mm.; *breadth*: 1.5 mm.

Colour: In spirit dirty pinkish.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. Bottom green mud. 1 ♂, 9 ♀♀, some ovigerous. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4063.)

In the shape of the head and the body this species is close to *E. parva* Bonnier (l.c. p. 600, pl. 33, fig. 4). The 5th and 6th peraeon segments, however, are not fused dorsally, segments 1-4 are not produced anteriorly and the 1st and 2nd pleopods differ in shape.

EURYCOPE QUADRATA n. sp.

(Plate XVII. Figs. 20, 21.)

Body smooth, glabrous. Head moderately long, shortly produced in front in a quadrangular process broader than long. Peraeon segments 1-4 subequal, increasing in width, side-plates directed forwards, acute; segments 5-7 decreasing in width, 5 and 6 subequal in length and of equal length throughout, 7 nearly as long as 5 and 6 together, antero-lateral angles of all three acutely, but shortly, produced forwards, postero-lateral angles rounded. Pleon as broad as long, antero-lateral angles acute, apex rounded.

Antenna 1, 1st joint apically rounded, not produced, the other joints lost.

Antenna 2, all except the basal joints lost.

Maxilliped, 4th and following joints in all the specimens broken off, epipod similar to that of *E. cornuta* (figured by Sars, l.c. pl. 64), apically acute, outer margin strongly produced in a blunt process, with the margin on either side concave, concentric sculpturing on epipod and 2nd joint strongly marked.

Peraeopods 1-7 all lost.

Pleopod 1 in ♂, peduncles of nearly the same width throughout, lateral margins sinuous, apices narrow acute, rami distinct, apically subacute with a few setules.

Pleopod 2 in ♂, peduncle subtriangular, inner margins straight, outer strongly angular near base, apex truncate, stylet inserted about middle of inner margin, tapering gradually, outer ramus broad, inserted on the truncate apex of peduncle.

Uropods lost.

Length: 4 mm.; *breadth*: 1.75 mm.

Colour: In spirit dirty pinkish.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. Bottom green mud. 9 specimens, some mutilated. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4062.)

This species is close to *E. complanata* Bonnier (1896, l.c. p. 601,

pl. 34, fig. 1), but has a more elongate pleon and a less produced and blunter median process on the head. The epipod of the maxilliped and the 2nd pleopod are very much alike in the two species.

EURYCOPE FUSIFORMIS n. sp.

(Plate XVII. Fig. 19.)

Female.—Body widest in the middle, tapering towards both ends, smooth, glabrous. Head strongly emarginate in front, lateral portions not developed. Peraeon segment 1 wider than head, segments 1–4 increasing gradually in width, antero-lateral angles of 1 and 2 quadrate, of 3 and 4 shortly acute; segment 5 widest of all, longer laterally than dorsally, antero-lateral angles rounded-quadrate, posterior margin concave; segment 6 of same length laterally as dorsally, posterior margin concave; segment 7 longer dorsally than laterally, posterior margin straight; segments 5–7 closely united, with nearly straight and even lateral margins, narrowing gradually posteriorly. Transverse ridges not developed. Side-plates distinct only on segments 3 and 4. Pleon at base as broad as peraeon segment 7, almost an equilateral triangle in shape, lateral margins slightly convex, apex subacute.

Antenna 1, 1st joint stout, 2nd short and much narrower, 3rd very slender, flagellum at least 5-jointed, 1st very short.

Antenna 2, except the basal joints, lost.

Mandibular palp with 3rd joint falciform.

Epipod of maxilliped broad, the inner margin and the proximal portion of outer margin subparallel, the distal portion of outer margin bevelled off straight or very slightly concave to the subacute apex.

All the peraeopods lost.

Operculum with a broad strong keel extending to apex.

Length: 3.5 mm.; *breadth*: 1.5 mm.

Colour: In spirit pinkish-white.

Locality: Cape Point N. 89° E., distant 36 miles. 700 fathoms. 3 nonovigerous ♀♀. s.s. "Pieter Faure." 20/8/03. (S.A.M. No. A4134.)

This species is in general appearance like *Ilyarachna plunketti* Tattersall (l.c. p. 28, pl. 7), but differs in having the anterior margin of 7th peraeon segment strongly convex and the pleon shorter relatively to its length—two features which bring it very close to *I. abyssorum* Rich. (Bull. Mus. d'Hist. Nat. Paris, 1911, no. 7, p. 533). Both species are without lateral developments of the head, but the latter species has no palp to the mandible and a distinctly biramous uropod.

The only features by which the generic position of the present specimens can be determined are the mandibular palp and the epipod of the maxilliped. Both of these are of the type found in *Eurycope*.

EPICARIDEA.

This tribe has hitherto been poorly represented in the fauna list of South African Crustacea. Stebbing in the General Catalogue, 1910, records only two species. In 1914 were added:

Liriopsis sp., from Durban, by Brady (Ann. Durban Mus. vol. 1, pt. 1, p. 7, pl. 3, figs. 9-15).

Hemiarthrus nematocarcini by Stebbing (Ann. S.A. Mus. vol. 15, pt. 1, p. 47, fig.).

Zonophryxus quinquedens by Barnard (ibid. vol. 10, pt. 7, p. 228, pl. 22).

Together with the species recorded below the number of the South African *Epicaridea* now totals 11.

With regard to the explanation of Brady's figures of *Liriopsis*, it may be remarked that, presumably by misprint, fig. 12 is labelled "first foot," whereas its structure shows it to be either the 6th or 7th; fig. 14 labelled as "second foot?" may be either the 1st or 2nd.

FAMILY BOPYRIDAE.

1905. *Bopyridae* Richardson, Bull. U.S. Nat. Mus. no. 54, p. 498.
 1908. „ Stebbing, S.A. Crust. pt. 4, p. 56.
 1910. „ id. Tr. Linn. Soc. Lond. Zool. vol. 14, pt. 1, p. 111.

