Report on the Amphipoda obtained by the F.I.S. "Endeavour" in Australian Seas.

BY

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Figures 1-16.

REPORT ON THE AMPHIPODA.

Introduction.

The collection of Amphipoda made by the F.I.S. "Endeavour" contains thirty-four species, and although there are only two of these that I have described as new, the collection is of very considerable value, affording additional information on species already known and particularly on their distribution. The most interesting is *Endevoura mirabilis*, nov. gen. et sp., which, in the greatly enlarged propod of the first peræopod, appears to differ from other members of the Lysianassidæ. The re-discovery of *Ephippiphora kröyeri*, White, from the type locality enables this fine species to be fully described and restored to its proper place in the group. It will be seen that an increasing number of the forms have been identified with species previously known only from European seas and the North Atlantic.

I am greatly indebted to Miss E. M. Herriott, M.A., assistant at the Biological Laboratory, Canterbury College, for preparing the drawings to illustrate this paper and for much other valuable assistance.

List of Species and their Distribution.

1. *Ephippiphora kröyeri*, White. Bass Strait and Coast of Tasmania.
2. *Waldeckia chevreuxi*, Stebbing. Australian seas.
3. *Nannonyx kidderi*, (S. I. Smith). Australia; New Zealand and Subantarctic seas.
4. *Tryphosa sarsi*, (Bonnier). Arctic Ocean; North Atlantic and Southern Australia.
5. *Endevoura mirabilis*, nov. gen. et sp. Bass Strait.
6. *Euonyx normani*, Stebbing. Bass Strait; Kermadec Islands.
7. *Amaryllis macrophthalma*, Haswell. Australia; New Zealand; South Africa.

8. *Andaniotes corpulentus,* (G. M. Thomson). Australia; New Zealand; Antarctic seas.

9. *Seba typica,* (Chilton). Bass Strait; New Zealand.

10. *Leucothoe spinicarpa,* (Abildg.). In all seas.

11. *Colomastix brazieri,* Haswell. Australia; New Zealand; South Orkneys.

12. *Liljeborgia brevicornis,* (Bruz.). Arctic Ocean; North Atlantic; Southern Australia.

13. *Liljeborgia dubia,* (Haswell). Australia; New Zealand.

14. *Oediceroides ornatus,* (Stebbing). Bass Strait.

15. *Bovallia Monoculoides,* (Haswell). Subantarctic seas; South Africa; Indian Ocean.

16. *Paramoera austrina,* (Bate) var. *megalophthalma,* Haswell. Australian seas.

17. *Melita fresnelii,* (Aud.). Atlantic and Indian Oceans; Australian seas; South Africa.

18. *Ceradocus rubromaculatus,* (Stimpson). Australia; New Zealand; Gambier Archipelago.

19. *Maera inaequipes,* A. Costa. Northern and Southern seas.

20. *Maera marstersii,* (Haswell). Australia; New Zealand; Kermadecs; Gambier Archipelago.

21. *Maera hamigera,* (Haswell). Australia; Indian Ocean; South Africa.

22. *Maera viridis,* Haswell. Australia; New Zealand; Gambier Archipelago.

23. *Elasmopus diemenensis,* (Haswell). Bass Strait.

24. *Elasmopus subcarinatus,* (Haswell). Australia; New Zealand; Indian Ocean; Fiji.

25. *Polycheria antarctica,* (Stebbing). Australia; New Zealand; Subantarctic and Antarctic seas.

26. *Lembos philacanthus,* (Stebbing). Australia; New Zealand; Chatham Islands.

27. *Photis dolichommata,* Stebbing. Southern Australia.

28. *Eurystheus maculatus,* Johnston. Arctic Ocean; North Atlantic; Southern Australia.

29. *Eurystheus atlanticus,* Stebbing. Australia; South Africa.

30. *Eurystheus thomsoni,* (Stebbing). Australia.

31. *Eurystheus persetosus,* sp. nov. South Australia.

32. *Ampithoe flindersi,* Stebbing. Australia; Torres Strait.

33. *Icilius australis,* Haswell. Australian seas.

34. *Pseudoprotella phasma,* (Mont.). European seas; Mediterranean; North Atlantic; Southern Australia.

EPHIPPIPHORA KROYERI, *White.*

(Figs. 1 *a*—*i*.)

Ephippiphora kroyeri, White, 1847*, p. 221.

? *Ephippiphora kroyeri,* Miers, 1884, p. 312.

Ephippiphora kroyeri, Stebbing, 1888, p. 224, and 1910, p. 571.

Socarnes kroyeri, Stebbing, 1906, p. 57.

Lysianassa kroyeri, Spence Bate, 1862, p. 65.

Localities.—East Coast of Flinders Island, Bass Strait. One specimen, 25 mm. long. (Reg. No. E. 4851.) Sixty to eighty miles west of Eucla, 80-120 fathoms. One specimen, 17 mm. long.

These specimens agree in size and in the general characters with the description given of this species by White in 1847. The species has, however, remained so long uncertain that Stebbing (1910, p. 571) speaks of it as "the enigmatical *Ephippiphora kroyeri,* White." The specimens come from the same locality as the original type, and I feel confident must be the same. White established the genus *Ephippiphora* in 1847, and as the description is quite suffi-

* The references are made by the year of publication to the list on p. 90.

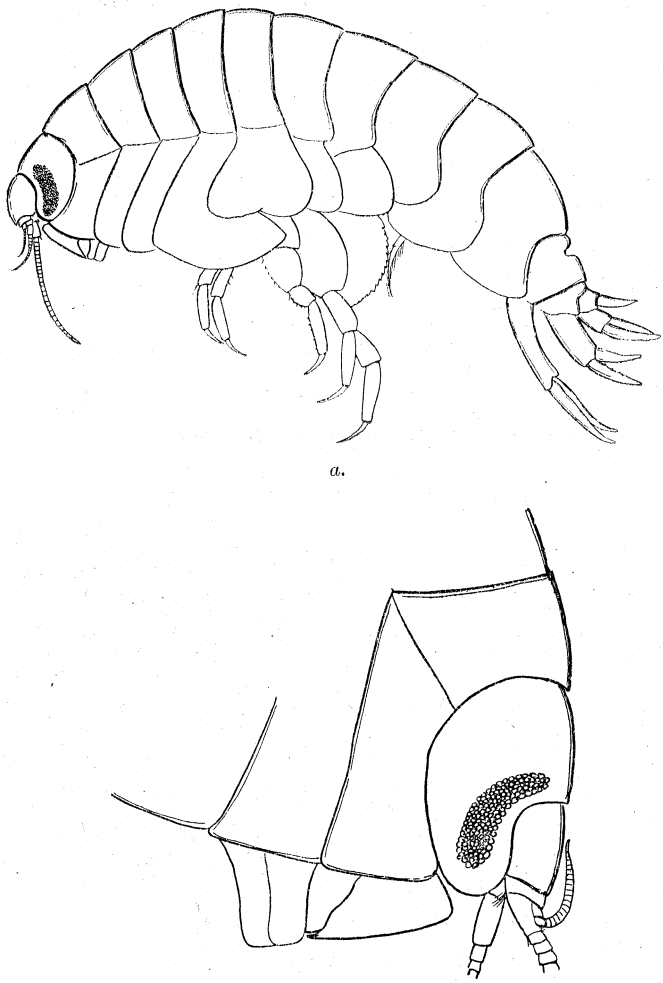


Fig. 1 *a—b*. *Ephippiphora kröyeri* White.
a. Side view of whole animal. *b*. Head and anterior segments of peraeon showing side view of projecting mouth parts.

cient for identification I think it right that his name should be re-established. His description is as follows:—

"Head rather large; antennae distant from each other, the upper pair with the basal joints very thick

and corneous, inserted in a deep notch in front of head; two setae at the end of each, the outer the thicker. Lower pair of the antennae with the basal joint somewhat elongated and furnished with hairs.

"Body much compressed, the lateral appendages on the first eight joints very large, and nearly concealing the legs; the appendage of the fourth joint much dilated behind at the end; eighth to eleventh joints slightly keeled on the back; appendages of the three last joints of abdomen longish, with short spines on the edge behind."

For the description of the species, *Ephippiphora kröyeri,* he merely says:—

"The body is very highly polished, the edges of the segments behind somewhat tinged with yellow; the legs and caudal appendages slightly brownish.

"*Hab.* Van Diemen's Land."

In 1862 the species was re-described and figured by Spence Bate from White's typical specimen in the British Museum, which is, he says, an inch in length. His description corresponds well with the two "Endeavour" specimens. Some further information as to White's type was given by Miers (1884, p. 312), who referred to this species small specimens obtained by the "Alert" at Dundas Straits, Prince of Wales Channel and Port Denison. These may, however, really belong to *Waldeckia chevreuxi,* Stebbing. The species *Ephippiphora kröyeri* and allied species were discussed by Stebbing in 1910 (p. 571).

From the figures which I give it will be seen that *E. kröyeri* is closely similar to the animals for which the genus *Waldeckia* has since been established, and it will be unnecessary to give a detailed description of all its appendages.

The mouth parts form a compact mass protruding below the anterior portion of the body and are shown in side view in Fig. 1 *b,* and as seen from below in Fig. 1 *c.* The separate mouth parts are very similar to those of *Waldeckia chevreuxi* if we make allowance for the greater size of the animal. The mandible (Fig. 1 *d*) has the same general shape with fairly narrowed cutting edge without separate teeth, and the process on the inner side (molar tubercle) is narrow and beset with many short setae; the palp is very

slender, and in the natural position lies closely against the outer surface of the mandible between it and the side plates; its first joint is short, the second the longest with

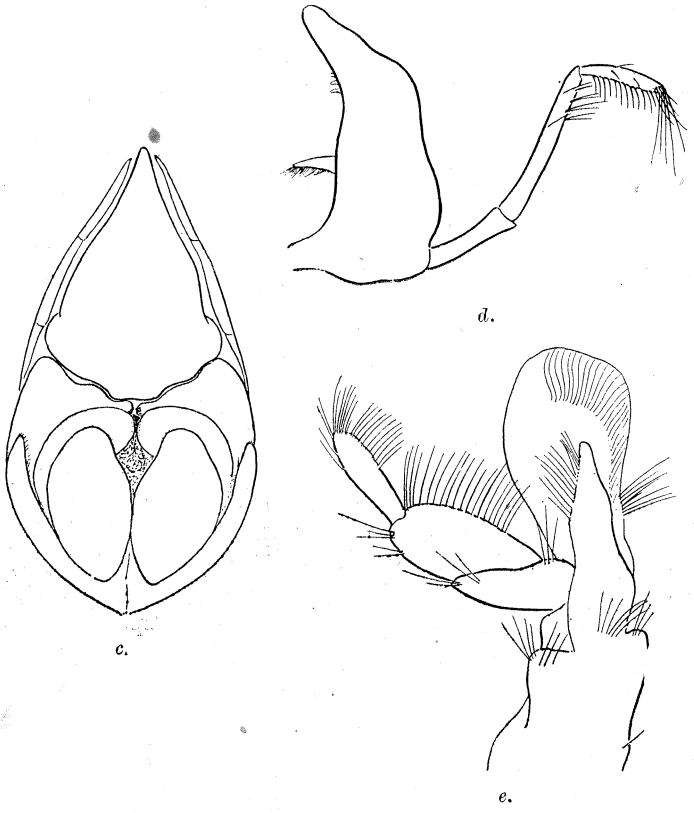


Fig. 1 *c*—*e*. *Ephippiphora kröyeri* White.
c. Mouth parts seen from below. *d*. Mandible, seen from outer side. *e*. Maxilliped, anterior aspect.

seven or eight long setae near the distal end, the third joint has a fringe of setae along one side with longer ones at the apex. The lower lip has the apex somewhat irregular, thickly fringed with spinules, the mandibular process well developed. The first maxilla has the inner lobe narrow, with two setae at its apex, outer lobe with a number of very stout dentate setules, some of them very broad. as in *Waldeckia chevreuxi,* and all of them yellowish brown in colour; the palp is two-jointed, first joint very short, the

second broad with rounded apex, concave on the inner side so as to fit against the other mouth appendages. The maxillipeds have the inner plate short with three or four stout teeth at the end and many spinules, the outer plate

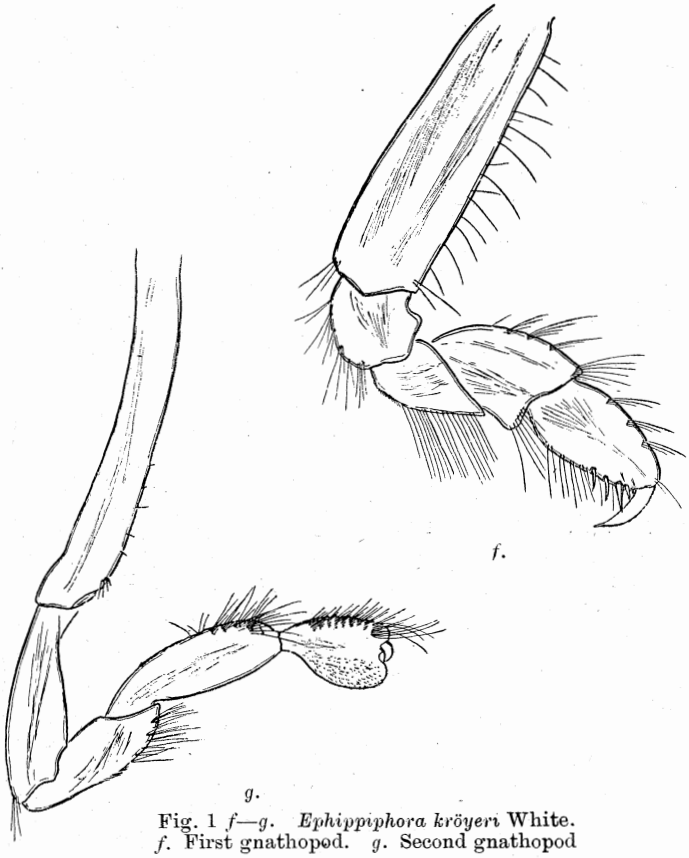
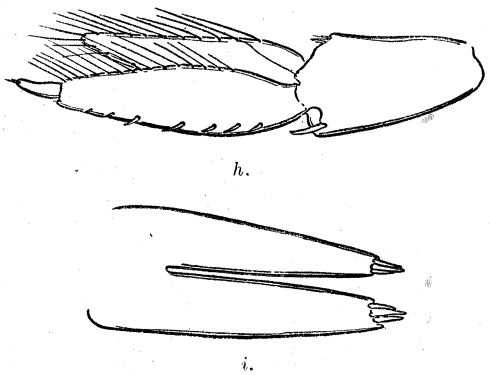


Fig. 1 *f*—*g*. *Ephippiphora kröyeri* White.
f. First gnathopod. *g*. Second gnathopod

large and broad, its margin entire, without spinules; palp well developed, reaching beyond the end of the outer plate: inner surface with joints well fringed with setae as shown in the figure. In Fig. 1 *e* the inner lobe of the maxilliped is seen in profile as it lies in the natural position projecting inwards almost at right angles to the rest of the appendage which closes in the other mouth parts posteriorly.

