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XLII.—*Remarks on some Copepoda from the Falkland Islands collected by Mr. Rupert Vallentin, F.L.S.* By THOMAS SCOTT, LL.D., F.L.S.

[Plates XIII.-XVI.]

In a previous paper\* on Copepoda obtained in collections made by Mr. Rupert Vallentin at the Falkland Islands in 1909, 1910, and 1911, the species which were dealt with belonged to the first and third divisions of Professor G. O. Sars's arrangement—the Calanoida and the Cyclopoida,—those described being chiefly fresh-water forms. In the present paper the species recorded belong for the most part to the Harpacticoida; the Monstrilloida and Caligoida are also represented, but only by one or two species.

### HARPACTICOIDA.

#### Fam. Harpacticidæ.

Genus HARPACTICUS, M.-Edwards, 1838.

*Harpacticus falklandi*, sp. n. (Pl. XIII. figs. 1-9.)

Female moderately robust, caudal rami very short. Antennules composed of nine joints, the first four tolerably

\* Cf. Ann. & Mag. Nat. Hist., January 1914, p. 1. I take this opportunity to thank Mr. Vallentin for his permission to examine this interesting collection, and also my son, Andrew Scott, A.L.S., for assistance with some of the more doubtful species, and for the drawings he has so kindly prepared for me.

stout and elongated, but the others are small, and the penultimate joint is only about half the size of the one on either side. The formula shows approximately the proportional lengths of the various joints :—

1	2	3	4	5	6	7	8	9
20	20	21	19	10	8	6	3	5

The outer ramus of the posterior antennæ is very small, slender, and two-jointed. Posterior maxillipeds stout; hand subglobular, with the palm hollowed out and fringed with small denticles; terminal claw curved and tolerably strong. First pair of legs moderately slender and elongated, inner ramus rather longer than the proximal joint of the outer, and both rami are armed with short and stout terminal claws (fig. 4). The next three pairs normal. The fifth pair are of moderate size, the proximal joint foliaceous, subtriangular in outline, and with the inner distal end somewhat produced, narrowly rounded, and provided with four setæ arranged as shown in the drawing; distal joint oblong, width equal to fully half the length, and with the angular extremity furnished with five setæ (fig. 7).

Length .7 mm. (about  $\frac{1}{36}$  of an inch).

*Male.*—The male is rather smaller than the female and with the antennules modified for grasping. The outer ramus of the second pair of thoracic legs is stout and the joints are subequal, but the middle one is slightly larger than the first or third; the third joint has also the extremity abruptly and somewhat obliquely truncated; the inner ramus is about as long as the outer, but is not so stout, and the second joint is produced on its inner aspect into a long spiniform process extending beyond the end joint, which is small and narrow. The rami of the third pair are also nearly equal in length, but the outer is somewhat longer than the inner and tolerably stout, the proximal joint is rather longer than the others, and the end joint is obliquely truncated; the inner ramus is moderately slender. Fifth pair with the proximal joint obsolete or nearly so; the end joint is oblong and its width equal to rather more than half the length; the end is broadly rounded and furnished with five elongated setæ, four of them being tolerably stout and spiniform; the margins of the joint are also fringed with small spinules (fig. 8).

*Hab.* Collected in the vicinity of the Falklands by tow-net in November 1909.

This species has a resemblance to *Harpacticus flexus*,

G. S. Brady, but differs in the structure of the second maxillipeds and in some other anatomical details.

## Fam. Tisbeidæ.

## Genus TISBE, Lilljeborg.

*Tisbe varians*, sp. n. (Pl. XIV. figs. 6-12.)