The separation of the two genera *Pseudione* and *Palaegyge* according to the presence or absence of warts on the pleopods of the female proposed by Giard and Bonnier and accepted by Stebbing (Hist. Crust. 1893, p. 410), is not recognised by Sars (Crust. Norw. vol. 2, p. 202). It would seem, however, to be a useful division though somewhat arbitrary, and moreover it can be correlated with the habitat: the species of *Palaegyge* occur on the *Caridea*, the species of *Pseudione* on the *Anomala* and *Thalassinida*.

GEN. PALAEGYGE Giard & Bonn.

1888. *Palaegyge* Giard & Bonnier, Bull. Sci. Fr. Belg. vol. 19, p. 68
 (sep. copy, pp. 3, 7, 11).
 1890. „ id. ibid. vol. 22, p. 384.
 1892. „ Weber, Zool. Ergebn. vol. 2, p. 557.

1893. *Palaegyge*, Stebbing, Hist. Crust. p. 410.
1900. „ Bonnier, Trav. Stat. Zool. Wimereux, vol. 8, p. 332.
1910. „ Horst, Notes from Leyden Mus. vol. 32, No. 1, p. 67.
1912. „ Richardson, Proc. U.S. Nat. Mus. vol. 42, p. 521.

PALAEGYGE PLESIONIKAE n. sp.

(Plate XVII. Figs. 24, 25.)

Female.—Head a little wider than long, anterior margin straight or slightly concave, “limbe posterieur” entire, each of its exterior angles produced into a rather stout, curved process. Ovarian bosses on first 4 peraeon segments; epimera not conspicuous, not developed as lamellae on the last 3 segments. Pleon of 6 distinct segments, the last entire; pleurae entire, not greatly developed, not concealing the outer rami of pleopods.

Antenna 1 3-jointed, basal joint stout, completely separated from its fellow by the triangular frontal plate, with apical tuft of setae.

Antenna 2 7-jointed, basal joint stout, distal 2 joints minute, with apical tuft of setae.

Maxilliped divided into two portions by an oblique suture, anterior portion quadrangular, postero-exterior angle produced backwards into a long curved process, palp rather large, strongly setose, posterior portion subtriangular, antero-interior angle produced.

The five pairs of marsupial plates overlap in the centre. First pair with the distal lobe produced backwards in a blunt process. The margin of the overlapping ridge has three small indentations. The hind margins of all the pairs, except the first, fringed with setae, those on the 5th being strong and conspicuous.

Pleopods increasing successively in length and diminishing in thickness posteriorly, the outer rami larger than the inner, both smooth.

Uropods slightly curved, tapering, with blunt apices.

Male.—Lanceolate in outline, head broader than long, anterior margin evenly rounded, eyes small but distinct. Peraeon segments all distinct, laterally rounded. Pleon segments also distinct, the lateral portions directed backwards, the 6th segment triangular, with a few short spines on postero-external angles.

Antenna 1 3-jointed, basal joint large, not contiguous with its fellow, with apical tuft of setae.

Antenna 2 7-jointed, basal joint not very enlarged, 6th and 7th minute, with apical tuft of setae.

Pleopods rudimentary, lobe-like projections on 1st-5th pleon segments.

Length: ♀ 15 mm., ♂ 4 mm.; *breadth*: ♀ 9 mm.; ♂ 1.5 mm.

Colour: In spirit pale yellowish.

Locality: Table Mountain N. 79° E., distant 40 miles. 250 fathoms. 3 ♀ ♀, 1 ♂; Cape Point NE. $\frac{3}{4}$ E., distant 29 miles. 470 fathoms. 1 ♀, 1 ♂. s.s. "Pieter Faure." 18/4/00 and 11/6/03. (S.A.M. Nos. A2274 and A2275.)

Host: *Plesionika martia* (M. Edw.). In the branchial cavities, both right and left, chiefly the former, the males are attached sometimes to the pleopods of the female, head hindermost, sometimes transversely across the middle of the brood-pouch.

In this species the uropods in the ♀ are more developed than appears usual in this genus according to definition. Moreover, the species hitherto described have all been taken from members of the family *Palaemonidae*, whereas the host of the present species belongs to the *Pandalidae*.

GEN. PSEUDIONE KOSM.

1881. *Pseudione* Kossmann, Zeitsch. Wiss. Zool. vol. 35, p. 663.
 1890. „ Giard and Bonnier, l.c. p. 377.
 1893. „ Stebbing, l.c. pp. 410, 411.
 1897. „ Hansen, Bull. Mus. Comp. Zool. Harv. vol. 31, No. 5,
 p. 118.
 1898. „ Sars, Crust. Norw. vol. 2, p. 200.
 1898. „ Calman, Ann. N.Y. Ac. Sci. vol. 11, No. 13, p. 274.
 1900. „ Bonnier, l.c. p. 292.
 1904. „ Richardson, Proc. U.S. Nat. Mus. vol. 27, pp. 78, 83.
 1905. „ id. Bull. U.S. Nat. Mus. No. 54, p. 522.
 1910. „ id. Wash. Bur. Fish. Doc. 736, p. 37.

PSEUDIONE MUNIDAE n. sp.

(Plate XVII. Figs. 26, 27.)

Female.—Head a little wider than long, anterior margin slightly convex, crenulate, "limbe posterieur" with hind margin and lateral processes crenulate. Ovarian bosses on first 4 segments. Epimera inconspicuous, antero-lateral angle acutely produced on anterior segments, lateral margin irregularly indented on the posterior segments. Pleon of 6 distinct segments, 6th minute and embraced by 5th, ventral surfaces crossed by longitudinal rugae, pleura developed as lamellae, but not concealing the pleopods, entire, covered with rounded warts.

Antenna 1 3-jointed, basal joint not greatly expanded, not contiguous with its fellow.

Antenna 2 4-jointed, basal joint not greatly expanded.

A pair of large tubes as described by Calman in *P. giardi*.

Maxilliped, anterior portion produced both backwards and forwards on the outside, posterior portion triangular, its antero-interior angle not produced, no palp.

Peraeopods with 3rd joint bulbous, exterior angle of palm produced into a rounded setose lobe on which the curved finger closes.

The 5 pairs of marsupial plates overlap in the centre. The first pair with a blunt posterior process on the distal lobe, no overlapping ridge. Hind margin of the 4th pair minutely setulose, of the 5th strongly setose.