The gnathopoda (Figs. 1*f* and *g*) are very like those of *Waldeckia obesa,* Chevreux.

The peraeopoda are normal, the basal joints widely expanded, the posterior margin in the fifth distinctly serrate. The uropoda and telson show a close general resemblance to those of *Waldeckia obesa,* Chevreux. (See Figs. 1 *h* and *i.*)



h.

i.

Fig. 1 *h—i. Ephippiphora kröyeri* White.
h. Third uropod. *i.* Telson.

The branchiae are large and bear a number of transverse folds on the upper portion like those in *Anonyx nugax,* Phipps. I did not find any "accessory branchiae," but was unable to make a full examination in the single specimen I dissected.

It is evident that the genus *Ephippiphora* is very nearly related to *Socarnes,* as Boeck stated when he established that genus in 1870. The resemblance of *E. kröyeri* to *Waldeckia obesa,* Chevreux, a species which I consider the same as *W. zschaui* (Pfeffer), is so close that the two should, I think, be placed in the same genus, but at present I leave them as they are and the discussion of these genera must be held over for some future occasion.

WALDECKIA CHEVREUXI, *Stebbing.*

(Fig. 2.)

Waldeckia chevreuxi, Stebbing, 1910, p. 572, pl. 47 *b.*

Localities.—Schouten Island, Tasmania, 5 fathoms. Many specimens, the largest about 8 mm. in length. (Reg. No. E 5351.)

Entrance to Oyster Bay, Tasmania. Two specimens. (Reg. No. E 4764.)

Sanders Bank, Kangaroo Island, South Australia. 28 fathoms. One male. (Reg. No. E 4855.)

Bay of Fires, Tasmania, 10 fathoms. Two specimens, one male, one female. (Reg. No. E 5350.)

Eastern Slope, Bass Strait. Two specimens. (Reg. No. E 5356.)

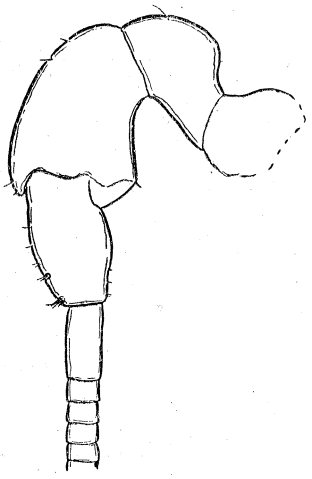


Fig. 2. *Waldeckia chevreuxi.* Second antenna of male.

These specimens agree well with Stebbing's description and figures which apply however only to the female. In the male the second antenna (Fig. 2) has the flagellum greatly elongated and is fully half as long as the animal, the penultimate joint of the peduncle is longer and broader than the ultimate and widens a little distally, the ultimate joint narrowing distally; there are only a few fine setae on the peduncle and the flagellum appears to be without calceoli. In both sexes the proximal joints of the flagellum of the upper antennae bear transverse rows of sensory setae which appear to be as numerous in the female as in the male.

In 1912 (p. 473) I stated that this species occurs in New Zealand. Comparison of specimens shows that the New Zealand form differs a little in the characters of the third uropoda and should, perhaps, be kept separate. '*Ephippiphora kröyeri,* White, and *Waldeckia obesa,* Chevreux, have the third uropoda nearly alike, but differing from both the Australian and the New Zealand forms mentioned.

NANNONYX KIDDERI, (*S. I. Smith*).

(Figs. 3 *a* and *b*.)

Nannonyx kidderi, Chilton, 1909, p. 615.

Parawaldeckia thomsoni, Stebbing, 1910, p. 571.

Locality.—Tasmanian Coast. One male. (Reg. No. E 5352.)

A full discussion of the forms which I grouped under this name in 1909 will be found in the reference quoted.

Stebbing has since suggested the establishment of a new genus, *Parawaldeckia,* for its inclusion.

The present specimen, which is a male with greatly elongated flagellum to the second antenna, appears to be quite the same as the type specimen of *Lysiannax stebbingi,* G. M. Thomson, which was obtained at Pirates Bay, Tasmania, and with which I have compared it. In the "Endeavour" specimen the telson (Fig. 3 *b*) has the posterior margin transverse with two setules at each posterior angle. Mr. Thomson's type is mounted permanently so that the telson is seen in side view and the posterior border cannot be made out, but it shows the two setules at the

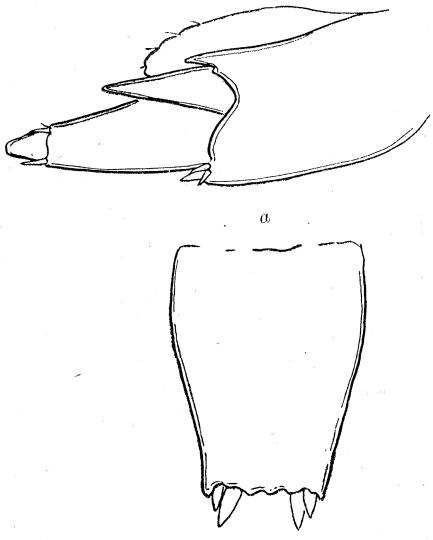


Fig. 3 *a*—*b*. *Nannonyx kidderi* (S. I. Smith), male.
a. Third uropod. *b*. Telson.

angles as in the "Endeavour" specimens. In *Socarnoides kergueleni,* Stebbing, which I have considered to be the same as the present species, the angles of the telson bear setules but the margin between is rather deeply indented or cleft. I give also a drawing of the third uropod (Fig. 3 *a*).

If all the forms I have grouped under the name *N. kidderi* are rightly included, the species is widely distributed in Australian and New Zealand seas and in Subantarctic regions.

TRYPHOSA SARSI, (*Bonnier*).

Tryphosa sarsi, Stebbing, 1906, p. 70.

Tryphosa camelus, Stebbing, 1910, p. 574, pl. xlvii. *a*.

Tryphosa nana, Sars, 1891, p. 76, pl. 27, Fig. 1.

Locality.—Bay of Fires, Tasmania, 10 fathoms. Many specimens, 3 mm. long; deep salmon coloured; eyes reddish.

I think these specimens must be referred to Stebbing's species, the type of which was obtained by H.M.C.S. "Thetis" off the coast of New South Wales, 54 to 59 fathoms. In some respects, however, they differ from Stebbing's description and approach still more nearly to *T. sarsi,* Bonnier, as described and figured by Sars under the name *T. nana* (1891, p. 76, pl. 27, fig. 1), and in my opinion Stebbing's name must be considered a synonym. The depression on the fourth segment of the pleon is not quite so narrow and deep as that shown in Stebbing's figure, but in some specimens at least it is well marked, while the posterior part of the segment is distinctly keeled. The variation in this character is sufficient to make one doubt its importance as a specific distinction. Stebbing states that in the second antenna the antepenultimate joint of the peduncle is, "contrary to custom, longer than the penultimate." This, however, is not the case in the "Endeavour" specimens, in which it is either shorter than, or equal to, the penultimate joint. The second gnathopod has the hinder angle of the hand not so acutely produced as shown in Stebbing's figure, but more like that figured by Sars for *T. sarsi;* the finger again is hardly "small and weak" as described by Stebbing, but agrees with the figure and description given by Sars, who speaks of it as being "rather strong." The peraeopods agree with Stebbing's description in having the basal joint large in comparison with the rest of the limb and the merus ("fourth joint") more expanded than is shown in Sars' figures. Stebbing describes the lobes of the telson as bearing three lateral spines instead of two as in *T. sarsi.* In some of my specimens, however, there are certainly only two lateral spines and, as stated below, there may be three lateral spines in *T. sarsi.*

I have compared the "Endeavour" specimens with specimens sent to me years ago by M. Chevreux from Le Croisic,

France, named "Tryphosa nana," and I cannot find any reliable character by which the two sets of specimens can be distinguished. These specimens from Le Croisic agree on the whole with the description and figures given by Sars, but have the fourth segment of the pleon in some cases at any rate distinctly keeled, while Sars describes his species as being easily known "by the absolute want of any dorsal projection" on the fourth segment of the pleon. The Le Croisic specimens, however, seem to show, just as do the "Endeavour" ones, that this character is by no means constant, but is subject to considerable variation in specimens collected at the same place and time. In the peraeopods again the Le Croisic specimens agree in the expanded meral joints with the "Endeavour" specimens, though the basal joint is perhaps a little shorter in proportion to the rest of the limb. In one of the Le Croisic specimens again the telson has three lateral spinules as in *T. camelus* instead of the two mentioned by Stebbing for *T. sarsi*.

The two species described by Sars under the names of *T. nana* and *T. Höringii* are united by Della Valle, and in this I am very much inclined to agree with him. He, however, considers them to be the same as *Anonyx nana*, Kröyer, which is considered by Stebbing to be a different species and is included in "Das Tierreich" Amphipoda under the name *Orchomenella nanus* (Kröyer).

It should be added that Walker in 1904 (p. 244) described, on a single male specimen from Ceylon, a new species, *Tryphosa cucullata*, which, he says, "is distinguished by the peculiar hooded character of the peduncular joints of the upper antennae." At the same time he recorded the occurrence in the seas of Ceylon of *Orchomenella nanus* (Kröyer) which had been collected in a different locality at a different time.

ENDEVOURA* MIRABILIS, *nov. gen. et sp.*

(Fig. 4 *a-q*.)

Locality.—East Coast of Flinders Island, Bass Strait. Numerous specimens. (Reg. No. E.4845.)

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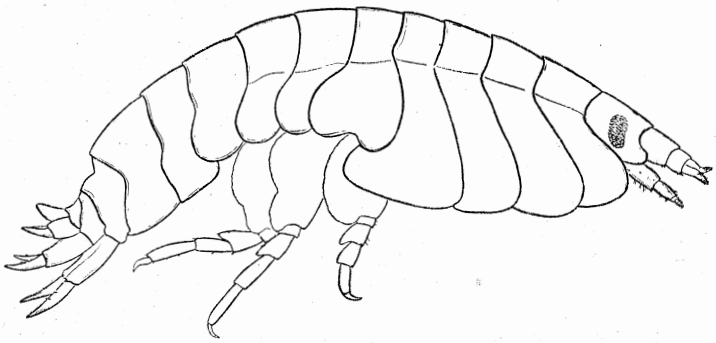
* The generic name has been formed by a slight alteration from the word "Endeavour," the name of the vessel by which the specimens were collected.



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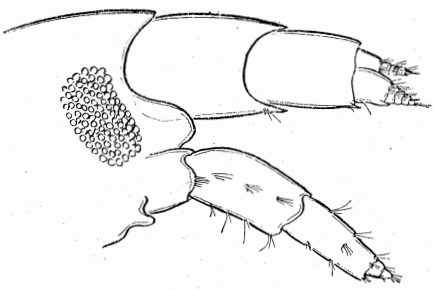

b.

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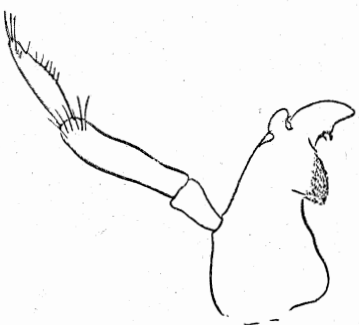


c.

d.

Fig. 4 *a—e*. *Endevoura mirabilis*, nov. gen. et sp. *a*. Side view of whole animal. *b*. Anterior portion of head with antennae. *c*. Mandible. *d*. First maxilla. *e*. Second maxilla.

Diagnosis. Antennae subequal, short, with reduced flagella; upper antennae with accessory flagellum. First gnathopod large, simple; second gnathopod of usual type in the Lysianassidae. First peraeopod developed into a subchelate grasping organ with greatly broadened propod. Telson entire with extremity rounded. In general shape, side plates, remaining peraeopoda and uropoda resembling the usual type of the family.

Length, about 6 mm.

Colour (in spirit), whitish.

The development of the first peraeopod in this species is most extraordinary, and I know nothing at all like it in the other Lysianassidae. At first I suspected that it might be a male character, but it is present in all the numerous specimens that I have been able to examine, although there is none among them that I am perfectly certain is a female.

The first gnathopod is also somewhat peculiar, being large in proportion to the second and somewhat ungainly in form, the distal portion lying in a different plane from the basal joints and being so curved that it is difficult to get a satisfactory view of the appendage. The very reduced flagella of both antennae are noteworthy, but in the remaining characters the animal presents the usual type found in the family Lysianassidae. The following is a detailed description:—

Both antennae (Fig. 4 *b*) are short and stout, the flagella being greatly reduced. In the upper antenna the first joint is much larger than the second, and the third joint is indistinguishable, being apparently sunk in the hollow end of the second. The primary flagellum is about one-half the length of the second joint of peduncle, composed of about five very short joints. The accessory flagellum is about half the size of the primary. The second antenna is of about the same length as the first, the antepenultimate joint slightly longer and considerably broader than the penultimate. The flagellum is very short, apparently composed of two or three small joints.

The eyes are large, oval.

In the mandibles (Fig. 4 *c*) the palp is well developed and arises at some distance from the base, it is considerably longer than the mandible itself, its second joint the longest

with several setae at the distal end, the third joint shorter and slightly narrower, with setae at the apex and some along one margin. The molar tubercle is fairly well developed and is situated distally to the base of the palp, and there are two small curved setules between it and the smooth cutting edge. On the outer side of the mandible, nearly opposite the molar tubercle, is a small rounded prominence similar to that figured by Sars in *Orchomenella ciliata*, Sars, and in other species.

The lower lip has the mandibular process well developed, each lobe rounded distally and fringed with setae, apparently small inner lobes more delicate than the outer lobes are present.

The first maxilla (Fig. 4 *d*) has the palp of two joints, the first very short, the second appears narrow as shown in Fig. 4 *d*, being seen in profile; when seen full-face it is broad, with rounded end bearing numerous short setules. The inner lobe is small and bears a single long seta at its rounded apex, the outer lobe is straight and bears seven or eight stout dentate setae.

The second maxilla (Fig. 4 *e*) has the two lobes subequal, the inner one bearing three long spinules at the apex and fine setæ along the inner margin, the outer has five or six long dentate setules at the apex and finer ones near their base.

The maxillipeds (Fig. 4 *f*) have both lobes well developed, the inner one with the inner margin straight and bearing fine setules, and one stouter spinule at some distance from the apex. The extremity is obliquely truncate and serrate, the appearance being similar to that caused by a number of short setae placed closely side by side. The outer lobe is much larger, reaching fully as far as the end of the carpus, its inner margin is finely crenulate or uneven, with curved lines reaching up to each crenulation; the surface bears three small spinules at some distance from the margin. In the palp the proportions of the joints are shown in Fig. 4 *f*. The terminal joint is not finger-like, but forms a broad oval.