*Female*.—Antennules moderately elongated and composed of joints; the first two joints are tolerably stout, but the second is distinctly longer than the first or third; the others are small, especially the penultimate joint, which is only about half the size of the one on either side. The formula shows approximately the lengths of the various joints:—

$$\frac{1 \ . \ 2 \ . \ 3 \ . \ 4 \ . \ 5 \ . \ 6 \ . \ 7 \ . \ 8}{14 \ 21 \ 16 \ 10 \ 6\frac{1}{2} \ 5\frac{1}{2} \ 3 \ 6}$$

Antennæ small, the outer ramus four-jointed. Second maxillipeds tolerably stout and armed with a strong terminal claw. First pair of thoracic legs also tolerably stout; the outer ramus is rather longer than the first joint of the inner one; the first and second joints are subequal, and the seta on the outer distal angle of the first joint is stout and spiniform, so also is the seta at the base of the joint; end joint short and furnished with slender setæ on its truncate extremity; first joint of the inner ramus moderately expanded and reaching nearly to the end of the outer ramus; it is provided with a tolerably long seta on the lower half of the inner margin; a stout spiniform seta also springs from the inner aspect of the basal joint and close to the proximal end of the inner ramus; the second joint of the inner ramus is narrower and rather longer than the first, and a long seta springs from near the proximal end of the inner margin; the end joint is very small and is provided with two short claw-like terminal spines (fig. 9). Other natatory legs slender and moderately elongated, as shown by the drawing (fig. 10), which represents the fourth pair. Fifth pair small and not very conspicuous; the end joint is moderately narrow and elongated, and bears five moderately slender setæ round the distal end. Caudal rami short, scarcely longer than the last abdominal segment.

A few specimens of this species were obtained on a mass of fish ova found by Mr. Vallentin on the shore at low-water springs.

This *Tisbe* resembles in some respects the *Tisbe armata*,

G. S. Brady, from the German South Polar Expedition, 1901-1903, but differs in the structure of the antennules, the second maxillipeds, and, to a small extent, in the form of the fifth pair of legs. It appears also to be nearly allied to *Tisbe austrina*, Scott, from Scotia Bay, South Orkneys, but the end joint of the fifth pair of legs is proportionally narrower. No males were observed.

Genus ASPIDISCUS, Norman, 1868.

*Aspidiscus australis*, sp. n. (Pl. XIV. figs. 1-5.)

*Female*.—The antennules are composed of nine articulations; the first three are tolerably stout and elongated, the fourth is also moderately stout, but is little more than half the length of the third; the remaining joints are narrow and short, except the end one, which is moderately elongated, as shown in the drawing (fig. 1). The formula shows approximately the proportional lengths of the various joints:—

$$\begin{array}{cccccccccc} 1 & .2 & .3 & .4 & .5 & .6 & .7 & .8 & .9 & \\ \hline 12 & 15 & 13 & 7 & 4 & 2 & 4 & 5 & 11 & \end{array}$$

The antennæ and mouth-appendages are somewhat like those of *A. littoralis*, G. O. Sars; the second maxillipeds are small (fig. 2). In the first pair of thoracic legs the first joint of the inner ramus is tolerably large and expanded interiorly at the proximal end; the second and third joints are small, and the latter is provided with two short claws fimbriated on the lower margin; the outer ramus is shorter than the inner and composed of three joints, the end one being small (fig. 3). Other natatory legs somewhat similar to those in the species mentioned above. Fifth pair with the end joint tolerably large and lamelliform; its width is about equal to half the length, and its distal end is truncated and provided with three moderately stout and elongated setæ (fig. 4). The caudal rami are short.

Length .84 mm (about  $\frac{1}{30}$  of an inch).

No males were observed.

Three specimens of this *Aspidiscus* occurred in a small tow-net gathering collected in the vicinity of the Falkland Islands in Nov. 1909.

Fam. Thalestridæ.

Genus PSEUDOTHALESTRIS, Brady, 1883.

*Pseudothalestris nana*, sp. n. (Pl. XV. figs. 1-11.)

*Female*.—Cephalothorax stout, dorsum boldly arcuate,

abdomen short, reflexed. The antennules are also short and composed of seven joints; the first three are large, the next three small and subequal, while the end joint is nearly equal in length to that of the two preceding ones combined (fig. 2).

The outer ramus of the antennæ is only one-jointed, and in this respect it differs from some other species which are provided with a two-jointed outer ramus, but agrees with *Pseudothalestris tumida*, G. S. Brady, from Kerguelen Island\*. The other mouth-appendages are also somewhat similar to the species mentioned, especially the second maxillipeds, the hand of which is similarly provided with a small seta near the middle of the inner margin (fig. 9). The first pair of legs has, as usual, the outer ramus very short and composed of two distinct joints, the inner ramus is elongated and composed of three joints, but the last two are very small and subequal, and the terminal claw is elongated and slender (fig. 8). The other natatory legs are normal.