Pleopods lanceolate, becoming slightly shorter posteriorly, outer and inner rami subequal, with small warts, chiefly on the anterior pairs.

Uropods lanceolate with acute apices.

Male.—Lanceolate in outline, head broader than long, anterior margin rounded. Peraeon segments distinct, laterally narrowed, subangular. Pleon abruptly narrower than peraeon, all 6 segments distinct, 6th segment broader than long, hind margin emarginate, postero-lateral angles without setae.

Antenna 1 3-jointed; antenna 2 4-jointed; the basal joints not expanded.

Peraeopods with 3rd joint not bulbous, palm oblique.

Pleopods—there are obscure indications of lobe-like processes on the first 3 segments and possibly on the 4th also.

Length: ♀ 9 mm., ♂ 4 mm.; *breadth*: ♀ 6 mm., ♂ 1.5 mm.

Colour: In spirit yellowish-white.

Locality: Off Buffalo River, East London. 300 fathoms. ♂♂ and ♀♀. s.s. "Pieter Faure." 16/4/01 and 24/4/01. (S.A.M. Nos. A269 and A2273.)

Host: *Munida sancti-pauli* Henderson. In the branchial cavity.

Distinguished from *P. crenulata* Sars 1898 by the acute epimera and the rounded pleura in the ♀. The ♂ bears most resemblance to that of *P. giardi* Calman 1898.

PSEUDIONE CRENULATA Sars.

1898. *Pseudione crenulata* Sars, Crust. Norw. vol. 2, p. 203, pl. 86, fig. 1.

1900. " " Bonnier, Trav. Stat. Wimereux, vol. 8, p. 303.

Female.—Head only very faintly crenulate, “limbe posterieur” with margin entire, the lateral processes not crenulate. Eyes not distinguishable. Ovarian bosses on segments 1–4. Maxilliped with inner distal angle of anterior part not so much produced as in Sars’ figure, without any indication of a palp. First marsupial plate without posterior process on distal lobe, overlapping ridge well developed; posterior margin of plates 2 and 3 setulose, of 4 and 5 strongly setose.

In other respects corresponding with Sars’ description.

Length: ♀ 5 mm., ♂ 2 mm.; *breadth*: ♀ 3.5 mm., ♂ 1.5 mm.

Colour: In spirit dull pinkish.

Locality: Off Port Shepstone, Natal. 24 fathoms. s.s. “Pieter Faure.” (S.A.M. No. A4860.)

Host: *Galathea dispersa* Bate. In the branchial cavity.

Geogr. Distribution: Coast of Norway. On *Munida rugosa* and *tenuimana*. (Sars.)

PARAGIGANTIONE n. g.

Female.—Body oval, asymmetrical. Epimera well defined, extending the whole length of the segment, not expanded. Pleon segments distinct. Pleura hiding the pleopods but not expanded, entire. Maxilliped similar to that of *Gigantione*, without palp. All 7 pairs of peraeopods developed. Pleopods biramous, entire, inner ramus larger than outer. Uropods biramous, rami subequal, ovate, not pedunculate.

Male.—Peraeon and pleon segments distinct. A median ventral papilla on peraeon segments 1–6. Pleopods present on segments 1–5, lobe-like. Uropods lamellate, uniramous, ovate.

Parasitic in the branchial cavity.

This genus differs from *Gigantione* in having in the ♀ non-pedunculate uropods, the segments not expanded and the pleopods not fimbriate or fringed. No mention is made of the ventral papillae of the ♂ in any species of *Gigantione*, so that their absence may be reckoned as a characteristic of the genus.

The only other genus in which the ♀ has biramous uropods and the pleon segments of the ♂ are distinct is *Aporobopyroides* Nobili 1906, but in this genus the 5th and 6th pleon segments of the ♂ are fused dorsally and ventrally and there are no pleopods or uropods. The ♂ of *Urobopyrus* Richardson 1904 is unknown.

PARAGIGANTIONE PAPILLOSA n. sp.

(Plate XVII. Figs. 28, 29.)

Female.—Head broader than long, anterior margin slightly convex,

“limbe posterieur” entire, the curved process at exterior angle strong. Ovarian bosses absent or not yet developed. Epimera conspicuous, extending whole length of segments. Pleon of 6 distinct segments, pleura entire, only the 4th and 5th strongly produced as lamellae, 5th segment embracing 6th, which is broader than long.

Antenna 1 3-jointed, 1st and 2nd joints stout, 3rd minute, tipped with setae.

Antenna 2 5-jointed, 1st and 2nd joints stout, 3rd and 4th elongate, 5th minute, tipped with setae.

Maxilliped, anterior portion quadrangular, exterior angle rounded, margins setose, posterior portion more semicircular than triangular, inner apical angle acute, ending in a small spine, inner margin setose, palp absent.

Only the first pair of marsupial plates meet in the centre; the others apparently are not fully developed. First pair with the 2 lobes subtriangular and about equal in size, overlapping ridge entire and smooth. Inner and hind margins of 2nd–5th pairs and inner margin of the distal lobe of 1st pair setose.

Pleopods probably not fully developed, inner ramus broadly lanceolate with acute apex, larger than outer ramus, which is quadrate, with the postero-exterior angle a little produced.

Uropods biramous, attached to the lateral angles of 6th pleon segment, rami subequal, ovate, apical margins finely setulose.

Male.—Nearly parallel-sided, anterior margin of head convex. Peraeon segments all distinct, laterally somewhat pointed, 1st with the median ventral papilla pointed, segments 2–6 with the papilla rounded, with a small pit in the middle. Pleon segments all distinct, pleura developed as blunt lamellae, the 5th segment embracing 6th, which is as broad as long, ovate and cleft nearly to the base.

Pleopods on segments 1–5 lobe-like.

Uropods lamellate, uniramous, obovate, extending a little beyond apex of 6th segment, apical margins finely setose.

Length: ♀ 7.5 mm., ♂ 3 mm.; *breadth*: ♀ 4 mm., ♂ 1 mm.

Colour: In spirit yellowish-white.

Locality: Off Buffalo River, East London. 300 fathoms. 1 ♂ and ♀. s.s. “Pieter Faure.” 24/4/01. (S.A.M. No. A2277.)

