

# SIBOGA-EXPEDITIE.

# Siboga-Expeditie

UITKOMSTEN

OP

ZOOLOGISCH, BOTANISCH, OCEANOGRAPHISCH EN GEOLOGISCH GEBIED

VERZAMELD IN

NEDERLANDSCH OOST-INDIË 1899—1900

AAN BOORD H. M. SIBOGA ONDER COMMANDO VAN

Luitenant ter zee 1<sup>e</sup> kl. G. F. TYDEMAN

UITGEGEVEN DOOR

**Dr. MAX WEBER**

Prof. in Amsterdam, Leider der Expeditie

(met medewerking van de Maatschappij ter bevordering van het Natuurkundig  
Onderzoek der Nederlandsche Koloniën)



BOEKHANDEL EN DRUKKERIJ

VOORHEEN

**E. J. BRILL**

LEIDEN

Siboga-Expeditie  
XXIXa

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THE  
COPEPODA OF THE SIBOGA EXPEDITION

BY

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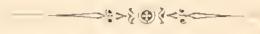
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PART I

FREE-SWIMMING, LITTORAL AND SEMI-PARASITIC  
COPEPODA

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With 69 plates



LATE E. J. BRILL  
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PART I

# FREE-SWIMMING, LITTORAL AND SEMI-PARASITIC COPEPODA.

## INTRODUCTORY.

The present report deals with the Free-Swimming, Littoral and Semi-Parasitic Copepoda obtained principally from the plankton collected by the various tow-nets employed during the investigations. Three bottles containing washings from dredged invertebrata were also sent to me for examination. These washings contained a number of interesting species of Harpacticoida, Lichomolgidae and Asterocheridae which would probably never have been secured by the ordinary method of tow-netting.

The total number of collections sent for examination was 86, and represents the following methods employed on board H. M. S. 'Siboga'.

Day Surface Collections . . . . .	50
Night Surface Collections . . . . .	13
HENSEN Vertical Net, Night Collections from 10 metres with Electric light in Net. . . . .	4
HENSEN Vertical Net, Collections between 100 and 2000 metres to surface . . . . .	11
Horizontal Cylinder Collections . . . . .	4
FOWLER Closing Net Collections . . . . .	1
Washings from Dredged Invertebrata. . . . .	3
Total	86

Only selected samples of the Copepoda were at first submitted for investigation. Every Copepod in each of these samples was identified and separated out. This furnished some indication of the value and richness of the material. Finally the whole of the crustacea plankton was sent for examination at the end of 1902. Owing to the contents of the cases being incompletely declared, and a portion being preserved in dutiable spirits, very great difficulty was experienced in getting the collection released by the British Customs Authorities at the Port of Entry into the Kingdom. After considerable correspondence and representation of the scientific value of the material, the cases were set free on payment of the duty charge on one

gallon of foreign alcohol. By a special indulgence of the Commissioners of Customs, to whom the difficulty had been submitted, the dutiable spirit was permitted to be destroyed in the presence of an Officer of the Customs Department at Barrow, and on receipt of his certificate that this had been done, the duty charge was refunded. The material in each bottle was put into a fine silk sieve and the foreign spirit allowed to drain away without loss or injury to the collection. The material was then replaced in the bottle and 70% British Methylated spirit added.

From a series of collections taken in an area like that investigated by the 'Siboga' in 1899—1900, especially as the HENSEN vertical net had been employed to some extent to obtain the deep water plankton, one could almost expect results rather above the ordinary. The collection has decidedly proved most interesting and instructive. Much valuable information relating to the distribution of known species of Copepoda has been gained from the investigation of the material. Some of the species described by former investigators that had become almost lost owing to incomplete description and illustration, have been re-discovered and are now placed on a more satisfactory basis.

The Copepoda noted in this report reach the total of 338 species, and of this number 83 do not appear to have previously been described. This collection has produced a greater number of species from a definite tropical area than has been secured in modern times, and distinctly proves the importance of a lengthened systematic collection in securing reliable results. The following table shews the results of comparatively recent investigations of the Copepoda in definite tropical areas, compared with what was revealed by the voyage of the 'Challenger' 1873—1876.

'Challenger' Copepoda . . . . .	107 species.
Gulf of Guinea Copepoda (10 weeks collections) . . . . .	150 species.
<sup>1)</sup> Ceylon Copepoda (about 6 months investigation) . . . . .	234 species.
Maldive Area Copepoda . . . . .	120 species.
'Siboga' Copepoda (exclusive of Asterocheridae and true parasitic forms).	338 species.

Much of the increase in the number of species is without any doubt largely due to the greatly improved facilities for collecting and investigating material, of course every expedition now organised has all the previous experience of the others as a guide, and the specialist is provided with a good supply of literature. At the beginning of the 'Challenger' expedition many methods had never been tested, or even suggested, and the literature was very scanty.

A good deal of investigation has already been done amongst the Copepoda of the Indian Ocean, and a fair amount of information is available relating to the Copepoda of even the Malay Archipelago.

If we compare the families represented in this report with the same families already recorded from the Indian Ocean, we find the following particulars: — The late Professor CLEVE

<sup>1)</sup> This number includes the seven species of Copepod Fish-Parasites recorded by C. B. WILSON in Supplementary Report XXXIV, Part V (1906), Report on the Pearl Oyster Fisheries of the Gulf Manaar. The Supplementary Report VII by THOMPSON & SCOTT (1903) deals with a total of 284 species representing various families, but 57 of these species were obtained from plankton collected during the traverse to and from Ceylon and were not actually present in the Gulf of Manaar. The last day of the outward journey, and the first day of the homeward one only, is regarded as part of Ceylon in the above list.

records 85 species from the Malay Archipelago in his report published in 1901. Dr. R. N. WOLFENDEN reports on 118 species from the plankton collected by J. STANLEY GARDINER around the Maldive and Laccadive Islands. Professor W. A. HERDMAN's collections from the Gulf of Manaar 1902-1903 produced 195 species.

The following table gives the families and divisions represented in the present report, with the number of species belonging to each, and shews the difference between the results obtained from the investigations of the 'Siboga' when compared with the parts of the Indian Ocean referred to.

	'Siboga'	Ceylon	Maldive Area	Malay Archipelago (CLEVE)
Calanoida . . . . .	225 . . . . .	78 . . . . .	80 . . . . .	57 . . . . .
Mormonillidae . . . . .	1 . . . . .	. . . . .	. . . . .	. . . . .
Oithonidae . . . . .	3 . . . . .	7 . . . . .	7 . . . . .	5 . . . . .
Harpacticoida . . . . .	44 . . . . .	62 . . . . .	8 . . . . .	5 . . . . .
Monstrillidae . . . . .	10 . . . . .	. . . . .	1 . . . . .	. . . . .
Oncaeiidae . . . . .	8 . . . . .	4 . . . . .	5 . . . . .	4 . . . . .
Corycaeiidae . . . . .	16 . . . . .	14 . . . . .	11 . . . . .	9 . . . . .
Sapphirinidae . . . . .	18 . . . . .	8 . . . . .	6 . . . . .	5 . . . . .
Lichomolgidae . . . . .	12 . . . . .	20 . . . . .	. . . . .	. . . . .
Clausiidae . . . . .	1 . . . . .	2 . . . . .	. . . . .	. . . . .
Total . . . . .	338	195	118	85

None of the above lists are strictly comparable with each other, as the methods employed in collecting the material were not identical in every case. For instance: — No vertical hauls with the HENSEN net were taken in the Gulf of Manaar. During the 'Siboga' expedition fifteen such hauls were taken from depths between 10 metres and 2000 metres. On the other hand we examined seven collections of washings from invertebrata dredged around Ceylon, compared with the three in the present report. WOLFENDEN does not give any information about the methods employed by J. STANLEY GARDINER in taking the collection of Copepoda from around the Maldive and Laccadive Islands, nor are the exact positions given for the occurrence of the species although the two groups of Islands are roughly 200 miles apart. The species recorded by WOLFENDEN, are such as would lead one to suspect that the Copepoda were obtained from at or near the surface, and at no great distance from the Islands. The collection reported on by the late Professor CLEVE appears to have been purely a surface series.

Unless one can deal with Copepoda that have been collected by similar methods in different areas for some considerable period, it would be pure speculation to attempt to explain the differences that are apparent in the four series given above, and any conclusions put forward must necessarily be fallacious to a very considerable extent. It is hopeless at present, for instance, to compare the Copepod fauna of the sea along the coast of Western Europe, with that of almost any other part of the world. The Copepoda of the seas round Northern and Western Europe have been investigated by different observers for nearly a century, and yet a dozen years ago not even the most optimistic student had any idea that the very deep region to the West of Ireland and North of Scotland, was populated with so many interesting species as

shewn by the results of the investigations now being carried out on the lines laid down by the Conseil Permanent International pour l'Exploration de la Mer.

It is demonstrated in the present report that some of the deep water pelagic Copepoda of the North Atlantic are identical with forms from the deep water of the Malay Archipelago. To suggest that this similarity may be accidental, or the result of ocean currents, would not account for the occurrence of such species in areas so widely apart, unless we know a very great deal regarding the Copepoda inhabiting the vast area of deep water that intervenes. The HENSEN net, if it had opened up no other line of observation than that of obtaining a continuous vertical sample of plankton from any depth to the surface, has proved of great service where it has been employed. No plankton observations can now be regarded as satisfactory unless this particular net is extensively employed along with ordinary nets worked at or near the surface.

An ordinary tow-net is of little use in collecting littoral forms of Copepoda that live at or on the sea bottom and are rarely able to swim any distance. Other methods, such as dredging up samples of invertebrata and mud, and washing out the minute Copepoda, or investigating the shore between tide marks, must be pursued to obtain such types. It would be quite erroneous to suggest that littoral Copepoda are absent from an area that is only investigated by tow-net, should none be found.

Dr. WOLFENDEN in his report on the Copepoda collected by J. STANLEY GARDINER around the Maldive and Laccadive Islands, attempts to draw some conclusions from the species of Copepoda recorded in his own report when compared with the forms recorded from Ceylon, especially the paucity of littoral forms in the Maldive area, that appear to be based on insufficient data. The record of no less than 84 species in the report on the Ceylon Copepoda is chiefly due to a piece of luck, and a suggestion by the writer to save all the debris mixed with the dredged invertebrata that had been brought back. Many of the larger invertebrata had been wrapped in paper previous to being placed in the store tanks, but this became greatly disintegrated in the process of sorting out the material, and added to the labour involved in working through the sand and mud left after the large specimens had been removed. It is certainly more troublesome to work through a bottle of debris, especially when largely mixed with shredded paper, than going over a collection of pelagic forms taken by tow-net. The washings from a sample of pearl oysters from Muttuvaratu Paar presented us with 32 species of Harpacticoida that were not found in any of the tow-net collections, or even in any of the other washings. It must be obvious, that the majority of the littoral Copepoda recorded in the Ceylon report could not have been obtained had we neglected the debris. Of the eight species of Harpacticoida recorded by WOLFENDEN from the Maldive area, no less than five of them are purely pelagic forms. The other three may have been accidentally swimming near the surface in very shallow water. There is no evidence in the report that true littoral species of Harpacticoida, Lichomolgidae or Asterocheridae were looked for. The more recent origin of the Maldive group, compared with Ceylon, is not a very satisfactory solution of the apparent paucity of the littoral Copepoda.

When we find European Harpacticoida like *Phyllothalestris mysis* and *Rhynchothalestris rufocincta* both present in the Malay Archipelago, one is inclined to regard the apparent absence

of true littoral forms from any large area that includes very shallow water with some suspicion. *Phyllothalestris mysis* was described by CLAUS from Mediterranean specimens, and has been shewn to occur on the coasts of Britain, Norway and Ceylon. *Rhynchothalestris rufocincta* has been obtained by Dr. A. M. NORMAN, Professor G. S. BRADY and other investigators on various parts of the British Coast, and by Professor G. O. SARS on the coast of Norway. I have a rich gathering of Harpacticoida in my possession that was found in the washings from a mere handful of calcareous and other algae collected on the dead coral-reef flats and Madreporia reefs in the Conflict Atoll, off the coast of New Guinea. Some of the species from this distant Island, which is of more recent origin than Ceylon, appear to be identical with forms occasionally found in washings from invertebrata dredged in the Irish Sea.

There is no doubt that the temperature of the sea at between 1000 and 2000 metres in the Malay Archipelago is nearly the same as that of the deep water of the North Atlantic. KRÜMMEL 1907, shews that the temperature of the deep water is much more uniform throughout the world, than that of the surface. One is led to suspect, therefore, that when the Copepoda of the world wide deep cold areas have been fully investigated, there may be a greater uniformity in the distribution of some species than is known at present. Scattered observations are of great value as a link in the chain of evidence, but until the chain be complete many pitfalls await the theorist should he venture into explanations regarding the presence or absence of groups without sufficient data to work from.

The result of the various methods employed on board the 'Siboga' gives one a fair idea of the Copepod fauna of the region investigated. A comparison of the deep forms with those of the shallow water, or of the surface and bottom types near the land, and also the conditions in the daylight and the dark can be obtained from the lists of Copepoda that were present in each collection as shewn on pages 278 to 314. The greatest number of species represented in a day surface gathering was 59. One night surface collection contained 64 species. A vertical net haul at Station 141, from 1500 metres to the surface, contained the astonishing total of 131 species of Copepoda. This is at least 11 more than was apparently present in the whole of plankton from the Maldive area. The Horizontal cylinder catches averaged 37 species per haul and the washings from dredged invertebrata 13 each. The following list gives the averages for each of the series: —

50 Day Surface Collections, average per sample . . . . .	29 species.
13 Night Surface Collections, average per sample . . . . .	40 species.
4 HENSEN Vertical Net Night Collections, average per sample	49,5 species.
11 HENSEN Vertical Net deep Collections, average per sample .	88,7 species.
4 Horizontal Cylinder Collections, average per sample . . . .	37 species.
1 FOWLER Closing Net Collection . . . . .	28 species.
3 Washings from Dredged Invertebrata, average per sample .	13 species.

The three tables below give the number of species belonging to the families and divisions that were represented in the 'Siboga' collection and are also recorded from Ceylon, the Maldive area, and the Malay Archipelago (CLEVE).

	Ceylon	Maldives	Malay Archipelago
Calanoida. . . . .	61	65	50
Oithonidae . . . . .	3	2	2
Harpacticoida . . . . .	17	3	3
Oncaeidae. . . . .	3	4	3
Corycaeidae . . . . .	12	8	8
Sapphirinidae . . . . .	6	6	4
Lichomolgidae . . . . .	4		
Clausidae. . . . .	1		
Total	<u>107</u>	<u>88</u>	<u>70</u>

This shews for instance, when compared with the numbers given for the 'Siboga' collection on page 3 that out of the 44 species of Harpacticoida recorded, 17 of them were present at Ceylon, 3 at the Maldives, and 3 had already been known from the Malay Archipelago. On the other hand, out of the 85 species recorded by CLEVE, 15 of them were apparently not taken during the cruise of the 'Siboga'.

No excuse is offered for the great length of the report, or for the delay in its preparation, beyond the fact that, the chief object was to make it worthy of the energy of the party of Dutch Naturalists who devoted so much time to the investigation of the area, and of the commendable example of the Dutch Government in meeting the expenses of the exploration, along with due consideration for the fulfilment of my official duties under Professor HERDMAN. Many dissections had to be made in the course of the work. Each appendage was dissected in regular order and mounted separately in the majority of the species so it must be obvious that time was necessary to obtain useful preparations. The illustrations are so drawn, that the characteristic features of each species can readily be detected, without undue crowding of the plates. The plumose setae of the swimming feet and other appendages have, therefore, not been included in many cases. The lengthy index, list of literature, and the extensive synonymy under some of the species, are given with the view to facilitate the investigations of future workers. I am deeply indebted to the Linnean Society, London, and to the Librarian, Mr. A. W. KAPPEL, for the free use of the literature in the library, and also to many investigators for furnishing reprints of their works on Copepoda. My father's experience and advice proved of the utmost value in the difficult points that cropped up from time to time, and in the determination of uncertain species. I am also deeply indebted to Professor WEBER for his kindness in giving me the opportunity of investigating this interesting collection of Copepoda, for his careful supervision of the printing of the report, and for the very satisfactory photographic reproductions of the plates from the original indian ink copies.

Piel, Barrow in Furness, April 30, 1909.

## SYSTEMATIC.

### Tribe AMPHASKANDRIA.

#### 1. Family CALANIDAE.

#### Genus *Calanus* Leach, 1816.

In the present report, certain species included in the genus *Calanus* by BRADY 1883, GIESBRECHT 1893, GIESBRECHT & SCHMEIL 1898, SARS 1905 (*a*), FARRAN 1908, VAN BREEMEN 1908, etc., have been removed to other genera on account of structural differences as stated below.

*Calanus finmarchicus* (Gunnerus) is regarded as the type of the genus. The antennules and mouth organs in both sexes are normal in structure. There are five pairs of bi-ramose feet. Each branch is three-jointed and adapted for swimming. The fifth pair of feet in both sexes is only very slightly different. In the male, the exopodites of the right and left feet are not quite symmetrical. That on the left side is usually a little longer than the right, and it is also slightly modified in shape and armature. The anterior surface of the second joint of the basiopodite of the first feet in both sexes is furnished with a simple plumose seta. There is no hook at the base of this seta, as in the genus *Megacalanus*.

Remarks. Under the restrictions adopted in this report, the genus *Calanus* is distinguished from the other genera by the almost complete similarity in the structure of the appendages in the two sexes. There is no hook-like armature on the anterior surface of the second joint of the basiopodite of the first feet.

Only two species from the 'Siboga' collections apparently possessed these characters.

#### 1. *Calanus minor* (Claus).

*Cetochilus minor* Claus, 1863, p. 172.

*Calanus valgus* Brady, 1883, p. 33, pl. III, figs. 1—7.

*Calanus valgus* I. C. Thompson, 1888, p. 147.

*Calanus minor* Giesbrecht, 1893, p. 90, pl. 6, 7, 8.

*Calanus valgus* T. Scott, 1893, p. 24.

*Calanus minor* Giesbrecht, 1895, p. 248.

*Calanus minor* Giesbrecht & Schmeil, 1898, p. 15.

*Calanus minor* Wheeler, 1900, p. 165, figs. *a*, *b*.

*Calanus minor* Cleve, 1901, p. 5.

- Calanus minor* Thompson, & Scott, 1903, p. 241.  
*Calanus minor* Cleve, 1903, p. 357.  
*Calanus minor* Cleve, 1904, p. 186.  
*Calanus minor* Wolfenden, 1905 (a), p. 995, pl. XCVII, figs. 36—38.  
*Calanus minor* Sars, 1905 (a), p. 1.  
*Calanus minor* Esterly, 1905, p. 126, fig. 2.

This species although rather rare in the 'Siboga' collections was apparently well distributed throughout the area investigated, as shewn by the following list of stations where its occurrence was noted.

- Stat. 36. — Stat. 47<sup>b</sup>. — Stat. 81. — Stat. 96 (night). — Stat. 118. — Stat. 125. — Stat. 128. —  
 Stat. 136. — Stat. 141. — Stat. 143. — Stat. 144. — Stat. 148. — Stat. 157. — Stat. 165. —  
 Stat. 168. — Stat. 184. — Stat. 186. — Stats. 194—7. — Stat. 204. — Stat. 210<sup>a</sup>. —  
 Stat. 217. — Stat. 282. — Stat. 304.

*Calanus minor* appears to be widely distributed in all the warmer seas, and a number of records of its occurrence have been made since the first description was published. *Calanus valgus* Brady 1883, has been included in the synonymy of this species by GIESBRECHT. WOLFENDEN 1905 (a), draws attention to differences between the figures of BRADY and GIESBRECHT. The fifth feet of the males from the 'Siboga' collections agree perfectly with the figures given in the 'Challenger' report, and in the 'Fauna und Flora des Golfes von Neapel'. The only difference between *Calanus valgus* Brady and *Calanus minor* Claus, appears to be in the size. The former is given as 3.5 mm. but the females of *C. minor* from the 'Siboga' material are only 1.7 mm. long.

## 2. *Calanus tenuicornis* Dana.

- Calanus tenuicornis* Dana, 1849, p. 15.  
*Calanus tenuicornis* Giesbrecht & Schmeil, 1898, p. 18.  
*Calanus tenuicornis* I. C. Thompson, 1903, p. 15.  
*Calanus tenuicornis* Cleve, 1903, p. 357.  
*Calanus tenuicornis* Cleve, 1904, p. 186.  
*Calanus tenuicornis* Wolfenden, 1904, p. 111.  
*Calanus tenuicornis* Sars, 1905 (a), p. 1.  
*Calanus tenuicornis* Esterly, 1905, p. 127, fig. 3.  
*Calanus tenuicornis* Farran, 1905, p. 30.  
*Calanus tenuicornis* Pearson, 1906, p. 5.  
*Calanus tenuicornis* Farran, 1908, p. 20.  
*Calanus tenuicornis* van Breemen, 1908, p. 11, fig. 8.

*Calanus tenuicornis* Dana, appears to be widely distributed in tropical and temperate seas. It was very rare in the collections taken by the 'Siboga' and was found only in the plankton from Station 282. There it was represented by three specimens. It is a characteristic species with moderately long furca and is easily identified.