The fifth pair have the inner portion of the proximal joint moderately expanded and furnished with five setæ on the irregularly rounded apex; the distal joint is small, sub-quadriform, and bears five setæ arranged as in the drawing (fig. 10). The caudal rami are very short.

Male unknown.

The length of the specimen represented by the drawing (fig. 1) is .45 mm. (about  $\frac{1}{56}$  of an inch).

*Hab.* Obtained in a small gathering collected by tow-net in the vicinity of the Falkland Islands in Nov. 1909. Only one specimen (a female) was observed.

*Remarks.* The species described above resembles in some respects the *Pseudothalestris*, G. S. Brady, from Kerguelen Island, already referred to, in the structure of the outer ramus of the posterior antennæ and in the form and armature of the second maxillipeds; but the body is not so tumid, and there are one or two anatomical features in which it also apparently differs.

#### Fam. Diosaccidæ.

GENUS AMPHIASCUS, G. O. Sars, 1905.

*Amphiascus proximus*, sp. n. (Pl. XVI. figs. 1-7.)

*Female.*—Species small: length .56 mm. (about  $\frac{1}{55}$  of an inch).

Antennules short, composed of eight joints; the first four

\* 'Deutsche Südpolar-Exped. 1901-1903,' Copepoda, p. 531, text-fig. 22.

are tolerably large, but the third is rather shorter than the other three, which are subequal; the four end joints are slender and the first three are moderately short, but the terminal one is somewhat elongated and nearly twice the length of the preceding joint. The formula shows approximately the proportional lengths of the various joints:—

$$\begin{array}{cccccccc} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ \hline 10 & 10 & 9 & 11 & 8 & 6 & 7 & 12 \end{array}$$

The antennæ are small and are provided with a very small outer ramus. The second maxillipeds are also small; the hand is narrow and of moderate length, and bears a minute seta near the distal end of the inner margin. The inner ramus of the first pair of thoracic legs is elongated and slender; the proximal joint reaches beyond the end of the outer ramus, but the other two are short; the joints of the outer ramus are subequal and moderately stout, and furnished with long spiniform setæ (fig. 4). The other natatory legs are slender and moderately elongated (fig. 5). Fifth pair broadly foliaceous; the inner portion of the proximal joint is rather narrower than the outer distal one, and its obliquely truncated end is provided with four setæ of moderate length; the distal joint is tolerably expanded, its outer and inner margins are nearly parallel, and its extremity is irregularly triangular and furnished with five setæ arranged as shown in the drawing (fig. 6). The caudal rami are very short.

One or two specimens of this minute form occurred in the same tow-net gathering with the *Pseudothalestris* previously described. This species has some resemblance to *Amphiascus minutus*, G. S. Brady, from Kerguelen Island, but differs in the form of the fifth pair of legs and in one or two other anatomical details. The male was not observed.

#### Fam. Laophontidæ.

Genus LAOPHONTE, Philippi, 1840.

*Laophonte insignis*, sp. n. (Pl. XIII. figs. 10–15.)

*Female*.—Somewhat similar to the female of *Laophonte gracilipes*, G. S. Brady, from Kerguelen Island. Antennules moderately short and composed of seven articulations; the first three joints are large and together are equal to nearly two-thirds the entire length of the antennule; the remaining joints are small, but the two end joints are rather longer than

the two immediately preceding. The formula shows approximately the proportional lengths of the various joints:—

$$\frac{1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7}{10 \ 14 \ 15 \ 5 \ 5 \ 6 \ 6}$$

Antennæ small, the outer ramus rudimentary and represented by two minute setæ (fig. 11). Second maxillipeds moderately stout and armed with a long terminal claw (fig. 12). The first pair of thoracic legs are tolerably stout and the inner ramus is furnished with a long and stout terminal claw; the outer ramus, which consists of three joints, is only about half as long as the first joint of the inner ramus (fig. 13). The fifth pair are broadly foliaceous; the inner portion of the proximal joint is somewhat expanded, and its distal end is obliquely truncated and furnished with four setæ, and there is also a seta on the inner margin; the two outermost setæ are close together, but the others are more widely apart; the outer joint is suborbicular and bears six setæ round its distal end, as shown in the drawing (fig. 14). The caudal rami are short and scarcely equal in length to the last segment of the abdomen.