Host: *Munida sancti-pauli* Henderson. In the branchial cavity.

GEN. HEMIARTHURUS Giard & Bonn.

1843. *Phryxus* Rathke, Nova Acta Ac. Leop.-Carol. Naturae Curios. p. 40.

1887. *Hemiarthrus* Giard & Bonnier (date quoted from Stebbing).
 1893. „ Stebbing, Hist. Crust. p. 417.
 1898. *Phryxus* Sars, Crust. Norw. vol. 2, p. 214.

HEMIARTHURUS NEMATOCARCINI Stebb.

1914. *Hemiarthrus nematocarcini* Stebbing, Ann. S.A. Mus. vol. 15,
 pt. 1, p. 47, fig.

The only further remarks necessary concerning this species is that the pleon of the ♀ is subacute and entire. This character distinguishes the species easily from *H. abdominalis* (Kröyer).

FAMILY CYPRONISCIDAE.

1889. *Cyproniscidae* Giard & Bonnier, Trav. Stat. Wimereux,
 Bopyriens, p. 221.

GEN. CYPRONISCUS, Kossm.

1884. *Cyproniscus* Kossmann, SB. K. Ak. Wiss. Berlin, Hft. 22,
 p. 460.
 1902. „ Stebbing, S.A. Crust. pt. 2, p. 75.

CYPRONISCUS CROSSOPHORI Stebb.

1901. *Cyproniscus crossophori* Stebbing, Knowledge, vol. 24, p. 100.
 1902. „ „ id. l.c. p. 76, pl. 15B.

Three specimens of the host *Crossophorus africanus* Stebb., from the "Pieter Faure" collection, have been examined for this parasite. In one 2 immature ♀♀ and 3 larvae were found, in another 3 larvae, and in the third 1 adult ♀.

The adult ♀ is symmetrical, flat on the side apposed to the host, convex on the outer side, anterior end narrower than the posterior, shaped therefore like half a pear. About 10 segments are indicated by shallow grooves. No attachment cord was found, the parasite appearing to be quite free in the incubatory pouch of the host. Length: 6.25 mm.; breadth and depth: both 3 mm.

The immature ♀♀ measure ca. 2 × 1.5 mm. and show indications of 7-9 segments. Head with a rudimentary oral cone, and on each side of this a short antenna-like process, which is constricted near the end so as to appear 2-jointed, but there is no suture.

The larvae range from 1-2.25 mm. in length and agree with Stebbing's description. The largest are probably functional ♂♂.

All three hosts were females.

Locality: Lion's Head SE. $\frac{1}{4}$ E., distant 50 miles. 230 fathoms. 1 adult ♀; South Head E. by S. $\frac{1}{2}$ S., distant 25 miles. 190 fathoms. 2 immature ♀♀ and 6 larvae. (Both localities off the Cape Peninsula.) s.s. "Pieter Faure." 2/4/02 and 3/4/02. (S.A.M. Nos. A4165 and A4166.)

FAMILY CABIROPSIDAE.

1895. *Cabiropsidae* Giard & Bonnier, Bull. Sci. Fr. vol. 25, pp. 421, 441, 443.

As Stebbing has done in the case of the *Cyproniscidae*, I keep this family separate for the sake of convenience, although Sars regards it as a part of the *Cryptoniscidae*.

GEN. CLYPEONISCUS Giard & Bonn.

1895. *Clypeoniscus* Giard & Bonnier, l.c. p. 444.

1899. " Sars, Crust. Norw. vol. 2, p. 239.

1905. " Richardson, Bull. U.S. Nat. Mus. No. 54, p. 577.

Only two species of this genus are known: *hanseni* Giard & Bonn. and *meinerti* Giard & Bonn., both from the North Atlantic and infesting members of the family *Idoteidae*. Their specific distinctness is doubtful.

Two larval specimens which may belong to this genus were found on a specimen of *Lanocira capensis* (see supra, p. 354).

CLYPEONISCUS STENETRII n. sp.

Body of ♀ irregularly oval, incised anteriorly and posteriorly, lateral margins with irregular shallow indentations. Dorsal surface moderately convex, the opaque area ovoid but indistinctly defined. Ventral surface with a longitudinal slit extending from the anterior to the posterior incisions, its margins with (so far as it was possible to count them) 10 pairs of marginal folds. These do not appear to be double or to interlock as is the case in *meinerti*.

A single ♂ was found attached to the same host, but is not in a good enough state of preservation to allow of the characters of antenna 1, side-plates and peraeopods being observed. The outer ramus of uropod is much shorter than inner.

The structure of the embryos also could not be made out, and in particular it was quite impossible to determine the presence or absence of the ventral plate.

Nevertheless, there is no doubt that this is a species of *Clypeoniscus* in view of the close agreement of the ♀ with *hanseni*. As to specific distinctness, scarcely any character can be found except the (apparently) singleness of the marginal folds on the brood-lamellae. Sars doubts the specific distinctness of the two northern species. These two forms were considered as belonging to two species by Giard & Bonnier in conformity with their assumption that each species of host is infested by its own particular species of parasite. This assumption has been proved to have no foundation in fact, or at least to have many exceptions.

I have instituted a new species for the South African specimens, not in support of the above hypothesis, but in order to indicate the occurrence of the genus on a member of a family different from that on which the northern species are found.

Length: ♂ .75 mm., ♀ 2 mm.; *breadth*: ♀ 1.5 mm.

Locality: Vasco da Gama Peak N. 71° E., distant 18 miles (off Cape Peninsula). 230 fathoms. ♂ and ♀ attached separately to the ventral surface of the same specimen of *Stenetrium dagama* (see supra, p. 399). s.s. "Pieter Faure." 4/5/00. (S.A.M. No. A4167.)

GEN. ET SP. INCERT.

(Text-figs. 1, 2.)

Attached to the ventral side of the peraeon of a ♂ specimen of *Ilychthonos capensis* (supra, p. 415) were two minute spherical bodies. They are both evidently ♀♀, but as no larvæ or ♂♂ were present their systematic position is uncertain.