## Genus *Canthocalanus* nov.

This new genus resembles *Calanus* in its general appearance. The females might well pass for true members of that genus, as the antennules and mouth organs are of a similar

structure. There are five pairs of swimming feet in both sexes. Each pair is composed of a three-jointed endopodite and exopodite. The joints of the basiopodite of the first feet are, however, distinct from those of true *Calanus*. The apex of the anterior margin of the first joint, terminates in a well defined hook-like projection. The second joint is furnished with a strong, naked, pyriform spine, on its anterior surface. The base of this spine, is only slightly attached to the surface of the joint. A considerable portion of the spine is continued upward, into a distinct tooth-like process, resulting, with the combination of the hook on the first joint, in the formation of a feeble prehensile apparatus. The other pairs of feet in the female are of the normal *Calanus* type, except that the first joint of the basiopodite of the fifth pair is not serrate on the inner margin. The fifth pair of feet in the male has a distinct prehensile left exopodite. The endopodite of that side is three-jointed, rudimentary, and destitute of plumose hairs. The right foot is normal. The first joint of the basiopodite resembles that of the female in not being serrate on the inner margin.

Remarks. The type of the genus is *Calanus pauper* Giesbrecht, but the structures on the joints of the basiopodite of the first feet, and the character of the male left fifth foot, with its prehensile exopodite and the rudimentary, naked, three-jointed endopodite, distinguish *Canthocalanus* from true *Calanus*. The genus at present is represented by one species.

1. *Canthocalanus pauper* (Giesbrecht).

*Calanus pauper* Giesbrecht, 1888, p. 331.

*Calanus pauper* Giesbrecht, 1893, p. 91, pls. 6 & 8.

*Calanus pauper* Giesbrecht & Schmeil, 1898, p. 16.

*Calanus pauper* I. C. Thompson, 1900, p. 275.

*Calanus pauper* Cleve, 1901, p. 5.

*Calanus pauper* A. Scott, 1902, p. 400.

*Calanus pauper* Thompson & Scott, 1903, p. 241.

*Calanus pauper* Cleve, 1903, p. 357.

*Calanus pauper* Wolfenden, 1905(a), p. 995, pl. XCVII, figs. 29—35.

*Canthocalanus pauper* appeared to be generally distributed throughout the area investigated by the 'Siboga' and was noted at the following stations.

Stat. 16. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 66. — Stat. 71. — Stat. 81. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 109. — Stat. 110. — Stat. 112. — Stat. 118. — Stat. 121. — Stat. 125 (night). — Stat. 128. — Stat. 133. — Stat. 136. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 144. — Stat. 148. — Stat. 149. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 172. — Stat. 184. — Stat. 185. — Stat. 186. — Stat. 189<sup>a</sup>. — Stats. 194—7. — Stat. 203 (1500 metres). — Stat. 204. — Stat. 205. — Stat. 214. — Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 224. — Stat. 225. — Stat. 229. — Stat. 252. — Stat. 271. — Stat. 276. — Stat. 282. — Stat. 315.

The distribution of this species, so far as is known at present, seems to be limited to the Mediterranean, Gulf of Suez, Red Sea, Arabian Sea, Indian and Pacific Oceans. WOLFENDEN, 1905(a), has described and figured the characteristic parts of this copepod from specimens collected around the Maldivé Islands by J. STANLEY GARDINER. These figures agree well with the original ones given by GIESBRECHT.

Genus **Calanoides** Brady, 1883.

This genus was established by BRADY in the 'Challenger' report, for the reception of a *Calanoid* form whose male possessed characters quite distinct from those of *Calanus*, the most important being the prehensile structure of the fifth feet. The exopodites of this pair are three-jointed, elongated, and destitute of plumose setae. The endopodites are rudimentary. That of the right foot is three-jointed. The left one is reduced to a single small joint. The absence of plumose setae on the male fifth feet indicate, that they are not adapted for swimming, and thus differ from those of typical *Calanus*. The female is of the usual *Calanus* type. GIESBRECHT in his great work 'Fauna und Flora des Golfes von Neapel' and GIESBRECHT & SCHMEIL in 'Das Tierreich', include this genus under *Calanus*. The fifth feet of the male however, are so obviously distinct, that its position there is untenable, and it must therefore be restored as a separate genus. The presence of a normal fifth pair of feet in the female, indicates that the genus is related to *Calanus*, and not to *Pseudocalanus* or *Euchaeta*, as suggested by BRADY.

No specimens of *Calanoides patagoniensis* Brady, the type of the genus, were found in the 'Siboga' collections, but there is so close a resemblance in the structure of the male fifth feet of *Calanus brevicornis* Lubbock, to *Calanoides*, that it has been included under that genus in this report. The genus is now represented by two species, one of which occurred in the plankton collected by the 'Siboga'.

1. *Calanoides brevicornis* (Lubbock).

*Calanus brevicornis* Lubbock, 1856, p. 11, pl. III.

*Calanus brevicornis* Giesbrecht, 1893, p. 90, pl. 6, 7, 8.

*Calanus frontalis* Dahl, 1894, p. 76.

*Calanus brevicornis* Giesbrecht & Schmeil, 1898, p. 16.

*Calanus brevicornis* Cleve, 1904, p. 185.

*Calanus brevicornis* Sars, 1907 (*l*), p. 4.

This species is easily recognised by its conical and slightly crested forehead, and by the rather pointed terminations of the last thoracic segment. The female is of the normal *Calanus* type. The fifth pair of feet of the male although not so elongated as in *Calanoides patagoniensis*, is of a somewhat similar structure to that of BRADY's species. The endopodites of both rami are rudimentary, that of the right side is three-jointed. The left is reduced to one small joint. It was noted in collections taken at the following stations.

Stat. 165, 20 specimens. — Stat. 168. — Stat. 169, 1 specimen. — Stat. 172, 2 specimens. —

Stat. 185. — Stat. 225, 1 specimen. — Stat. 230, 5 specimens. — Stat. 276, 3 specimens.

*Calanoides brevicornis* (Lubbock), has previously been recorded from the Atlantic and Indian Oceans only.

Genus **Megacalanus** Wolfenden, 1904.

WOLFENDEN 1904 (wrongly quoted as 1905 in Plankton Studies, part I) briefly described a very large Calanoid form under the above genus that, was taken in the deep water of the Atlantic,

between Valentia in Ireland and the Farøe banks, and gave a characteristic figure. This genus is distinguished from *Calanus*, by the presence of a remarkable hook on the anterior surface of the second joint of the basiopodite of the first feet, and by the last joint of the exopodites of the second, third, and fourth feet being furnished with three spines on the outer margin, instead of two as in *Calanus*. WOLFENDEN fully described his genus in 1905, in Plankton Studies, part 1. SARS in the same year (1905*a*) described a very similar form under the name of *Macrocalanus longicornis*, and a good deal of confusion arose through no figures accompanying the description. SARS, however, in 1907 (*b*), withdrew his genus in favour of the one named by WOLFENDEN, which had the prior claim. WOLFENDEN in his first description had then only met with one form, to which he gave the name *Megacalanus princeps*. In Plankton Studies, part I, the number of species under *Megacalanus* was increased to two. The specific name *princeps* originally adopted for the type of the genus was dropped in favour of a new specific name, *bradyi*, while the name *princeps* was applied to the additional form, which is clearly not a *Megacalanus*. There is no doubt, that *Megacalanus bradyi* is the same form for which the genus was founded in 1904, as it is characterised by the prominent hook on the second basal joint of the first feet and the figure 2, plate I, is identical with the figure given with the original description in 1904. The second species of the genus, was identified as equal to BRADY'S *Calanus princeps* of the Challenger report, and the basiopodite of the first pair of feet is described as having no trace of hooks.

In the interval between the publication of WOLFENDEN'S two papers SARS had recorded the occurrence of *Macrocalanus princeps* (*Calanus princeps* Brady).

In Plankton Studies, part II, 1906, WOLFENDEN has the following note: "Professor G. O. SARS has informed me that the genus *Megacalanus* (Wolfenden) is identical with his genus "*Macrocalanus* (Sars) (Bull. du Musée Océanog. de Monaco), and *Megacalanus Bradyi* is the "same as his species *Macrocalanus longicornis*, and that my name, *Megacalanus*, however has "the priority over *Macrocalanus*. He also informs me that the species described by me as "*Megacalanus princeps* = *Calanus princeps* (Brady) is not that species, but = *Bathycalanus* "*Richardi* (G. O. Sars), and that BRADY'S *Calanus princeps* is a true *Megacalanus*, differing "from *M. longicornis* (G. O. S.) = *Megacal. Bradyi* (Wolfenden), in the strongly recurved frontal "appendages, somewhat shorter Anterior Antennae, and the dense ciliation of the spines on the "Anterior Maxillipedes, which otherwise are quite normal in appearance.

"The genus *Bathycalanus* differs from *Megacalanus* in the peculiar armature of the "frontal part and in the somewhat different structure of the maxillae and maxillipedes (both "pairs), and in the structure of the first pair of feet, which are without the hooked process of "the second basal, and have the outer ramus composed of only two joints".

It is quite certain that WOLFENDEN'S second species, *Megacalanus princeps* (Brady), is not a *Bathycalanus*, because WOLFENDEN in his description of the species states that the first four pairs of feet have three-jointed rami. WOLFENDEN, after an examination of the dissections of *Calanus princeps* preserved in the British Museum, concludes that BRADY'S species is neither a *Megacalanus* nor a *Bathycalanus*, yet he finally renames *Megacalanus princeps* Wolfenden, not the original one which established the genus in 1904, as *Bathycalanus maximus*.

SARS 1905 (*a*), and FARRAN 1908, identify BRADY'S *Calanus princeps* with the genus

*Megacalanus*, but it is doubtful if they are justified in doing so, as BRADY makes no reference to the remarkable hook on the second joint of the basiopodite of the first feet, which is a pronounced character in *Megacalanus*. It is very unlikely that BRADY would overlook this hook, had it been present in his *Calanus princeps*, as he notes the occurrence of a hook in *Calanus gracilis* which is a much smaller form. The hook is quite as pronounced as in WOLFENDEN'S type of the genus *Megacalanus*. I regard BRADY'S *Calanus princeps* to be a member of a new genus mentioned later. On the other hand I include under the genus *Megacalanus* two species hitherto regarded as true *Calanus*. They are of much smaller size than the type of the genus, and have only two marginal spines on the last joint of the exopodites of the second, third, and fourth feet. They have, however, the strong hook on the anterior surface of the second joint of the basiopodite of the first feet. This hook is quite distinct from that found in *Canthocalanus*. In *Megacalanus* the hook is a well defined projection from the surface of the joint, and has a plumose seta articulated to it. In *Canthocalanus* the seta is transformed into a strong spine with a hooked base. Three members of this genus were represented in the Siboga plankton.

Remarks. I include under the genus *Megacalanus* only those Calanoids that have the anterior surface of the second joint of the basiopodite of the first pair of feet furnished with a strong hook as originally defined by WOLFENDEN. I do not think that size alone should have any generic or specific importance, so long as the principal character established in the original definition is upheld.

1. *Megacalanus gracilis* (Dana).

- Calanus gracilis* Dana, 1849, pp. 18, 24.  
*Calanus gracilis* Brady, 1883, p. 35, pls. V & XLVI.  
*Calanus gracilis* I. C. Thompson, 1888, p. 147.  
*Calanus gracilis* Giesbrecht, 1893, p. 90, pls. 1, 6, 7, 8.  
*Calanus gracilis* T. Scott, 1893, p. 25.  
*Calanus gracilis* Giesbrecht, 1895, p. 248.  
*Calanus gracilis* Giesbrecht & Schmeil, 1898, p. 17.  
*Calanus gracilis* I. C. Thompson, 1900, p. 275.  
*Calanus gracilis* I. C. Thompson, 1903, p. 15.  
*Calanus gracilis* Thompson & Scott, 1903, p. 241.  
*Calanus gracilis* Cleve, 1903, p. 357.  
*Calanus gracilis* Sars, 1905 (a), p. 1.  
*Calanus gracilis* Esterly, 1905, p. 128, fig. 4.  
*Calanus gracilis* Pearson, 1906, p. 5.  
*Calanus gracilis* Farran, 1908, p. 20.  
*Calanus gracilis* van Breemen, 1908, p. 10, fig. 7.

*Megacalanus gracilis* although generally distributed over the area investigated, appeared to be rather scarce in numbers. It was noted at the following stations.

- Stat. 19. — Stat. 35. — Stat. 40. — Stat. 66. — Stat. 75. — Stat. 89. — Stat. 98. —  
 Stat. 99. — Stat. 110. — Stat. 117<sup>a</sup>. — Stat. 118. — Stat. 125. — Stat. 125 (night) —  
 Stat. 128. — Stat. 129. — Stat. 133. — Stat. 141. — Stat. 143. — Stat. 148. — Stat. 157. —  
 Stat. 177<sup>a</sup>. — Stat. 189<sup>a</sup>. — Stats. 194—7. — Stat. 203 (1500 metres). — Stat. 204. —  
 Stat. 220 (vertical net). — Stat. 220 (surface). — Stat. 243. — Stat. 245. — Stat. 252. —  
 Stat. 276. — Stat. 282.

This species appears to be widely distributed in all the oceans. It is evident from FARRAN'S remarks (1908), and its presence in the deep collection at Station 203, although absent at the surface, that it occasionally descends to considerable depths. BRADY in his 'Challenger' report, pointed out the characters of *Calanus gracilis*, and was of the opinion that future research would render necessary the formation of a new genus for this species.

2. *Megacalanus robustior* (Giesbrecht).

- Calanus robustior* Giesbrecht, 1888, p. 332.  
*Calanus robustior* Giesbrecht, 1893, p. 91, pls. 7 & 8.  
*Calanus comptus* T. Scott, 1893, p. 26, pls. V & VI.  
*Calanus robustior* Giesbrecht, 1895, p. 248.  
*Calanus robustior* Giesbrecht & Schmeil, 1898, p. 18.  
*Calanus robustior* Thompson & Scott, 1903, p. 242.  
*Calanus robustior* Sars, 1905 (a), p. 1.  
*Calanus robustior* Wolfenden, 1905 (a), p. 996, pl. XCVI, figs. 1—6.  
*Calanus robustior* Esterly, 1905, p. 129, fig. 5.

This species has a close resemblance to *Megacalanus gracilis* and without a careful examination may be easily mistaken for it. The robust form of the animal and the very swollen genital segment, help to separate it from *Megacalanus gracilis*. It was noted at the following 'Siboga' stations but appeared to be rather rare.

Stat. 37. — Stat. 40. — Stat. 110. — Stat. 117<sup>a</sup>. — Stat. 128. — Stat. 141. — Stat. 185. —  
 Stat. 189<sup>a</sup>. — Stat. 245. — Stat. 276.

The form recorded by my father from the Gulf of Guinea (1893) as ?*Calanus comptus* Dana, and which he was inclined to consider as only a variety of *Calanus gracilis*, has been identified by GIESBRECHT & SCHMEIL as *Calanus robustior*, a conclusion that appears to be quite correct.

*Megacalanus robustior* has been previously recorded from the Atlantic, Pacific, and Indian Oceans.

3. *Megacalanus princeps* Wolfenden. Plate I, figs. 12—18.

- Megacalanus princeps* Wolfenden, 1904, p. 112, pl. IX, fig. 1.  
*Macrocalanus longicornis* Sars, 1905 (a), p. 7.  
*Megacalanus bradyi* Wolfenden, 1905, p. 1, figs. 1—6.  
*Megacalanus longicornis* Pearson, 1906, p. 6.  
*Megacalanus longicornis* Farran, 1908, p. 21.  
*Megacalanus longicornis* van Breemen, 1908, p. 13, fig. 9.  
 nec *Calanus princeps* Brady, 1883, p. 36, pl. IV, figs. 3—7.  
 nec *Macrocalanus princeps* Sars, 1905 (a), p. 7.  
 nec *Megacalanus princeps* Wolfenden, 1905, p. 3, pl. I, figs. 7—9.  
 nec *Megacalanus princeps* Pearson, 1906, p. 6.  
 nec *Bathycalanus maximus* Wolfenden, 1906, p. 26, pl. VIII.  
 nec *Megacalanus princeps* Farran, 1908, p. 21.  
 nec *Megacalanus princeps* van Breemen, 1908, p. 13.

This fine species was represented in the 'Siboga' material by five specimens, all females,

but only one of them was mature. The length of the mature female was 9,5 mm. exclusive of the caudal setae. It was found at the following stations.

- Stat. 148. HENSEN vertical net, 1000 metres to surface, 2 specimens.  
 Stat. 185. HENSEN vertical net, 1536 metres to surface, 2 specimens.  
 Stat. 243. HENSEN vertical net, 1000 metres to surface, 1 specimen.

I have been unable to detect any difference between the original description given by WOLFENDEN from the North Atlantic specimen, and those from the area investigated by the 'Siboga'. I have also examined specimens from the deep water of the Farøe Channel, and find that they are identical with the figures given on plate I of this report.

As already stated WOLFENDEN originally described the species as *Megacalanus princeps*, and subsequently withdrew the specific name in favour of *bradyi*, under the impression that BRADY'S *Calanus princeps* belonged to the same genus. FARRAN and VAN BREEMEN have used SARS specific name *longicornis*, as it was given prior to the substitution of the new name by WOLFENDEN. BRADY'S *Calanus princeps* apparently belongs to the new genus described below rather than to *Megacalanus*, and the name originally given by WOLFENDEN must necessarily be restored.

#### Genus **Bradycalanus** nov.

In general appearance, this new genus resembles *Megacalanus* Wolfenden, but is at once distinguished from it by the densely plumose spines on the apex of the first maxillipedes, and by the absence of the prominent hook on the anterior surface of the second joint of the basipodite of the first feet. The endopodites and exopodites of the five pairs of feet are three-jointed. The last joint of the exopodites of the second, third, and fourth feet are furnished with three spines on the outer margin instead of two as in *Calanus*. The generic description of *Bathycalanus* Sars 1905 (*a*), states that the exopodites of the first feet are two-jointed, and in this important point it differs from *Bradycalanus*. The forehead has no trace of a dorsal crest which distinguishes *Megacalanus* and *Bathycalanus* from WOLFENDEN'S *Heterocalanus*, a name by the way that has been previously used in the Gulf of Guinea report for a new Calanoid that afterwards became a synonym of *Pseudodiaptomus*. So far, only the female of *Bradycalanus* is known.

I think that it is probable that BRADY'S *Calanus princeps* belongs to this genus rather than to *Bathycalanus* or *Heterocalanus*, but I do not regard it as identical with the species upon which this genus is founded.

#### 1. *Bradycalanus typicus* nov. sp. Plate I, figs. 1—11.

Female — length 9 mm.

The head is distinctly separated from the first thoracic segment. It is considerably contracted in front and produced slightly into a rounded knob as seen from the dorsal aspect, fig. 1. The fourth and fifth thoracic segments are completely separated. The fifth thoracic segment is produced posteriorly and ends in distinct points. When viewed from the side the

segment is seen to terminate in well defined spines. The abdomen is four-jointed, symmetrical, and equal to one-third of the length of the *cephalothorax*. The genital segment is longer than broad, and is nearly equal to the combined lengths of the second and third segments. The second segment is about half the length of the genital segment. The third segment is equal to two-thirds of the length of the second. The fourth segment is about half as long as the third. The furcal joints are short and slightly longer than broad but rather longer than the last abdominal segment.

The antennules are twenty-five-jointed and extend beyond the end of the abdomen by at least four joints.

The antennae, mandibles, and maxillae are nearly as in *Calanus*.

The first maxillipedes are furnished with distinct curved spines on the third, fourth, and fifth lobes, that on the fifth being quite conspicuous. The apical portion of the first maxillipedes bears a number of spines, which are densely clothed with short fine hairs.

The second maxillipedes have a general resemblance to those of *Calanus* but the apical portion is only indistinctly five-jointed.

The five pairs of feet are bi-ramose and each branch is composed of three joints. The second joint of the basiopodite of the first pair of feet is furnished with a simple plumose seta on the anterior surface. The last joint of the exopodites of the second, third, and fourth feet, bear three marginal spines as in *Megacalanus princeps*. The fifth pair of feet is of a similar structure to the fourth, but the last joint of the exopodites has only two marginal spines.

The only record for *Bradycalanus typicus* in the 'Siboga' material is two mature females taken in a HENSEN net vertical haul at Station 148 from a depth of 1000 metres to the surface. It is evident that *Megacalanus princeps* and *Bradycalanus typicus*, are deep water Calanoids, as they were only found in the vertical hauls taken between 1000 and 1536 metres.

It is probable, that the present species is specifically distinct from *Calanus princeps* Brady, as I think it is very unlikely that BRADY in his description would have overlooked the terminal spines on the last thoracic segment, had they been present in his species.

I am unable to decide whether *Bradycalanus typicus* is identical with SARS *Megacalanus princeps* or not, as nothing beyond the record of its occurrence has yet appeared. FARRAN also unfortunately, has not given illustrations of the Calanoid he recognises to be identical with *Calanus princeps* Brady, and *Megacalanus princeps* Sars. FARRAN (1908) regards WOLFENDEN'S *Heterocalanus medius* to be generically and specifically identical with *Megacalanus princeps* (Brady). In that case BRADY'S Calanoid cannot be a *Megacalanus* at all, as WOLFENDEN distinctly states that there is no hook on the second joint of the basiopodite of the first feet, and it cannot be the present species, as *Heterocalanus medius* is described as having a prominent dorsal crest, which is quite absent in *Bradycalanus typicus*.

I have lately had an opportunity of examining a specimen of a large Calanoid with a dorsal crest, from the deep water of the Faröe Channel. It agreed in every way with WOLFENDEN'S *Heterocalanus medius*, but differs from *Bradycalanus typicus* by the possession of a dorsal crest, the terminations of the last thoracic segment are rounded, and the apical spines of the first maxillipedes are more densely clothed with fine hairs.

*Heterocalanus medius* Wolfenden, may be the species described by KROYER 1848—49 as *Calanus cristatus*. Two figures of the forehead of KROYER's species are given by GIESBRECHT in 'Fauna und Flora des Golfes von Neapel' (pl. 6, figs. 14—15).