The male was not observed.

This species has a general resemblance to *Laophonte gracilipes*, G. S. Brady, as already stated\*; but the antennæ have no outer ramus, and there is also a difference in the form of the fifth pair of thoracic legs.

## MONSTRILLOIDA.

### Fam. Monstrillidæ.

Genus MONSTRILLA, Dana, 1848.

*Monstrilla mixta*, sp. n. (Pl. XVI. figs. 8–12.)

*Female*.—In its general appearance and structure this form is somewhat similar to *Monstrilla conjunctiva*, Giesb., described in his account of the Copepoda of the Belgian Expedition, 1897–1898–1899 †.

The body is moderately slender and elongated; the length of the specimen represented by the drawing (fig. 8) is about  $2\frac{1}{2}$  mm.; the proximal segment is fully half the entire length

\* Cf. 'Die marinen Copepoden der Deutsche Südpolar Exped. 1901–1903,' p. 562.

† 'Exped. Antarctic Belge: Copepoden,' p. 40, Taf. xii. figs. 1–6 (1902).

of the cephalothorax; the abdomen is composed of three segments, the first being the largest. The antennules are very short, moderately stout, and composed of four joints, and are provided with tolerably long branching setæ. The natatory legs are similar to those in *M. conjunctiva*. The fourth pair (fig. 10), which have both rami three-jointed, are provided with densely plumose setæ; the outer ramus is somewhat longer than the inner and has a short seta on the inner margin and a short spine on the outer distal angle; there is also a short spine on the outer distal angle of the end joint; the marginal seta on the second joint and those on the third joint are all elongated and plumose, except that the outer one on the last joint differs from the others in having its outer edge fringed with minute spinules. The middle joint has no spine exteriorly, but the rounded distal angle bears a few small bristles; the first and second joints of the inner ramus have neither spines nor setæ on the exterior margin, but they each bear a long plumose seta on the inner margin, and five similar setæ spring from the inner margin and end of the third joint.

The fifth pair of legs are small, slightly expanded, and bilobed; the inner lobe is without armature, but the outer is furnished with three setæ, one on the outer margin and two at the apex (fig. 11).

The bifurcated setiform appendage, which springs from the underside of the genital segment and upon which the eggs are clustered, is tolerably slender and elongated, being about equal to the entire length of the animal, the antennules included. The caudal rami are short and somewhat divergent; they are each provided with four setæ; the second seta from the inside is slender and only of moderate length, but the others are stout and considerably elongated; one springs from the outer margin and the others from the apex.

*Colour.* As is usual, the body of the animal is of a reddish colour, but the cluster of eggs is bright green; the size of the egg-cluster varies in different individuals.

*Hab.* Vicinity of the Falklands; collected by tow-net; one specimen at 6 fathoms and four at the surface.

*Remarks.* Though the Monstrillidæ are widely distributed, and a number of species have been described, yet comparatively few of them appear to have been obtained by expeditions to the Antarctic or Subantarctic Oceans. The somewhat erratic appearances of these organisms may probably be one reason for the apparent scarcity. Even in the British seas, though the Monstrillidæ are usually not very common,



their appearances have at times been frequently noticed, and a considerable time may elapse ere they are again met with.

The form recorded by Dr. Giesbrecht in his account of the Copepoda collected by the Belgian Antarctic Expedition, already referred to, was obtained in a plankton sample from 475 metres, taken in lat.  $69^{\circ} 54'$  S., long.  $82^{\circ} 49'$  W. ; only a single specimen was observed. This specimen was a male and is smaller than those from the Falkland Islands, which appear to be all females\* ; but although, as previously stated, there is a certain resemblance between the male described by Dr. Giesbrecht and those from the Falklands, I am unable, from the differences observed, to regard them as the male and female of the same species.

#### CALIGOIDA.

Genus CALIGUS, O. F. Müller, 1785.

*Caligus thynni*, Dana. (Pl. XVI. figs. 13, 14.)