They bear some resemblance to *Munnoniscus* Giard & Bonnier 1895, but this genus possesses no definite fixing apparatus. *Oosaccus* Richardson (Bull. U.S. Nat. Mus. no. 54, p. 582, fig. 644) has no attachment cord, but appears to have a kind of suction-disk composed of a raised rim with 3 or 4 valvular flaps within.

The two specimens in question have the following structure, so far as I have been able to elucidate it. Having only the two specimens, which, moreover, are not exactly alike, I have not resorted to sectioning, but contented myself with mounting them whole in glycerine jelly.

Both are spherical in shape, measuring .5 mm. in diameter. In the one specimen (Fig. 1) there are two little contiguous conical processes,

each bearing a small spine. The spines do not project parallel but diverge outwards, so as to form an efficient fixing apparatus. The interior is completely filled by an opaque mass in which no definite elements can be distinguished. There appears to be no trace of any other structure.

On the other hand the second specimen (Fig. 2) shows no sign of the

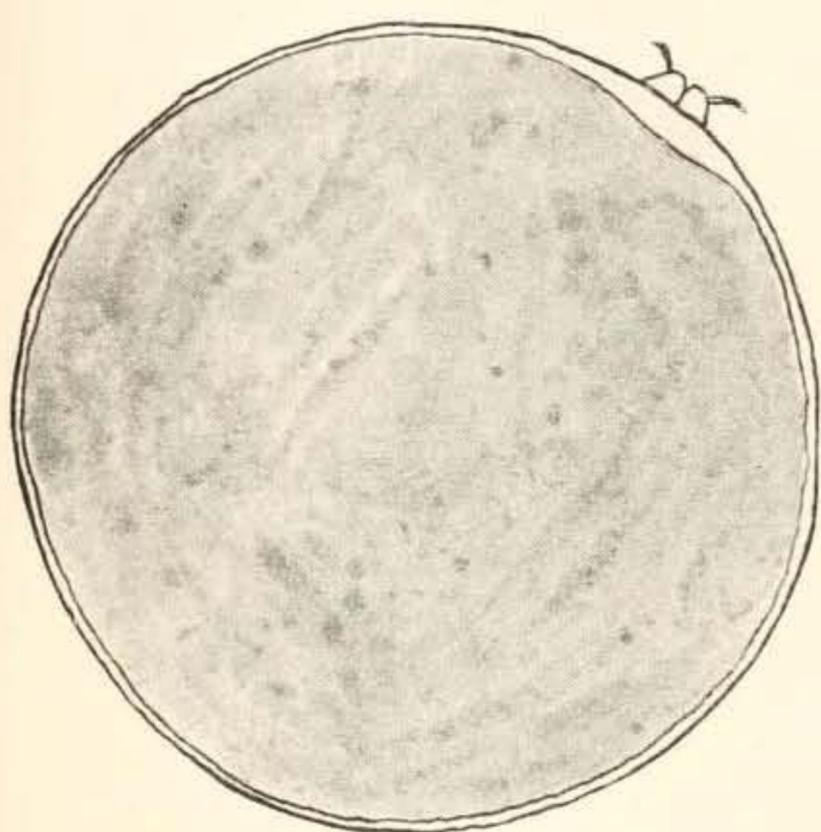


FIG. 1.

× 100.

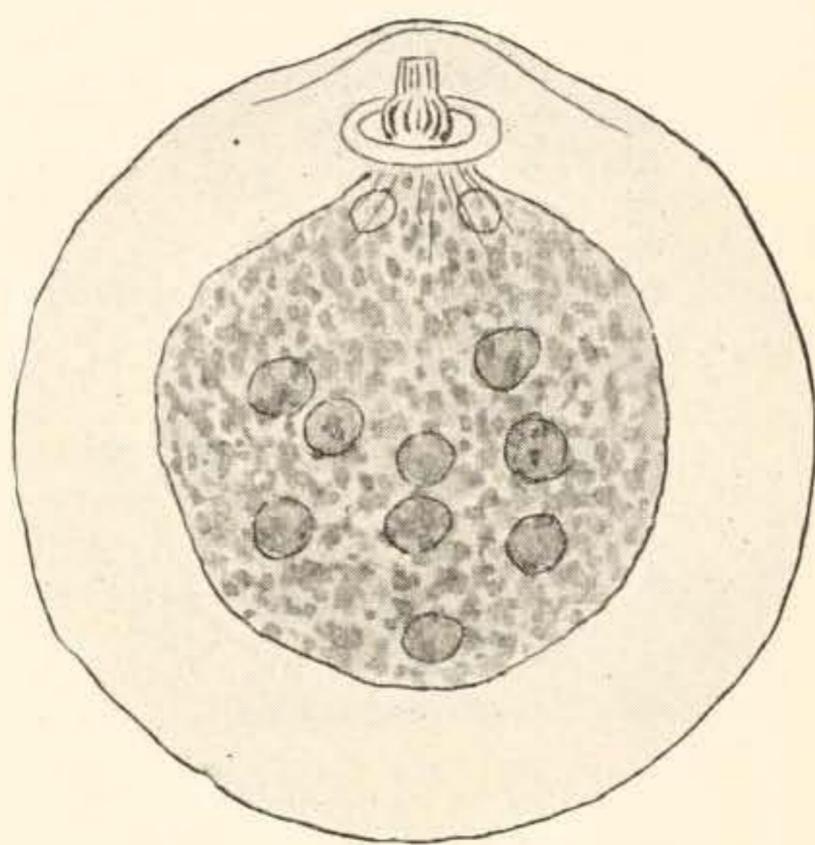


FIG. 2.

two little conical processes, but is attached by means of a kind of proboscis. This appears to be composed of 3 or 4 pieces, which are enlarged at the base, end bluntly and form a closed cylindrical tube. Around the base of this is a ring, the nature of which is difficult to interpret, and below this are seen several strands which may be muscles working the proboscis. The internal mass does not by any means fill up the outer sac. It appears granular, and contains several darker granular masses which are apparently ova. Just below the proboscis are two ovoid structures.

(S.A.M. No. A4131.)

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EXPLANATION OF PLATES.

PLATE XV.

FIG.

