

ANNALS  
OF THE  
SOUTH AFRICAN MUSEUM

VOLUME XVII.

PART V, containing:—

- 11.—*Contributions to the Crustacean Fauna of South Africa.*  
By K. H. BARNARD, M.A., Assistant. (Plates XV–XVII.)
- 12.—*Contributions to the South African Arachnid Fauna.*  
II.—*On Some New South African Spiders of the Families Barychelidae, Dipluridae, Eresidae, Zodariidae, Heraclidae, Troctidae, Clubionidae.* By R. W. E. TUCKER, B.A., Assistant. (Plates XXVIII and XXIX.)



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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. Stobbing 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:

*Heterotanaïs* (?) *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 *Agathotauais 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>Agathotauais ingolfi</i> Hansen . . . . .	1	"
<i>Gnathia</i> sp. . . . .	4	"
<i>Neoarcturus oudops</i> Brnd. . . . .	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. *Apsseudidae* 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. *Apsseudes* Leach, Edinb. Encycl. vol. 7, p. 404.  
1914. ,, Barnard, Ann. S.A. Mus. vol. 10, pt. 11, p. 327a  
(references).  
1914. ,, Vanhöffen, Deutsch. Südpol. Exp. vol. 15, pt. 4, p. 461.

#### APSEUDES AVICULARIA Brnrd.

1914. *Apsseudes 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, *Achéris*, 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 pereon 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* Brnd. 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 pereon 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 pereon 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.

Pereopod 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.

Pereopod 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.

Pereopods 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.

Peleopods reduced to the 3 anterior pairs, each biramous, the rami narrow, unarticulate, 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.; Unkomaas 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 pereopod, and lastly the plumose 2nd joint of the exopod on the latter pereopod.

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 pereopods 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 guinardi*. 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 TANAIDAE.

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. 32*a*, 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. 32*a*, p. 38.

PARATANAIS EUELPIS n. sp.

Body cylindrical. Head plus 1st pereaeon segment longer than broad, anterior margin straight with a minute median point, eyes and ocular lobes distinct. Pereaeon 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 pereaeon, equal to last 2 pereaeon 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 setae.

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 *Heterotanus* (?) *capensis* 1914. Up to the present I have not been able to consult Vanhoffen's paper.

Distinguished from *P. batei* Sars by the stout peraeopod 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. *Agathotanus* Hansen, l.c. p. 63.

AGATHOTANAIS INGOLFI Hansen.

1913. *Agathotanus 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 maxilla 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. *Dolichochelia* 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 peracopods; 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.

Tropod, 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 pereaeon segment, about as broad as long. Eyes small, oval.

Pereaeon segment 1 shorter than the following segments, 7 shorter than 1. Pleon segments distinct in both sexes, short, all 5 together equal to 6th pereaeon 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  $\frac{2}{3}$  length of 2nd joint, narrow, oval.

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

Pereaeopod 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.

Pereaeopods 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 13/15. (K.H.B.) 1 ♂, 1 ♀ with embryos. (S.A.M. Nos. A2620, A2698, A2692 and A3303 respectively.)

#### GEN. EXANTHURA Brnd.

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. Art. 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. † 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



determination Richardson's description is lacking in detail, *e. g.* the 1st pereiopod 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 pereiopod 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 pereiopod 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.

Pereiopod 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.

Peraeopods 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.

Peraeopods 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.

Tropod, 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. II, 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 fluvialis* 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 pereopod 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. pleomastica* 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 tubereles.

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 tubereles.

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. schiodtei* 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 pereaeon segments and on the side-plates. Head moderately immersed in 1st pereaeon segment, anterior margin strongly convex, produced over and hiding the bases of 1st antennae. Eyes moderately large.

Pereaeon 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 pereaeon 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  $\frac{1}{2}$  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 *Conidorpheus*, 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 Bmrd.

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 pereon 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 *sic* elevations on the head and 1st pereon 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 pereon 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 ovigerous ♀ ♀; 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 I with 6-8 teeth. Antenna 2-5-jointed. Side-plates tectinate. Peracopods as in *Glypeoniscus*.

## 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 Snucker-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 ( $\sigma$ ) specimen, measuring 9 mm., there are indications of a transverse ridge on the 2nd and 3rd pereon 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 pereon 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 ( $\varphi$ ) specimen, measuring 10 mm., only the 4th and 5th pereon segments have transverse ridges, the 6th and 7th segments with 4 tubercles each. The two submedian tubercles on the 5th segment in the  $\sigma$  and the 6th in the  $\varphi$  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  $\varphi$  is crushed, but the telson is similar to that of the  $\sigma$ .

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 pereon 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, Diet. 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 *Parisocladius* 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 *Cilicaca 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.

CYODOCE 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 pereon 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 ♀.

CYODOCE 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 anteriormargin 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 ♂; Unkomaas 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*.

CYMODOCE 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 pereon 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 Maldive 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 pereaeon 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.

Tropod 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 pereaeon segments and telson with short setae, posterior pereaeon 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 pereaeon 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 pereon 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. Pereon 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 pereon 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 *Sphaeromene 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. *Valentinia* Stebbing, Proc. Zool. Soc. Lond. 1914, p. 351 (nom. preocc.).

1914. *Eurallentinia* id. ibid. p. 944.

In 1905 Hansen suggested that a new genus was necessary for Cunningham's *Cymodocea darwini* 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. darwini* 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. darwini*. 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. darwini*. 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 *darwini* 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 *darwini* 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 subacute, 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.

Tropod 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 bonnieri*.

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
Peracopods 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 uncleft 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.