A single specimen of a *Caligus*, which appears to be the male of *C. thynni*, Dana, was captured at Roy Cove, Falkland Islands, in 3 fathoms water, in December 1909. The specimen measures scarcely 3 mm. from the forehead to the end of the caudal rami, and is therefore considerably smaller than the females of that species are said to be. The males and females of these fish-parasites, however, frequently differ more or less from each other, not only in size, but also in their general appearance. Unless, therefore, both sexes are available for examination, there may be some difficulty in determining accurately the species they belong to. Figure 13 represents the general form of the specimen seen from the dorsal aspect, and figure 14 one of the fourth pair of legs. It would appear, from records previously published, that the male of *C. thynni*, like that of *C. rapax* in our own seas, is able to lead at times the life of a "free swimmer"; hence its occurrence in tow-net gatherings with other pelagic organisms.

\* In this group the males are almost invariably smaller than the females.

*A few of the Works and Papers consulted in the  
Preparation of the preceding Notes.*

(Addenda to List in first paper, pp. 10, 11.)

1883. BRADY, G. S. 'Report on the Scientific Results of the Voyage of the 'Challenger' during the Years 1873-76.' Zool. vol. viii. Report on the Copepoda.
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1892. GIESBRECHT, W. "Fauna u. Flora des Golfes von Neapel.—XIX. Monogr. Pelagischen Copepoden."
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1894. SCOTT, T. "Report on Entomostraca from the Gulf of Guinea, collected by John Rattray, B.Sc." Trans. Linn. Soc. ser. 2, Zool. vol. vi.
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1900. STEBBING, T. R. R. "On Crustacea brought by Dr. Willey from the South Seas." A. Willey's 'Zoological Results,' part v.
1903. THOMPSON, I. C., and A. SCOTT. "Report to the Government of Ceylon on the Pearl-Oyster Fisheries of the Gulf of Manaar by W. A. Herdman, D.Sc., F.R.S." Supplementary Report VII. On the Copepoda. (Published by the Royal Society, 1903.)

EXPLANATION OF THE PLATES.

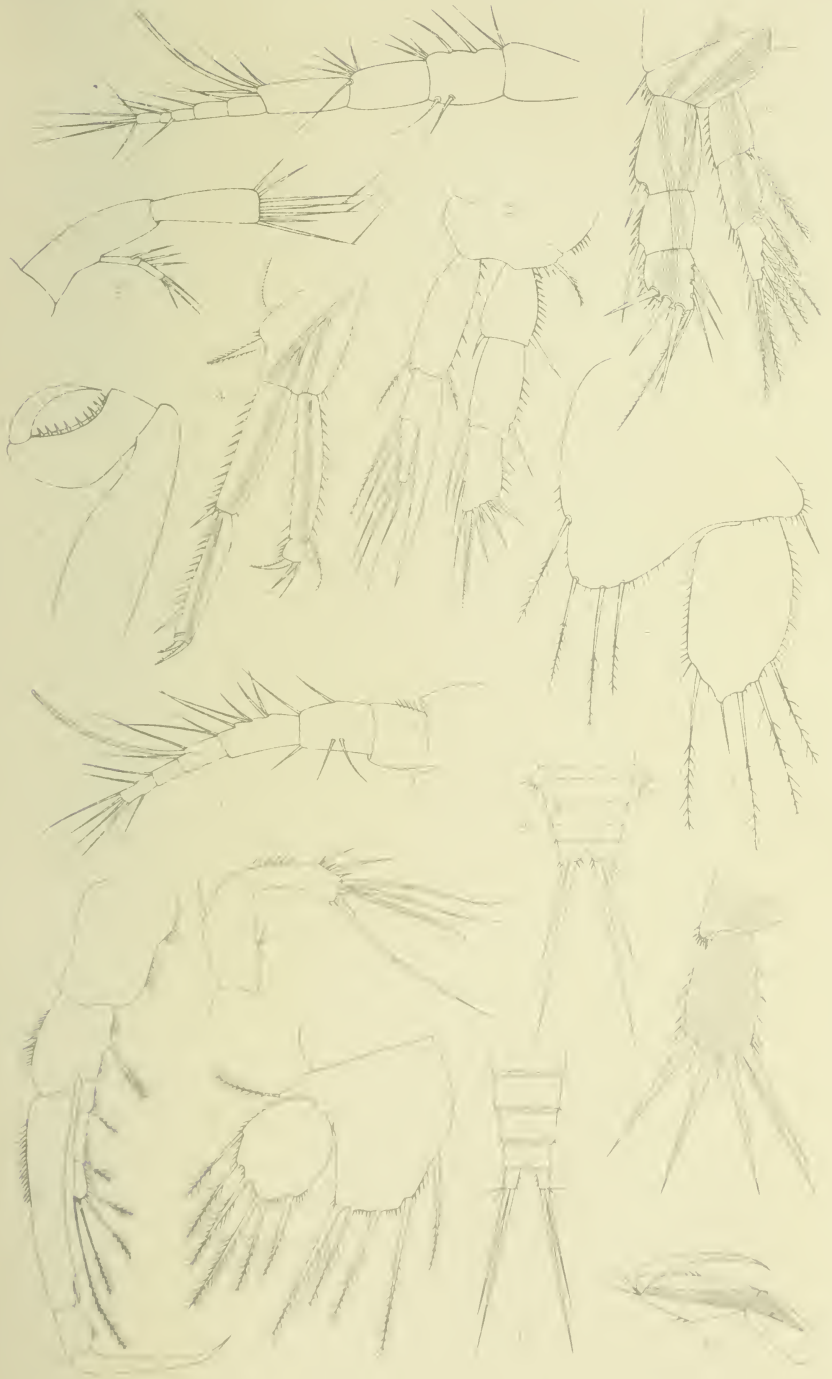
PLATE XIII.