1. *Apseudes agulhensis* n. sp. Animal enlarged 17 times, peraeopods and uropods omitted.
2. „ *australis* n. sp. Animal enlarged 10 times, peraeopods and uropods omitted.
3. *Trichapseudes tridens* n. g. et sp. Animal enlarged 7 times, peraeopods and uropods omitted.
4. „ „ „ Mandible.
5. „ „ „ Maxilliped.
6. „ „ „ Peraeopod 1.
7. „ „ „ Exopod of peraeopod 1.
8. „ „ „ Exopod of peraeopod 2.
9. *Gnathia spongicola* n. sp. Animal enlarged 7 times, antennae and peraeopods omitted.
10. „ *disjuncta* n. sp. Animal enlarged 11 times, antennae and peraeopods omitted.
11. *Apanthura serricauda* n. sp. Maxilliped with apical joint further enlarged.
12. „ „ „ Telson.
13. *Pseudanthura lateralis* Rich. Telson and right uropod from above.
14. „ „ „ Antenna 1.
15. „ „ „ Peraeopod 1.
16. „ „ „ Maxilliped.
17. *Cirolana littoralis* n. sp. Frontal lamina.
18. „ *meinerti* n. sp. Frontal lamina.
19. „ *fluviatilis* Stebb. Frontal lamina.
20. „ *palifrons* n. sp. Animal enlarged 5 times, peraeopods omitted.
21. „ „ „ Frontal lamina.
22. „ *cingulata* n. sp. Animal enlarged 5 times, peraeopods omitted.
23. „ „ „ Frontal lamina.
24. *Gnatholana mandibularis* n.g. et sp. Animal enlarged 6 times, peraeopods omitted.
25. „ „ „ Mandible.
26. *Zuzara furcifer* n. sp. Peraeon segment 7, pleon, telson and right uropod.
27. „ „ „ Epistome.
28. *Cymodoce tuberculosa* Stebb. var. *tripartita* Rich. Pleon and telson with uropods, ♂, setae omitted.

PLATE XVI.

FIG.

1. *Cymodoce japonica* Rich var. *natalensis* n. Pleon and telson with uropods, ♂, setae omitted.
2. „ „ „ „ The same, ♀.
3. „ *tetrathele* n. sp. Pleon and telson with uropods, ♂, setae omitted.
4. „ *cavicola* n. sp. Pleon and telson with uropods, ♂.
5. „ „ „ The same, ♀.

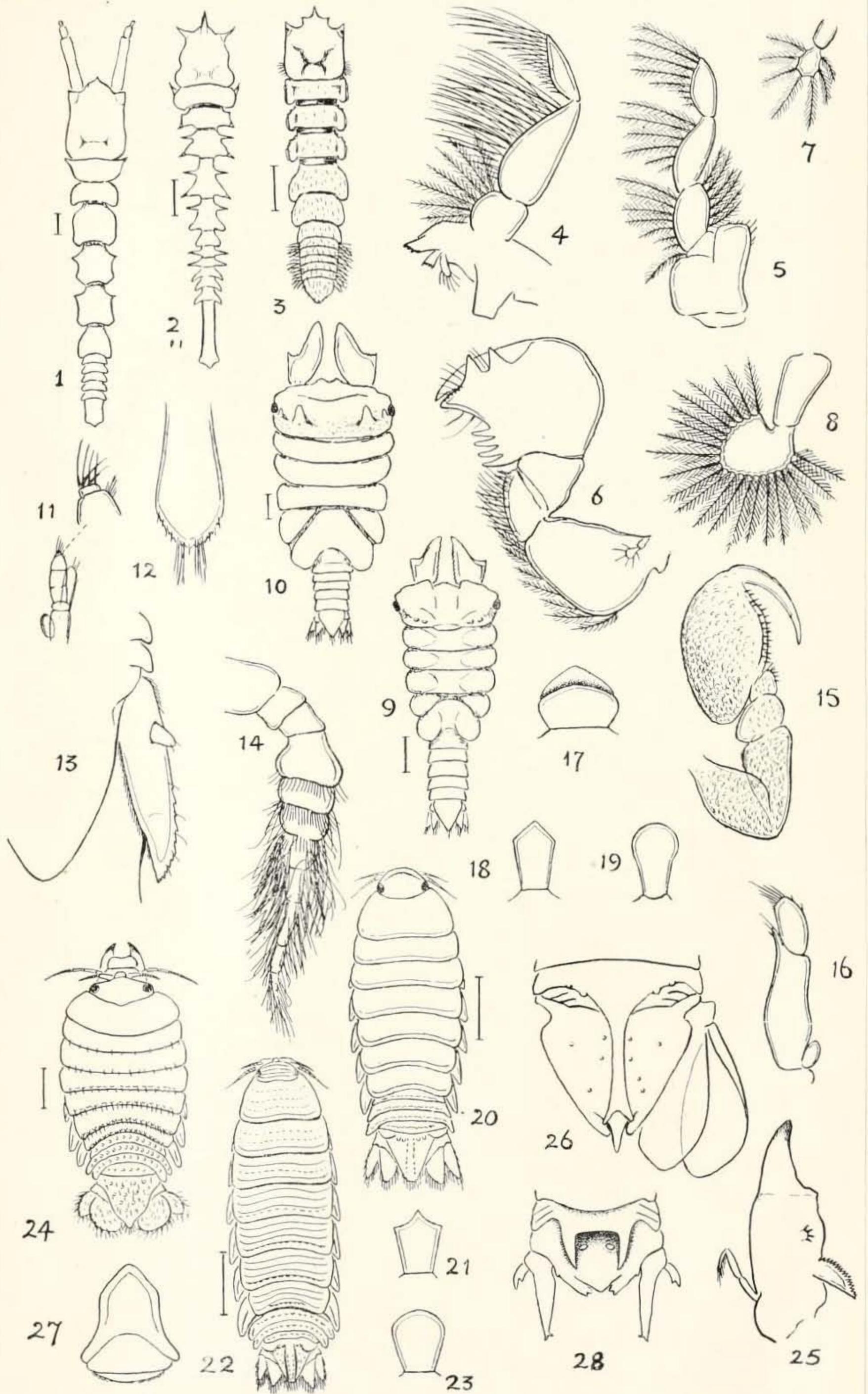
- FIG.
6. *Cymodoce cryptodoma* n. sp. Pleon and telson with uropods, ♂, setae omitted.
 7. " " " The same, ♀.
 8. " *excavans* n. sp. Pleon and telson with uropods, ♂, setae omitted.
 9. " " " The same, ♀.
 10. *Cymodocella cancellata* n. sp. Animal enlarged 7 times, peraeopods omitted.
 11. " " " Lateral view of peraeon segments 5-7, pleon and telson.
 12. " " " Male stylet on pleopod 2.
 13. " " " Epistome.
 14. " " " Male appendages on peraeon segment 7.
 15. *Cassidias africana* n. sp. Pleon and telson with uropods, ♂, dorsal view.
 16. " " " The same in lateral view.
 17. " " " The same, ♀, dorsal view.
 18. *Holidotea unicornis* n. g. et sp. ♂ enlarged 6 times, antennae and peraeopods omitted.
 19. " " " ♀ enlarged 5 times.
 20. " " " Head process of ♂ further enlarged, in dorsal and lateral views.
 21. " " " Pleopod 1, ♀.
 22. " " " Pleopod 1, ♂, and male appendage.
 23. " " " Peraeopod 1.
 24. *Arcturella pustulata* n. sp. ♀ enlarged 5 times, antennae and peraeopods omitted.
 25. " *longipes* n. sp. ♀ enlarged 4½ times, only the left peraeopod 4 drawn in.
 26. " " " ♂ enlarged 4½ times, antennae and peraeopods omitted.
 27. " *brevipes* n. sp. ♀ enlarged 4½ times, only the right peraeopod 4 drawn in.
 28. *Stenetrium dagama* n. sp. Peraeopod 1, ♂.
 29. " " " Pleopod 1, ♂.
 30. " *diasi* n. sp. Peraeopod 1, ♂.
 31. " " " Peraeopod 1, ♀.
 32. " " " Pleopod 1, ♂.
 33. " *saldanha* n. sp. Peraeopod 1, ♂.
 34. " " " Pleopod 1, ♂.