Genus **Undinula** nom. nov.

= *Undina* Dana, 1847. A name preoccupied by GOULD, (Aves) 1836 and Munst., (Pisces) 1842.

GIESBRECHT 1893, combined the genus *Undina* Dana, with *Calanus* Leach, and with the exception of SARS, subsequent workers adopted this plan. SARS 1902, p. 8, points out that the structure of the fifth feet of the male of *Undina* differs considerably from the males of true *Calanus*, and that the genera ought properly to be kept apart. Very little examination of the fifth feet of the males of the types of the two genera is required to shew that SARS view is the correct one. There is no similarity between the left fifth foot of the male of *Calanus finmarchicus*, and that of the male of *Undina vulgaris*. The males of DANA's *Undina* have the last joint of the exopodite of the left fifth foot developed into a well defined prehensile organ.

The generic name used by DANA had been established for a genus of birds previous to its adoption by that author and *Undinula* has, therefore, been substituted for *Undina* in the present report.

The females of *Undinula* differ very little in the structure of the appendages from typical *Calanus*, the only noticeable distinction is an incomplete division of the eighth and ninth joints of the antennules. There are five pairs of bi-ramose feet, all adapted for swimming, and each branch is three-jointed. The males are very easily recognised by the structure of the fifth pair of feet. The foot of the right side is bi-ramose and each branch is three-jointed. The left foot has the exopodite considerably elongated and its last joint is converted into a powerful bi-ramose prehensile organ. The endopodite of the left foot may be entirely absent as in *Undinula vulgaris*, or very rudimentary, consisting of one small joint, as in *Undinula darwini* and *Undinula caroli*. There are at present three species belonging to this genus and they were all noted in the 'Siboga' material.

1. *Undinula vulgaris* (Dana).

- Undina vulgaris* Dana, 1849, pp. 17, 18, 22.
- Undina vulgaris* Brady, 1883, p. 53, pls. XV & XVIII.
- Calanus vulgaris* Giesbrecht, 1893, p. 92, pls. 6, 7, 8.
- Undina vulgaris* T. Scott, 1893, p. 44.
- Calanus vulgaris* Giesbrecht, 1895, p. 248.
- Calanus vulgaris* Giesbrecht & Schmeil, 1898, p. 17.
- Calanus vulgaris* I. C. Thompson, 1900, p. 275.
- Calanus vulgaris* Cleve, 1901, p. 5.
- Calanus vulgaris* A. Scott, 1902, p. 400.
- Calanus vulgaris* Thompson & Scott, 1903, p. 242.
- Calanus vulgaris* Cleve, 1903, p. 357.
- Calanus vulgaris* Cleve, 1904, p. 186.
- Calanus vulgaris* Wolfenden, 1905(a), p. 994, pls. XCVI & XCVII.
- Undina vulgaris* Sars, 1905(a), p. 2.

This was one of the most common and widely distributed Calanoids found in the material collected by the 'Siboga' as the following records shew.

Stat. 16, 32 specimens. — Stat. 19, 20 specimens. — Stat. 35, 121 specimens. — Stat. 36, 135 specimens. — Stat. 37, 137 specimens. — Stat. 40, 5 specimens. — Stat. 47<sup>b</sup>, 90 specimens. — Stat. 50. — Stat. 66, 265 specimens. — Stat. 71. — Stat. 75, 6 specimens. — Stat. 81, 10 specimens. — Stat. 89, 3 specimens. — Stat. 93, 26 specimens. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98, 108 specimens. — Stat. 99, 25 specimens. — Stat. 101. — Stat. 106, 20 specimens. — Stat. 109, 35 specimens. — Stat. 110, 3 specimens. — Stat. 112, 8 specimens. — Stat. 117<sup>a</sup>, 128 specimens. — Stat. 118, 2 specimens. — Stat. 121. — Stat. 122, 8 specimens. — Stat. 124, 300 specimens. — Stat. 125, 30 specimens. — Stat. 125 (night), 22 specimens. — Stat. 136, 380 specimens. — Stat. 138, 1336 specimens. — Stat. 141, 20 specimens. — Stat. 142, 3 specimens. — Stat. 143. — Stat. 144, 113 specimens. — Stat. 148, 10 specimens. — Stat. 149, 10 specimens. — Stat. 157, 150 specimens. — Stat. 165, 45 specimens. — Stat. 168, 5 specimens. — Stat. 169, 3 specimens. — Stat. 172, 95 specimens. — Stat. 174, 55 specimens. — Stat. 177<sup>a</sup>. — Stat. 184, 103 specimens. — Stat. 185, 2 specimens. — Stat. 189<sup>3</sup>, 63 specimens. — Stats. 194—7, 10 specimens. — Stat. 203 (surface), 35 specimens. — Stat. 203 (1500) metres, 5 specimens. — Stat. 204, 110 specimens. — Stat. 205, 30 specimens. — Stat. 210<sup>3</sup>, 5 specimens. — Stat. 213, 2 specimens. — Stat. 215<sup>a</sup>, 20 specimens. — Stat. 216. — Stat. 217 (horizontal cylinder), 18 specimens. — Stat. 220 (vertical net), 15 specimens. — Stat. 220 (surface), 33 specimens. — Stat. 223, 10 specimens. — Stat. 224, 15 specimens. — Stat. 225, 37 specimens. — Stat. 229, 17 specimens. — Stat. 230. — Stat. 243, 5 specimens. — Stat. 245, 30 specimens. — Stat. 252, 3 specimens. — Stat. 271. — Stat. 276. — Stat. 282, 32 specimens. — Stat. 304, 70 specimens. — Stat. 315.

The numbers of specimens noted above, do not in every case represent the whole of *Undinula vulgaris* present in the samples.

The female of *Undinula vulgaris* is easily distinguished from the female of the next species, by the presence of strong spines at the terminations of the last thoracic segment. In some specimens the left side has two spines instead of one. The second joint of the exopodites of the second pair of feet in both sexes, is deeply notched at the base. The exopodite of the left foot of the male is much elongated. The outer spine of the prehensile apical joint has no tooth on its inner margin, and the endopodite is absent.

## 2. *Undinula darwini* (Lubbock).

*Undina darwini* Lubbock, 1860, p. 7, pl. 29.

*Undina darwini* Brady, 1883, p. 54, pl. XVI.

*Calanus darwini* Giesbrecht, 1893, p. 91, pls. 6, 7, 8.

*Calanus darwini* Giesbrecht, 1895, p. 248.

*Calanus darwini* Giesbrecht & Schmeil, 1898, p. 17.

*Calanus darwini* I. C. Thompson, 1900, p. 275.

*Calanus darwini* Cleve, 1901, p. 5.

*Calanus darwini* A. Scott, 1902, p. 400.

*Calanus darwini* Thompson & Scott, 1903, p. 241.

*Calanus darwini* Cleve, 1903, p. 357.

*Calanus darwini* Cleve, 1904, p. 185.

*Calanus darwini* Wolfenden, 1905 (a), p. 994, pl. XCVII, fig. 40.

*Undinula darwini* although less numerous than *Undinula vulgaris*, was well distributed throughout the area investigated by the 'Siboga' as shewn by the following records.

Stat. 19, 2 specimens. — Stat. 35, 3 specimens. — Stat. 36, 3 specimens. — Stat. 37, 15 specimens. — Stat. 40. — Stat. 66, 5 specimens. — Stat. 75, 16 specimens. — Stat. 81, 4 specimens. — Stat. 93, 7 specimens. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98, 20 specimens. — Stat. 99. — Stat. 106. — Stat. 110, 3 specimens. — Stat. 112, 3 specimens. — Stat. 117<sup>a</sup>. — Stat. 118, 5 specimens. — Stat. 124, 15 specimens. — Stat. 125. — Stat. 128. — Stat. 129, 3 specimens. — Stat. 133. — Stat. 136, 75 specimens. — Stat. 138, 90 specimens. — Stat. 144. — Stat. 146. — Stat. 148, 8 specimens. — Stat. 149. — Stat. 157. — Stat. 165, 33 specimens. — Stat. 168, 3 specimens. — Stat. 169, 46 specimens. — Stat. 172. — Stat. 177<sup>a</sup>. — Stat. 184, 65 specimens. — Stat. 185. — Stat. 186, 8 specimens. — Stat. 189<sup>a</sup>, 10 specimens. — Stat. 193, 8 specimens. — Stat. 203 (surface), 2 specimens. — Stat. 203 (1500 metres), 8 specimens. — Stat. 204, 25 specimens. — Stat. 205, 10 specimens. — Stat. 210<sup>a</sup>, 15 specimens. — Stat. 213, 15 specimens. — Stat. 214. — Stat. 215<sup>a</sup>, 50 specimens. — Stat. 216. — Stat. 217 (horizontal cylinder), 100 specimens. — Stat. 220 (vertical net), 8 specimens. — Stat. 220 (surface), 15 specimens. — Stat. 223, 3 specimens. — Stat. 224, 7 specimens. — Stat. 225, 5 specimens. — Stat. 229, 10 specimens. — Stat. 243, 10 specimens. — Stat. 245, 5 specimens. — Stat. 276. — Stat. 282, 11 specimens. — Stat. 304.

The peculiar projection of the last thoracic segment, and the row of fine spines at the distal end of the abdominal segments, help to identify the females of this species from *Undinula vulgaris*, and the peculiar form of the exopodite of the left fifth foot, renders the identification of the males comparatively simple. The endopodite of the male left fifth foot is rudimentary, and consists of a single small joint. Some care has to be taken in separating the male of *Undinula darwini*, from that of *Undinula caroli*, as the exopodite of the left fifth foot of the two species has a very similar structure.

### 3. *Undinula caroli* (Giesbrecht).

*Calanus caroli* Giesbrecht, 1888, p. 331.

*Calanus caroli* Giesbrecht, 1893, p. 91, pl. 8, fig. 36.

*Calanus caroli* Giesbrecht & Schmeil, 1898, p. 17.

*Calanus caroli* Wolfenden, 1895 (a), p. 994, pl. XCVII, fig. 41.

This species although widely distributed throughout the area traversed by the 'Siboga' appeared to be comparatively rare. The following are the stations where it was noted.

Stat. 37, 2 specimens. — Stat. 75, 2 specimens. — Stat. 93, 1 specimen. — Stat. 98, 2 specimens. — Stat. 124. — Stat. 136, 2 specimens. — Stat. 138, 5 specimens. — Stat. 148, 2 specimens. — Stat. 165, 4 specimens. — Stat. 186, 1 specimen. — Stat. 210<sup>a</sup>, 1 specimen. — Stat. 217 (horizontal cylinder), 1 specimen. — Stat. 220, 1 specimen.

The difficulty in distinguishing this species from *Undinula darwini*, is no doubt the cause of the paucity of records since it was established by GIESBRECHT. WOLFENDEN is apparently doubtful that it is really distinct from *Undinula darwini*. It must be admitted, that considerable care is necessary to make out the species when mixed up with *Undinula darwini*, but when the difference is once seen, further identification is comparatively easy. The position of the tooth on the inner edge of the external spine, which is part of the last joint of the exopodite of the left fifth foot, is the specific character separating the two species. In *Undinula caroli*, the tooth is placed about one-sixth from the base of the spine, and five-sixths from the distal end. The

tooth in *Undinula darwini*, is one-third from the base, and two-thirds from the distal end of the spine.

So far as the records shew, this Calanoid appears to be limited to the Pacific and Indian Oceans. Only the males have yet been discovered.

## 2. Family EUCALANIDAE.

Genus **Eucalanus** Dana, 1852.

The members of this genus are easily distinguished from those belonging to the other genera of this family, by the entire absence of a fifth pair of feet in the female. The frontal part of the head is not produced into a beak-like prominence. The last abdominal segments and furcal joints are not separated. Seven species of *Eucalanus* were found in the material collected by the 'Siboga', one of which appears to be undescribed.

### 1. *Eucalanus crassus* Giesbrecht.

- Eucalanus crassus* Giesbrecht, 1888, p. 333.  
*Eucalanus crassus* Giesbrecht, 1893, p. 132, pls. 4, 11, 35.  
*Eucalanus crassus* T. Scott, 1897(a), p. 312.  
*Eucalanus crassus* Giesbrecht & Schmeil, 1898, p. 22.  
*Eucalanus crassus* T. Scott, 1900, p. 382.  
*Eucalanus crassus* T. Scott, 1901, p. 236.  
*Eucalanus crassus* Cleve, 1901, p. 6.  
*Eucalanus crassus* Wolfenden, 1902, p. 361.  
*Eucalanus crassus* A. Scott, 1902, p. 401.  
*Eucalanus crassus* T. Scott, 1903, p. 110.  
*Eucalanus crassus* Thompson & Scott, 1903, p. 242.  
*Eucalanus crassus* Cleve, 1903, p. 362.  
*Eucalanus crassus* Cleve, 1904, p. 189.  
*Eucalanus crassus* Wolfenden, 1904, pp. 111, 112.  
*Eucalanus crassus* Wolfenden, 1905(a), p. 996.  
*Eucalanus crassus* Sars, 1905(a), p. 2.  
*Eucalanus crassus* Esterly, 1905, p. 134, fig. 8.  
*Eucalanus crassus* Farran, 1905, p. 30.  
*Eucalanus crassus* Pearson, 1906, p. 7.  
*Eucalanus crassus* Farran, 1908, p. 22.  
*Eucalanus crassus* van Breemen, 1908, p. 16, fig. 13.

This *Eucalanus*, which is apparently widely distributed throughout the oceans as shewn by the above references, occurred at the following stations in the area investigated by the 'Siboga'.

- Stat. 16. — Stat. 37. — Stat. 66. — Stat. 75. — Stat. 89. — Stat. 93. — Stat. 98. —  
 Stat. 99. — Stat. 106. — Stat. 109. — Stat. 118. — Stat. 124. — Stat. 125 (day). —  
 Stat. 125 (night). — Stat. 138. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 144. —  
 Stat. 146. — Stat. 148. — Stat. 165. — Stat. 169. — Stat. 172. — Stat. 184. — Stat. 189. —  
 Stats. 194—7. — Stat. 204. — Stat. 216. — Stat. 220 (vertical net). — Stat. 252. —  
 Stat. 282. — Stat. 315.

*Eucalanus crassus* is easily identified by its tumid body and very swollen, rounded, genital segment. The body is well covered with short stiff hairs.

2. *Eucalanus monachus* Giesbrecht.

- Eucalanus monachus* Giesbrecht, 1888, p. 333.  
*Eucalanus monachus* Giesbrecht, 1893, p. 132, pl. 11 & 35.  
*Eucalanus monachus* Giesbrecht & Schmeil, 1898, p. 21.  
*Eucalanus monachus* Wheeler, 1900, p. 167, fig. 4.  
*Eucalanus monachus* Cleve, 1901, p. 6.  
*Eucalanus monachus* Thompson & Scott, 1903, p. 242.  
*Eucalanus monachus* Cleve, 1903, p. 362.  
*Eucalanus monachus* Cleve, 1904, p. 189.  
*Eucalanus monachus* Sars, 1905 (a), p. 2.  
*Eucalanus monachus* Wolfenden, 1905 (a), p. 996.

*Eucalanus monachus* does not appear to be so widely distributed throughout the oceans as the previous species. It was apparently rather limited in its occurrence in the region traversed by the 'Siboga' as shewn by the following records.

- Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 75. —  
 Stat. 93. — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 110. — Stat. 117<sup>a</sup>. — Stat. 136. —  
 Stat. 138. — Stat. 141. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 205. — Stat.  
 215<sup>a</sup>. — Stat. 315.

This *Eucalanus* is distinguished from the other species by the broadly rounded and somewhat truncate outline of the head when viewed from the side.

3. *Eucalanus mucronatus* Giesbrecht.

- Eucalanus mucronatus* Giesbrecht, 1888, p. 333.  
*Eucalanus mucronatus* Giesbrecht, 1893, p. 132, pls. 11 & 35.  
*Eucalanus mucronatus* Giesbrecht & Schmeil, 1898, p. 21.  
*Eucalanus mucronatus* Cleve, 1901, p. 7.  
*Eucalanus mucronatus* Cleve, 1903, p. 362.  
*Eucalanus mucronatus* Cleve, 1904, p. 189.  
*Eucalanus mucronatus* Wolfenden, 1905 (a), p. 996.

This species was moderately common in the 'Siboga' collections, and appeared to be widely distributed in the area investigated. It was found at the following stations.

- Stat. 36. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 75. — Stat. 89. — Stat. 93. —  
 Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 110. —  
 Stat. 117<sup>a</sup>. — Stat. 118. — Stat. 121. — Stat. 124. — Stat. 125 (day). — Stat. 128. —  
 Stat. 129. — Stat. 133. — Stat. 136. — Stat. 138. — Stat. 141. — Stat. 142. — Stat.  
 143. — Stat. 144. — Stat. 146. — Stat. 148. — Stat. 157. — Stat. 165. — Stat. 168. —  
 Stat. 169. — Stat. 172. — Stat. 177<sup>a</sup>. — Stat. 184. — Stat. 185. — Stat. 186. — Stat.  
 189<sup>a</sup>. — Stat. 194—7. — Stat. 203 (surface). — Stat. 203 (1500 metres). — Stat. 204. —  
 Stat. 210<sup>a</sup>. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 217 (horizontal cylinder). —  
 Stat. 220 (vertical net). — Stat. 220. — Stat. 223. — Stat. 224. — Stat. 225. — Stat.  
 230. — Stat. 243. — Stat. 245. — Stat. 252. — Stat. 271. — Stat. 276. — Stat. 282. —  
 Stat. 304. — Stat. 315.

*Eucalanus mucronatus* when in good condition, is easily distinguished from the other species of *Eucalanus* by the hook-like projection of the forehead when seen from the side. The forehead of the species however, seems to be easily telescoped, and it is therefore not always possible to make out the beak at first sight.

4. *Eucalanus pileatus* Giesbrecht.

- Eucalanus pileatus* Giesbrecht, 1888, p. 334.  
*Eucalanus pileatus* Giesbrecht, 1893, p. 132, pls. 11 & 35.  
*Eucalanus pileatus* Giesbrecht & Schmeil, 1898, p. 21.  
*Eucalanus pileatus* Thompson & Scott, 1903, p. 242.  
*Eucalanus pileatus* Cleve, 1904, p. 189.  
*Eucalanus pileatus* Wolfenden, 1905 (a), 996.

This *Eucalanus* is apparently not a common species. It was rather scarce in the region traversed by the 'Siboga' as shewn by the records of its occurrence.

- Stat. 16. — Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 93. —  
 Stat. 96. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 121. — Stat. 138. — Stat. 165. —  
 Stat. 168. — Stat. 169. — Stat. 177<sup>a</sup>. — Stat. 282. — Stat. 315.

This species has been recorded from the Red Sea, Atlantic, Pacific, and Indian Oceans

5. *Eucalanus subcrassus* Giesbrecht.

- Eucalanus subcrassus* Giesbrecht, 1888, p. 334.  
*Eucalanus subcrassus* Giesbrecht, 1893, p. 132, pls. 11 & 35.  
*Eucalanus subcrassus* Giesbrecht & Schmeil, 1898, p. 22.  
*Eucalanus subcrassus* Cleve, 1901, p. 7.  
*Eucalanus subcrassus* Thompson & Scott, 1903, p. 242.  
*Eucalanus subcrassus* Cleve, 1903, p. 362.  
*Eucalanus subcrassus* Cleve, 1904, p. 190.  
*Eucalanus subcrassus* Wolfenden, 1905 (a), p. 996.

*Eucalanus subcrassus* although not plentiful, appeared to have a wide distribution in the area traversed. It was noted at the following stations.

- Stat. 35. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 81. — Stat. 89. — Stat. 93. — Stat. 96 (day). —  
 Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 109. —  
 Stat. 112. — Stat. 117<sup>a</sup>. — Stat. 125 (day). — Stat. 125 (night). — Stat. 129. — Stat.  
 133. — Stat. 136. — Stat. 138. — Stat. 141. — Stat. 144. — Stat. 146. — Stat. 148. —  
 Stat. 157. — Stat. 165. — Stat. 168. — Stat. 172. — Stat. 177<sup>a</sup>. — Stat. 184. — Stat. 185. —  
 Stat. 189<sup>a</sup>. — Stat. 193. — Stats. 194—7. — Stat. 203 (surface). — Stat. 203 (1500 metres). —  
 Stat. 204. — Stat. 205. — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). —  
 Stat. 229. — Stat. 252. — Stat. 315.

This *Eucalanus* has also been recorded from the Atlantic, Indian, and Pacific Oceans, and the Red Sea.

6. *Eucalanus subtenuis* Giesbrecht.

- Eucalanus subtenuis* Giesbrecht, 1888, p. 333.  
*Eucalanus subtenuis* Giesbrecht, 1893, p. 132, pls. 11 & 35.

- Eucalanus subtenuis* Giesbrecht & Schmeil, 1898, p. 21.  
*Eucalanus subtenuis* Cleve, 1901, p. 7.  
*Eucalanus subtenuis* A. Scott, 1902, p. 401.  
*Eucalanus subtenuis* Thompson & Scott, 1903, p. 242.  
*Eucalanus subtenuis* Cleve, 1903, p. 363.  
*Eucalanus subtenuis* Cleve, 1904, p. 190.  
*Eucalanus subtenuis* Sars, 1905 (a), p. 2.  
*Eucalanus subtenuis* Wolfenden, 1905 (a), p. 996.  
*Eucalanus subtenuis* Esterly, 1905, p. 135, fig. 9.

*Eucalanus subtenuis* appeared to have a fairly wide distribution in the area traversed by the 'Siboga' as shewn by the following records.

- Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 75. — Stat. 93. — Stat. 98. — Stat. 118. — Stat. 124. — Stat. 125 (day). — Stat. 125 (night). — Stat. 129. — Stat. 136. — Stat. 138. — Stat. 141. — Stat. 142. — Stat. 144. — Stat. 157. — Stat. 165. — Stat. 169. — Stat. 172. — Stat. 184. — Stat. 189<sup>a</sup>. — Stats. 194—7. — Stat. 203 (surface). — Stat. 203 (1500 metres). — Stat. 204. — Stat. 205. — Stat. 214. — Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). — Stat. 245.

*Eucalanus subtenuis* has been recorded from the Atlantic, Pacific, and Indian Oceans and also from the Arabian Sea.

A considerable amount of care is necessary to distinguish the last three species of *Eucalanus* from each other. The external characters are not very well marked, and the points of difference are frequently obliterated when the specimens are distorted. It is always wise to make dissections of the appendages before a definite conclusion is arrived at.

7. *Eucalanus dentatus* nov. sp. Plate II, figs. 1—8.

Female — length 2,6 mm.

The head is considerably contracted in front and is produced into a well-marked spiniform process. When viewed from the side, the spiniform process appears to be directed slightly upward, terminating in a sharp point, (Plate II, fig. 2). The fourth and fifth thoracic segments are completely separated. The last thoracic segment has rounded extremities. The apex of the last thoracic segment is greatly contracted and is very little wider than the base of the genital segment. The abdomen is three-jointed and symmetrical, with one free segment between the genital and anal segments.

The antennules are twenty-three jointed, and extend beyond the end of the furca by five joints.

The antennae are nearly as in *Eucalanus crassus*. The proximal joint of the endopodite is about double as long as broad.

The mandible palp is furnished with two inner setae on the second joint of the basipodite. The first joint of the endopodite is destitute of setae, and the second joint is furnished with four apical setae. The exopodite is apparently without segmentation, and is furnished with six setae on the distal end.

The maxillae and maxillipedes are nearly as in *Eucalanus attenuatus*. The first and second joints of the endopodite of the second maxillipedes are furnished with four setae.

The four pairs of swimming feet are very similar to those of *Eucalanus attenuatus*.  
Male unknown.

This species is easily distinguished from the other members of the genus by its strong, well defined cephalic spine, and by the absence of segmentation in the exopodite of the mandible palp.

Specimens of this species were found in samples of plankton from the following stations.

Stat. 141, 1 specimen. — Stat. 172, 3 specimens. — Stat. 184, 2 specimens. — Stat. 315, 12 specimens.

#### Genus *Rhincalanus* Dana, 1852.

The members of this genus are distinguished from *Eucalanus*, by the peculiar beak-like projection of the forehead, by the spines on the thoracic segments, and by the presence of a fifth pair of feet in the female. Two species were represented in the plankton collected by the 'Siboga'.

##### 1. *Rhincalanus cornutus* Dana.

- Rhincalanus cornutus* Dana, 1852, p. 1083, pl. 76.  
*Rhincalanus cornutus* Brady, 1883, p. 41, pl. VII.  
*Rhincalanus cornutus* I. C. Thompson, 1888, p. 148.  
*Rhincalanus cornutus* T. Scott, 1893, p. 30.  
*Rhincalanus cornutus* Giesbrecht, 1893, p. 153, pls. 12 & 35.  
*Rhincalanus cornutus* Giesbrecht & Schmeil, 1898, p. 23.  
*Rhincalanus cornutus* I. C. Thompson, 1900, p. 276.  
*Rhincalanus cornutus* Cleve, 1901, p. 8.  
*Rhincalanus cornutus* A. Scott, 1902, p. 402.  
*Rhincalanus cornutus* I. C. Thompson, 1903, p. 16.  
*Rhincalanus cornutus* Thompson & Scott, 1903, p. 242.  
*Rhincalanus cornutus* Cleve, 1903, p. 368.  
*Rhincalanus cornutus* Cleve, 1904, p. 196.  
*Rhincalanus cornutus* Sars, 1905 (a), p. 2.  
*Rhincalanus cornutus* Wolfenden, 1905 (a), p. 996.  
*Rhincalanus cornutus* Pearson, 1906, p. 8.  
*Rhincalanus cornutus* van Breemen, 1908, p. 18, fig. 15.

This species although not very common except at Station 141 and Station 148, appeared to be generally distributed throughout the area traversed by the 'Siboga', as shewn by the following records.

Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 50. — Stat. 66. — Stat. 81. — Stat. 98. — Stat. 99. — Stat. 106. — Stat. 112. — Stat. 117<sup>a</sup>. — Stat. 118. — Stat. 125 (day). — Stat. 128. — Stat. 133. — Stat. 136. — Stat. 138. — Stat. 141, 160 specimens. — Stat. 143. — Stat. 144. — Stat. 146. — Stat. 148, 422 specimens. — Stat. 157. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 172. — Stat. 174. — Stat. 177<sup>a</sup>. — Stat. 184. — Stat. 185. — Stat. 189<sup>a</sup>. — Stat. 203 (1500 metres). — Stat. 204. — Stat. 213. — Stat. 216. — Stat. 220 (vertical net). — Stat. 220 (surface). — Stat. 223. — Stat. 230. — Stat. 243. — Stat. 276. — Stat. 282. — Stat. 315.

*Rhincalanus cornutus* appears to be widely distributed in the warmer seas. WOLFENDEN

(1902) recorded it from the Farøe Channel, but in a later report (1904) withdrew the record, stating that all records of the occurrence of this species beyond 30° N. must be looked upon with suspicion. The late I. C. THOMPSON (1903) records the species from the collections taken during the cruise of the 'Oceana' in 1898, at stations in the Atlantic north of 52° N., and Professor G. O. SARS (1905) records it from collections taken during the investigations carried on by the Prince of Monaco.

The very strongly projecting forehead, and the structure of the fifth pair of feet in both sexes, are the chief points that separate this species from the following one.

## 2. *Rhincalanus gigas* Brady.

- Rhincalanus gigas* Brady, 1883, p. 42, pl. VIII, figs. 1—11.  
*Rhincalanus gigas* I. C. Thompson, 1888, p. 148.  
*Rhincalanus nasutus* Giesbrecht, 1888, p. 334.  
*Rhincalanus nasutus* Giesbrecht, 1893, p. 152, pl. 3, 9, 12, 35.  
*Rhincalanus nasutus* Canu, 1896, p. 421.  
*Rhincalanus nasutus* Giesbrecht & Schmeil, 1898, p. 22.  
*Rhincalanus gigas* I. C. Thompson, 1900, p. 276.  
*Rhincalanus* ? *gigas* T. Scott, 1901, p. 237, pl. XVII, figs. 1—4.  
*Rhincalanus* ? *gigas* T. Scott, 1902, p. 450.  
*Rhincalanus nasutus* Wolfenden, 1902, p. 361.  
*Rhincalanus nasutus* A. Scott, 1902, p. 401.  
*Rhincalanus grandis* Giesbrecht, 1902, p. 8, pl. 1, figs. 15—18.  
*Rhincalanus nasutus* Sars, 1902, p. 15, pl. VI & VII.  
*Rhincalanus nasutus* I. C. Thompson, 1903, p. 16.  
*Rhincalanus nasutus* Thompson & Scott, 1903, p. 242.  
*Rhincalanus nasutus* Cleve, 1903, p. 368.  
*Rhincalanus nasutus* Cleve, 1904, p. 196.  
*Rhincalanus nasutus* Wolfenden, 1904, p. 111.  
*Rhincalanus nasutus* Wolfenden, 1905 (a), p. 996.  
*Rhincalanus nasutus* Sars, 1905 (a), p. 2.  
*Rhincalanus nasutus* Esterly, 1905, p. 136, fig. 10.  
*Rhincalanus nasutus* Farran, 1905, p. 30.  
*Rhincalanus nasutus* Pearson, 1906, p. 8.  
*Rhincalanus nasutus* Farran, 1908, p. 22.  
*Rhincalanus nasutus* van Breemen, 1908, p. 18, fig. 14.

*Rhincalanus gigas* appeared to be rather a scarce species in the area traversed by the 'Siboga', as shewn by the following records of its occurrence.

Stat. 118, 2 specimens. — Stat. 125 (night). — Stat. 128, 42 specimen. — Stat. 141. — Stat. 142, 6 specimens. — Stat. 165, 1 specimen. — Stat. 168, 7 specimens. — Stat. 172, 10 specimens. — Stat. 174, 2 specimens. — Stat. 185, 1 specimen. — Stat. 203 (1500 metres), 5 specimens. — Stat. 210<sup>a</sup>, 4 specimens. — Stat. 230. — Stat. 243, 1 specimen. — Stat. 276, 6 specimens. — Stat. 282.

The characters that are adopted to distinguish *Rhincalanus nasutus* Giesbrecht, from *Rhincalanus gigas* Brady, are of so little importance that for the present I regard GIESBRECHT'S species to be only a small form of *Rhincalanus gigas*. BRADY'S figures appear to have been drawn from imperfect specimens. GIESBRECHT himself regarded it as possible, that the form he

described from the Antarctic as *Rhincalanus grandis*, was identical with *Rhincalanus gigas*, and the rather incomplete figures given by BRADY, was the chief reason for separating the two forms. The figure of the entire animal given by BRADY, is evidently drawn from a male and apart from its larger size, there is nothing to distinguish it from the males found in the 'Siboga' plankton. Dr. W. T. CALMAN kindly examined the type specimens of *Rhincalanus gigas* in the British Museum, and I quote the following remarks from one of his letters to me. 'The bottles 'labelled *Rhincalanus gigas* in the Challenger collection seem to my eye, to contain specimens 'of more than one species, but I chose one of the largest specimens from Stat. 156 as most 'likely to be what BRADY meant. None of the specimens seem to exceed 8,5 mm. in length 'excluding the caudal setae. In this specimen both rami of the first pair of legs have only 'two joints. I had begun to make a camera sketch of the limb to send you but it is so absolutely like GIESBRECHT's fig. 10 on plate 12 of the Naples Monograph that I did not think 'it worth while. The only difference from GIESBRECHT's figure which I can see is that the 'terminal setae of the exopodite are relatively a trifle longer'.

The terminal spine on the female fifth pair, apparently varies a good deal in different individuals of the same size. In some cases it is quite stout and terminates abruptly, in others, it is rather slender and tapers gradually to a fine point. The largest female from the 'Siboga' plankton measured 5 mm. in length, exclusive of the caudal setae.

Genus **Mecynocera** I. C. Thompson, 1888.

The only known member of this genus, is easily distinguished from the other genera belonging to the family, by its very long antennules, and by the structure of the first and fifth pairs of feet. The exopodite of the first pair is three-jointed. The endopodite is composed of one joint only. The fifth pair of feet is rudimentary, and only the exopodites are present. The exopodite consists of three joints, and is attached to a two-jointed basiopodite. The second joint of the exopodite is furnished with one plumose seta, and the third joint with five. GIESBRECHT & SCHMEIL state in 'Das Tierreich', that the male is unknown. WHEELER (1900), and van BREEMEN (1908), also failed to notice, that the male had been obtained both by THOMPSON at Madeira, and by my father in the Gulf of Guinea. The late I. C. THOMPSON in his original description, says 'males and females were both plentiful, and taken by surface tow-net at all the places visited'. In the Report on '*Entomostraca* from the Gulf of Guinea' (1893), my father partly described and figured the male, stating that the fifth feet are alike in both sexes.

1. *Mecynocera clausi* I. C. Thompson.

*Mecynocera clausi* I. C. Thompson, 1888, p. 150, pl. XI, figs. 1—4.

*Leptocalanus filicornis* Giesbrecht, 1888, p. 334.

*Mecynocera clausi* Giesbrecht, 1893, p. 160, pls. 5, 11, 35.

*Mecynocera clausi* T. Scott, 1893, p. 80, pls. 1 & 2.

*Mecynocera clausi* Giesbrecht & Schmeil, 1898, p. 23.

*Mecynocera clausi* Wheeler, 1900, p. 168, fig. 5.

*Mecynocera clausi* I. C. Thompson, 1903, p. 16.

*Mecynocera clausi* Thompson & Scott, 1903, p. 242.



*Mecynocera clausi* Sars, 1905 (*a*), p. 2.

*Mecynocera clausi* Esterly, 1905, p. 137, fig. 16.

*Mecynocera clausi* Pearson, 1906, p. 8.

*Mecynocera clausi* van Breemen, 1908, p. 19, fig. 16.

*Mecynocera clausi* although not common in any of the 'Siboga' plankton samples, had a moderately wide distribution in the area investigated, as shewn by the following records.

Stat. 16. — Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 101. — Stat. 106. — Stat. 109. — Stat. 121. — Stat. 141. — Stat. 143. — Stat. 144. — Stat. 146. — Stat. 148. — Stat. 184. — Stat. 203 (surface). — Stat. 203 (1500 metres). — Stat. 213. — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). — Stat. 252. — Stat. 276. — Stat. 282. — Stat. 304. — Stat. 315.

This Calanoid has been recorded from the Mediterranean, Atlantic, Indian, and Pacific Oceans.

### 3. Family PARACALANIDAE.

Genus **Paracalanus** Boeck, 1864.

The known Calanoids belonging to this genus are small and rather robust. The females can be readily recognised by the presence of a small fifth pair of feet. The fifth feet of the female is composed of a basal part and one free joint. A form described by CANON NORMAN and T. SCOTT as *Paracalanus parvus*, var. *perplexus*, differs from the typical members of the genus, in that the left fifth foot of the female has two free joints instead of one. I have recently detected this variety in plankton from the Irish Sea, but whether it is normal or not, is difficult to make out, as the material is very limited. The right fifth foot of the males of *Paracalanus* is the same as in the female. The left foot is elongated and slightly prehensile, with four free joints. The largest size that any of the females attain appears to be 1.2 mm.

Two species were represented in the plankton collected by the 'Siboga'.

#### 1. *Paracalanus aculeatus* Giesbrecht.

*Paracalanus aculeatus* Giesbrecht, 1888, p. 333.

*Paracalanus aculeatus* Giesbrecht, 1893, p. 164, pl. 9.

*Paracalanus parvus* T. Scott, 1893, p. 26, pl. 1, figs. 9—14.

*Paracalanus aculeatus* Giesbrecht, 1896, p. 318.

*Paracalanus aculeatus* Giesbrecht & Schmeil, 1898, p. 24.

*Paracalanus aculeatus* Cleve, 1901, pp. 8 & 47, pl. VI, figs. 1—10.

*Paracalanus aculeatus* A. Scott, 1902, p. 402.

*Paracalanus aculeatus* Cleve, 1903, p. 366.

*Paracalanus aculeatus* Cleve, 1904, p. 194.

*Paracalanus aculeatus* Wolfenden, 1905 (*a*), p. 998, pl. XCVI, figs. 12—15.

*Paracalanus aculeatus* Sars, 1905 (*a*), p. 2.

*Paracalanus aculeatus* appeared to have a wide distribution throughout the region traversed by the 'Siboga', as shewn by the following records.

Stat. 35. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 81. — Stat. 101. — Stat. 118. — Stat. 128. — Stat. 136. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 148. — Stat. 157. — Stat. 165. — Stat. 168. — Stat. 184. — Stat. 185. — Stat. 186. — Stats. 194—7. — Stat. 203 (1500 metres). — Stat. 205. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). — Stat. 220 (surface). — Stat. 223. — Stat. 229. — Stat. 230. — Stat. 243. — Stat. 252. — Stat. 276. — Stat. 304. — Stat. 315.

This species is closely related to the next one, and some care is required to distinguish the two at first. The longer antennules, and the armature of the second joint of the endopodite of the fourth foot, are the specific points that separate the two species. The species recorded from the Gulf of Guinea by my father as *Paracalanus parvus* (Claus), is probably GIESBRECHT'S *Paracalanus aculeatus*.

## 2. *Paracalanus parvus* (Claus).

- Calanus parvus* Claus, 1863, p. 173, pl. XXVI, figs. 10—14.  
*Paracalanus parvus* Giesbrecht, 1893, p. 164, pls. 1, 6, 9.  
*Paracalanus parvus* Giesbrecht & Schmeil, 1898, p. 24.  
*Paracalanus parvus* T. Scott, 1899, p. 248.  
*Paracalanus parvus* T. Scott, 1900, p. 383.  
*Paracalanus parvus* Wheeler, 1900, p. 168, fig. 6.  
*Paracalanus parvus* T. Scott, 1901, p. 350.  
*Paracalanus parvus* Cleve, 1901, p. 8.  
*Paracalanus parvus* Sars, 1902, p. 17, pls. VIII, IX.  
*Paracalanus parvus* A. Scott, 1902, p. 402.  
*Calanus parvus* Wolfenden, 1902, p. 361.  
*Paracalanus parvus* Thompson & Scott, 1903, p. 243.  
*Paracalanus parvus* Farran, 1903, p. 11.  
*Paracalanus parvus* Cleve, 1903, p. 367.  
*Paracalanus parvus* Cleve, 1904, p. 194.  
*Paracalanus parvus* Wolfenden, 1904, p. 111.  
*Paracalanus parvus* Wolfenden, 1905 (a), p. 997, pl. XCVI, figs. 7—11 & 16.  
*Paracalanus parvus* Sars, 1905 (a), p. 2.  
*Paracalanus parvus* Esterly, 1905, p. 140, fig. 12.  
*Paracalanus parvus* Farran, 1905, p. 30.  
*Paracalanus parvus* Pearson, 1906, p. 8.  
*Paracalanus parvus* T. Scott, 1906 (a), p. 298.  
*Paracalanus parvus* Farran, 1908, p. 22.  
*Paracalanus parvus* van Breemen, 1908, p. 20, fig. 17.

This species was well distributed over the area investigated by the 'Siboga', as shewn by the records of the stations where it was noted.

Stat. 16. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 71. — Stat. 75. — Stat. 81. — Stat. 96 (day). — Stat. 96 (night). — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 109. — Stat. 112. — Stat. 117<sup>a</sup>. — Stat. 118. — Stat. 121. — Stat. 125 (day). — Stat. 128. — Stat. 133. — Stat. 136. — Stat. 138. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 144. — Stat. 148. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 177<sup>a</sup>. — Stat. 184. — Stat. 185. — Stat. 204. — Stat. 205. — Stat. 213. — Stat. 217 (horizontal cylinder). — Stat. 229. — Stat. 243. — Stat. 250. — Stat. 271. — Stat. 304.

I have been unable to detect any differences between the specimens regarded as *Paracalanus parvus*, collected by the 'Siboga', and those taken frequently in plankton samples from the Irish Sea. WOLFENDEN 1905 (a), has described some varieties from J. STANLEY GARDINER'S Maldive plankton, but whether the minute differences mentioned, are worthy of even making varieties of, is extremely doubtful. In such a widely distributed species as *Paracalanus parvus*, one would expect to find a certain amount of local variation from the type found in the seas of Northern Europe.

The species described by my father in the report 'On *Eutomostraca* from the Gulf of Guinea' as *Paracalanus pygmaeus*, agrees much better with the description and figures of *Paracalanus crassirostris* Dahl, than with the imperfect description given by CLAUS. The very strong rostrum, and the short spines on the fifth feet of the female, are two important characters, along with its small size, by which it differs from any of WOLFENDEN'S varieties.

*Paracalanus parvus*, has a remarkably wide distribution throughout the great Oceans, as shewn by the record of observers who have noted its occurrence.

#### Genus *Acrocalanus* Giesbrecht, 1888.

This genus is closely allied to *Paracalanus*, but is distinguished from it, by the outer margin of the second and third joints of the exopodites of the third and fourth pairs of swimming feet being armed with teeth. The proximal part of the outer margin of the last joint of the exopodite of the fourth pair of feet, is nearly double as long as the distal portion. The fifth feet are very rudimentary, or absent in the female. Only the left fifth foot is present in the male.

Four species of *Acrocalanus* were represented in the material collected by the 'Siboga'.

##### 1. *Acrocalanus longicornis* Giesbrecht.

*Acrocalanus longicornis* Giesbrecht, 1888, p. 332.

*Acrocalanus longicornis* Giesbrecht, 1893, p. 171, pls. 6 & 10.

*Acrocalanus longicornis* Giesbrecht & Schmeil, 1898, p. 25.

*Acrocalanus longicornis* Cleve, 1901, p. 5.

*Acrocalanus longicornis* Thompson & Scott, 1903, p. 243.

*Acrocalanus longicornis* Wolfenden, 1905 (a), p. 1000.

This species proved to be the most common member of the genus, and was noted in plankton collected at the following stations.

Stat. 16. — Stat. 35. — Stat. 36. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 71. — Stat. 75. — Stat. 81. — Stat. 89. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 110. — Stat. 111. — Stat. 112. — Stat. 118. — Stat. 121. — Stat. 125 (day). — Stat. 128. — Stat. 138. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 144. — Stat. 148. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 184. — Stat. 185. — Stat. 203 (1500 metres to surface). — Stat. 204. — Stat. 205. — Stat. 210<sup>a</sup>. — Stat. 213. — Stat. 214. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). — Stat. 220 (surface). — Stat. 223. — Stat. 229. — Stat. 230. — Stat. 243. — Stat. 271. — Stat. 315.

*Acrocalanus longicornis* can be easily separated from the other species, by the length

of its antennules. The antennules extend beyond the body by five joints. It can be also recognised by the armature of the distal part of the last joint of the exopodites of the fourth pair of feet. The armature consists of a number of very fine teeth.

This species has been recorded from the Atlantic, Indian, and Pacific Oceans, and also from the Red Sea.