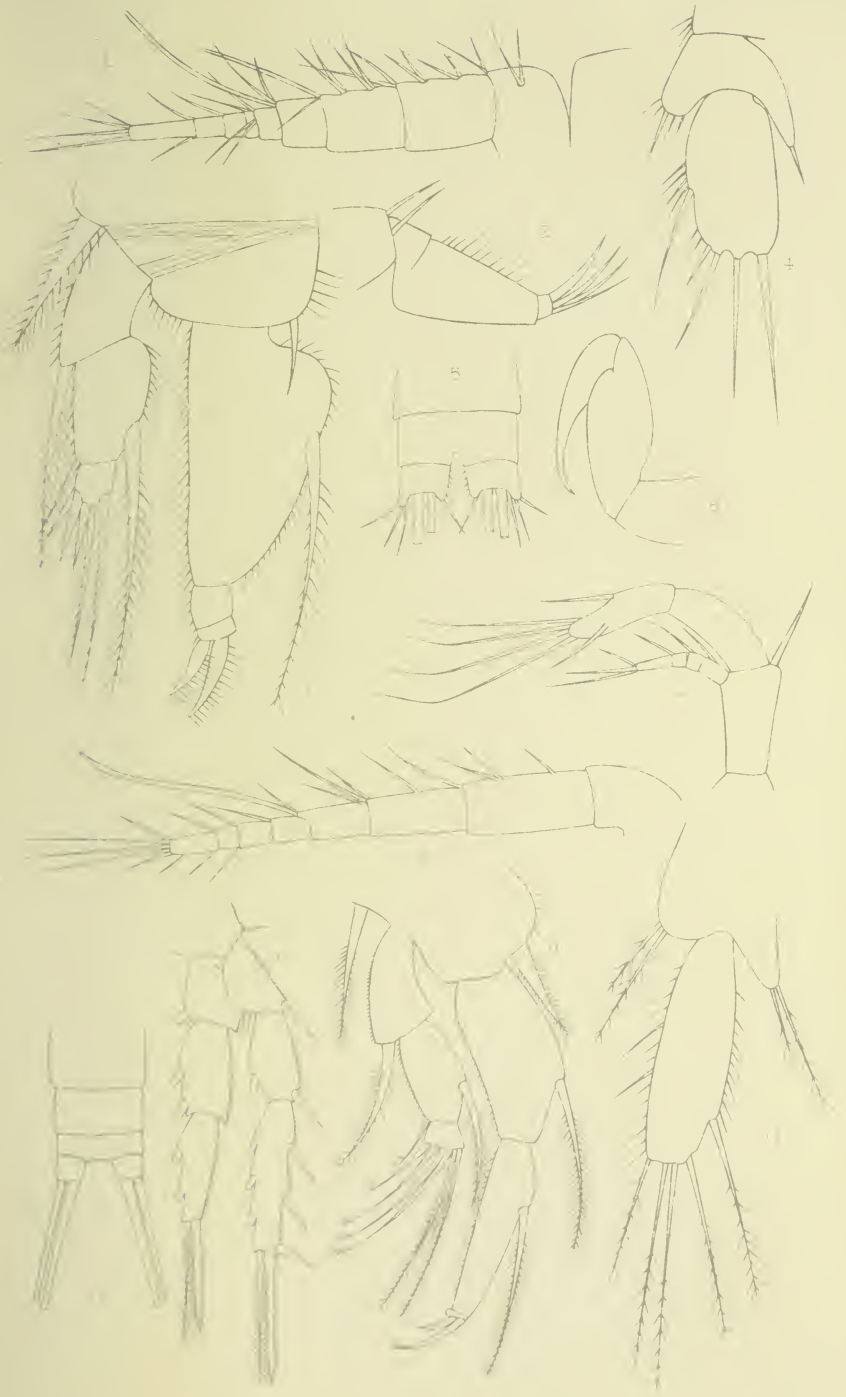
*Harpacticus falklandi*, sp. n.