PLATE XVII.

- FIG.
1. *Janira angusta* n. sp. Animal enlarged 14 times, peraeopods omitted.
 2. " " " Peraeopod 1, ♂.
 3. " " " Pleopod 1, ♂.
 4. *Haploniscus dimeroceras* n. sp. ♂ enlarged 15 times.
 5. " " " Pleopod 1, ♂.
 6. " " " Pleopod 2, ♂.
 7. " " " Antenna 2, ♂.
 8. *Paramunna concavifrons* n. sp. Head, and left antenna 1.

FIG.

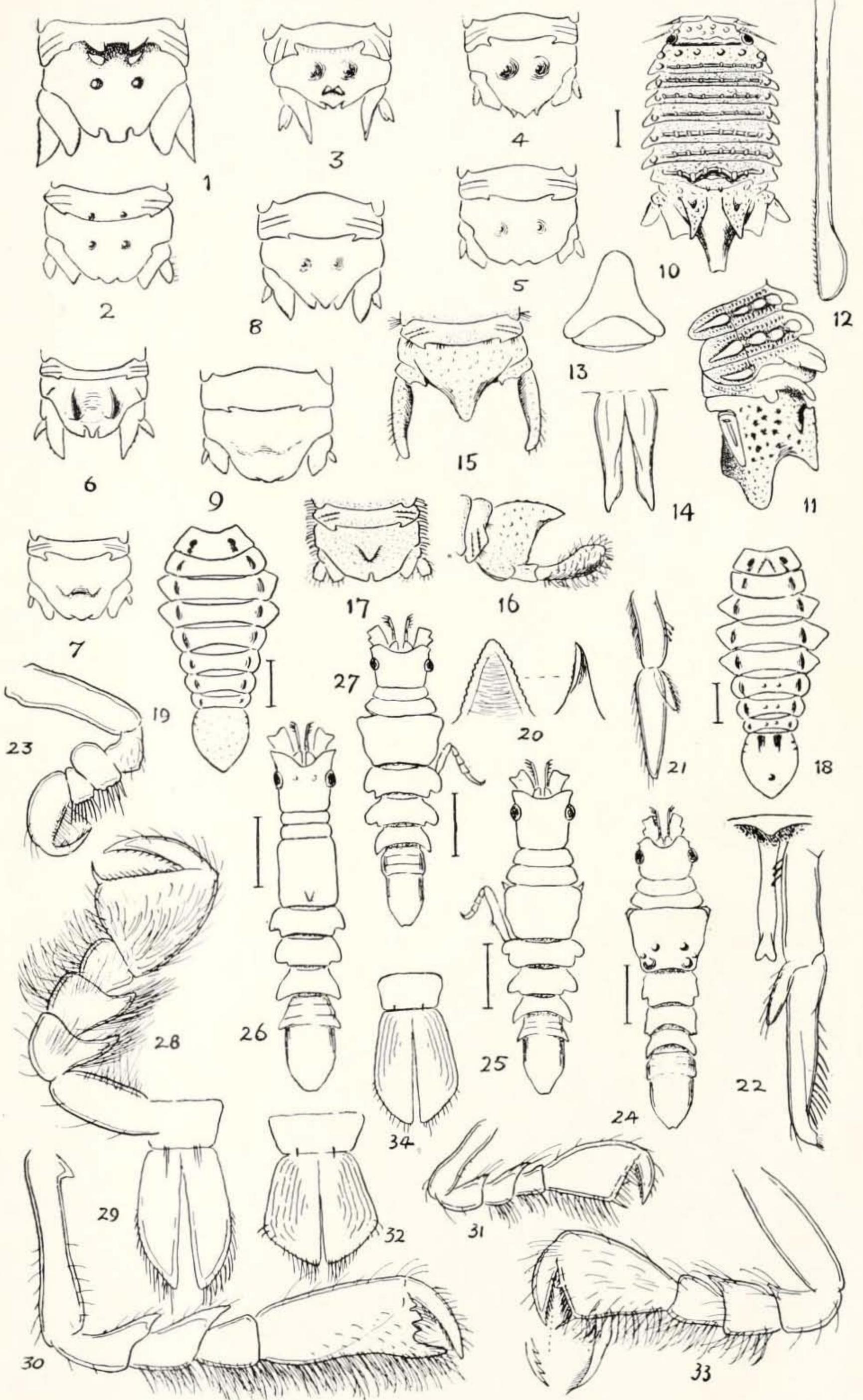
9. *Paramunna concavifrons* n. sp. Peraeopod 1.
10. *Macrostylis spiniceps* n. sp. Animal enlarged 13 times, with antenna 1, but without peraeopods.
11. " " " Pleopod 1, ♂ with apex further enlarged.
12. " " " Pleopod 2, ♂.
13. *Rhabdomesus bacillopsis* n. sp. Animal enlarged 10 times, with antenna 2 and peraeopods, as far as preserved, drawn in.
14. *Ilychthonos capensis* n. g. et sp. Animal enlarged 8 times, antenna 2 and peraeopods omitted.
15. " " " Pleopod 2, ♂.
16. " " " Pleopod 1, ♂.
17. *Pseudomunnopsis beddardi* (Tatt.). Pleopod 2, ♂.
18. " " " Pleopod 1, ♂, with apex further enlarged.
19. *Eurycope fusiformis* n. sp. Animal enlarged 10 times, antenna 2 and peraeopods omitted.
20. " *quadrata* n. sp. Pleopod 2, ♂.
21. " " " Pleopod 1, ♂.
22. " *sulcifrons* n. sp. Pleopod 1, ♂.
23. " " " Pleopod 2, ♂.
24. *Palaegyge plesionikae* n. sp. ♀ enlarged 3 times, dorsal view.
25. " " " ♂ enlarged 14 times, ventral view, peraeopods omitted.
26. *Pseudione munidae* n. sp. ♀ enlarged 3½ times, dorsal view.
27. " " " ♂ enlarged 11½ times, ventral view, peraeopods omitted.
28. *Paragigantione papillosa* n. g. et sp. ♀ enlarged 5½ times, dorsal view, with terminal pleon segment and uropods further enlarged.
29. " " " ♂ enlarged 14 times, ventral view, with terminal pleon segment and uropods further enlarged, peraeopods omitted.