The first gnathopod (Fig. 4 *g* and *h*) is very large and is peculiarly bent and curved so that it is difficult to get a view of the whole of it at the one time, the side plate is large, rounded anteriorly, the basal joint is very long and bears

on its anterior margin three or four short dentations. The ischium is very long and slightly narrowed proximally as usual; the remaining joints of the appendage are twisted so as to lie in a line almost at right angles to that of the basal joints. In Fig. 4 *g* they are shown in this position more or

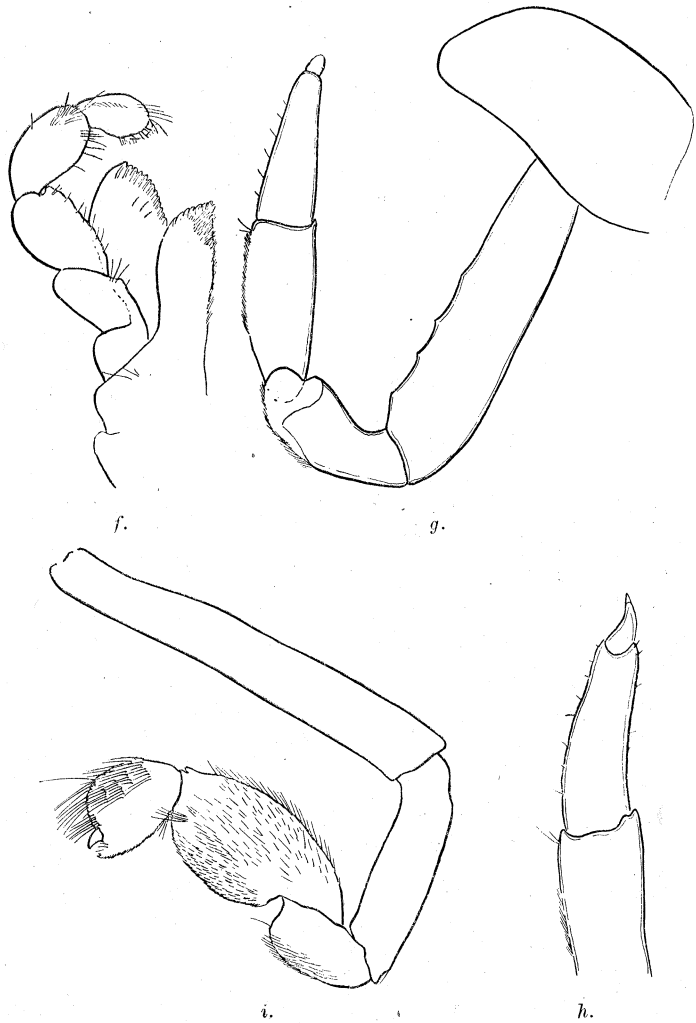
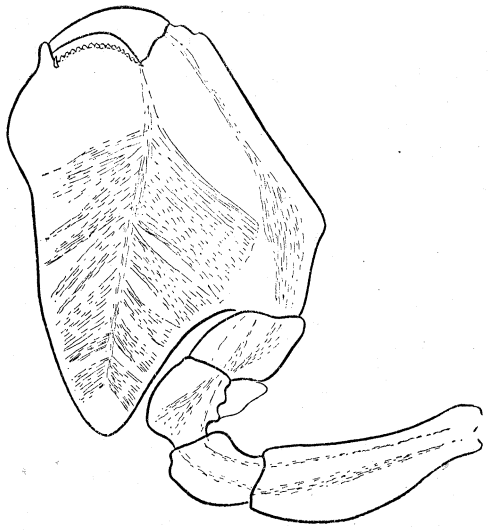


Fig. 4 *f*–*i*. *Endevoura mirabilis*, nov. gen. et. sp. *f*. Maxilliped. *g*. First gnathopod. *h*. Extremity of same seen full face. *i*. Second gnathopod.



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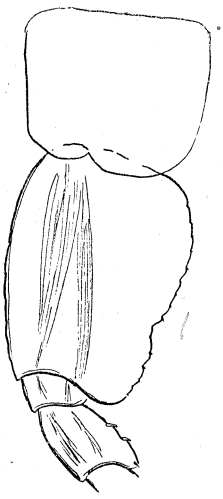

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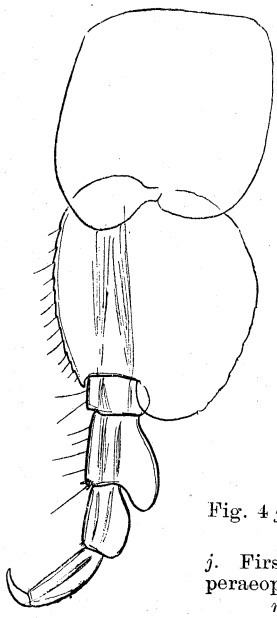

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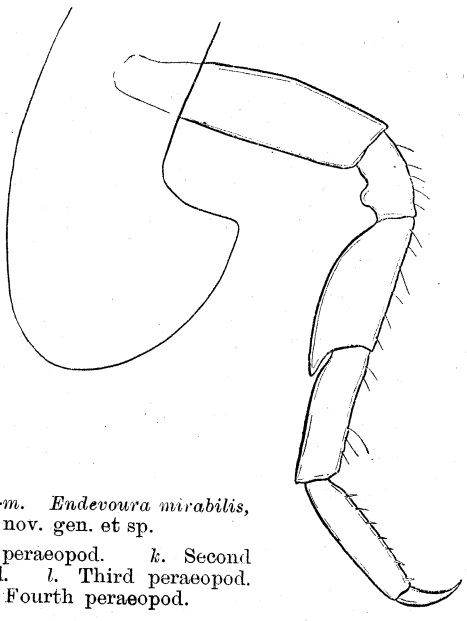


k

Fig. 4 *j*—*m*. *Endevoura mirabilis*, nov. gen. et sp.

j. First peraeopod. *k*. Second peraeopod. *l*. Third peraeopod. *m*. Fourth peraeopod.

less in profile, the apex of the finger being directed away from the observer; the carpus and propod are somewhat flattened, but are curved so it is difficult to get them in a position to show their full width, but a full-face view as given in Fig. 4 *h* shows that the propod, which is about as long as the carpus, narrows distally, and that there is no trace of a palm, the limb ending simply in the short, stout curved finger.

The second gnathopod (Fig. 4 *i*) is long and delicate and has the characters usually found in the Lysianassidae. The carpus is broadly oval, with its whole surface densely covered with fine short setules, the propod is much smaller than the carpus, oval in shape, with transverse rows of setules on its anterior margin. It projects slightly so as to form a minute chelate joint with the short finger.

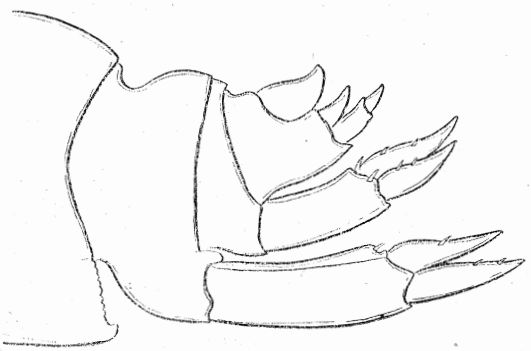
The first peraeopod (Fig. 4 *j*) is large and of extremely peculiar appearance, forming a powerful subchelate organ. The propod is immensely enlarged and is irregularly quadrate in shape, the postero-distal portion being produced backwards into a lobe reaching nearly to the proximal end of the merus, it narrows somewhat distally, the palm being only half the distal width of the joint, defined by a stout tooth, regularly convex and fringed with a row of very short, stout teeth; the finger is short and stout, fitting closely on to the palm.*

The second peraeopod (Fig. 4 *k*) is normal, and has the side plate produced backwards, along the lower margin of the fifth side plate, into a moderately large lobe about as broad as deep.

The third peraeopod (Fig. 4 *l*) has the side plate very large, deeper than broad, lobed below, the posterior portion widely expanded, oval, anterior margin fringed with setules arising from slight serrations, posterior margin with minute crenulations. The merus is produced postero-distally into a rounded lobe.

The fourth (Fig. 4 *m*) and fifth (Fig. 4 *n*) peraeopods are of similar shape, the fifth slightly larger than the fourth, the basal joint narrower than in the third, and with the posterior margin somewhat irregular in outline, slightly concave towards the distal end and with minute crenulations. The third pleon segment has the infero-posterior angle quadrate, the angle itself being produced into a short point.

* In another specimen, subsequently examined, the palm projects much more and the limb might be described as chelate.



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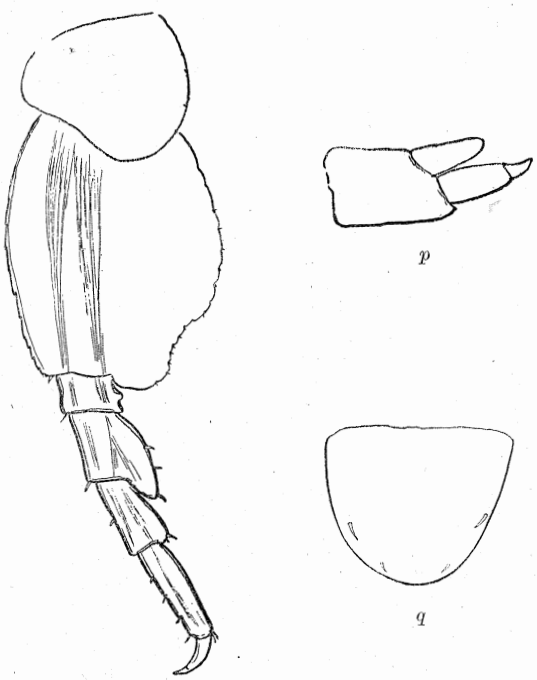


p

q

n

Fig. 4 *n*—*q*. *Endevoura mirabilis*, nov. gen. et sp. *n*. Fifth peraeopod. *o*. Terminal portion of pleon with side view of uropods and telson. *p*. Third uropod. *q*. Telson.

The first uropod with the branches subequal, shorter than the peduncle; the second uropod similar but shorter and the branches rather broader in proportion, the third uropod (Fig. 4 *p*) very short, two-branched, outer branch of two joints, inner branch one-jointed, as long as the first joint of the outer.

The telson (Fig. 4 *q*) short, entire, forming a half oval, and bears two minute spinules on each side near the margin.

EUONYX NORMANI, *Stebbing.*

(Figs. 5 *a-d.*)

Euonyx normani, Stebbing, 1906, p. 19.

Locality.—East Coast of Flinders Island, Bass Strait. One male, length about 18 mm. (Reg. No. E. 4851.)

I think this specimen must be referred to Stebbing's species although there are one or two points of difference. In the general shape, the small first side plate, large second

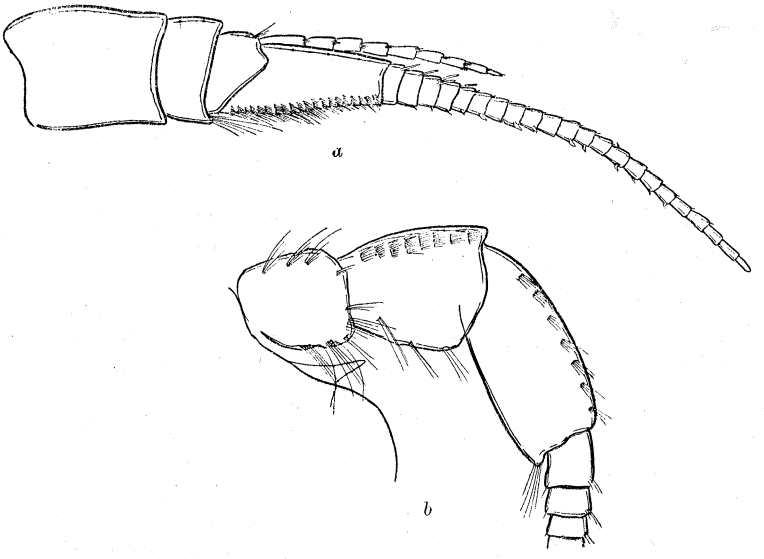


Fig. 5 *a—b*. *Euonyx normani,* Stebbing, male.
a. First antenna. *b*. Second antenna.

plate produced into a rounded anterior lobe and in the peraeopoda, etc., it agrees well with his figures, but the first antennae seem shorter in proportion to the second. In the "Endeavour" specimen these (Fig. 5 *b*) have the general characters found in males of similar genera and have the flagellum elongated to about one-half the length of the body. The eye is large and oval. The first gnathopod is similar to the figure given by Stebbing, but is considerably longer and more slender; the second gnathopod is also long and slender, agreeing well with Stebbing's figure and description. Stebbing's specimen, which was a female, was obtained in the South Pacific near the Kermadec Islands at a depth of 1,140 metres.

In the first antenna (Fig. 5 *a*) the first joint of the flagellum is very long and bears on the under side numerous short transverse rows of fine setae, the joints of the flagellum bear calceoli and are twenty-three in number, while the accessory flagellum contains nine, of which the first is the longest. The last joint of the second antenna is longer than

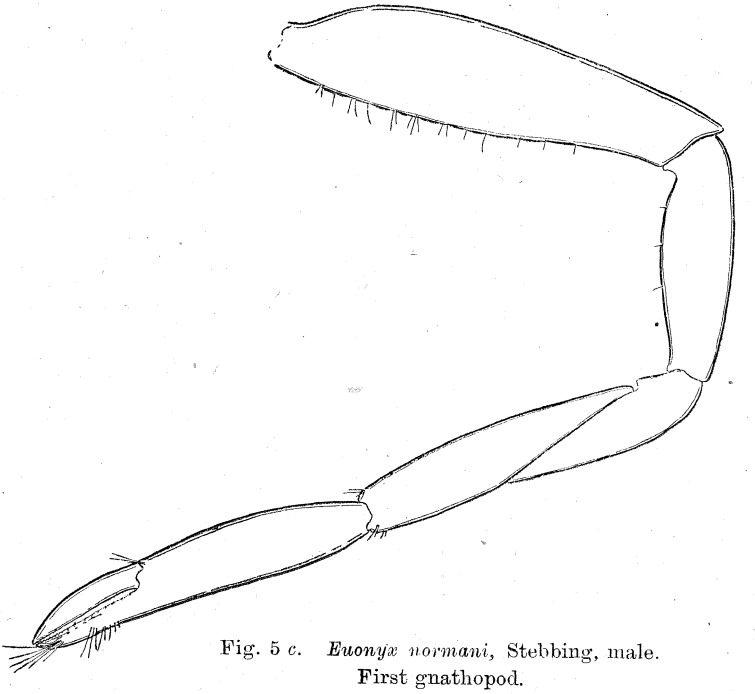


Fig. 5 *c*. *Euonyx normani*, Stebbing, male. First gnathopod.

the preceding, both bear transverse tufts of setae on the upper surface, the flagellum contains seventy-nine joints, many of the proximal ones bearing calceoli.