- Fig.* 1. Antennule, female.  
*Fig.* 2. Antenna.  
*Fig.* 3. Second maxilliped.  
*Fig.* 4. Foot of first pair.  
*Fig.* 5. Foot of second pair, male.  
*Fig.* 6. Foot of third pair, male.  
*Fig.* 7. Foot of fifth pair, female.  
*Fig.* 8. Foot of fifth pair, male.  
*Fig.* 9. Abdomen and caudal rami, male.

*Laophonte insignis*, sp. n.

- Fig.* 10. Antennule, female.  
*Fig.* 11. Antenna.  
*Fig.* 12. Second maxilliped.  
*Fig.* 13. Foot of first pair.  
*Fig.* 14. Foot of fifth pair, female.  
*Fig.* 15. Abdomen and caudal rami.









## PLATE XIV.

*Aspidiscus australis*, sp. n.

- Fig. 1. Antennule, female.  
 Fig. 2. Second maxilliped.  
 Fig. 3. Foot of first pair.  
 Fig. 4. Foot of fifth pair, female.  
 Fig. 5. Part of abdomen and caudal rami.

*Tisbe varians*, sp. n.

- Fig. 6. Antennule, female.  
 Fig. 7. Antenna.  
 Fig. 8. Second maxilliped.  
 Fig. 9. Foot of first pair.  
 Fig. 10. Foot of fourth pair.  
 Fig. 11. Foot of fifth pair, female.  
 Fig. 12. Part of abdomen and caudal rami.

## PLATE XV.

*Pseudothalestris nana*, sp. n.

- Fig. 1. Female, side view.  
 Fig. 2. Antennule, female.  
 Fig. 3. Antenna.  
 Fig. 4. Mandible.  
 Fig. 5. Maxilla.  
 Fig. 6. First maxilliped.  
 Fig. 7. Second maxilliped.  
 Fig. 8. Foot of first pair.  
 Fig. 9. Foot of fourth pair.  
 Fig. 10. Foot of fifth pair, female.  
 Fig. 11. Abdomen and caudal rami.

## PLATE XVI.

*Amphiascus proximus*, sp. n.

- Fig. 1. Antennule, female.  
 Fig. 2. Antenna.  
 Fig. 3. Second maxilliped.  
 Fig. 4. Foot of first pair.  
 Fig. 5. Foot of third pair.  
 Fig. 6. Foot of fifth pair, female.  
 Fig. 7. Part of abdomen and caudal rami.

*Monstrilla mixta*, sp. n.

- Fig. 8. Female, side view.  
 Fig. 9. Antennule.  
 Fig. 10. Foot of fourth pair.  
 Fig. 11. Foot of fifth pair.  
 Fig. 12. Abdomen and caudal rami.

*Caligus thynni*?, Dana.

- Fig. 13. Male, dorsal view.  
 Fig. 14. Foot of fourth pair.