## 2. *Acrocalanus gracilis* Giesbrecht.

- Acrocalanus gracilis* Giesbrecht, 1888, p. 332.  
*Acrocalanus gracilis* Giesbrecht, 1893, p. 171, pls. 6 & 10.  
*Acrocalanus gracilis* Giesbrecht, 1897, p. 318.  
*Acrocalanus gracilis* Giesbrecht & Schmeil, 1898, p. 25.  
*Acrocalanus gracilis* Cleve, 1901, p. 4.  
*Acrocalanus gracilis* Thompson & Scott, 1903, p. 243.  
*Acrocalanus gracilis* Cleve, 1903, p. 356.  
*Acrocalanus gracilis* Cleve, 1904, p. 184.  
*Acrocalanus gracilis* Wolfenden, 1905 (a), p. 1003.

This *Acrocalanus* although not so common as the preceding species, was more plentiful than either of the next two. It occurred at the following stations.

- Stat. 16. — Stat. 36. — Stat. 40. — Stat. 75. — Stat. 93. — Stat. 98. — Stat. 99. —  
 Stat. 101. — Stat. 109. — Stat. 117<sup>a</sup>. — Stat. 118. — Stat. 138. — Stat. 141. — Stat.  
 142. — Stat. 143. — Stat. 148. — Stat. 203 (1500 metres to surface). — Stat. 213. —  
 Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 224. — Stat. 225. — Stat. 229. —  
 Stat. 243. — Stat. 245. — Stat. 315.

This species is easily distinguished from the other three, by its larger size, and by the smoothly rounded dorsal surface of the *cephalothorax*, when viewed from the side.

*Acrocalanus gracilis* has a distribution similar to the preceding species.

## 3. *Acrocalanus gibber* Giesbrecht.

- Acrocalanus gibber* Giesbrecht, 1888, p. 332.  
*Acrocalanus gibber* Giesbrecht, 1893, p. 171, pls. 6 & 10.  
*Acrocalanus gibber* Giesbrecht & Schmeil, 1898, p. 65.  
*Acrocalanus gibber* I. C. Thompson, 1900, p. 276.  
*Acrocalanus gibber* Cleve, 1901, p. 4.  
*Acrocalanus gibber* A. Scott, 1902, p. 402.  
*Acrocalanus gibber* Thompson & Scott, 1903, p. 243.  
*Acrocalanus gibber* Cleve, 1903, p. 356.  
*Acrocalanus gibber* Cleve, 1904, p. 184.  
*Acrocalanus gibber* Wolfenden, 1905 (a), p. 1003.

*Acrocalanus gibber* although not common, apparently had a moderately wide distribution in the area traversed by the 'Siboga', as shewn by the following records.

- Stat. 16. — Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 93. —  
 Stat. 98. — Stat. 112. — Stat. 118. — Stat. 138. — Stat. 141. — Stat. 142. — Stat.  
 143. — Stat. 184. — Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 315.

This species when present, can be easily identified by its very compact body, and although

very like *Acrocalanus longicornis* in general appearance, is readily separated by its smaller size, and shorter antennules.

This *Acrocalanus* has a distribution similar to that of the two previous species.

4. *Acrocalanus monachus* Giesbrecht.

*Acrocalanus monachus* Giesbrecht, 1888, p. 333.

*Acrocalanus monachus* Giesbrecht, 1893, p. 171, pls. 6 & 10.

*Acrocalanus monachus* Giesbrecht & Schmeil, 1898, p. 25.

*Acrocalanus monachus* Thompson & Scott, 1903, p. 243.

*Acrocalanus monachus* Cleve, 1903, p. 356.

*Acrocalanus monachus* Wolfenden, 1905 (a), p. 1002.

This appeared to be the least common species of the genus, and was only noted at the following stations.

Stat. 98. — Stat. 99. — Stat. 128. — Stat. 217.

*Acrocalanus monachus* has a very characteristic head when seen in lateral view, which makes the identification comparatively easy. The forehead when seen from the side, is moderately broad and nearly truncate in outline.

This species up to the present, has been recorded only from the Pacific and Indian Oceans, and from the Red Sea.

Genus **Calocalanus** Giesbrecht, 1888.

The members of this genus are not unlike *Paracalanus*, but are easily recognised by the abdomen being composed of only two or three joints, by the long terminal joint of the antennules, and by the structure of the fifth feet. The fifth feet of the female are symmetrical, and consist of two or three free joints attached to a basal portion. The right foot of the male is composed of three free joints, and the left foot of five. The left fifth foot is considerably elongated, and is slightly prehensile.

Two species were obtained from the 'Siboga' plankton.

1. *Calocalanus pavo* (Dana).

*Calanus pavo* Dana, 1849, p. 13.

*Calocalanus pavo* Giesbrecht, 1893, p. 175, pls. 1, 4, 9, 36.

*Calocalanus pavo* T. Scott, 1893, p. 37, pl. 6, figs. 9 & 10.

*Calocalanus pavo* Giesbrecht, 1896, p. 318.

*Calocalanus pavo* Giesbrecht & Schmeil, 1898, p. 26.

*Calocalanus pavo* I. C. Thompson, 1900, p. 277.

*Calocalanus pavo* Wheeler, 1900, p. 169, fig. 7.

*Calocalanus pavo* Cleve, 1901, p. 5.

*Calocalanus pavo* A. Scott, 1902, p. 402.

*Calocalanus pavo* Thompson & Scott, 1903, p. 243.

*Calocalanus pavo* Cleve, 1903, p. 357.

*Calocalanus pavo* Cleve, 1904, p. 186.

*Calocalanus pavo* Wolfenden, 1904, p. 111.

*Calocalanus pavo* Wolfenden, 1905 (a), p. 999.

*Calocalanus pavo* Pearson, 1906, p. 9.

*Calocalanus pavo* van Breemen, 1908, p. 22, fig. 18.

*Calocalanus pavo* although not common, had a moderately wide distribution throughout the area traversed by the 'Siboga' as shewn by the records given.

Stat. 16. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 75. — Stat. 96 (day). — Stat. 96 (night). — Stat. 99. — Stat. 101. — Stat. 110. — Stat. 118. — Stat. 121. — Stat. 133. — Stat. 138. — Stat. 141. — Stat. 148. — Stat. 203 (1500 metres to surface). — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). — Stat. 224. — Stat. 229. — Stat. 243. — Stat. 271. — Stat. 276. — Stat. 282. — Stat. 304.

This species is easily identified by its two-jointed abdomen, and by the peculiar position of the furcal joints. The furcal joints are symmetrical and are nearly always spread at right angles to the abdomen. None of the specimens had the caudal setae in the perfect condition so well shewn by GIESBRECHT.

*Calocalanus pavo* has a wide distribution in the warm seas, and it has been frequently recorded from various parts of the great oceans.

## 2. *Calocalanus plumulosus* (Claus).

*Calanus plumulosus* Claus, 1863, p. 174, pl. XXVI, figs. 15 & 16.

*Calocalanus plumulosus* Giesbrecht, 1893, p. 176, pls. 3, 9, 36.

*Calocalanus plumulosus* T. Scott, 1893, p. 39, pls. 1 & 6.

*Calocalanus plumulosus* Giesbrecht & Schmeil, 1898, p. 26.

*Calocalanus plumulosus* Wheeler, 1900, p. 170, fig. 8.

*Calocalanus plumulosus* A. Scott, 1902, p. 403.

*Calocalanus plumulosus* Thompson & Scott, 1903, p. 243.

*Calocalanus plumulosus* Wolfenden, 1905 (a), p. 999.

This *Calocalanus* appeared to be rather a rare species in the area investigated, and was only observed in the plankton collected at the following eleven stations.

Stat. 35. — Stat. 47<sup>b</sup>. — Stat. 75. — Stat. 121. — Stat. 146. — Stat. 148. — Stat. 184. — Stat. 217 (horizontal cylinder). — Stat. 271. — Stat. 282. — Stat. 304.

*Calocalanus plumulosus* is easily separated from *Calocalanus pavo*, by its three-jointed abdomen and asymmetrical furca. The left furcal joint is larger than the right, and it is not separated from the anal segment. The left furcal joint is furnished with a very long plumose seta, but this is seldom perfect in specimens taken in ordinary tow-net collections.

This species has a distribution somewhat similar to the previous one.

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## 4. Family PSEUDOCALANIDAE.

Genus **Clausocalanus** Giesbrecht, 1888.

This genus is distinguished from the other members of the family chiefly by the structure of the fifth pair of feet of both sexes. The fifth pair is symmetrical in the female and has

two free joints attached to the basal portion. In the male, the left foot is greatly elongated, and is composed of five joints. The right foot is very short and consists of one or three joints.

Two species belonging to this genus were represented in the 'Siboga' plankton.

1. *Clausocalanus arcuicornis* (Dana).

- Calanus arcuicornis* Dana, 1849, p. 12.  
*Clausocalanus arcuicornis* Giesbrecht, 1893, p. 186, pls. 1, 2, 10, 36.  
*Clausocalanus arcuicornis* T. Scott, 1893, p. 73, pl. 8.  
*Clausocalanus arcuicornis* Giesbrecht & Schmeil, 1898, p. 27.  
*Clausocalanus arcuicornis* I. C. Thompson, 1900, p. 277.  
*Clausocalanus arcuicornis* Wheeler, 1900, p. 171, fig. 9.  
*Clausocalanus arcuicornis* Cleve, 1901, p. 5.  
*Clausocalanus arcuicornis* Thompson & Scott, 1903, p. 243.  
*Clausocalanus arcuicornis* Farran, 1903, p. 11.  
*Clausocalanus arcuicornis* Cleve, 1903, p. 359.  
*Clausocalanus arcuicornis* Cleve, 1904, p. 188.  
*Clausocalanus arcuicornis* Esterly, 1905, p. 142, fig. 13.  
*Clausocalanus arcuicornis* Sars, 1905(a), p. 3.  
*Clausocalanus arcuicornis* Wolfenden, 1905(a), p. 999.  
*Clausocalanus arcuicornis* Pearson, 1906, p. 9.  
*Clausocalanus arcuicornis* Farran, 1908, p. 28.  
*Clausocalanus arcuicornis* van Breemen, 1908, p. 23, fig. 20.

This species was moderately common, and appeared to be generally distributed in the area investigated, as shewn by the following records.

- Stat. 16. — Stat. 19. — Stat. 35. — Stat. 36. — Stat. 47<sup>b</sup>. — Stat. 71. — Stat. 75. —  
 Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 112. — Stat. 118. —  
 Stat. 121. — Stat. 128. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 148. — Stat. 168. —  
 Stat. 174. — Stat. 185. — Stat. 203 (1500 metres to surface). — Stat. 205. — Stat. 213. —  
 Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). — Stat. 223. —  
 Stat. 224. — Stat. 225. — Stat. 230. — Stat. 243. — Stat. 276. — Stat. 282. — Stat. 315.

The females of *Clausocalanus arcuicornis*, are not unlike those of the next species. They are rather larger than *Clausocalanus furcatus*, and can be separated by the difference in the lengths of the segments of the abdomen and furcal joints. In this species the genital segment is longer than each of the next two segments. The furcal joints are about as long as broad.

This species has a wide distribution in the warm seas. It has also been recorded from the deep water of the Atlantic, off the West Coast of Ireland by G. P. FARRAN.

2. *Clausocalanus furcatus* (Brady).

- Drepanopus furcatus* Brady, 1883, p. 77, pls. IV & XXIV.  
*Clausocalanus furcatus* Giesbrecht, 1893, p. 186, pl. 36.  
*Clausocalanus furcatus* T. Scott, 1893, p. 72.  
*Clausocalanus furcatus* Giesbrecht, 1896, p. 318.  
*Clausocalanus furcatus* Giesbrecht & Schmeil, 1898, p. 27.  
*Clausocalanus furcatus* Cleve, 1901, p. 5.  
*Clausocalanus furcatus* A. Scott, 1902, p. 403.  
*Clausocalanus furcatus* Thompson & Scott, 1903, p. 244.

- Clausocalanus furcatus* Cleve, 1903, p. 360.  
*Clausocalanus furcatus* Cleve, 1904, p. 188.  
*Clausocalanus furcatus* Sars, 1905 (a), p. 3.  
*Clausocalanus furcatus* Wolfenden, 1905 (a), p. 999.

*Clausocalanus furcatus* appeared to be almost as widely distributed in the region traversed by the 'Siboga', as the previous species. The following is the record of the stations where it was noted.

Stat. 16. — Stat. 40. — Stat. 81. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 110. — Stat. 112. — Stat. 118. — Stat. 121. — Stat. 128. — Stat. 138. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 148. — Stat. 168. — Stat. 184. — Stat. 185. — Stat. 203 (surface). — Stat. 203 (1500 metres to surface). — Stat. 204. — Stat. 205. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). — Stat. 224. — Stat. 230. — Stat. 271. — Stat. 276. — Stat. 282. — Stat. 315.

The females of this *Clausocalanus*, are distinguished from those of *Clausocalanus arcuicornis*, by the genital segment being shorter than either of the next two segments, and by the furcal joints being twice as long as broad.

This species has a similar distribution in the great oceans as the previous one.

#### Genus *Oxycalanus* Farran, 1908.

This genus was established by G. P. FARRAN in 1908, for the reception of a Calanoid nearly related to *Spinocalanus*, but the possession of a strong bifurcate rostrum at once separates it from that genus.

A number of specimens of a form apparently belonging to this genus, were found in the 'Siboga' plankton. I was inclined at first, to regard them as identical with FARRAN'S species, but further consideration revealed some important differences, which appear worthy of specific rank.

Only one species belonging to this genus was observed.

#### 1. *Oxycalanus semispinus* nov. sp. Plate II, figs. 9—21.

Female — length 2.4 mm.

The *cephalothorax* is oblong ovate in dorsal view, and is slightly contracted in front. The head is completely fused with the first thoracic segment. The fourth and fifth thoracic segments are fused together. The lateral margins of the last segment are rounded, and slightly produced posteriorly. The rostrum is well defined, and is produced into two sharp points (Pl. II, fig. 11).

The abdomen is four-jointed, and is equal to rather more than one-third of the length of the *cephalothorax*. The genital segment is asymmetrical. This is due to a slight protuberance on the right side. It is equal to the combined length of the second and third segments. The third segment is slightly shorter than the second. The anal segment is equal to two-thirds of the length of the third segment. The furcal joints are slightly longer than broad, and are about as long as the anal segment.

The antennules are twenty-four-jointed and reach to the anal segment. The terminal joint is very small, and is furnished with one sensory filament.

The antennae, mandibles and maxillae, are similar to those of FARRAN's species (*Oxycalanus spinifer*).

The first and second pairs of maxillipedes also resemble those of *Oxycalanus spinifer*. The lower margin of the basal joint of the second pair of maxillipedes is furnished with a transverse row of short spines.

The first pair of swimming feet has a three-jointed exopodite, and a one-jointed endopodite shewing a faint trace of subdivision (Pl. II, fig. 17).

The second pair of swimming feet has a three-jointed exopodite, and a two-jointed endopodite. The second joint of the exopodite has one row, and the third joint two rows, of fine spines (Pl. II, fig. 18).

The third and fourth pairs of swimming feet have three-jointed exopodites and endopodites. The first joint of the basiopodite of the third pair of feet has two rows of fine spines on its surface. The surface of the second joint of the exopodite of the third pair of feet has one row, and the third joint two rows, of fine spines. The second and third joints of the endopodite of the third pair of feet, have each two rows of fine spines. The second joint of the exopodite of the fourth pair of feet has two rows of fine spines, and the third joint is well covered with fine spines. The endopodite of the fourth pair of feet has a similar spinulation to that of the third pair. The first basal joint of the fourth pair of feet has about six spines on the inner margin. There is a well defined row of long acicular spines traversing the posterior surface of the first joint of the basiopodite of the left foot only (Pl. II, fig. 21). The terminal spines of the second, third, and fourth pairs of feet, have finely serrate lamina.

The fifth pair is entirely absent.

Male unknown.

Occurrence — eighteen specimens of this Calanoid were found in collections taken at the following stations.

Stat. 118, 2 specimens. — Stat. 141, 4 specimens. — Stat. 143, 4 specimens. — Stat. 148, 2 specimens. — Stat. 185, 1 specimen. — Stat. 203 (1500 metres to surface), 2 specimens. — Stat. 230, 1 specimen. — Stat. 276, 2 specimens.

The species although bearing a general resemblance to *Oxycalanus spinifer* Farran, appears to differ from it in the following points: — The genital segment is asymmetrical and rather longer. The antennules are much longer. The first joint of the basiopodite of the left fourth foot only, is traversed with a single row of long acicular spines on the posterior surface. There are no spines on the second joint. FARRAN states that the second joint of the basiopodite of the fourth foot of *Oxycalanus spinifer*, has two transverse rows of long acicular spines, and does not refer to any armature on the first joint.

Genus **Monacilla** Sars, 1905 (*a*).

This genus was established by Professor G. O. SARS in 1905 for the reception of a Calanoid closely related to *Clausocalanus*. The characters which separate it from that genus are: — A more robust body with very short and thick rostral appendages: — The second

joint of the basiopodite of the second, third, and fourth pairs of swimming feet is not enlarged, and the surface of the endopodites of these feet is furnished with fine spines. The fifth pair of feet of the female is rudimentary.

A single specimen, unfortunately a male, but apparently possessing some of these characters, was found in one of the plankton collections taken by the 'Siboga', and is described below.

Only one representative of the genus was obtained.

1. *Monacilla dubia* nov. sp. Plate III, figs. 17—29.

Male — length 2,3 mm.

The *cephalothorax* is oblong ovate in dorsal view. It is considerably contracted in front, and is produced into a small knob. The head is separated from the first thoracic segment by a well defined suture. The fourth and fifth thoracic segments are fused together. The lateral margins of the last thoracic segment are rounded, and are very slightly produced posteriorly. The rostrum consists of two small blunt points.

The abdomen is composed of five segments, and is nearly equal to two-fifths of the length of the *cephalothorax*. The first four segments are of about equal length. The fifth segment is very small, and only about one-third of the length of the fourth segment. The furcal joints are rather longer than broad, and are about twice the length of the anal segment.

The antennules are composed of twenty joints, and reach to the end of the fourth abdominal segment. The eighth joint of the right antennule represents four fused joints, and the same joint of the left side represents five joints.

The antennae, mandibles and mandible palps, resemble those of *Oxycalanus semispinus*.

The maxillae and first pair of maxillipedes are also similar to those of *Oxycalanus semispinus*, with the exception, that the maxillae are somewhat rudimentary, and the claw lobe is absent.

The second pair of maxillipedes have long and slender second and third joints. The last three joints are very small.

The first four pairs of swimming feet are similar in structure to those of *Oxycalanus semispinus*, except in the following particulars: — There is no marginal spine on the first joint of the exopodite of the first pair of feet. There are no fine spines on the surface of the third and fourth joints of the exopodite of the second pair of feet. The exopodites, and endopodites, of the third and fourth pairs of feet, are furnished with surface spines as in *Oxycalanus semispinus*, but the method of arrangement is slightly different. The last joint of the exopodite of the fourth pair of feet has only two rows of spines. The first and second joints of the basiopodite of the fourth pair of feet are not furnished with acicular spines.

The fifth pair of feet is well developed. Each foot consists of a two-jointed basiopodite, and three free joints. The last free joint of each foot, is furnished at the apex with a moderately long curved spine. The right foot has a small rudimentary endopodite. The inner distal angle of the second joint of the basiopodite of the left foot, bears a long spine with a moderately stout base. The whole of the inner margin of the second free joint, and part of the inner margin of the third joint, is furnished with fine spines.

Only one specimen of this peculiar Calanoid was observed in all the 'Siboga' material. It was found in a HENSEN vertical net collection, from 1500 metres to the surface at Station 203.

This species is only doubtfully included in the genus *Monacilla*, as the males were unknown when Professor G. O. SARS described it. The preliminary description of the female, without figures, by that author, is insufficient to enable one to decide whether the male now described really belongs to this genus or not. I was at first inclined to regard it as the male of *Oxycalanus*, but its very small rostrum apparently separates it from that genus.

## 5. Family ÆTIDEIDAE.

### Genus Ætideus Brady, 1883.

The females of this genus are easily recognised by the very strong and bifurcate rostrum, by the highly arched forehead when seen in lateral view, and by the well pronounced spiniform projections of the last thoracic segment.

A considerable amount of doubt has arisen as to the identity of the species originally described by Professor BRADY, upon which the genus was founded in 1883. Professor G. O. SARS regards the species described by BRADY, to be identical with the Calanoid described by BOECK in 1872, as *Pseudocalanus armatus*. This view is probably partly correct, and will be dealt with later.

The genus was well represented in the plankton collected during the traverse of the 'Siboga', and one had no difficulty in separating the material into the three apparently distinct species described below.

#### 1. *Ætideus giesbrechti* Cleve. Plate IV, Figs. 1—13.

*Ætideus armatus* Giesbrecht, 1893, p. 213, pls. 2, 14, 36.

*Ætideus armatus* T. Scott, 1893 (pars), p. 70.

*Ætideus armatus* Giesbrecht & Schmeil, 1898 (pars), p. 31.

*Ætideus armatus* Giesbrecht, 1903, p. 200.

*Ætideus armatus* Wolfenden, 1903, p. 266.

*Ætideus armatus* Thompson & Scott, 1903 (pars), p. 244.

*Ætideus giesbrechti* Cleve, 1904, p. 185.

*Ætideus giesbrechti* Sars, 1905 (a), p. 3.

*Ætideus giesbrechti* Farran, 1908, p. 29.

This characteristic member of the genus was found in nine of the collections, and was apparently the most common type in the area investigated by the 'Siboga'. The following are the stations where it was noted.

Stat. 118, 4 specimens. — Stat. 128, 2 specimens. — Stat. 141, 10 specimens. — Stat. 142, 5 specimens. — Stat. 143, 10 specimens. — Stat. 185, 10 specimens. — Stat. 203 (1500 metres to surface), 8 specimens. — Stat. 220 (vertical net) 1 specimen — Stat. 276, 1 specimen.