The gnathopoda are shown in Fig. 5 *c* and *d* and do not call for detailed description; the first bears very few setules and the second has the structure commonly found in the Lysianassidae; in both the ischial joint is considerably elongated.

The type specimen, which was a female, was taken off the Kermadec Islands, and the species is now for the first time recorded from the Australian coast.

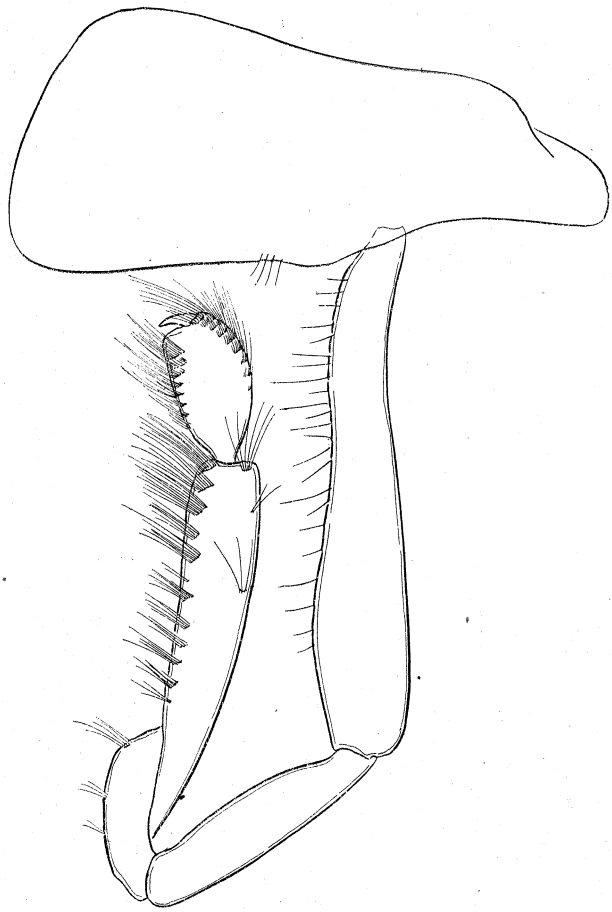


Fig. 5 *d*. *Euonyx normani*, Stebbing, male. Second gnathopod.

AMARYLLIS MACROPHTHALMA, *Haswell.*

Amaryllis macrophthalma, Haswell, 1880*a*, p. 253, pl. viii., fig. 3.

Amaryllis macrophthalma, Stebbing, 1910, p. 569.

Amaryllis macrophthalma, Barnard, 1916, p. 114.

Localities.—10 miles north of Circular Head, Tasmania. Several specimens.

Eastern Slope, Bass Strait; several specimens.

Tasmanian Coast; several.

60-80 miles west from Eucla, 80-120 fathoms; one specimen.

Off Cape Jervis, South Australia; one.

East Coast of Flinders Islands, Bass Strait; one.

These specimens vary very much in size, the largest being 20 mm. in length. They seem all referable to this species.

Barnard has recently given a fuller account of the species, based on the examination of specimens from South Africa, and his description appears to agree well with the "Endeavour" specimens. He points out that some forms have pale eyes, while others from the same locality have dark eyes. All the "Endeavour" specimens have dark eyes.

Distribution.—Australia, New Zealand, South Africa, and the Straits of Magellan.

ANDANIOTES CORPULENTUS, (*G. M. Thomson*).

Andaniotes corpulentus, Stebbing, 1910, p. 575.

Locality.—Eastern Slope, Bass Strait.

One small specimen, about 3 mm. long. (Reg. No. E. 5356.)

This agrees well with the description given by Stebbing. The species was originally recorded from New Zealand waters, but was taken in Australian seas by the "Thetis" and Chevreux has recorded it from Port Charcot in Antarctic regions. Stebbing (1910, p. 575) also recorded that it was taken by the "Scotia" Expedition in Lat. 66° 40′ S., Long. 40° 35′ W.

SEBA TYPICA, (*Chilton*).

(Fig. 6 *a-d.*)

Teraticum typicum, Chilton, 1884, p. 257, pl. 18, figs. 1*a—f.*

Seba typica, Chilton, 1906, p. 572, (with synonymy).

Locality.—East Coast of Flinders Island, Bass Strait, about 10 specimens, all small, the largest with body 4.5 mm. long.

These specimens were found along with numerous other Amphipoda collected at the same time. After examining them and comparing them with New Zealand specimens, I have no hesitation in referring them to this species, *S. typica,* which has hitherto been known only from a very few small-sized specimens from New Zealand.

There are altogether five species described of the genus *Seba,* all of them somewhat imperfectly known. In two of the species the male differs from the female in the shape of the first gnathopod. In the male the propod of the first gnathopod is expanded and the palm shows various projections or teeth with concave depressions between them. In the female the propod is much smaller and has the palm produced so that the limb is distinctly chelate, the inner margin of the fixed finger—*i.e.,* the palm—being straight or almost so.

In his account of *S. antarctica* Walker (1907, p. 37) pointed out that the male of that species differs from the female in the posterior peraeopoda, which had the meral joint very much broadened and expanded posteriorly. Walker speaks of his species as having dimorphic males, some being similar to the female and distinguished from it only by the absence of incubatory lamellae, the others larger and differing in the expansion of the meral joint of the last three pairs of peraeopoda; though, according to Walker's account and figures, these large males have the first gnathopod similar to that of the female. In *S. saundersii* Stebbing the female only is known, but in the two species, *S. armata* (Chevreux) and *S. typica* (Chilton) there is a form which has been described as the male differing, as already mentioned, from the female in the configuration of the palm of the first gnathopod; in these two species the difference in the meral joint of the last peraeopods has not previously been noticed.

The largest of the "Endeavour" specimens, which measure 4.5 mm. in length of body, differ from the figure

of the male that I had previously given of New Zealand specimens in having the meral joints of the posterior peraeopoda as greatly expanded as in *S. antarctica* and in having the palm of the first gnathopod very distinctly

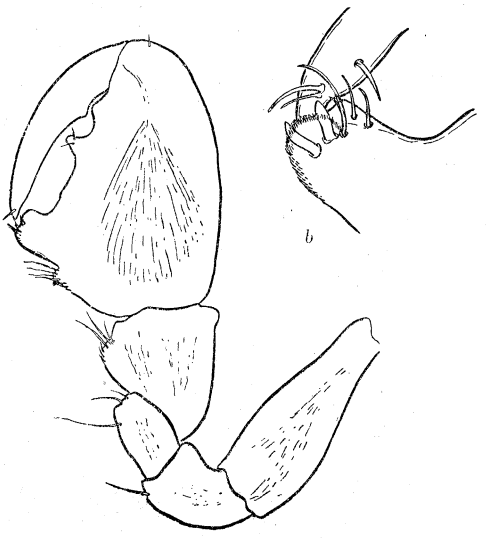
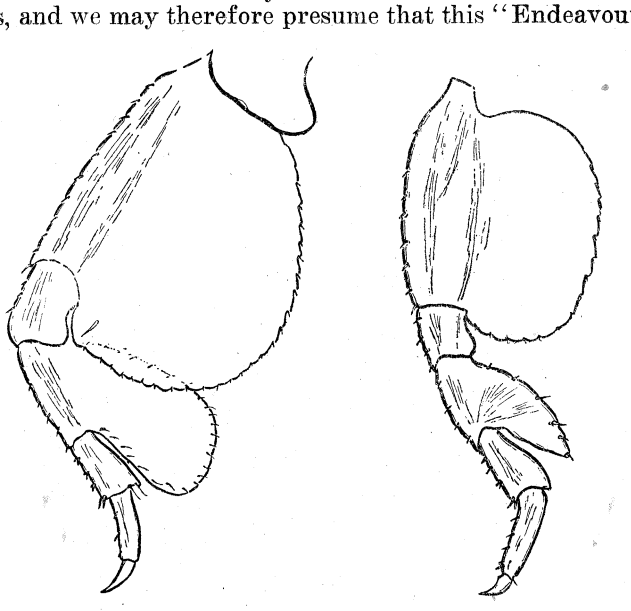


Fig. 6 *a*—*b*. *Seba typica*, Chilton, male.
a. First gnathopod. *b*. End of palm with tip of finger (more highly magnified).

oblique instead of being transverse, though the armature of the palm itself is closely similar (Fig. 6 *a* and *b*). I find, however, that the small specimens collected by the "Endeavour," measuring only about 2 mm. in length of body, have the palm transverse as in the New Zealand specimens, which are of about the same size, and, as in them, the meral joint of the posterior peraeopoda is only slightly broadened. Transitional forms are also found, and it appears evident that the expansion of the meral joints of the peraeopods is greatest in fully developed males and is gradually attained, and that in young males the palm of the first gnathopod is transverse or even projecting, while in the larger or older males it becomes gradually more and more oblique. The expansion of the merus of the fifth peraeopoda increases in proportion to the greater obliqueness of the palm of the first gnathopod. Probably in quite young males the first gnathopod is similar to that of the

female; I have one small specimen that I presume is a young male which has the first gnathopod almost the same as in the female, but with the palm more nearly transverse and slightly irregular. Among the "Endeavour" specimens there is no female bearing eggs, but there is one specimen which has the first gnathopod similar to that described by Stebbing for *S. saundersii* or to the female of *S. armata* as described and figured by Chevreux. It has the first gnathopod distinctly chelate and the distal portion bent inwards in a different plane from that of the basal half, so that it is difficult to get the whole gnathopod in view at one time.

Individuals with the first gnathopoda having this same chelate form were found by Walker in *S. antarctica* bearing eggs, and we may therefore presume that this "Endeavour"



c *d*

Fig. 6 *c*—*d*. *Seba typica*, Chilton, male.
c. Fifth peraeopod. *d*. Fourth peraeopod.

specimen is also a female. In *S. antarctica* Walker speaks of dimorphic males, but as the two forms he describes differ only in the amount of expansion of the meral joints of the posterior peraeopoda they are probably rather to be considered as different stages of development. In *S. antarctica*, therefore, the males appear to differ from the females only in the great expansion of the meral joints of the posterior

peraeopoda. In his figure of the whole animal Walker (1907, pl. 13, fig. 22) shows the meral joints of the third, fourth and fifth peraeopoda all equally expanded. In the "Endeavour" specimens of *S. typica* it is only the fifth peraeopod that has the very marked expansion and in some specimens the joint is produced posteriorly more than is shown in Walker's figures (see Fig. 6 *c*) ; in the fourth peraeopod (Fig. 6 *d*) there is considerably less expansion, and in the third still less, the meral joint showing the same amount of dilatation as in the female.

In *S. armata,* as in *S. typica,* the male differs from the female in the armature of the palm, the projections and teeth being similar to those of the latter species, but the propod is markedly produced so that the gnathopod is distinctly chelate. Chevreux gives the size of the males examined by him as scarcely 3 mm., and it is possible that they were not fully mature, and that older specimens would have the palm more transverse or even obliquely subchelate. The male figured by Chevreux shows no expansion of the meral joint of the last peraeopod; either it is not yet developed or the species differs in this point from *S. typica.*

As Walker has already pointed out, the females of all the species described are practically indistinguishable.

*Seba typica** is known from New Zealand and from Bass Strait between Australia and New Zealand. *S. saundersii* Stebbing, with which *S. typica* was at one time united, and with which it may ultimately prove to be identical, is known from Cape Virgins, Patagonia, and, with some doubt, from Algoa Bay, S. Africa. *S. antarctica* Walker is known from South Victoria Land in the Antarctic; *S. armata* Chevreux from the Gulf of Gascony and the Azores. The remaining species, *S. innominata* Bate was recorded from the Gulf of Naples, but is still imperfectly known.

LEUCOTHOE SPINICARPA, (*Abildg.*).

Leucothoe spinicarpa, Stebbing, 1906, p. 165.
Leucothoe spinicarpa, Chilton, 1912, p. 478.
Leucothoe spinicarpa, Barnard, 1916, p. 148.
Leucothoe miersi, Stebbing, 1906, p. 165.
Leucothoe commensalis, Stebbing, 1910, p. 580.

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* Stebbing (1906, p. 163) gives *S. typica* and *S. armata* as synonyms of *S. saundersii.* In view of the facts mentioned by Walker in his description of *S. antarctica,* I have spoken of all these forms as separate species pending further investigation.

Localities.—Tasmanian Coast and Eastern Slope, Bass Strait. Three specimens. (Reg. Nos. E. 5352 and E. 5356.)

Forty miles west of Kingston, South Australia, 30 fathoms. Several specimens. (Reg. No. E. 4862.)

I am referring these specimens to the species mentioned above, which is of world-wide distribution. To the synonyms previously given Barnard has definitely added *L. commensalis* Haswell and *L. miersi* Stebbing, which I had also done in my MS. notes before I received Mr. Barnard's paper.

COLOMASTIX BRAZIERI, *Haswell.*

(Fig. 7 *a-h.*)

Colomastix brazieri, Haswell, 1880*b,* p. 341, pl. 22, fig. 4.

Colomastix brazieri, Stebbing, 1906, p. 206.

Colomastix brazieri, Chilton, 1912, p. 484.

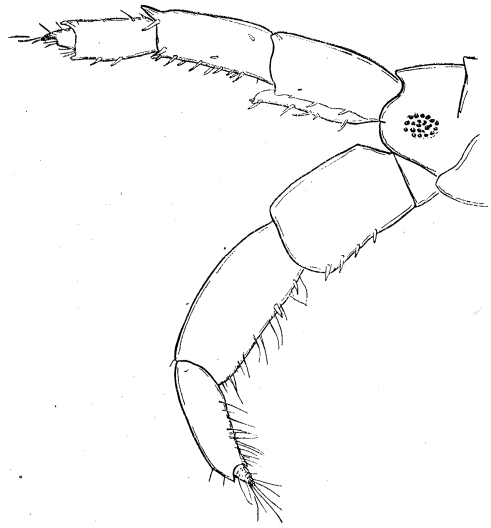
One specimen, male, about 6 mm. long, exact locality not recorded.

Distribution.—Australia, New Zealand, South Orkneys.