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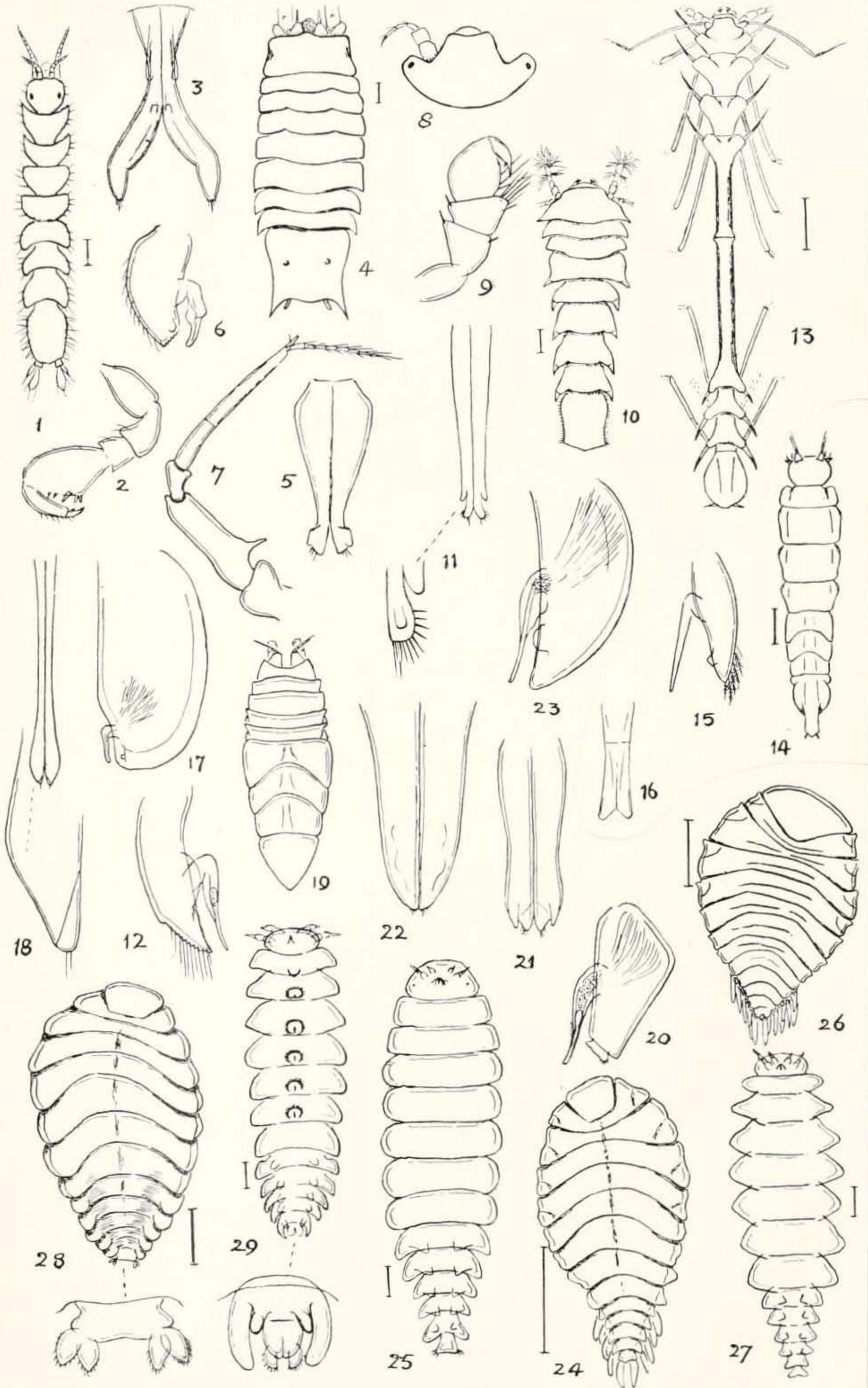
SOUTH AFRICAN ISOPODA.



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