There is no doubt, I think, that this is the species GIESBRECHT considered to be identical with BRADY'S *Ætideus armatus*, and is therefore the same Calanoid that was raised to specific rank by CLEVE in 1904. It is a very characteristic form and readily recognised. The forehead

is highly chitinized, and when viewed from the dorsal aspect, is seen to contract gradually to a blunt point. There is a distinct crest, and a large horny rostrum with a moderately deep excavation and slightly divergent points. There are two distinct knobs in the hollow of the rostrum as shewn by GIESBRECHT (Pl. IV, fig. 4). The last thoracic segment is highly chitinized, and is produced posteriorly into strong spines. The spines extend beyond the end of the second segment of the abdomen. The proportional lengths of the abdominal segments are distinctly different from those of the next two species. The combined length of the abdomen and furcal joints, is rather less than one-third of the length of the *cephalothorax* from the forehead to the base of the genital segment. The genital segment is about equal to the combined length of the next two segments. The second segment is about half the length of the genital segment. The third segment is about two-thirds the length of the second. The anal segment is as long as the second segment. The furcal joints are as long as the anal segment, and are about twice as long as broad.

Length of female 2.1 mm.

This species, when carefully looked for, will probably be found to have a moderately wide distribution in the warmer seas. I found examples of it on re-examining the plankton collected in the Gulf of Guinea by the 'Buccaneer' early in 1886, and also in the plankton collected by Professor HERDMAN during his traverse between England and Ceylon in 1902.

2. *Etideus armatus* (Boeck). Plate IV, Figs. 14—25.

- Pseudocalanus armatus* Boeck, 1872, p. 6.  
*Etideus armatus* Brady, 1883 (pars), p. 76.  
*Etideus armatus* T. Scott, 1893 (pars), p. 70.  
*Etideus armatus* Giesbrecht & Schmeil, 1898 (pars), p. 31.  
*Etideus armatus* T. Scott, 1901, p. 238.  
*Etideus armatus* Wolfenden, 1902 (pars), p. 364.  
*Etideus armatus* Sars, 1902, p. 25, pls. XIII & XIV.  
*Etideus tenuirostris* Wolfenden, 1903, p. 266.  
*Etideus tenuirostris* Wolfenden, 1904, p. 116.  
*Etideus armatus* Cleve, 1904, p. 185.  
*Etideus armatus* Sars, 1907 (a), p. 6.  
*Etideus armatus* Farran, 1908, p. 28.  
*Etideus armatus* van Breemen, 1908, p. 30, fig. 30.

This *Etideus*, although less common than the preceding species, had apparently a slightly wider distribution in the area traversed by the 'Siboga', as shewn by the following records.

Stat. 89, 8 specimen. — Stat. 118, 4 specimens. — Stat. 128, 3 specimens. — Stat. 141, 6 specimens. — Stat. 143, 2 specimens. — Stat. 203 (1500 metres to surface), 8 specimens. — Stat. 276, 3 specimens.

This particular type from the 'Siboga' collections, appears to be identical with the form described by BOECK, which was very fully illustrated and described by Professor G. O. SARS in 1902. It is quite distinct from the other two members of the genus described in this report. This species can be recognised by the following characters: — The forehead is not exceptionally strengthened with chitin, and when viewed from the dorsal aspect, the front margin appears evenly rounded. There is no trace of a crest, although the forehead appears boldly

arched when seen from the side. The rami of the rostrum are slender and sharply pointed, and the excavation is deeper than in the other two species (Pl. IV, fig. 17). The last thoracic spines extend to the end of the genital segment only, and are not greatly chitinized. The proportional lengths of the abdominal segments are very different from *Etideus giesbrechti*. The combined length of the abdomen and furca is slightly more than one-third of the total length of the *cephalothorax*, from the forehead to the base of the genital segment. The genital segment is distinctly longer than the combined length of the next two segments. The second, third, and fourth segments are of nearly equal length. The furcal joints are longer than the anal segment, and are about twice as long as broad.

Length of female 2 mm.

*Etideus armatus* appears to be widely distributed, if all the records be regarded as correct. Sars in the appendix to the volume on the Calanoids 'Crustacea of Norway', states, that he examined two of the 'Challenger' specimens, and could find no difference between them and the Norwegian forms. It was present in the plankton from the Gulf of Guinea, but I was unable to find it in the Ceylon material.

3. *Etideus bradyi* nov. sp. Plate V, figs. 1—12.

*Etideus armatus* Brady, 1883 (pars), p. 76, pl. X, figs. 5—16.

*Etideus armatus* T. Scott, 1893 (pars), p. 70.

*Etideus armatus* Giesbrecht & Schmeil, 1898 (pars), p. 31.

*Etideus armatus* Thompson & Scott, 1903 (pars), p. 224.

Female — length 1,8 mm.

In general appearance this species resembles *Etideus giesbrechti* but it can be distinguished both from that species, and from *Etideus armatus*, by the following characters: — Viewed from the dorsal aspect, the forehead is marked by a deep constriction just behind the front margin. A slight expansion is caused by the wide base of the rostrum, and the front margin appears to have a bluntly rounded, knob-like projection. In lateral view, the forehead is boldly arched, and a distinct chitinized crest is present. The rostrum is very large and horny, with a moderately deep excavation. The rami are slightly converged at the apex. The last thoracic segment is distinctly chitinized, and is produced into strong spines. The spines project to near the middle of the second abdominal segment. The combined length of the abdomen and furca, is slightly greater than one-third of the total length of the *cephalothorax*, from the forehead to the base of the genital segment. The genital segment is equal to the combined length of the next two segments. The second and fourth segments are of equal length, but the third segment is distinctly shorter than these two. The furcal joints are about as long as the anal segment, and are fully twice as long as broad.

The various appendages have a general resemblance to those of the previous species.

Occurrence — twenty-five specimens of this species were obtained from the plankton collected at the following stations.

Stat. 118, 2 specimens. — Stat. 128, 1 specimen. — Stat. 141, 4 specimens. — Stat. 143, 2 specimens. — Stat. 185, 4 specimens. — Stat. 203 (1500 metres to surface), 6 specimens. — Stat. 220 (vertical net), 2 specimens. — Stat. 276, 4 specimens.

I regard this species to be more closely related to the one originally illustrated in the 'Challenger' report as *Ætideus armatus*, than to the species now known as *Ætideus armatus* (Boeck). The very strong rostrum described and figured by BRADY, is a character not possessed by BOECK's species. The last thoracic spines in the 'Challenger' specimen, appear to have been shorter than in the present form, but I have noticed, that these chitinized spines are easily damaged, and perfect specimens with the spines complete, may not always be secured. With regard to the specimens from the 'Challenger' collection examined by SARS, and stated to be identical with BOECK's species: — It is quite possible, that more than one type of *Ætideus* was obtained by the 'Challenger', but the differences were not regarded as worthy of specific rank at that time, and the type from which BRADY's figures were drawn, might easily be distinct from those examined by SARS. I have found on re-examining the selected specimens from the Gulf of Guinea plankton, regarded to be identical with the type described in the 'Challenger' report, that all the three forms now figured were present. *Ætideus giesbrechti*, and the form now described as *Ætideus bradyi*, proved, on the re-examination of the selected specimens, to have been present in the plankton collected by Professor HERDMAN, on the way out to Ceylon.

WOLFENDEN (1903, p. 266) refers to a species, *Æt. bradyi* (Brady), but I am unable to identify it. BRADY has not named a species of *Ætideus* after himself.

#### Genus **Bradyidius** Giesbrecht, 1897.

This genus is closely related to *Ætideus*, but differs from it in the less highly developed rostrum, and by the endopodite of the second pair of swimming feet being distinctly two-jointed.

One species belonging to this genus was found in the plankton collected during the traverse of the 'Siboga'. The specimens differ in some minor details from SARS figures of the northern type but, I have, for the present, decided to regard them as simply tropical examples of *Bradyidius armatus*.

#### 1. *Bradyidius armatus* (Brady). Plate VI, figs. 1—11.

*Pseudocalanus armatus* Brady, 1878, non Boeck 1872, Vol. 1, p. 46, pl. IV.

*Undinopsis bradyi* Sars, 1884 (name only).

*Bradyanus armatus* Vanhoffen, 1897, p. 322.

*Bradyidius armatus* Giesbrecht & Schmeil, 1898, p. 32.

*Bradyidius armatus* T. Scott, 1898, p. 264, pl. XII, figs. 1—19.

*Bradyidius armatus* T. Scott, 1899, p. 248.

*Bradyidius armatus* I. C. Thompson, 1900, p. 278.

*Bradyidius armatus* T. Scott, 1900, p. 383.

*Bradyidius armatus* T. Scott, 1901, p. 238.

*Bradyidius armatus* T. Scott, 1901 (a), p. 350.

*Undinopsis bradyi* Sars, 1902, p. 32, pls. XIX & XX.

*Bradyidius armatus* I. C. Thompson, 1903, p. 16.

*Bradyidius armatus* Wolfenden, 1904, p. 111.

*Bradyidius armatus* Wolfenden, 1905 (a), p. 1005.

*Bradyidius armatus* Farran, 1905, p. 31.

*Bradyidius armatus* Pearson, 1906, p. 11.

*Bradyidius armatus* T. Scott, 1906(a), p. 298.

*Bradyidius armatus* van Breemen, 1908, p. 31, fig. 31.

Female — length 1.7 mm.

The *cephalothorax* seen from above appears oval fusiform in outline, with both extremities about equally narrowed. Viewed laterally it is seen to be moderately arched, with the forehead obtusely truncated, and produced into a small bifurcate rostrum with divergent points. The last thoracic segment is produced posteriorly into moderately strong spines, which scarcely reach to the end of the genital segment. The combined length of the abdomen and furca is equal to slightly less than one-third of the total length of the *cephalothorax*, from the front margin to the base of the genital segment. The genital segment is nearly as long as the combined length of the next three segments. The second segment is longer than the third. The third and fourth segments are of nearly equal length. The furcal joints are about as long as the anal segment, and are slightly longer than broad. The posterior margin of the genital segment is furnished with a fringe of fine spines.

The various appendages are similar to the figures given by Sars in the 'Crustacea of Norway'.

The 'Siboga' specimens differ from the Norwegian form in size, and in the length of the spines of the last thoracic segment. Sars states that the spines reach beyond the genital segment. I have compared the 'Siboga' specimens with examples found in plankton collected in the Firth of Clyde, and with the exception of the smaller size, there appears to be no material difference between them. This can be seen on comparing the figures now given, with those in the 'Sixteenth Annual Report of the Fishery Board for Scotland' (1898). Dr. R. N. Wolfenden records a form obtained from plankton collected around the Maldives, under the name *Bradyidius armatus*, which is probably identical with the species now figured. Wolfenden's specimens were even smaller than those obtained from the 'Siboga' plankton, but unfortunately no figures are given by that author, to enable a comparison to be made.

This species was only represented by three specimens in the plankton collected during the traverse of the 'Siboga'. The specimens were obtained at the following stations.

Stat. 141, HENSEN vertical net, 1500 metres to surface, 2 specimens.

Stat. 276, HENSEN vertical net, 750 metres to surface, 1 specimen.

#### Genus *Ætideoopsis* Sars, 1903.

The genus *Ætideoopsis* approaches *Ætideus* in general appearance, but is easily distinguished, by the fourth and fifth thoracic segments being completely separated.

Only one species is known. Specimens not differing materially from the description and figures given by Professor G. O. Sars were found in the 'Siboga' plankton. I have, therefore, placed them under *Ætideoopsis rostrata* for the present.

1. *Ætideoopsis rostrata* Sars. Plate V, figs. 13—24.

*Ætideoopsis rostrata* Sars, 1903, p. 160, pls. IV & V (suppl.).

*Ætideoopsis rostrata* van Breemen, 1908, p. 33, fig. 35.

Six specimens apparently identical with this species, were obtained from the following deep water samples of plankton.

Stat. 141, HENSEN vertical net, 1500 metres to surface, 2 specimens.

Stat. 143, HENSEN vertical net, 1000 metres to surface, 2 specimens.

Stat. 148, HENSEN vertical net, 1000 metres to surface, 2 specimens.

The specimens agree in almost every detail, with the description and figures given by SARS. The minor points of difference are: — The external margins of the rostrum are more concave, and the excavation between the rami is much narrower than is shewn by SARS' figure. The specimens are also smaller, being 3,5 mm. instead of 4,4 mm. as given by SARS.

The distribution of this species appears to be very limited. It has hitherto only been observed in the North Atlantic Ocean. I have recently been able to compare specimens of the northern type, sent by my father, which he obtained in plankton collected in the deep water of the Farøe Channel, by the Scottish International Fisheries Cruiser 'Goldseeker'. I do not see any material difference between the North Atlantic form, and the 'Siboga' specimens.

#### Genus *Chiridius* Giesbrecht, 1893.

I follow GIESBRECHT's definition of this genus, which was established for the reception of a Calanoid without a trace of a rostrum, and having the last thoracic segment produced into spines.

SARS in the first portion of his volume on the Calanoida 'Crustacea of Norway', included two species possessing a distinct rostrum, under this genus. One of the species, however, was removed to the genus *Gaidius*, on the publication of the supplementary part of the Calanoida.

G. P. FARRAN (1908) follows SARS in including *Euchaeta armata* Boeck, under the genus *Chiridius*, and says, 'The fact that GIESBRECHT originally defined the genus as not having a rostrum should not in itself have any weight'. This is surely a mistaken view, and if pursued to any extent, would lead to endless confusion in all systems of classification. I regard the original definition, so far as the rostrum is concerned, as final, and think that *Euchaeta armata* Boeck, ought rightly to be excluded. WOLFENDEN (1903) has already done this, and has established a new genus, *Pseudactideus*, for its reception, which is the most satisfactory solution.

Three species, apparently all distinct, agreeing with GIESBRECHT's definition, were found in the plankton collected during the traverse of the 'Siboga'. In the absence of males, one has considerable doubt of course, as to whether the various forms ought to be regarded as really distinct, or only varieties. All the females examined, had the endopodite of the second pair of swimming feet composed of a single joint with a faint thickening, indicating where a joint may have been at some time.

#### 1. *Chiridius poppei* Giesbrecht. Plate XI, figs. 10—17.

*Chiridius poppei* Giesbrecht, 1893, p. 224, pls. 14 & 36.

*Chiridius poppei* Giesbrecht & Schmeil, 1898, p. 33.

*Chiridius poppei* Cleve, 1904, p. 187.

*Chiridius poppei* Sars, 1905(a), p. 3.

*Chiridius poppei* van Breemen, 1908, p. 34, fig. 36.

The specimens included under this species, so far as can be made out from the few figures given by GIESBRECHT, appear to agree fairly well with *Chiridius poppei*. The *cephalothorax* viewed from above, is moderately robust and oblong ovate in form. The anterior margin is slightly contracted and a little produced in the middle. The spines of the last thoracic segment project slightly beyond the middle of the genital segment. The combined length of the abdomen and furca, is almost equal to one-third of the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is rather longer than the second segment. The second segment is nearly as long as the third and fourth together. The anal segment is about half the length of the third segment. The furcal joints are slightly longer than the anal segment, and are a little longer than broad. The terminal spine of the exopodite of the fourth pair of feet has twenty-six teeth.

Length of the female, 1,8 mm.

Occurrence — six specimens were found in plankton collected at the following stations.

Stat. 128, HENSEN vertical net, 700 metres to surface, 1 specimen.

Stat. 141, HENSEN vertical net, 1500 metres to surface, 1 specimen.

Stat. 142, 1 specimen.

Stat. 148, HENSEN vertical net, 1000 metres to surface, 1 specimen.

Stat. 185, HENSEN vertical net, 1536 metres to surface, 1 specimen.

Stat. 276, HENSEN vertical net, 750 metres to surface, 1 specimen.

2. *Chiridius* ? *gracilis* Farran. Plate XI, figs. 1—9.

*Chiridius poppei* Farran, 1905, p. 35.

*Chiridius gracilis* Farran, 1908, p. 30, pl. II, figs. 1—3.

The specimens of this form are only doubtfully regarded as FARRAN'S species. They are less robust than those recorded as *Chiridius poppei*, and the abdomen is not so slender as in FARRAN'S *Chiridius gracilis*.

Female — length 2,4 mm.

Viewed dorsally, the *cephalothorax* appears less robust than in the previous species, and although considerably contracted, the frontal margin of the forehead is quite rounded. The spines of the last thoracic segment are produced distinctly beyond the middle of the genital segment. The combined length of the abdomen and furca, slightly exceeds one-third of the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The second segment is very slightly longer than the third segment. The anal segment is equal to fully half of the length of the third segment. The furcal joints are about as long as broad, and are scarcely as long as the anal segment. The terminal spine of the exopodite of the fourth pair of feet has twenty-two teeth.

Occurrence — four specimens were found at the following stations.

Stat. 141, HENSEN vertical net, 1500 metres to surface, 1 specimen.

Stat. 142, 1 specimen.

Stat. 143, HENSEN vertical net, 1000 metres to surface, 1 specimen.

Stat. 148, HENSEN vertical net, 1000 metres to surface, 1 specimen.

3. *Chiridius* ? *obtusifrons* Sars. Plate XLIV, figs. 1—3.

*Chiridius armatus* Sars (non Boeck) 1900, p. 64, pl. XVII.

*Chiridius obtusifrons* Sars, 1902, p. 29, pl. XVII.

*Chiridius obtusifrons* van Breemen, 1908, p. 34, fig. 37.

A single specimen that I am inclined to regard as identical with Sars' *Chiridius obtusifrons*, was found in the plankton taken in a HENSEN vertical net haul at Station 141, 1500 metres to surface.

The specimen differs, however in the following details: — The length is 2,6 mm. and the various appendages are the same as in the species identified as *Chiridius poppei*. The exopodite of the second, third, and fourth pairs of swimming feet in the 'Siboga' specimen, is distinctly three-jointed as in the other *Chiridius* illustrated in this report. The combined length of the abdomen and furca, is contained about two and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment.

The very short spines of the last thoracic segment although not divergent, appear to agree very well with the figure given by Sars, and this is the chief reason for supposing, that the specimen may only be a tropical variation of the type from the Coast of Norway.

Genus **Chirundina** Giesbrecht, 1895.

The female of this genus is allied to *Euchirella* and *Undeuchaeta*. The rostrum is moderately long and one pointed. The forehead has a distinct crest. The last thoracic segment is produced on each side into a small knob. The exopodite of the first pair of swimming feet is indistinctly three-jointed, and the inner margin of the first joint of the basiopodite of the fourth feet is without spines. The fifth pair of feet is absent.

The male was described and partly figured for the first time by C. O. ESTERLY. It differs from the female in the last thoracic segment not being produced into knobs. The abdomen is composed of five joints. The exopodite of the first pair of feet is distinctly three-jointed, and there is a well developed prehensile fifth pair of feet.

Only one species is known. It was well represented in the plankton collected by the 'Siboga'.

1. *Chirundina streetsi* Giesbrecht. Plate XII, figs. 1—11.

*Chirundina streetsii* Giesbrecht, 1895, p. 250, pl. I, figs. 5—10.

*Chirundina streetsi* Giesbrecht & Schmeil, 1898, p. 34.

*Euchirella carinata* Wolfenden, 1902, p. 366.

*Euchirella carinata* Wolfenden, 1904, p. 115.

*Chirundina streetsi* Cleve, 1904, p. 187.

*Chirundina streetsi* Sars, 1905 (a), p. 4.

*Chirundina streetsi* Esterly, 1906, p. 59, pls. 9, 10, 12, 14.

*Chirundina streetsi* Pearson, 1906, p. 16.

*Chirundina streetsi* Farran, 1908, p. 37.

*Chirundina streetsi* van Breemen, 1908, p. 46.

*Chirundina streetsi* appears to be a moderately deep water form, and was found in several of the vertical net hauls, as shewn by the records.

Stat. 128, 1 specimen. — Stat. 141, 8 specimens. — Stat. 142, 10 specimens. — Stat. 143, 1 specimen. — Stat. 148, 2 specimens. — Stat. 177<sup>a</sup>, 1 specimen. — Stat. 185, 1 specimen. — Stat. 203 (1500 metres to surface), 2 specimens. — Stat. 230, 3 specimens. — Stat. 243, 6 specimens. — Stat. 276, 20 specimens.

There are slight differences between the figures of the fifth pair of feet of the male given by ESTERLY, and that shewn in this report. The exopodite of the right foot in the 'Siboga' males appears to be only two-jointed. There is no secondary process at the junction of the second and third joints of the exopodite of the left foot. The third joint of the left exopodite terminates in a simple spine.

Length of female 4,8—5,3 mm. Length of male 4,1 mm.

Fifty females and five males were obtained from the 'Siboga' plankton.

*Chirundina streetsi* appears to have a wide distribution. It has been obtained in the warm seas of the tropics, and in the deep water of the North Atlantic, as far north as the Farøe Channel.

#### Genus *Gaetanus* Giesbrecht, 1888.

The members of this genus are distinguished from those belonging to the other genera of the family *Ætideidae*, by the possession of a distinct median spine on the front of the forehead. The rostrum is short and stated to be one pointed, but all the species from the 'Siboga' collections, except one, shew a distinct attempt of bifurcation at the apex. The posterior margin of the first basal joint of the second maxillipedes, is furnished with a lamella. I think too much is made of the shape of this lamella in the different species of the genus, as it appears to be very soft and, therefore, easily distorted.

Adult males of this genus appeared to be unknown, until the discovery of one by C. O. ESTERLY which he described in 1906.

Seven species belonging to the genus *Gaetanus* were found in the 'Siboga' plankton.