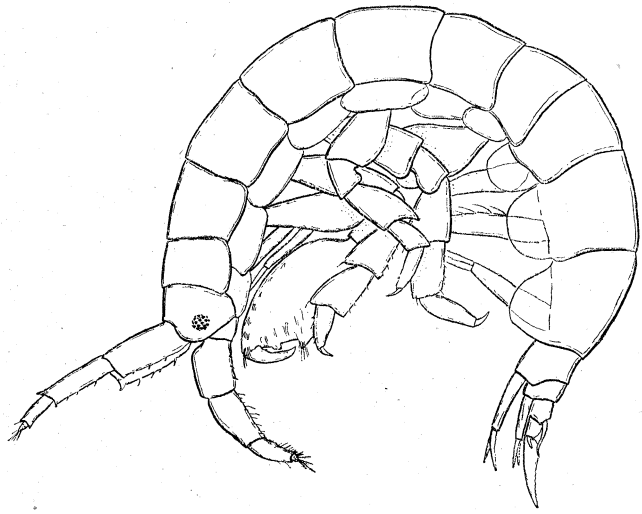
As this species is as yet only imperfectly known and belongs to a peculiar genus, the following description of the single specimen obtained by the "Endeavour" may be acceptable.

The general shape of the body agrees with Haswell's description, and is shown in Fig. 7 *a*; the back is smooth; the side plates are all shallow and present no peculiarity.

The antennae (Fig. 7 *b*) are stout, pediform, the flagellum being vestigial in both. The first antenna has the first joint about the same length as the second, both end in subacute teeth and sharp spines above and below, and bear a row of spinules on the under surface, in the first segment the under surface being concave with spines along both margins; the third joint is considerably shorter than the second, but ends similarly with spines. The flagellum is represented only by one or two minute joints, the first one being produced to an acute point reaching to the end of the



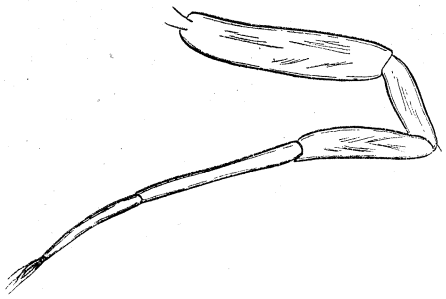
b

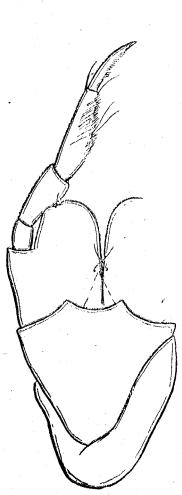


a

Fig. 7 *a—b*. *Colomastix brazieri*, Haswell, male.
a. Side view of animal. *b*. Head and antennae.

vestigial flagellum. The second antenna has the third joint of the peduncle stouter than the fourth or fifth and bearing stout spinules on its lower margin; the fourth joint is longer and stouter than the fifth, both bear slender setules on the lower margin, and the fifth is produced at the extremity into subacute teeth above and below; the flagellum is vestigial, being composed of four or five segments fused into a single piece and bearing numerous slender setules towards the apex. The maxillipeds are shown in Fig. 7 *c*.





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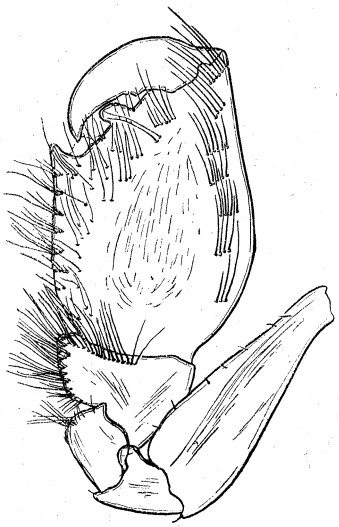


e

Fig. 7 *c—e*. *Colomastix brazieri*, Haswell, male.
c. Maxillipeds. *d*. First gnathopod. *e*. Second gnathopod.

The first gnathopod (Fig. 7 *d*) is very small, long, slender and delicate, and ends without dactyl in a small tuft of setae as in *C. pusilla* (Grube).

The second gnathopoda (Fig. 7 *e*) are large and powerful, the right and left equal in size. The basal and ischial joints are produced into a flange on the inner side against which the large propod rests when reflexed. The carpus is short and subtriangular and bears on the posterior margin several transverse rows of long setules, a similar row extending along the distal margin on the inner side. The propod is greatly dilated, being fully two-thirds as broad as long; it bears numerous transverse rows of setae near the anterior margin, others along the posterior margin and numerous single setae scattered at various places on the inner surface; the palm is defined by a stout subacute tooth, is broad, and shows two or more rounded prominences; the finger is short, stout, strongly curved, and fits into a depression near the defining tooth.

The peraeopoda call for no special remark, the third, fourth and fifth have the basal joint only slightly dilated. (See Figs. 7 *f* and *g*.)

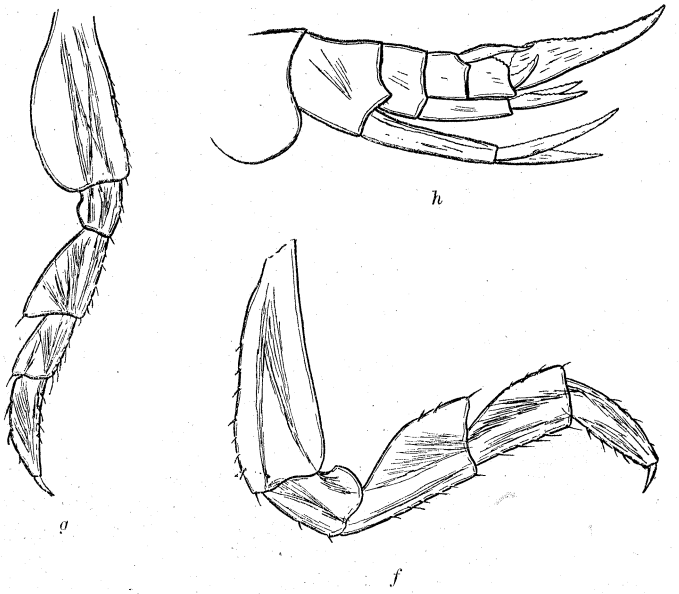


Fig. 7 *f*—*h*. *Colomastix brazieri*, Haswell, male.
f. First peraeopod. *g*. Fifth peraeopod.
h. Pleon, with uropoda and telson.

The first and second uropoda are small and have the rami small, styliform and subequal, both finely serrate on the upper margin. In the third uropod the outer ramus is small, slender and shorter than the peduncle; the inner ramus is much longer, three times as long as the peduncle, flattened vertically, the upper margin serrate or irregularly dentate. (Fig. 7 *h*).

The telson reaches beyond the end of the peduncle of the third uropod.

Colour.—In spirit, dull white, eye red, green according to Stebbing.

The single New Zealand specimen that I have is much smaller, and is probably immature. It was obtained by surface net in Port Chalmers in 1904; it is still greenish in colour (mounted in glycerine jelly) and when alive the eye was a bright red. The second gnathopod is small and appears like that of *C. pusilla* as figured by Bonnier (1893, pl. 8), who says his figure is that of an adult male, though judging from the "Endeavour" specimen it seems possible that his were not fully developed. In the third uropod the outer ramus is much shorter than the inner. In the "Scotia" specimens from South Orkneys the outer ramus was two-thirds the length of the inner. Probably as the animal develops the inner ramus becomes longer in proportion.

LILJEBORGIA BREVICORNIS, (*Bruz.*).

Liljeborgia brevicornis, Stebbing, 1906, p. 231.

Liljeborgia aequabilis, Stebbing, 1910, p. 588.

Liljeborgia pallida, Sars, 1894, p. 530, pl. 187.

Locality.—Eastern Slope, Bass Strait. (Reg. No. E. 5356.)

Three specimens, the largest 12 mm. long.

These specimens are certainly similar to those described by Stebbing under the name *L. aequabilis*, agreeing in the absence of dorsal dentation, but the species is, I think, too close to *L. brevicornis* Bruz. to be retained as a separate species. Stebbing mentions several small points of difference, and of these the first one, namely, the absence of a projecting tooth at the lower hind corner of the first and

second side plates holds good in the specimen I have specially examined, but these teeth are so small in *L. brevicornis* that their absence is not a very important character. The third pleon segment has the lateral margin straight and shows no emargination above the postero-lateral tooth; the slender finger of the fifth pair of peraeopods is not more than one-third the length of the propod, and is thus similar to the figure given by Sars; the length of this finger appears to vary, being longer in smaller specimens; the telson has only a single seta in the notch at the end of each lobe, thus agreeing with Sars' figure and differing from Stebbing's description. The slight differences mentioned by Stebbing in the gnathopods appear of little importance, those of my specimen agreeing quite closely with the figures given by Sars, the palm of the second having a small concave depression near the base of the finger.

L. brevicornis Bruz. is known from the Arctic Ocean and the North Atlantic. If *L. aequabilis* is really the same its range is extended to Australian seas.

The species *L. proxima* Chevreux from the Gambier Archipelago should, in Mr. Barnard's opinion, become a synonym of *L. aequabilis*. He records it from False Bay, South Africa.

LILJEBORGIA DUBIA, (*Haswell*).

Liljeborgia dubia, Stebbing, 1906, p. 233, and 1910, p. 638.

Liljeborgia dubia, Chilton, 1912, p. 485.

Locality.—Tasmanian Coast. Two specimens, the largest 15 mm. long. (Reg. No. E. 5352.)

These specimens agree on the whole with the description of this species given by Stebbing in 1906. The sixth and seventh segments of the peraeon are produced into a sharp dorsal tooth and there is a minute tooth on the fifth segment also; the teeth and carinations on the pleon are as described by Stebbing.

L. dubia is known from Australia, New Zealand, South Africa, the South Orkneys, and South Victoria Land. The closely allied species *L. consanguinea* has been recorded by Stebbing from Kerguelen and Heard Islands and by Chevreux from Marguerite Bay in the Antarctic. The two species present many points in common which are also found in the European species *L. fissicornis* (Sars.)

OEDICEROIDES ORNATUS, (*Stebbing*).

Oediceroides ornatus, Stebbing, 1906, p. 270, and 1910, p. 589.

Locality.—Eastern Slope, Bass Strait. One specimen, about 12 mm. long. (Reg. No. E. 5356.)

This specimen agrees with *O. ornatus* in the shape of the eyes, which extend to the acute tip of the frontal process, and in the little process to which the ventral carina of the rostrum is produced. It was obtained in Bass Strait near where the typical species was collected. The segments of the body bear rounded corrugations, but there is an absence of the small tubercles which appear to be so marked in Stebbing's figure, the species in this respect being more similar to *O. cinderella* from the Falkland Islands. However, the resemblance in the eyes and in the appendages is, I think, sufficient to warrant its being assigned to *O. ornatus.*

The species was taken by the "Thetis" off Port Hacking and also from Botany Bay, New South Wales.

BOVALLIA MONOCULOIDES, (*Haswell*).

Bovallia monoculoides, Chilton, 1909, p. 622, and 1912, p. 494.

Eusiroides monoculoides, Stebbing, 1910, p. 595.

Eusiroides monoculoides, Barnard, 1916, p. 174.

Eusiroides crassi, Stebbing, 1910, p. 594.

Localities.—Tasmanian Coast. Four specimens, the longest about 20 mm. in length. (Reg. No. E. 5352.)

Forty miles west of Kingston, South Australia, 30 fathoms. Two specimens, each about 15 mm. long. (Reg. No. E. 4862.)

Under the name *Bovallia monoculoides* or *Eusiroides monoculoides* a number of forms have been grouped, the relations of which are rather puzzling. In the "Challenger" Report, Stebbing described three species under the new genus *Eusiroides,* namely, *E. caesaris, E. pompeii,* and *E. crassi.* In "Das Tierreich" Amphipoda he united the first two as synonyms of the previously described species

Atylus monoculoides Haswell, but left *E. crassi* as a distinct species. In 1909 I identified specimens from the Auckland Islands with *E. crassi* and gave various reasons for the opinion that it could hardly be kept as a species distinct from *E. monoculoides* (i.e., *E. caesaris* and *E. pompeii*). I also pointed out that my specimens appeared to be nearly identical with *Bovallia gigantea* as described by Pfeffer and Chevreux. In 1912, after comparing specimens gathered by the "Scotia" with co-types of *Bovallia gigantea,* I remained still of the same opinion. In 1913, p. 168, Chevreux advanced several reasons for considering *Bovallia gigantea* distinct from *B. monoculoides.* In drawing up these differences he has, I think, based some of them on the published descriptions of *E. caesaris.* It has been pointed out by Walker, Stebbing and myself that in *B. monoculoides* there are very considerable variations in the presence and acuteness of the dorsal teeth and in the amount of serration of the posterior margin of the third pleon segment. Certainly extreme forms of *E. monoculoides* (i.e., *E. caesaris*) and *B. gigantea* look considerably different, but if we are to unite under one species *E. caesaris, E. pompeii* and *E. monoculoides,* then the differences between these forms and *Bovallia gigantea* do not seem to me to be sufficient to warrant us in keeping them distinct from that species. Whether the different forms are to be distinguished by different names or not is a point of comparatively little importance, the main point is to ascertain the characters of the forms under consideration and the amount of variation they show. This will be illustrated by the following brief description of the specimens gathered by the "Endeavour."

Off the Tasmanian Coast, four specimens (Reg. No. E. 5352) were collected. One of these is a female fully 20 mm. long with recently hatched young in the brood pouch. Both upper and lower antennae agree well with the figures given by Stebbing for *E. caesaris* and also with those given by Chevreux for *Bovallia gigantea,* except that the calceoli are not so numerous on the peduncular joints. The third pleon segment has the posterior margin convex and without serrations, the angle being very slightly produced, in this respect agreeing with both *E. crassi* and *B. gigantea.* None of the segments are produced dorsally into teeth; the fourth pleon segment shows a depression, more distinctly marked than in Stebbing's figure; the fifth segment is produced posteriorly into a short median triangular tooth, which in side view appears as a narrow

curved tooth. In the absence of dorsal teeth and of serrations on the third pleon segment this specimen agrees with *E. crassi*. A second specimen, about 15 mm. long, a female bearing eggs, is similar in general appearance and in the appendages, but has the posterior margin of the third pleon segment with numerous dentations as drawn by Stebbing for *E. pompeii*, there is a very slight indication of pleon segments one and two being produced into dorsal teeth, but no sign of a tooth on pleon segment four, the presence of which in the previous specimen seems to be exceptional. The third specimen, also a female with eggs, about 13 mm. long, has the first and second pleon segments very slightly produced, and is similar to the second in practically all other characters, but the third pleon segment has more numerous serrations, these being nearly as numerous as shown by Stebbing for *E. caesaris*. The fourth specimen, about 12 mm. long, also a female, is similar to the second and third but has only about six or seven serrations on the third pleon segment, the rest of the margin being slightly uneven.

Off Kingston, South Australia, two specimens (Reg. No. E. 4862) were collected, each about 15 mm. long, and having the serrations on the third pleon segment intermediate in character between those shown for *E. caesaris* and *E. pompeii* by Stebbing. One of them also showed very slight dorsal production of pleon segments one and two.

Certainly all the "species" mentioned above must, in my opinion, be placed in one genus, and the name *Bovallia* appears to have priority over *Eusiroides*.

PARAMOERA AUSTRINA, (*Bate*) var. MEGALOPHTHALMA, (*Haswell*).

(Fig. 8 *a-c.*)

Paramoera austrina, (part), Stebbing, 1906, p. 363.

Paramoera austrina, (part), Chilton, 1909, p. 625, and 1912, p. 498.

Paramoera austrina, (part), Stebbing, 1910, p. 456.

Localities.—Entrance to Oyster Bay, Tasmania. Many specimens. (Reg. No. E. 4764.)

Port Arthur, Tasmania. Many specimens. (Reg. No. E. 4765.)

Tasmanian Coast. Seven specimens. (Reg. No. E. 5352.)

Under the name, *Paramoera austrina,* Stebbing has grouped a large number of forms to which I have added others. He included the species originally described by Haswell as *Atylus megalophthalmus.* I have since pointed

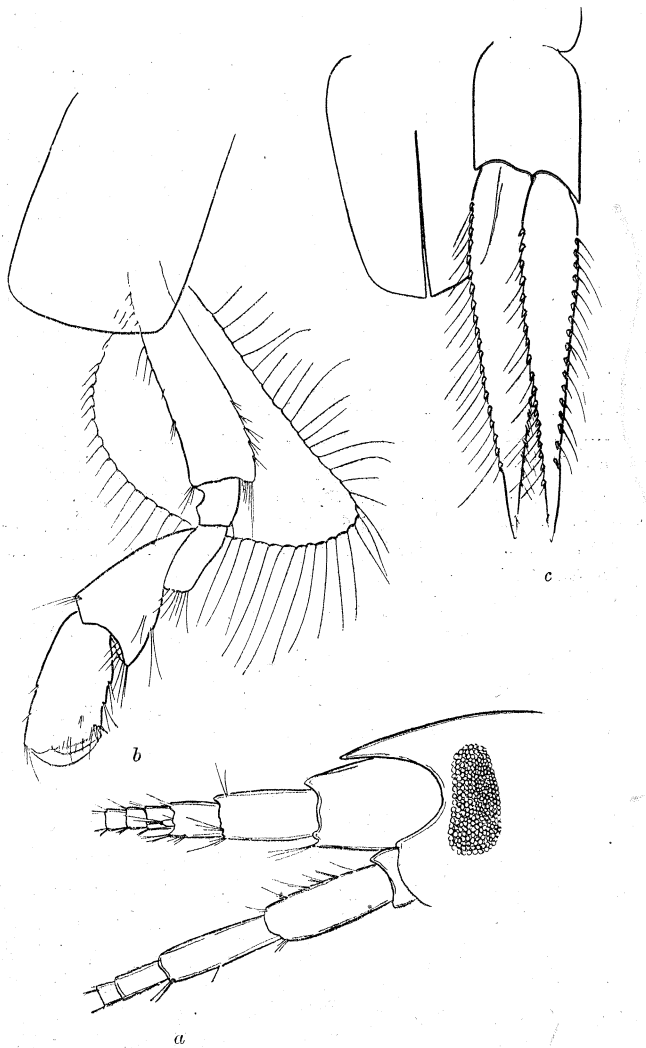


Fig. 8 *a*—*c*. *Paramoera austrina* Bate, var. *megalophthalma* Stebbing. *a*. Head and bases of antennae; showing rostrum. *b*. Second gnathopod of female. *c*. Third uropod and telson,

out that this form differs from the others in sufficient points to warrant its being considered a separate variety, if not a species. Similarly the form from South Africa, with several teeth on each lobe of the telson, which I described in 1912, has been considered by Barnard to be sufficiently distinct to be recognised as a separate species under the name *P. capensis* (Dana). Further discussion of the various forms is given by Barnard (1916, p. 183), who includes *Atyloides magellanica* Stebbing (1888, p. 925, pl. 79) as a synonym of *P. capensis* (Dana).

The "Endeavour" specimens all appear to belong to the variety *megalophthalma,* which may be distinguished by the very large eyes, the presence of a distinct rostrum (Fig. 8 *a*), the shorter and more triangular carpal joints of the gnathopoda (Fig. 8 *b*), the broader rami of the third uropods and the absence of setae from the telson (Fig. 8 *c*).

The accessory flagellum seems to vary, as might be expected. In the specimens from Port Jackson that I have examined it is almost indistinguishable and apparently fused to the last joint of the peduncle; in the "Endeavour" specimens it is fairly distinct as in typical specimens of the species.

Stebbing considers *Atylus microdeuteropus* Haswell from Port Jackson to be a synonym of *Amphitoe* (*Iphimedia*) *simplex* Dana from Hermit Island, and says that the species is probably identical with *P. austrina* Bate. There is very considerable resemblance between the descriptions and figures given by Dana and Haswell, and it is probable they were describing the same species, but the enlargement of the joints of the flagellum of the first antenna mentioned and figured by each seems to me to be too marked and too widely separated—"every third or fourth" (Haswell)—to apply to *P. austrina,* in which every second joint is dilated but only to a slight extent, and the species more probably belongs to the genus *Pontogeneia.*

MELITA FRESNELII (*Aud*).

Melita fresnelii, Stebbing, 1906, p. 423, and 1910, p. 596.

Locality.—Sanders Bank, Kangaroo Island, 28 fathoms. Several specimens (male and female). (Reg. No. E. 4855.)

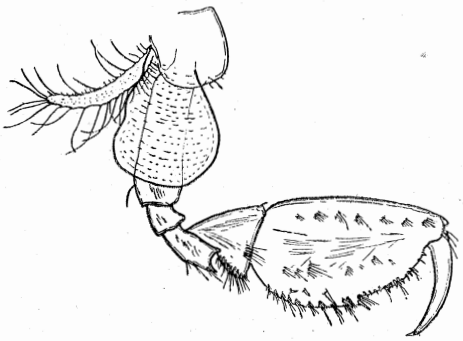
This widespread species appears to be fairly common in Australian seas. The specimens examined agree well with the description given by Stebbing in 1906, though the numbers of teeth on the posterior margins of the pleon segments do not appear to be constant.

CERADOCUS RUBROMACULATUS (*Stimpson*).

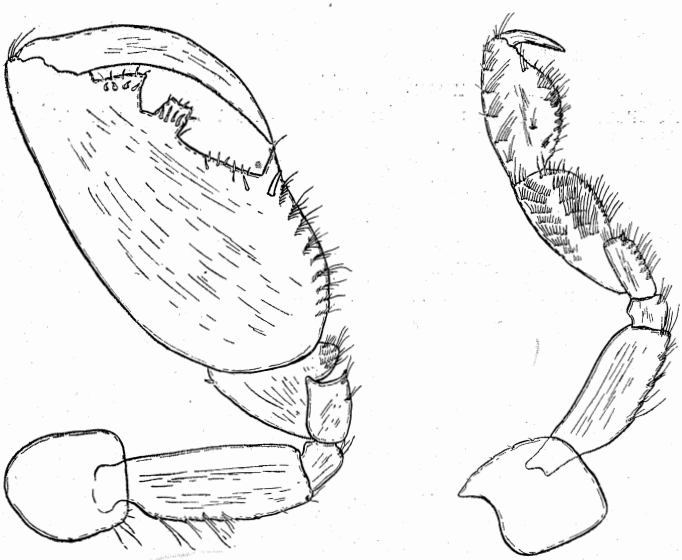
(Fig. 9 *a-c*).

Ceradocus rubromaculatus, Stebbing, 1910, p. 598 (with synonymy).

Ceradocus rubromaculatus, Chilton, 1916, p. 369.



c



b

Fig. 9 *a—c*. *Ceradocus rubromaculatus* (Stimpson).
a. First gnathopod of male. *b*. Second gnathopod of male.
c. Second gnathopod of female.

Localities.—Tasmanian Coast. (Reg. No. E. 5352.)

Ten miles North of Circular Head, Tasmania.

Eastern Slope, Bass Strait. (Reg. No. E. 5356.)

Of this species there are several specimens, males and females, from the localities mentioned. I give figures of the first and second gnathopods of the male and of the second gnathopod of the female, which will readily indicate their structure and the arrangement of the setae without further description. In the male the palm is very oblique, while in a form from the Gambier Archipelago referred to this species by M. Chevreux, the palm is transverse.

The species is widely distributed in New Zealand and Australian seas. I have discussed its occurrence in New Zealand in the paper quoted above.

MAERA INAEQUIPES, (*A. Costa*).

Maera inaequipes, Stebbing, 1910, p. 599.

Maera inaequipes, Chilton, 1916, p. 365, figs. 5 and 6, and 1917, p. 19.

Locality.—Fifteen miles N.W. of Cape Jervis, South Australia, 17 fathoms. One ovigerous female, 6 mm. long. (Reg. No. E. 4842.)

In this specimen the right and left second gnathopods are equal, the palm regularly convex. The third uropod is missing. I have recorded the occurrence of this species in New Zealand seas and have made some remarks on its distribution and variations in the two papers quoted above.

MAERA MASTERSII, (*Haswell*).

Megamoera mastersii, Haswell, 1880*a*, p. 265, pl. 11, fig. 1.

Maera mastersii, Stebbing, 1906, p. 439, and 1910, p. 642.

Maera mastersii, Chevreux, 1908, p. 481.

Maera mastersii, Chilton, 1916, p. 367.

Maera mastersii, Barnard, 1916, p. 195.

Locality.—Forty miles West of Kingston, South Australia, 30 fathoms. One specimen, 6 mm. long.

I have described this species in detail in the paper mentioned above. It is known from Australian and New Zealand seas, from the Kermadec Islands, South Africa, and the Gambier Archipelago.

MAERA HAMIGERA, (*Haswell*).

Maera hamigera, Stebbing, 1910, p. 600.

Maera hamigera, Barnard, 1916, p. 196.

Locality.—Eastern Slope, Bass Strait. Four specimens, length about 12 mm. (Reg. No. E. 5356.)

These specimens undoubtedly belong to this species, agreeing well with specimens received from Port Jackson, New South Wales. They also correspond on the whole with the description of the species given by Barnard of South African specimens, except that the large right second gnathopod of the male differs in having the palm distinctly transverse and in a slightly different armature; the finger is stout but not scimitar-shaped as in his specimen. Apparently there is considerable difference in the second gnathopod of this species as I have another specimen from Port Jackson which I think must be referred to the species, though it differs both from the typical form and from that described by Mr. Barnard.

The species is known from Australia, South Africa and from the Indian Ocean.

MAERA VIRIDIS, *Haswell.*

Maera viridis, Haswell, 1880*b*, p. 333, pl. 21, fig. 1.

Elasmopus viridis, Stebbing, 1906, p. 445, and 1910, p. 643.

Maera viridis, Chilton, 1916, p. 362.

Locality.—Eastern Slope, Bass Strait. One specimen, about 6 mm. long.

In this specimen gnathopod two has the palm slightly projecting and even—*i.e.,* without notches—except for the deep narrow notch next to the sharp defining tooth.

I have discussed this species in the paper quoted above. It is widely distributed in Australian and New Zealand seas.

ELASMOPUS DIEMENENSIS, (*Haswell*).

(Fig. 10 *a-c.*)

Megamoera diemenensis, Haswell, 1880*a*, p. 266, pl. xi., Fig. 3.

Elasmopus diemenensis, Stebbing, 1906, p. 442, and 1910, p. 643.

Locality.—Eastern Slope, Bass Strait. One male, 11 mm. long.

This species is very similar in general appearance to *E. subcarinatus*, but can be readily distinguished from it by the pair of strong dorsal teeth on the posterior margin of the first four segments of the pleon.

In the first gnathopod (Fig. 10 *a*) the side-plate is produced a little anteriorly and bears on the lower margin a

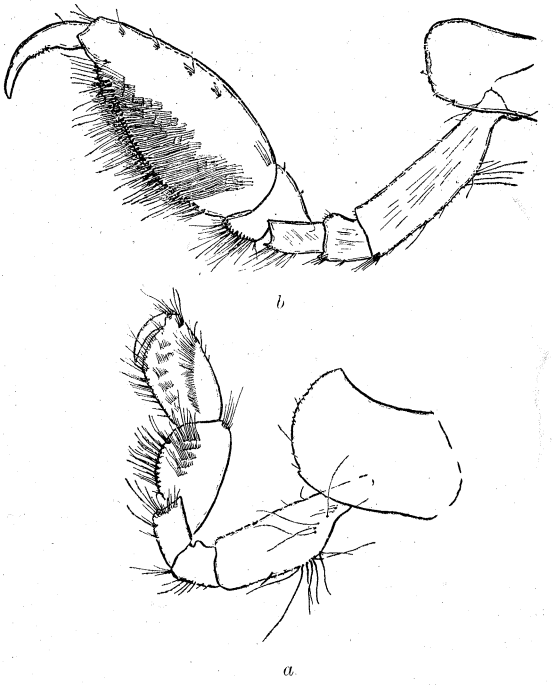
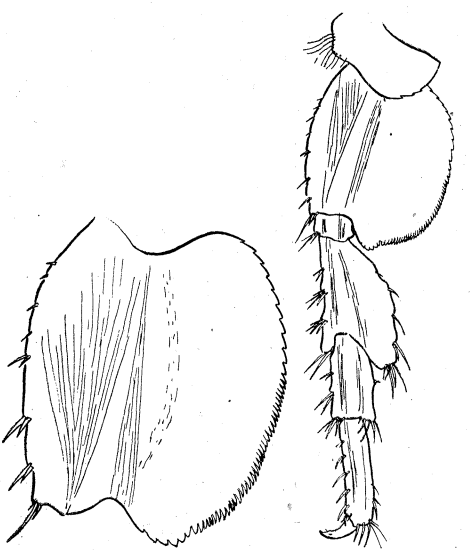


Fig. 10 *a—b*. *Elasmopus diemenensis* (Haswell), male. *a*. First gnathopod. *b*. Second gnathopod.

few spinules; the rest of the appendage is closely similar to that of *E. subcarintus* and shows the same characteristic arrangement of setae on the inner surface. The second gnathopod (Fig. 10 *b*) is much larger than the first, but the propod is only moderately expanded, being narrow pyriform, the greatest width being at about one-third of the length from the base; the palm is long and ill-defined, and bears a few irregular teeth towards the base of the dactyl; the whole length of the palm and the posterior half of the inner surface is thickly covered with fine long hairs mostly arranged in short transverse rows; there are five or six small tufts of spinules along the anterior margin; the dactyl is more than one-third the length of the propod and has the inner concave margin with a few irregularities near the middle.



d *c*

Fig. 10 *c*—*d*. *Elasmopus diemenensis* (Haswell), male.
c. Fifth paraeopod. *d*. Basal joint of same, more highly magnified.