#### 1. *Gaetanus miles* Giesbrecht. Plate VIII, figs. 1—8.

*Gaetanus miles* Giesbrecht, 1888, p. 335.

*Gaetanus miles* Giesbrecht, 1893, p. 219, pls. 14 & 36.

*Gaetanus miles* Giesbrecht & Schmeil, 1898, p. 32.

*Gaetanus miles* I. C. Thompson, 1903, p. 17.

*Gaetanus miles* Cleve, 1904, p. 191.

*Gaetanus miles* Sars, 1905 (a), p. 3.

*Gaetanus miles* Pearson, 1906, p. 14.

*Gaetanus miles* Farran, 1908, p. 36.

*Gaetanus miles* van Breemen, 1908, p. 39, fig. 42.

The whole of the specimens of this species were found in plankton collected with the HENSEN vertical net at the following stations.

Stat. 118 (900 metres to surface). — Stat. 128 (700 metres to surface). — Stat. 141 (1500 metres to surface). — Stat. 148 (1000 metres to surface). — Stat. 185 (1536 metres to surface). — Stat. 230 (2000 metres to surface). — Stat. 276 (750 metres to surface).

*Gaetanus miles* is easily distinguished from the other species, by the great length of the antennules. The antennules are fully twice as long as the entire animal, from the apex of the frontal spine to the end of the furca. The frontal spine is very prolonged, and when viewed laterally, is seen to taper uniformly from the base to the apex. The spines of the last thoracic segment extend beyond the middle of the genital segment. The combined length of the abdomen and furca, is slightly less than one-fourth of the total length of the *cephalothorax*, from the apex of the cephalic spine to the base of the genital segment. The rostrum is slightly bifid at the apex. The lamella on the basal joint of the second maxillipedes, has a bluntly rounded apex, and a very slight excavation. The exopodite of the first pair of feet is two-jointed, with a very faint line across the middle of the first joint. The first joint of the basiopodite of the fourth pair of feet, is furnished with about twelve strong short spines on its inner distal angle.

Seven specimens, all females, were found. Length 4.3 mm.

This species has been recorded from the Atlantic and Pacific Oceans. G. P. FARRAN has met with it in the deep water plankton taken off the West Coast of Ireland.

The 'Siboga' specimens of this *Gaetanus*, appear to differ slightly from GIESBRECHT'S type, in their larger size, and in possessing twelve instead of six spines on the inner margin of the first basal joint of the fourth feet.

2. *Gaetanus armiger* Giesbrecht. Plate VIII, figs. 16—22.

*Gaetanus armiger* Giesbrecht, 1888, p. 335.

*Gaetanus armiger* Giesbrecht, 1893, p. 219, pls. 14 & 36.

*Gaetanus armiger* T. Scott, 1893, p. 71, pl. 8, figs. 16—27.

*Gaetanus armiger* I. C. Thompson, 1903, p. 17.

*Gaetanus armiger* Cleve, 1904, p. 191.

*Gaetanus armiger* Wolfenden, 1904, p. 111.

*Gaetanus armiger* Sars, 1905 (a), p. 4.

*Gaetanus armiger* Pearson, 1906, p. 14.

*Gaetanus armiger* van Breemen, 1908, p. 39, fig. 44.

This species appeared to be very rare in the 'Siboga' plankton and was only noted at two stations as shewn.

Stat. 118, 1 specimen. — Stat. 215<sup>a</sup>, 1 specimen.

Some care is required to identify this *Gaetanus*, as two species very like it in general appearance, have been described within recent years.

The antennules extend to the anal segment. The frontal spine is very small and can, only with difficulty, be observed when the copepod is viewed from the dorsal aspect. The spines of the last thoracic segment extend beyond the middle of the genital segment. The combined length of the abdomen and furca, is equal to one-third of the total length of the *cephalothorax*, from the apex of the frontal spine to the base of the genital segment. The rostrum is small and is distinctly bifid at the apex. I was unable to detect the lamella on the basal joint of the second maxillipedes. The exopodite of the first pair of feet is distinctly three-jointed. The first joint of the basiopodite of the fourth pair of feet is furnished with a number of fine bristles along its inner margin.

Only two females were found. Length 3.5 mm.

The 'Siboga' specimen that was dissected, and is illustrated in this report, agrees very well with GIESBRECHT's description. I do not attach much importance to the apparent absence of the lamella on the basal joint of the second maxilliped, as it is evidently very small and will, therefore, be easily folded up.

*Gaetanus armiger* has a similar distribution to *Gaetanus miles*, but does not appear, so far, to have been taken in the deep water off the West Coast of Ireland.

3. *Gaetanus caudani* Canu. Plate VIII, figs. 9—15.

*Gaetanus caudani* Canu, 1896, p. 422.

*Gaetanus caudani* Giesbrecht & Schmeil, 1898, p. 33.

*Gaetanus pileatus* Farran, 1903, p. 16, pl. XVII, fig. 1—11.

*Gaetanus caudani* Wolfenden, 1904, p. 114, pl. IX, figs. 20, 22.

*Gaetanus pileatus* Farran, 1905, p. 33.

*Gaetanus caudani* Sars, 1905 (a), p. 4.

*Gaetanus caudani* Pearson, 1906, p. 13.

*Gaetanus unicornis* Esterly, 1906, p. 57, pls. 9, 12, 13.

*Gaetanus pileatus* Farran, 1908, p. 35.

*Gaetanus caudani* van Breemen, 1908, p. 42, fig. 48.

*Gaetanus caudani* was obtained from plankton collected with the HENSEN vertical net at the following stations.

Stat. 118 (900 metres to surface). — Stat. 128 (700 metres to surface). — Stat. 143 (1000 metres to surface). — Stat. 230 (2000 metres to surface). — Stat. 276 (750 metres to surface).

This *Gaetanus*, at first sight, looks like a large form of *Gaetanus miles*, but on careful examination can readily be separated.

The antennules are equal to one and a half times the length of the body, from the apex of the cephalic spine to the end of the furca. They extend beyond the furca by the last seven joints. The frontal spine is greatly prolonged, and viewed laterally, there is seen to be a sudden change in the continuity of the outline, between the base and the apex. The spines of the last thoracic segment reach to the middle of the genital segment. The combined length of the abdomen and furca is distinctly less than one-fourth of the total length of the *cephalo-thorax*, from the apex of the frontal spine to the base of the genital segment. The genital segment is nearly as long as the combined lengths of the next three segments. The furcal joints are about as long as broad, and are as long as the anal segment. The posterior margin of the first three abdominal segments is fringed with fine spines. The rostrum is small and is very faintly bifid at the apex. The lamella on the basal joint of the second maxillipedes is narrowed at the apex and deeply excavated. The exopodite of the first pair of feet is two-jointed, with a very faint line across the middle of the first joint. The first joint of the basio-podite of the fourth pair of feet, is furnished with a number of fine bristles on its inner margin.

Five specimens, all females, of this *Gaetanus* were found. Length 6 mm.

CANU's description although given from an immature specimen, agrees fairly well with the species now described. The 'Caudan' specimen was apparently an immature female, otherwise

I do not think the first joint of the basiopodite of the fourth pair of feet would possess the armature described by CANU. The three-jointed exopodite of the first pair of feet in *Gaetanus caudani*, is the only noteworthy difference between that species, and the form now dealt with. The three-jointed exopodite might easily be changed, and the rudimentary fifth pair of feet be suppressed at the final ecdysis.

I regard FARRAN'S *Gaetanus pileatus* to be identical with CANU'S *Gaetanus caudani*. FARRAN'S type specimen was obtained from the stomach of a mackerel, and even a very short exposure to the gastric juices would bring about some changes in the appearance of the copepod. The only difference between FARRAN'S figures and those now given, appears to be in the setting of the cephalic spine, and this is probably due to the cause mentioned. Some weight is given to the view that *Gaetanus pileatus* is the same as *Gaetanus caudani* by the fact that *Oöthrix bidentata* Farran (1905), is identical with *Neoscolecithrix koehleri* Canu (1896), and both these copepods have been taken in some quantity, in the plankton collected from the deep water of the Faröe Channel, by the Scottish International Fisheries Cruiser 'Goldseeker'. I have compared the Faröe Channel form of long spined *Gaetanus* with *Gaetanus caudani* of this report, and can find no difference between them.

ESTERLY'S *Gaetanus unicornis* is, I think, clearly identical with *Gaetanus caudani* Canu.

*Gaetanus caudani* has apparently a wide distribution, extending from the deep water of the Malay Archipelago to the Faröe Channel.

4. *Gaetanus minor* Farran. Plate IX, figs. 1—8.

*Gaetanus minor* Farran, 1905, p. 34, pl. V, figs. 1—11.

*Gaetanus minor* Pearson, 1906, p. 14.

*Gaetanus minor* Farran, 1908, p. 37.

*Gaetanus minor* van Breemen, 1908, p. 41, fig. 46.

This *Gaetanus* was obtained from plankton collected with the HENSEN vertical net at the following two stations.

Stat. 141 (1500 metres to surface). — Stat. 276. (750 metres to surface).

*Gaetanus minor* is not unlike a small form of *Gaetanus armiger*, and without careful examination, may be easily overlooked.

The antennules reach to the middle of the abdomen. The cephalic spine is somewhat similar to that of *Gaetanus armiger*, but it is distinctly longer and more conspicuous when viewed from the dorsal surface. The spines of the last thoracic segment extend nearly to the end of the genital segment. The combined length of the abdomen and furca, is contained about three and a half times in the total length of the *cephalothorax*, from the apex of the cephalic spine to the base of the genital segment. The genital segment slightly exceeds the combined length of the second and third segments. The rostrum is small and does not appear to be divided at the apex. The lamella on the basal joint of the second maxillipedes is bluntly rounded at the apex and slightly excavated. The exopodite of the first pair of feet is two-jointed, with no trace of a division across the first joint. The first joint of the basiopodite of the fourth pair of feet, is furnished with a very few bristles on its inner margin.

Three specimens, all females, of this species were found. Length 2.3 mm.

With the exception of the slightly longer antennules, I see no difference between the 'Siboga' specimens, and the figures given by FARRAN.

*Gaetanus minor* has hitherto only been known from the North Atlantic Ocean.

5. *Gaetanus kruppii* Giesbrecht. Plate IX, figs. 9—15 (female). Plate X, figs. 1—9 (male).

*Gaetanus kruppii* Giesbrecht, 1903, p. 202, pls. 7 & 8.

*Gaetanus major* Wolfenden, 1903(a), p. 125.

*Gaetanus major* Wolfenden, 1904, p. 114, pl. IX, figs. 7 & 8.

*Gaetanus kruppi* Sars, 1905(a), p. 4.

*Gaetanus major* Farran, 1905, p. 33.

*Gaetanus major* Pearson, 1906, p. 14.

*Gaetanus clarus* Esterly, 1906, p. 57, pls. 9 & 14.

*Gaetanus brevicornis* Esterly, 1906, p. 56, pls. 9 & 12.

*Gaetanus major* Farran, 1908, p. 36.

*Gaetanus major* van Breemen, 1908, p. 40, fig. 45.

*Gaetanus kruppi* van Breemen, 1908, p. 41, fig. 47.

All the specimens obtained by the 'Siboga', were found in plankton collected with the HENSEN vertical net at the following stations.

Stat. 118 (900 metres to surface). — Stat. 141 (1500 metres to surface). — Stat. 143 (1000 metres to surface). — Stat. 243 (1000 metres to surface). — Stat. 276 (750 metres to surface).

Female. This *Gaetanus* is not unlike a large example of *Gaetanus armiger*, but it can be distinguished from that species on careful examination.

The antennules extend beyond the end of the furca, by the last two-joints. The cephalic spine is small, but quite visible when the copepod is seen from the dorsal aspect. The spines of the last thoracic segment are very small, and are only about one-third of the length of the genital segment. The combined length of the abdomen and furca, is distinctly less than one-third of the total length of the *cephalothorax*, from the apex of the frontal spine to the base of the genital segment. The genital segment is considerably longer than the combined length of the next two segments. The furcal joints are about as long as broad, and are shorter than the anal segment. The rostrum is small and is distinctly bifid at the apex. The lamella on the ventral margin of the first joint of the second maxillipedes is distinctly pointed and deeply excavated. The exopodite of the first pair of feet is distinctly three-jointed. The first joint of the basiopodite of the fourth pair of feet is furnished with a number of fine bristles on its inner margin. Four specimens were found. Length 5.7 mm.

Adult male. This resembles the female in general appearance, but the antennules are shorter, and the proportional lengths of the abdominal segments are different.

The antennules extend slightly beyond the middle of the abdomen, and are furnished with a number of sensory organs placed along the dorsal margin of the first or basal half. The frontal spine is stronger than in the female, and the frontal margin of the head when viewed from the side is seen to have a distinct swelling. The spines of the last thoracic segment are short. The combined length of the abdomen and furca, is equal to about one-third of the total

length of the *cephalothorax*, from the apex of the frontal spine to the base of the genital segment. The first, third, and fourth segments of the abdomen are of about equal length. The second segment is decidedly longer than the others. The fifth segment is very short. The rostrum is distinctly bifid at the apex. The mouth organs are considerably modified, and the mandible is without a toothed biting part. The first basal joint of the second maxilliped does not appear to have any trace of a lamella. The exopodite of the first pair of feet is distinctly three-jointed, and the last joint is furnished with a small spine on the middle of its outer margin. The first joint of the basiopodite of the fourth pair of feet has no bristles on its inner margin. The fifth pair of feet is moderately large and prehensile and has rudimentary endopodites. The right exopodite is two-jointed. The apical portion of the second joint is spiniform and very faintly articulated. The left exopodite is apparently composed of three joints. The apical half of the last joint is spiniform and slightly articulated. The endopodite of the right foot is of moderate size and faintly two-jointed. The apical half is large and triangular in shape. The endopodite of the left foot is short and rod shaped.

Two specimens were obtained, but one was immature. Length of mature male 5,6 mm.

I regard WOLFENDEN'S *Gaetanus major*, to be identical with GIESBRECHT'S *Gaetanus kruppii*. WOLFENDEN'S description appeared in a report, 'Plankton of the Farøe Channel', by G. H. FOWLER, and was read at a meeting of the Zoological Society, London, on February 3rd, 1903. Volume I, part 1, of the proceedings of the Zoological Society, containing papers read in January and February, is dated June 1903. *Gaetanus kruppii* is described by GIESBRECHT in a report by S. LO BIANCO, published in Mittheilungen aus der Zoologischen Station zu Neapel, 16 Band, 1 & 2 Heft, which bears the date April 30, 1903. GIESBRECHT'S description therefore, appears to be the first that was published.

The species described by ESTERLY in 1906, as *Gaetanus brevicornis*, appears to be the same as *Gaetanus major*, WOLFENDEN, and is therefore identical with GIESBRECHT'S *Gaetanus kruppii*. The only apparent difference is that ESTERLY'S species possesses a lamella, and *Gaetanus major* is described as having no lamella on the first basal joint of the second maxilliped. I have examined a number of specimens of a *Gaetanus* from the deep water of the Farøe Channel, which agree in all points with WOLFENDEN'S *Gaetanus major*, except that they have a lamella. I think it is extremely probable that the lamella in WOLFENDEN'S preparation had been accidentally folded under the joint, and so overlooked.

*Gaetanus clarus* Esterly, is the same as the male described above, which I regard to be the male of *Gaetanus kruppii*.

*Gaetanus kruppii* is evidently widely distributed, and is not uncommon in the deep water of the North Atlantic.

6. *Gaetanus latifrons* G. O. Sars. Plate X, figs. 10—17.

*Gaetanus latifrons* Sars, 1905 (a), p. 11.

*Gaetanus holti* Farran, 1905, p. 33, pl. VI, figs. 1, 12.

*Gaetanus longispinus* Wolfenden, 1905, p. 7, pl. III.

*Gaetanus latifrons* Pearson, 1906, p. 14.

*Gaetanus latifrons* Farran, 1908, p. 36.

*Gaetanus latifrons* van Breemen, 1908, p. 39, fig. 43.

One specimen of *Gaetanus latifrons*, was obtained from the plankton collected with the HENSEN vertical net at Station 276 (750 metres to surface). This species is easily distinguished from the other known *Gaetanus*, by the peculiar form of the forehead and cephalic spine, when seen in lateral view.

The antennules extend beyond the furca by at least three joints. The frontal spine is prolonged and when viewed laterally, is seen to be slightly curved upwards. The forehead seen from the side, is wide and truncate, with a slight crest extending from the base of the spine to beyond the middle of the frontal margin. The spines of the last thoracic segment extend beyond the middle of the genital segment. The combined length of the abdomen and furca is equal to one-third of the total length of the *cephalothorax*, from the apex of the cephalic spine to the base of the genital segment. The genital segment is nearly as long as the combined length of the next three segments. The third segment is distinctly smaller than any of the others. The rostrum is distinctly bifid at the apex but the points are not symmetrical. The lamella on the base of the first joint of the second maxilliped appears to be quite pointed. The preparation made from the 'Siboga' specimen is slightly distorted, and the lamella is folded over the surface of the joint. The exopodite of the first pair of feet is distinctly three-jointed, and the first joint is furnished with an outer-edge spine. The first joint of the basipodite of the fourth pair of feet, is furnished with a number of moderately long and strong bristles on its inner distal angle. Length of female, 5.4 mm.

There appears to be no difference between the specimen obtained from the Malay Archipelago, and the figures given by FARRAN.

*Gaetanus latifrons* has been recorded from the North Atlantic Ocean by SARS, and almost at the same time by FARRAN and WOLFENDEN. FARRAN described it as *Gaetanus holti*, and WOLFENDEN as *Gaetanus longispinus*.

7. *Gaetanus hamatus* nov. sp. Plate IX, figs. 16—22.

Female — length 5.4 mm.

Seen from above, the body is moderately robust with a broadly rounded forehead. Viewed laterally, the cephalic spine is seen to be very small, and similar to that of *Gaetanus kruppii*. The spines of the last thoracic segment are very short and stout. The spines are pointed at almost a right angle, in the dorsal direction from the segment.

The abdomen is composed of four segments. The combined length of the abdomen and furca is equal to one-third of the total length of the *cephalothorax*, from the apex of the cephalic spine to the base of the genital segment. The genital segment is slightly longer than the second segment. The third segment is rather smaller than any of the others. The anal segment is as long as the genital segment. The furcal joints are slightly longer than broad, and are fully half as long as the anal segment.

The rostrum is small and the apex is distinctly bifid.

The antennules are twenty-four-jointed, and extend beyond the furca by the last three joints.

The antennae, mandibles, maxillae, and first maxillipedes are nearly similar to those of *Gaetanus latifrons*.

The lamella on the basal joint of the second maxilliped, appears to be similar to that of *Gaetanus latifrons*, but the preparation was slightly damaged during dissection, and the apex of the lamella was destroyed.

The exopodite of the first pair of feet is incompletely three-jointed. The division across the middle of the first joint, although fairly well defined, does not appear to pass right through.

The inner margin of the first joint of the basiopodite of the fourth pair of feet, is furnished with seven short spines.

The fifth pair of feet is absent.

Two specimens were obtained from the plankton collected with the HENSEN vertical net at Station 276 (750 metres to surface).

It is only with some hesitation that I describe the above species as new. Both specimens although well developed are not quite mature. The narrowly rounded last thoracic segment with its short, stout and almost upright spines when seen in lateral view, may help to identify it when mixed up with other species of *Gaetanus*.

#### Genus *Gaidius* Giesbrecht, 1895.

This genus is distinguished from the other members of the family by the short one-pointed rostrum. The exopodite of the first pair of feet in the female is composed of two joints. The inner margin of the first joint of the basiopodite of the fourth pair of feet is without armature. The male has a well developed prehensile fifth pair of feet. The exopodite of the first pair of feet appears to be indistinctly three-jointed in some specimens.

Two species were obtained from the 'Siboga' material.

#### 1. *Gaidius similis* (T. Scott). Plate VII, figs. 1—11.

*Euchaeta hessei* var. *similis* T. Scott, 1893 (male only), p. 58, pl. VI, figs. 24, 25.

*Gaidius pungens* Giesbrecht, 1895, p. 249, pl. 1, figs. 1—4.

*Gaidius pungens* Giesbrecht & Schmeil, 1898, p. 32.

*Euchaeta similis* Giesbrecht & Schmeil, 1898, p. 52.

*Chiridius tenuispinus* Sars, 1900, p. 67, pl. XVIII.

*Chiridius tenuispinus* Sars, 1902, p. 30, pl. XVIII.

*Gaidius tenuispinus* Sars, 1903, p. 162, pl. VI (suppl.), fig. 1.

*Gaidius pungens* I. C. Thompson, 1903, p. 17.

*Euchaeta hessei* var. *similis*, I. C. Thompson, 1903, p. 18.

*Gaidius pungens* Wolfenden, 1904, p. 112, pl. IX, fig. 43.

*Gaidius pungens* Esterly, 1905, p. 146, fig. 15.

*Gaidius tenuispinus* Farran, 1905, p. 33.

*Gaidius tenuispinus* Pearson, 1906, p. 13.

*Gaidius pungens* Pearson, 1906, p. 12.

*Gaidius tenuispinus* Farran, 1908, p. 32.

*Gaidius tenuispinus* van Breemen, 1908, p. 36, fig. 39.

*Gaidius similis* appeared to be rather rare in the plankton collected during the traverse of the 'Siboga', and was only obtained at the following stations.

Stat. 66, 1 specimen. — Stat. 141, 2 specimens. — Stat. 142, 1 specimen. — Stat. 203 (Hensen vertical net), 1 specimen. — Stat. 245, 1 specimen. — Stat. 252, 1 specimen.

One female and six males were found. Female — length 3 mm. Male — length 2,87 mm.