The fifth peraeopod (Fig. 10 *c*—*d*) is broad, especially in the meral joint; the posterior margin of the basal joint is moderately convex and simply serrate on the proximal portion, while on the distal portion the serrations are much closer and deeper, forming a regular pectinate margin, similar to that in *E. neglectus*, Chilton, and *E. serrula*, Walker.

In the telson each half has the lateral margins produced into long acute teeth so that the posterior margin is deeply concave; from it arises two stout spinules. (See Fig. 10 *e*.)

In the structure of the second gnathopods and of the peraeopoda, this species appears to approach *E. serrula*,

Walker, a species which Barnard has recently combined with *E. pectenicrus,* Bate, but in that species there are no dorsal teeth on the segments of the pleon.

Elasmopus diemenensis is at present known only from Bass Strait and Tasmania.

Fig. 10 *e*. *Elasmopus diemenensis* (Haswell), male. Terminal portion of pleon with uropoda and telson.

ELASMOPUS SUBCARINATUS (*Haswell*).

Megamoera subcarinatus, Haswell, 1880*b*, p. 335, pl. xxi., fig. 4.

Elasmopus subcarinatus, Stebbing, 1910, p. 602.

Elasmopus subcarinatus, Chilton, 1915, p. 321.

Locality.—Eastern Slope, Bass Strait. Four males, one female. (Reg. No. E. 5356.) Tasmanian Coast. One female. (Reg. No. E. 5352.)

The second gnathopods of the males vary a little in shape and have probably not all attained their fully developed form. They belong to what I have called the "form 1" (1915, p. 325).

In all the specimens the body bears a few long hairs scattered on the dorsal surface.

The species is common on the Australian and New Zealand coasts and is also known from several localities in the Indian Ocean.

POLYCHERIA ANTARCTICA (*Stebbing*).

Polycheria antarctica, Chilton, 1912, p. 502 (with synonymy).

Locality.—Sanders Bank, Kangaroo Island, 28 fathoms, one specimen (Reg. No. E. 4855).

This specimen is about 4 mm. long; it has the antennae subequal and not longer than the head and first three segments of the peraeon; in the third uropod the rami are only slightly unequal. In these points it resembles the description of *P. brevicornis,* Haswell, but on the other hand the eye is large and red, fully as large as in *P. tenuipes,* and I have no doubt the "Endeavour" specimen is immature and that Haswell's two species are only stages in the life-history of one, as already suggested by Stebbing.

I have fully discussed the described species of *Polycheria* elsewhere and come to the conclusion that they are only forms of the one species, *P. antarctica* (Stebbing), which is very widely distributed in southern seas and extends north of the equator in one or two localities.

LEMBOS PHILACANTHUS (*Stebbing*).

(Fig. 11 *a—c.*)

Lembos philacanthus, Stebbing, 1888, p. 1082, pl. 110.

Lembos philacanthus, Stebbing, 1910, p. 605.

Localities.—Tasmanian Coast, two specimens (Reg. No. E. 5352); Eastern Slope, Bass Strait, several specimens (Reg. No. E. 5356).

These specimens vary considerably in size and in the structure of the gnathopoda, but they present such a general resemblance that I think they all belong to one species and that they must be referred to *L. philacanthus,* Stebbing, the type specimen of which was obtained from the same locality. Some of the differences observed are doubtless due to stages of development and to sexual characters.

My specimens differ from Stebbing's description in having the eye round and the lateral lobe of the head narrowly rounded, while he described the eye as reniform and the lateral lobe acute. The appendages are long and slender as in the specimens examined by him; they evidently increase in length with the development of the animal. The antennae and peraeopoda agree with his description, the peraeopoda having the basal joints rather narrow and not dilated.

In one specimen which I imagine to be a mature male, the first gnathopod (Fig. 11 *a*) is long and slender and bears dense tufts of long slender setae on the ischium, merus and carpus; the second gnathopod (Fig. 11 *b*) is practically as drawn by Stebbing, propod only very slightly expanded distally, basis not expanded.

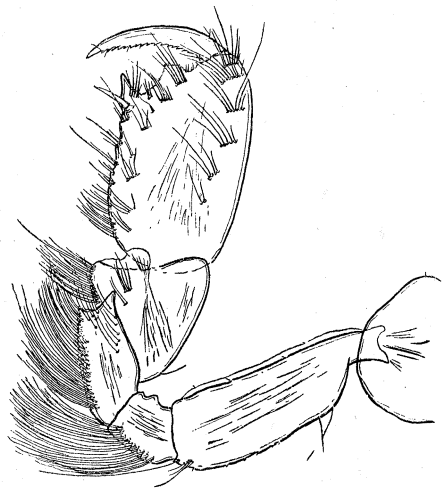


Fig. 11 *a*. *Lembos philacanthus* (Stebbing). First gnathopod of male.

In the female (Fig. 11 *c*) and in the immature males the appendages are not so elongated and correspond more nearly to the figures given by Stebbing of the "Challenger" specimens (1888, pl. 110).

It will be seen from the figure of the adult male (Fig. 11 *a*) that in this character *L. philacanthus* presents very considerable resemblance to *L. longipes* (Liljeborg) and *L. websteri* (Spence Bate) from the Northern Hemisphere. In these species, however, the arrangement of the long slender setae on the first gnathopod is slightly different.

In 1914 Stebbing redescribed *L. fuegiensis* (Dana) from specimens obtained from the Falkland Islands and identified with that species the form from the Indian Ocean described under the name of *L. kergueleni* by Walker in 1909. From the description and figures given by Stebbing it is evident that *L. fuegiensis* approaches very closely to *L. philacanthus*, but as yet the fully developed male does not appear to have been described.

L. philacanthus, Stebbing, occurs in New Zealand and Chatham Islands, as I have specimens from these localities which I feel certain must be referred to that species. The relation of the species mentioned to *L. kergueleni,* Stebbing, and to the form from the Subantarctic Islands of New Zealand which I described under that name in 1909 will require further investigation when additional material is available.

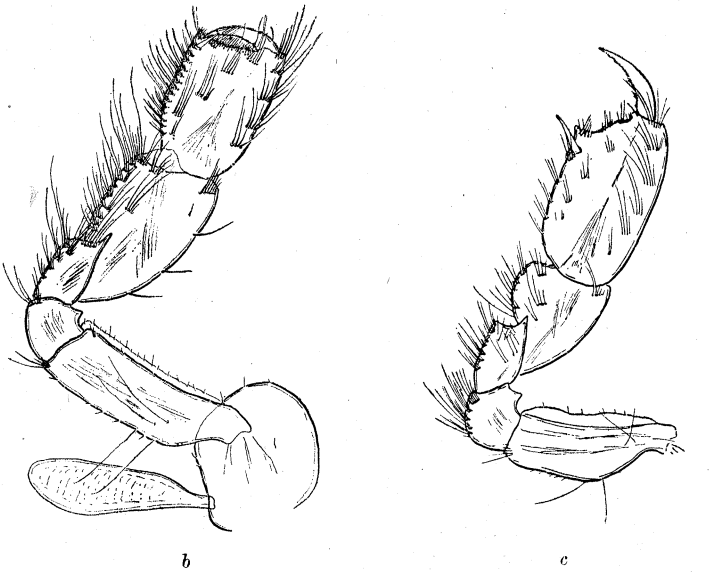


Fig. 11 *b—c.* *Lembos philacanthus* (Stebbing).
b. Second gnathopod of male. *c.* First gnathopod of female.

PHOTIS DOLICHOMMATA, *Stebbing.*

Photis dolichommata, Stebbing, 1910, p. 609, pl. 55*.

Locality.—Eastern Slope, Bass Strait (Reg. No. E. 5356). Two specimens. Length of body about 6 mm.

In the prolonged and apically rounded eye-lobes and in other characters generally these specimens closely resemble Stebbing's description and figures. The species seems to be very close to *P. longicaudata* (Bate), a form of which has been recorded from Ceylon by Walker (1904, p. 286, pl. 6, fig. 43), and from South Africa by Barnard (1916, p. 243).

The specimen I have dissected agrees with Stebbing's in lacking the decurrent lobe of the basis in the second gnathopod and in having the palm less oblique; the decurrent lobe is, however, not figured by Walker in the Ceylon specimens he refers to *P. longicaudata.*

EURYSTHEUS MACULATUS (*Johnston*)

(Fig. 12.)

Eurystheus maculatus, Stebbing, 1906, p. 617.

Locality.—Eastern Slope, Bass Strait. One male (Reg. No. E. 5356).

This single specimen lacks the antennae and is imperfect in one or two other respects, but it agrees with Stebbing's description in:—the two minute medio-dorsal teeth on the fourth pleon segment, the second side-plate being the largest, the bulging of the third pleon segment above the small tooth at the postero-lateral angle, the shape of the second gnathopod which has the basal and carpal joints robust, the palm oblique, slightly concave and provided with two teeth or tubercles, and in the spine at each side of the apex of the telson. I have no hesitation therefore in identifying it with the above-named species. It agrees closely with the figures given by Sars of *E. erythrophthalma* except that the posterior margin of the third pleon segment is more bulging and resembles that of *G. melanops,* both of these species being considered synonyms of *E. maculatus,* Johnston, by Stebbing. I have been able to compare it with a female specimen of *E. maculatus* from England with which it closely corresponds.

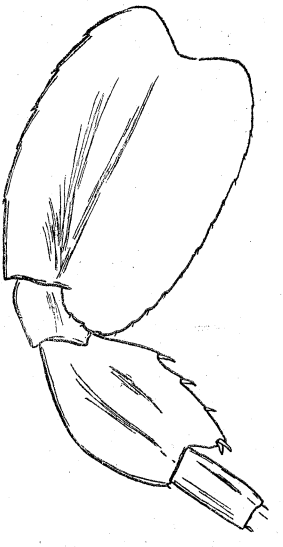


Fig. 12. *Eurystheus maculatus* (Johnston), male. Proximal joints of fifth paraeopod showing the widened merus.

The merus of one of the peraepoda, I think the fifth, is considerably broadened, as in the male specimen from Gough Island, collected by the "Scotia," which I referred with much doubt to *E. afer* (Stebbing) in 1912; I have since pointed out (1920, p. 7) that this should rather be *E. dentatus* (Chevreux).

Stebbing gives the distribution of *E. maculatus* as "Arctic Ocean and North Atlantic." Its occurrence in Bass Strait at the south of Australia greatly extends its range.

EURYSTHEUS ATLANTICUS (*Stebbing*).

Eurystheus atlanticus, Stebbing, 1906, p. 611.

Locality.—Sanders Bank, Kangaroo Island, S. Australia, 28 fathoms, one specimen, female, about 8 mm. long (Reg. No. E. 4855); Shoalhaven Bight, N.S.W., one, probably male (mounted) (Reg. No. E. 4852).

These specimens agree closely with Stebbing's description and figures in the shape of the lateral lobe of the head and of the eye, except that the eye is almost confined to the lateral lobe, its narrow neck being nearly obsolete. The eye is still red in the spirit specimen.

The second antenna has the upper margin of the first joint of the peduncle concave to accommodate the lateral lobe as described by Stebbing. The gnathopods agree closely and so do the peraeopoda, except that the basal joint of the fifth has the posterior margin more distinctly serrate than is shown in the figure of the "Challenger" specimen.

E. atlanticus was originally described from the Atlantic Ocean. It has been taken with *E. afer* in South Africa, and Stebbing thinks it is perhaps a variety of that species. The Australian specimens agree so well with the figures given in the "Challenger" Report of *E. atlanticus* that I prefer to leave them in the meantime under that name.

EURYSTHEUS THOMSONI (*Stebbing*).

(Fig. 13 *a*—*c*.)

Eurystheus thomsoni, Stebbing, 1910, p. 614.

Locality.—40 miles W. of Kingston, South Australia, 30 fathoms. Two specimens, male and female (Reg. No. E. 4862).

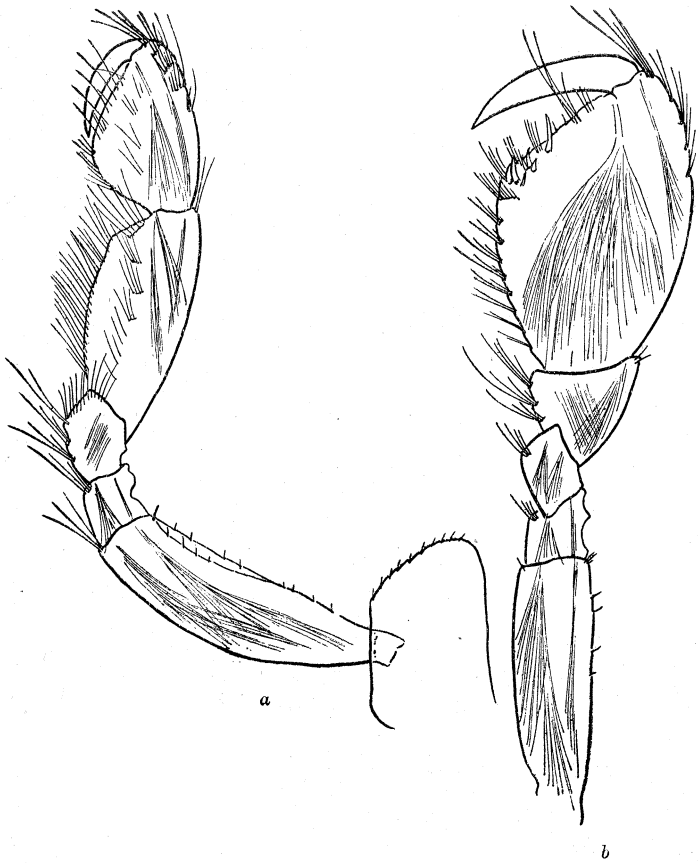


Fig. 13 *a—b*. *Eurystheus thomsoni* (Stebbing), male.
a. First gnathopod. *b*. Second gnathopod of one side.

The male differs from the female in the second gnathopod which agrees with the description given by Stebbing. In this specimen, as in the "Thetis" specimen examined by Stebbing, the second gnathopods were unequal, one of them resembling the female form. In a recent paper (1920, p. 8) I suggested that *Eurystheus thomsoni* (Stebbing) was somewhat similar to *E. dentatus,* Chevreux, which I had recorded from New Zealand waters, and the females are certainly somewhat difficult to distinguish; but the male of *E. thomsoni,* which I have now for the first time been

able to examine, differs considerably and is not very dissimilar in the second gnathopod from *E. crassipes* (Haswell), though the fourth peraeopod does not appear to be greatly broadened as in that species.

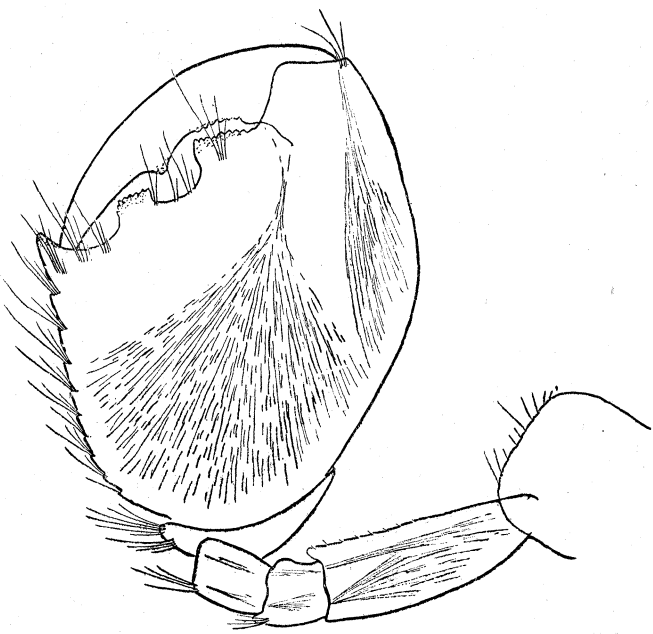


Fig. 13 *c*. *Eurystheus thomsoni* (Stebbing), male.
Second gnathopod of opposite side.

I give figures of the first gnathopod (Fig. 13 *a*) and of the right (Fig. 13 *b*) and left (Fig. 13 *c*) second gnathopoda of the male specimen.

The "Thetis" specimens were taken off Botany Bay and Wata Mooli, the type specimens having been collected by the "Challenger" off New Zealand.

EURYSTHEUS PERSETOSUS, *sp. nov.*

(Fig. 14 *a*—*b*.)

Locality.—40 miles west of Kingston, South Australia, 30 fathoms. Four specimens, about 12 mm. (Reg. No. E. 4862).

Eyes large, reddish, oval, in horizontal direction, situated on the narrow rounded lateral lobe of the head below the insertion of the upper antenna. All the appendages very hirsute, a pair of tufts of setae on the dorsal surface of the fourth and fifth segments of pleon. Side plates small, shallow.

Upper antennae (Fig. 13 *a*) with first joint shorter and stouter than second and third, which are subequal, flagellum of about 20 joints, rather longer than the last segment of peduncle; accessory flagellum 5-6 jointed. Lower antenna (Fig. 13 *a*) with last two segments of peduncle subequal in length and about as long as the second of the upper; flagellum of 16 joints nearly as long as last joint of peduncle. Both antennae are densely fringed with long setules.

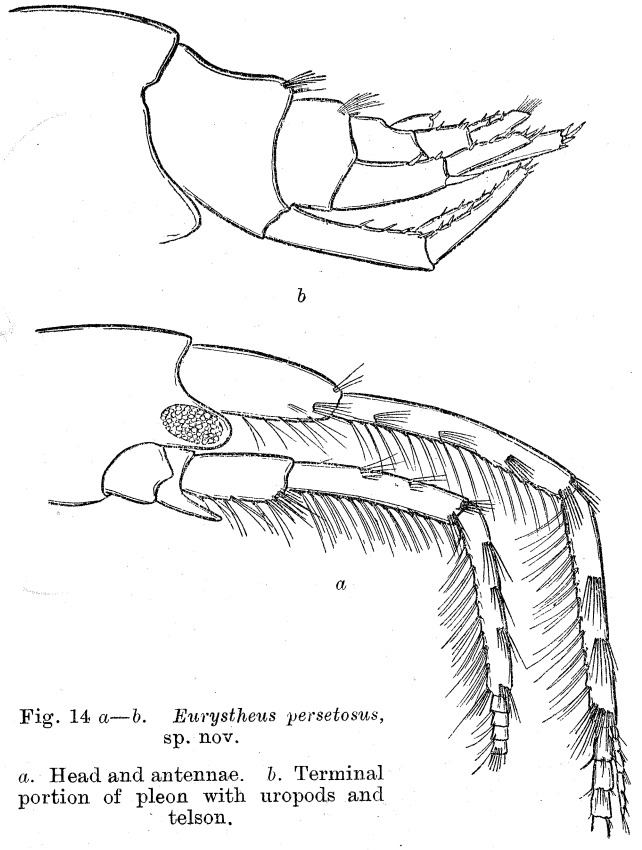


Fig. 14 *a—b*. *Eurystheus persetosus*, sp. nov.

a. Head and antennae. *b*. Terminal portion of pleon with uropods and telson.

The first gnathopod with merus ending acutely at the distal angle; carpus slightly shorter than the propod, posterior margin somewhat lobed and bearing 6 or 7 tufts of long setules; anterior margin with a row of six short, stout setules; propod oval, narrowing distally, palm very oblique, slightly concave, defined by a blunt tooth and having an acute tooth about the centre; finger with inner margin serrate. The second gnathopod similar to the first but with carpus shorter, propod rather longer and palm more distinctly concave, with the central tooth small.

Basal joints of the third to fifth peraeopoda rather narrow, posterior margin in the fifth straight. Third uropoda with rami subequal. Telson with dorsal surface depressed in the median line, raised on each side into narrow rounded lobe, tipped posteriorly with a stout setule (Fig. 13 *b*).

Length.—About 12 mm.

Colour.—Brownish.

The mouth parts are normal and agree well with those of the genus, the inner lobe of the first maxilla well developed and bearing numerous long setules.

I am very uncertain about the position of this species, of which I have seen females only. In the hirsute character of the appendages, the gnathopods and some other points, it agrees with the description given by Stebbing (1906, p. 615) of *Eurystheus hirsutus* (Giles), but that species is considered by Walker to be the female of *Cheiriphotis megacheles* (Giles) which differs in the very small size of the inner ramus of the third uropod and in other respects.

AMPITHOE FLINDERSI, *Stebbing.*

(Fig. 15 *a-d.*)

Ampithoe flindersi, Stebbing, 1906, p. 635, and 1910, p. 616.

Locality.—40 miles west of Kingston, South Australia, 30 fathoms. One female (Reg. No. E. 4862).

I think this must be referred to Stebbing's species, although in the absence of male specimens the determination of the species of this genus is very uncertain. Stebbing's description was based on a single specimen

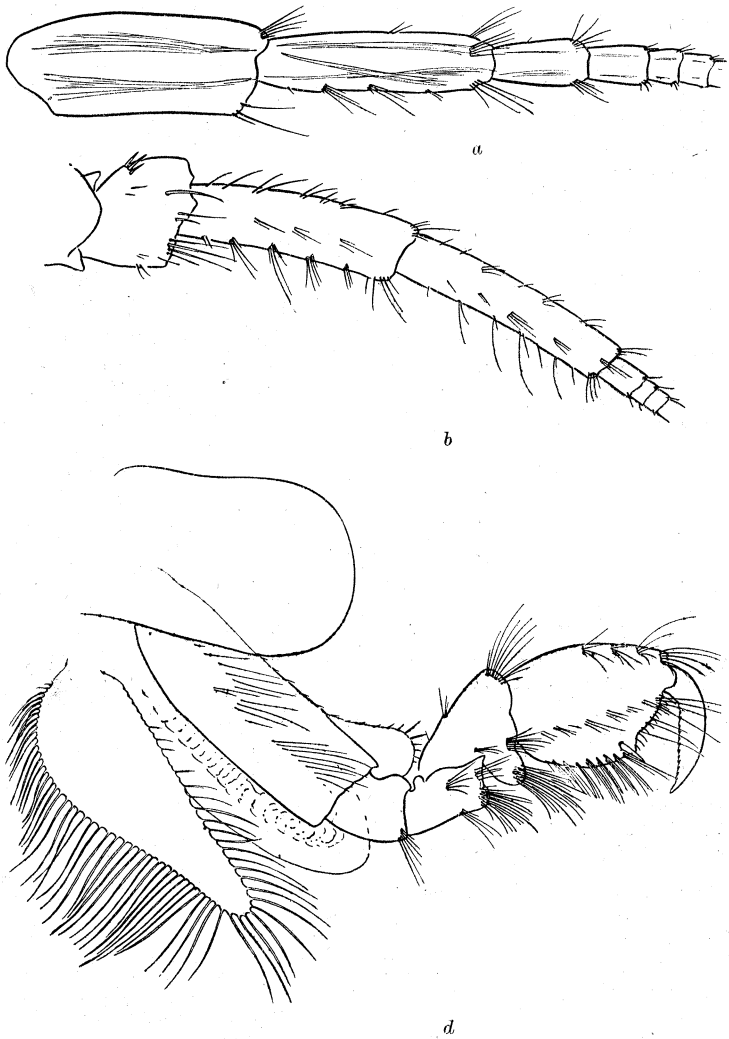


Fig. 15 *a*, *b* and *d*. *Ampithoe flindersi*, Stebbing, female.
a. First antenna. *b*. Second antenna. *d*. Second gnathopod.

about 4 mm. long, in which the antennae were wanting and which, as he suggests, was probably an immature specimen. The further specimens from the "Thetis" Expedition examined by him also lacked the antennae. Of these specimens he described the second gnathopods as having "an

excavation of the palm at right angles to the hind margin of the sixth joint,'' and as this seems to agree with the ''Endeavour'' specimens I venture to make the identification. In order to complete the description I give figures of the peduncles of the antennae (Fig. 15 *a* and *b*) and of the gnathopods (Fig. 15 *c* and *d*) from which the structure can be learnt without further detailed description.

I have some specimens of an *Ampithoe* from Norfolk Island which I had previously thought probably belonged to *A. flindersi,* but in them the carpus of the first gnathopod is very much longer than in the present specimen, being longer than the propod, and possibly the Norfolk Island specimens should be placed in a separate species. The ''Challenger'' specimens were from Flinders Passage in Torres Strait, and those of the ''Thetis'' from off Wata Mooli, N.S.W.

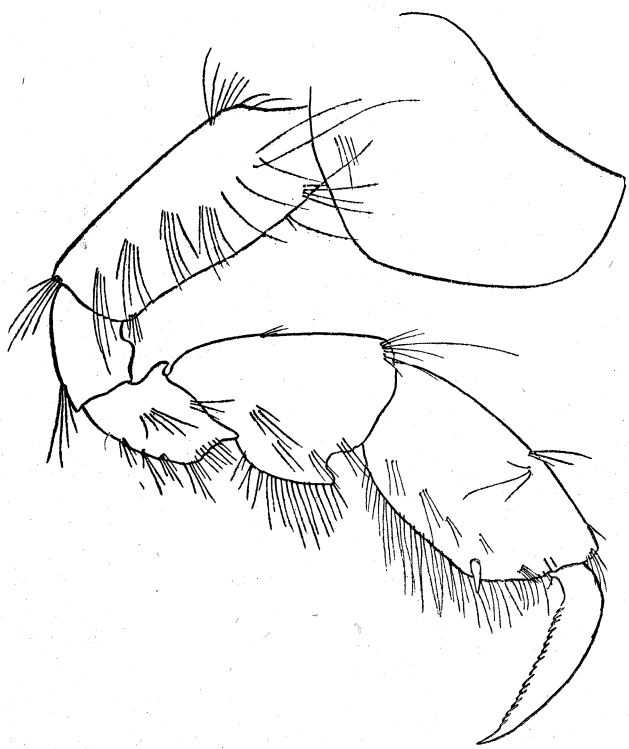


Fig. 15 *c*. *Ampithoe flindersi,* Stebbing, female. First gnathopod.

ICILIUS AUSTRALIS, *Haswell.*

(Fig. 16 *a-c.*)

Icilius ovalis (part), Stebbing, 1906, p. 706.

Icilius australis, Stebbing, 1910, p. 628.

Localities.—40 miles west of Kingston, South Australia, 30 fathoms, several specimens; Sanders Bank, Kangaroo Island, South Australia, 28 fathoms, two specimens; Shoalhaven Bight, New South Wales, several specimens, 15 miles N.W. Cape Jervis, South Australia, 17 fathoms, one specimen.

I think all these specimens must be referred to *Icilius australis,* Haswell, as defined by Stebbing in 1910. He had previously considered all the species of *Icilius* to be synonyms of *Icilius ovalis,* Dana, but in 1910 prefers to recognise the four species as distinct. He divides them into two groups, the first containing *I. ovalis,* Dana, and *I. danae,* Stebbing, having the pleon segments produced dorsally into a median tooth; the second containing *I. australis,* Haswell, and *I. punctatus,* Haswell, with the pleon segments not produced. The "Endeavour" specimens come under the second group and, on the whole, agree fairly well with Stebbing's description and with specimens named *I. australis,* Haswell, sent to me from the Australian Museum. In one or two points, however, they seem to come a little nearer to *I. punctatus,* Haswell, and I should not be surprised if these two species have to be again recombined. In the fifth peraeopod the shape of the basal joint (Fig. 16 *a*) is pretty much the same as that shown in Stebbing's figure, having a narrow bulge at the top, though the difference between this and the corresponding part of *I. punctatus* seems to be slight. I am giving a drawing of the third uropod (Fig. 16 *c*) showing the inner branch which was wanting in Stebbing's specimen. This shows that the inner branch is almost identical with that drawn for *I. punctatus* by Stebbing, but that the outer branch is longer and has more setae on the lateral margin, thus agreeing with the description of this joint for *I. australis.* The drawing is made from a specimen taken off Kingston, South Australia, but in specimens sent from the Australian Museum the outer branch of the third uropod is shorter and has only one or two setules on the outer margin, being thus intermediate in character and approaching that of *I. punctatus* as drawn by Stebbing.

The telson is narrowed posteriorly as in *I. australis,* but in place of having two spinules only, there are five or six small spinules on each side of the apex. Further back nearer the base, there are three large spinules on the

Fig. 16 *a*—*c*. *Icilius australis,* Haswell.
a. Basal joints of fifth peraeopod. *b*. Basal joint of third pleopod. *c*. Third uropod and telson.

surface of the telson on each side near each lateral margin. The pleopods (Fig. 16 *b*) do not quite agree with the figure given for either species. They are not quite so broad as drawn by Stebbing for *I. australis* and have the inner margin straight with only a slight indication of the lobe near the base and the spinules on the outer margin are fewer than shown in Stebbing's figure.

PSEUDOPROTELLA PHASMA (*Mont*).

Protella phasma, Mayer, 1882, p. 29.

Pseudoprotella phasma, Mayer, 1903, p. 37.

Locality.—Eastern Slope, Bass Strait. One male, about 17 mm. long (Reg. No. E. 5356).

This species agrees closely with the description and figures given by Mayer in 1882 and I have been able to compare it with specimens from Banyuls-sur-mer, South France, with which it appears to agree.

The species is known to be widely distributed in European seas, the Mediterranean and North Atlantic, and four varieties have been recognised by Mayer.

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