The species described by my father from the Gulf of Guinea in 1893 as *Euchaeta hessei* var. *similis*, appears to be undoubtedly the male of the form described by Giesbrecht in 1895 as *Gaidius pungens*, from females only. *Gaidius pungens* Giesbrecht, will therefore, necessarily, give way to *Gaidius similis* (T. Scott). The fifth pair of feet of the male figured in the 'Report on Entomostraca from the Gulf of Guinea', only differs from that shewn in the present report, by the absence of the endopodite of the left foot. This no doubt, is due to the fact that the endopodite lies close to the exopodite, and may easily become folded under it. I find too, that the exopodite of the first pair of feet in some of the males may be very indistinctly three-jointed, according to the state of maturity.

I regard the form described by Sars as *Gaidius (Chiridius) tenuispinus*, that has been recorded by FARRAN, PEARSON, and VAN BREEMEN, from the North Atlantic, to be identical with this species.

The first joint of the exopodite of the right foot of the males from the 'Siboga' material, has a lamella-like process on the middle of the inner margin, which may be very easily overlooked.

The species apparently has a wide distribution.

2. *Gaidius notacanthus* Sars. Plate XXI, figs. 24—33.

*Gaidius notacanthus* Sars, 1905 (a), p. 9.

*Gaidius notacanthus* Farran, 1908, p. 33, pl. III, fig. 7.

One specimen, a male, apparently belonging to this species was found in plankton collected with the HENSEN vertical net at Station 148, 1000 metres to surface. Length 5,9 mm.

The fifth pair of feet agrees fairly well with the figure given by FARRAN, except that the second joint of the right exopodite is shorter, but this may be due to accident or slight immaturity.

The records by Sars and FARRAN appear to be all that is known of the distribution of this species.

Genus **Gaidiopsis** nov.

Forehead without cephalic spine, with short one-pointed rostrum. The fourth and fifth thoracic segments are completely separated, and the fifth segment is produced into strong lateral spines. The abdomen is composed of four joints. The antennules are twenty-four-jointed. The antennae, mandibles, maxillae and maxillipedes, are almost similar to those of *Gaidius*. The exopodite of the first pair of feet is distinctly three-jointed. The second, third and fourth pairs of feet are similar to those of *Gaidius*. The endopodite of the second pair is distinctly two-jointed.

This new genus resembles *Aetideopsis*, in the complete segmentation of the fourth and fifth thoracic segments, and the distinctly three-jointed exopodite of the first pair of feet. It also resembles *Gaidius* in the short one-pointed rostrum.

Only one species was observed and the male is unknown.

1. *Gaidiopsis crassirostris* nov. sp. Plate VII, figs. 12—22.

Female — length 3 mm.

Seen from above, the *cephalothorax* is oblong ovate and moderately robust. The frontal part is considerably contracted, and the frontal margin is produced into a rounded knob. The head is fused with the first thoracic segment. The fifth thoracic segment is distinctly separated from the fourth, and is produced into strong lateral spines, which project beyond the middle of the genital segment. The rostrum is short and very stout, without a trace of bifurcation.

The combined length of the abdomen and furca, is rather less than one-third of the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is broad and slightly swollen below. It is as long as the combined length of the next two segments. The second and fourth segments are of about equal length. The third segment is distinctly shorter than the others. The furcal joints are nearly twice as long as broad, and are as long as the anal segment.

The antennules are twenty-four-jointed, and extend to the end of the furca.

The antennae, mandibles, maxillae and maxillipedes, are similar to those of the genus *Gaidius*.

The exopodite of the first pair of feet is distinctly three-jointed, and the first joint is furnished with one outer-edge spine.

The second, third, and fourth pairs of feet are similar in structure to those of *Gaidius*. The endopodite of the second pair of feet is distinctly two-jointed. The first joint of the basipodite of the third and fourth pairs of feet is furnished with a number of fine hairs on the inner margin.

The fifth pair of feet is absent.

Occurrence. — One female was found in plankton collected with the HENSEN vertical net at Station 203, 1500 metres to the surface.

The species is easily recognised by its very swollen one-pointed rostrum, and by the complete segmentation of the fourth and fifth thoracic segments.

Genus **Euchirella** Giesbrecht, 1888.

Head with or without a crest. Rostrum one spined or absent. Last thoracic segment rounded or pointed. The endopodite of the antennae is usually shorter than the exopodite. The first joint of the basipodite of the fourth pair of swimming feet of the female, is furnished with one or more spines on the inner margin.

Eleven species belonging to this genus were found in the plankton collected by the 'Siboga', three of which appear to be undescribed.

1. *Euchirella amoena* Giesbrecht.

*Euchirella amoena* Giesbrecht, 1888, p. 336.

*Euchirella amoena* Giesbrecht, 1893, p. 233, pls. 15 & 36.

*Euchirella amoena* Giesbrecht & Schmeil, 1898, p. 36.

*Euchirella amoena* Esterly, 1905, p. 155, fig. 21.

A single specimen, a male, undoubtedly belonging to this species was found in the plankton collected with the HENSEN vertical net at Station 128, 700 metres to surface.

*Euchirella amoena* appears to be only known from the Pacific Ocean.

2. *Euchirella hessei* (Brady).

*Euchaeta hessei* Brady, 1883, p. 63, pl. XXIII.

*Euchirella bella* Giesbrecht, 1888, p. 336.

*Euchirella bella* Giesbrecht, 1893, p. 233, pl. 15.

*Euchirella bella* Giesbrecht & Schmeil, 1898, p. 35.

*Euchirella rostrata* Thompson & Scott, 1903, p. 244.

*Euchirella bella*, var. *indica* Wolfenden, 1905(a), p. 1006, pl. XCVI.

This was the most common member of the genus in the plankton collected during the traverse of the 'Siboga', and was found at the following stations.

Stat. 117<sup>a</sup>, 1 specimen. — Stat. 118 (HENSEN vertical net 900 metres to surface), 2 specimens. — Stat. 128 (HENSEN vertical net 700 metres to surface), 2 specimens. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 12 specimens. — Stat. 142, 4 specimens. — Stat. 177<sup>a</sup>, 4 specimens. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 3 specimens. — Stat. 203 (HENSEN vertical net 1500 metres to surface), 3 specimens. — Stat. 230 (HENSEN vertical net 2000 metres to surface), 1 specimen. — Stat. 252, 6 specimens.

I regard the species described by BRADY in the 'Challenger Report' as *Euchaeta hessei*, and the figures given on Plate XXIII, to be identical with the form described by GIESBRECHT as *Euchirella bella*. BRADY'S figure of the first joint of the basiopodite of the fourth pair of feet shews four spines, although he states 'about five very broad and strong spines' in the description. *Euchirella rostrata* has a row of six or seven triangular *lamellae* on the first joint of the basiopodite of the fourth pair of feet. *Euchirella hessei*, with one exception, was obtained in plankton collected by the 'Challenger' in the Pacific Ocean. GIESBRECHT has recorded it from the Pacific Ocean only. *Euchirella rostrata*, with the exception of the record by ESTERLY, is only known from the Mediterranean, and North Atlantic Ocean. The species recorded in the Ceylon Report by I. C. THOMPSON and the present writer, from Stat. 21 (off Minikoi) and Stat. 23 (Maldives to Gulf of Manaar), has proved on re-examination to be identical with *Euchirella bella*, and therefore the same as *Euchirella hessei* (Brady).

I find that the number of spines on the first joint of the basiopodite of the fourth pair of feet vary from three to four, instead of four, as stated by GIESBRECHT and SCHMEIL. The two innermost spines apparently fuse in some cases and form one large spine, thus giving rise to three spines, one of which is decidedly larger than the others, instead of one large and three smaller spines.

I see nothing to distinguish WOLFENDEN'S variety *indica* from the specimens collected by the 'Siboga'.

The form described by BRADY as the male of *Euchaeta hessei* and CLEVE'S male of *Euchirella rostrata* (1900), both appear to be identical, but the fifth pair of feet is quite distinct from that of a true *Euchirella*.

3. *Euchirella curticauda* Giesbrecht.

- Euchirella curticauda* Giesbrecht, 1888, p. 336.  
*Euchirella curticauda* Giesbrecht, 1893, p. 233, pls. 15 & 36.  
*Euchirella curticauda* Giesbrecht & Schmeil, 1898, p. 36.  
*Euchirella curticauda* I. C. Thompson, 1903, p. 18.  
*Euchirella curticauda* var. *atlantica* Wolfenden, 1904, p. 116.  
*Euchirella curticauda* Sars, 1905 (*a*), p. 4.  
*Euchirella curticauda* Farran, 1905, p. 35.  
*Euchirella curticauda* Esterly, 1906, p. 59, pls. 9, 10, 12, 13.  
*Euchirella curticauda* Pearson, 1906, p. 15.  
*Euchirella curticauda* Farran, 1908, p. 38.  
*Euchirella curticauda* van Breemen, 1908, p. 48, fig. 54.

Seven specimens, all females, were found in plankton collected with the HENSEN vertical net at the following stations.

- Stat. 118 (900 metres to surface), 1 specimen. — Stat. 128 (700 metres to surface), 1 specimen. — Stat. 141 (1500 metres to surface), 2 specimens. — Stat. 185 (1536 metres to surface), 1 specimen. — Stat. 230 (2000 metres to surface), 1 specimen. — Stat. 276 (750 metres to surface), 1 specimen.

*Euchirella curticauda* is easily distinguished from the other species of *Euchirella*, by the high crest on the forehead, by the absence of a rostrum, by the very short abdomen and symmetrical genital segment, and by the row of twelve to thirteen teeth on the inner margin of the first joint of the basiopodite of the fourth pair of feet.

This species is widely distributed from the deep water of the Pacific Ocean to the North Atlantic. I have seen a number of specimens from the deep water of the Farøe Channel, and they do not differ in any way from those collected by the 'Siboga' in the Malay Archipelago.

4. *Euchirella galeata* Giesbrecht.

- Euchirella galeata* Giesbrecht, 1888, p. 336.  
*Euchirella galeata* Giesbrecht, 1893, p. 233, pls. 15 & 16.  
*Euchirella galeata* Giesbrecht & Schmeil, 1898, p. 36.  
*Euchirella galeata* Sars, 1905 (*a*), p. 4.  
*Euchirella galeata* Esterly, 1905, p. 155, fig. 22.  
*Euchirella galeata* Farran, 1908, p. 37.

Twenty females and two immature males were found in the plankton collected at the following stations.

- Stat. 71, 3 specimens. — Stat. 118 (HENSEN vertical net 900 metres to surface), 1 specimen. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 1 specimen. — Stat. 142, 2 specimens. — Stat. 143 (HENSEN vertical net 1000 metres to surface), 1 specimen. — Stat. 148 (HENSEN vertical net 1000 metres to surface), 2 specimens. — Stat. 203 (HENSEN vertical net 1500 metres to surface), 4 specimens. — Stat. 230 (HENSEN vertical net 2000 metres to surface), 4 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 2 specimens. — Stat. 276 (HENSEN vertical net 750 metres to surface), 2 specimens.

This species can be readily recognised by its high crest, and by the presence of a rostrum. The inner margin of the first joint of the basiopodite of the fourth pair of feet is furnished with one or two moderately long teeth

*Euchirella galeata* has a similar distribution to *Euchirella curticauda*, and has been obtained from the deep water of the Farøe Channel.

5. *Euchirella messinensis* (Claus).

- Undina messinensis* Claus, 1863, p. 187, pl. XXXI.  
*Euchirella messinensis* Giesbrecht, 1893, p. 232, pls. 15 & 36.  
*Euchirella messinensis* Canu, 1896, p. 424.  
*Euchirella messinensis* Giesbrecht & Schmeil, 1898, p. 35.  
*Euchirella messinensis* Giesbrecht, 1903, p. 201.  
*Euchirella messinensis* Thompson & Scott, 1903, p. 244.  
*Euchirella messinensis* Cleve, 1904, p. 190.  
*Euchirella messinensis* Sars, 1905(a), p. 4.  
*Euchirella messinensis* Esterly, 1905, p. 151, fig. 18.  
*Euchirella messinensis* Farran, 1908, p. 37.

Nine females and six males of this *Euchirella* were found in plankton collected at the following stations.

- Stat. 118 (HENSEN vertical net 900 metres to surface), 1 specimen. — Stat. 133, 1 specimen. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net 1000 metres to surface), 2 specimens. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 2 specimens. — Stat. 203 (HENSEN vertical net 1500 metres to surface), 3 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 3 specimens. — Stat. 276. — (HENSEN vertical net 750 metres to surface), 1 specimen.

The females of this species have a rostrum but no crest. The genital segment is asymmetrical, and has a peculiar sack-like projection on the dorsal surface. The inner margin of the first joint of the basiopodite of the fourth pair of feet is furnished with one or two teeth.

*Euchirella messinensis* has been recorded from the Mediterranean, North Atlantic and Pacific Oceans.

6. *Euchirella pulchra* (Lubbock).

- Undina pulchra* Lubbock, 1856, pp. 2 & 20, pls. IV & VII.  
*Euchaeta pulchra* Brady, 1883, (pars) p. 63, pl. XX.  
*Euchirella pulchra* Giesbrecht, 1893, p. 233, pls. 15 & 36.  
*Euchaeta pulchra* T. Scott, 1893, p. 57.  
*Euchirella pulchra* Giesbrecht & Schmeil, 1898, p. 36.  
*Euchirella pulchra* I. C. Thompson, 1903, p. 17.  
*Euchirella pulchra* Sars, 1905(a), p. 4.  
*Euchirella pulchra* Esterly, 1905, p. 153, fig. 20.  
*Euchirella pulchra* van Breemen, 1908, p. 47, fig. 53.

This *Euchirella* was represented by twenty-eight females, and nine males, obtained from the plankton collected at the following stations.

- Stat. 117<sup>a</sup>, 1 specimen. — Stat. 118 (HENSEN vertical net 900 metres to surface), 4 specimens. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 4 specimens. — Stat. 142, 5 specimens. — Stat. 143 (HENSEN vertical net 1000 metres to surface), 4 specimens. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 2 specimens. — Stat. 203 (HENSEN vertical net 1500 metres to surface), 6 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 4 specimens. — Stat. 276 (HENSEN vertical net 750 metres to surface), 2 specimens.

The female is distinguished by its low crest and small rostrum. The genital segment is asymmetrical. The inner margin of the first joint of the basiopodite of the fourth pair of feet is furnished with one or two moderately long teeth.

*Euchirella pulchra* has been recorded from the Atlantic and Pacific Oceans.

7. *Euchirella venusta* Giesbrecht.

*Euchirella venusta* Giesbrecht, 1888, p. 336.

*Euchirella venusta* Giesbrecht, 1893, p. 233, pls. 15 & 36.

*Euchirella venusta* Giesbrecht & Schmeil, 1898, p. 35.

*Euchirella venusta* Cleve, 1904, p. 190.

*Euchirella venusta* Sars, 1905 (a), p. 4.

Nineteen females of this *Euchirella* were obtained from the plankton collected at the following stations.

Stat. 117<sup>a</sup>, 3 specimens. — Stat. 118 (HENSEN vertical net 900 metres to surface), 1 specimen. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net 1000 metres to surface), 1 specimen. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 2 specimens. — Stat. 203 (HENSEN vertical net 1500 metres to surface), 4 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 1 specimen. — Stat. 276 (HENSEN vertical net 750 metres to surface), 2 specimens. — Stat. 315, 1 specimen.

*Euchirella venusta* is closely related to *Euchirella messinensis*, but may be distinguished from it by the absence of the sack-like projection on the dorsal surface of the genital segment. The inner margin of the first joint of the basiopodite of the fourth pair of feet is furnished with one or two moderately long spines.

This species has been recorded from the Atlantic and Pacific Oceans.

8. *Euchirella maxima* Wolfenden. Plate XII, figs. 12—20.

*Euchirella maxima* Wolfenden, 1905, p. 18, pl. VI, figs. 9, 11.

*Euchirella maxima* Farran, 1908, p. 38.

Adult female — length 7.2 mm.

The *cephalothorax* is oblong ovate, moderately robust and slightly contracted in front. The head is fused with the first thoracic segment. It is furnished with a high triangular crest and a small rostrum. The fourth and fifth thoracic segments are completely separated. The last thoracic segment is produced into a lamelliform process on each side.

The abdomen is four-jointed. The combined length of the abdomen and furca is contained four and a half times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The genital segment is symmetrical and only very slightly swollen below. It is as long as the combined lengths of the next three segments. The second, third, and fourth segments are of about equal length. The furcal joints are as broad as long, and are slightly longer than the anal segment. The posterior margins of the first, second, and third segments, are fringed with fine spines.

The antennules are twenty-four-jointed and extend to the end of the furca.

The endopodite of the antennae is about equal to one-third of the length of the exopodite.

The second joint of the basiopodite of the maxillae is furnished with one long seta and two short ones on its distal angle. The exopodite is furnished with eleven long setae and the endopodite with three.

The mandibles and maxillipedes resemble those of *Euchirella rostrata*.

The exopodite of the first pair of feet is indistinctly three-jointed, and is furnished with three marginal spines. The endopodite is short and one-jointed.

The exopodite of the second pair of feet is three-jointed and the endopodite one-jointed.

The third and fourth pairs of feet have a three-jointed exopodite and endopodite. The first joint of the basiopodite of the fourth pair of feet is furnished with one strong tooth on its inner margin (Plate XII, 19—20).

Only two specimens, one of which was immature, were obtained from plankton collected at the following stations.

Stat. 148, HENSEN vertical net 1000 metres to surface, 1 mature female.

Stat. 276, HENSEN vertical net 750 metres to surface, 1 immature female.

I have been unable to detect any difference between the mature female obtained by the 'Siboga', and the description and figures given by Dr. WOLFENDEN.

*Euchirella maxima* has hitherto only been known from the North Atlantic Ocean.

9. *Euchirella granulata* nov. sp. Plate XIII, figs. 1—12.

Female — length 5,5 mm.

The *cephalothorax* is oblong ovate and very robust. The head is distinctly separated from the first thoracic segment. It is without a crest, but has a short one-pointed rostrum. The fourth and fifth thoracic segments are completely separated. The last thoracic segment is very slightly produced, and the distal margins are narrowly rounded when seen in lateral view.

The abdomen is composed of four joints. The combined length of the abdomen and furca is contained three and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is symmetrical with broadly rounded lateral margins, and is greatly swollen below. It is about as broad as long, and exceeds the combined length of the next three segments. The second and third segments are of about equal size. The third segment is distinctly shorter than the others. The furcal joints are about as broad as long, and are slightly shorter than the anal segment. The posterior portions of the genital segment, and the whole of the second, third, and fourth segments are well covered with fine hairs.

The antennules are twenty-four-jointed, and extend beyond the end of the furca.

The endopodite of the antennae is about three-fourths of the length of the exopodite, and bears eight + seven setae on the apical joint.

The mandibles have a strongly toothed cutting edge. The first joint of the endopodite is furnished with two setae.

The second joint of the basiopodite of the maxillae is furnished with five setae on its apex. The exopodite is furnished with eleven long setae. The endopodite is apparently indistinctly

jointed, and is furnished with groups of seven + four + four setae from the apex downwards.

The maxillipedes are similar in structure to those of *Euchirella rostrata*.

The exopodite of the first pair of feet is distinctly three-jointed, and each joint is furnished with an outer-edge seta. The endopodite is composed of one joint.

The exopodite of the second pair of feet is three-jointed, and the endopodite is distinctly two-jointed.

The third and fourth pairs of feet have a three jointed exopodite and endopodite. The first joint of the basiopodite of the fourth pair of feet is furnished with a transverse row of fine bristles on its inner margin (Plate XIII, fig. 12).

The fifth pair of feet is absent.

The whole of the integument, with the exception of that of the mandible-palps, maxillae, and first maxillipedes, is covered with fine granulations.

Occurrence. — One female was found in plankton collected with the HENSEN vertical net at Station 185, 1536 metres to surface.

10. *Euchirella dentata* nov. sp. Plate XIII, figs. 13—21.

Female — length 7,5 mm.

The *cephalothorax* is oblong ovate and rather robust. The head is distinctly separated from the first thoracic segment. It is without a crest but has a conspicuous one-pointed rostrum. The fourth and fifth thoracic segments are completely separated. The last thoracic segment is produced into small spines, which, when viewed laterally, are seen to be pointed slightly upward (Plate XIII, fig. 15).

The abdomen is composed of four joints. The combined length of the abdomen and furca is contained three and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is slightly asymmetrical, being rather more swollen on the right side than on the left. It is longer than broad and exceeds the combined length of the next three segments. The second segment is about half the length of the genital segment. The third and fourth segments are of about equal length and are about half the length of the second. The furcal joints are about as long as broad, and are as long as the anal segment. The posterior margins of the first, second, and third segments are fringed with fine spines. The whole of the dorso-lateral surface of the abdominal segments and furca, is covered with short hairs.

The antennules are twenty-four-jointed and extend to the end of the furca.

The endopodite of the antennae is equal to three-fifths of the length of the exopodite. The apical joint bears eight + seven setae.

The mandibles, maxillae, and maxillipedes are similar to those of *Euchirella granulata*.

The exopodite of the first pair of feet is indistinctly three-jointed.

The exopodite of the second pair of feet is three-jointed. The endopodite is very indistinctly two-jointed.

The third and fourth pairs of feet have a three-jointed exopodite and endopodite. The first joint of the basiopodite of the fourth pair of feet is furnished with seven or eight moderately

long and strong spines on the inner margin. Fig. 21, Plate XIII shews eight spines and represents the left foot. The first joint of the basiopodite of the right foot has seven spines.

The fifth pair of feet is absent.

Occurrence. — Two females were found in plankton collected with the HENSEN vertical net at Station 185, 1536 metres to surface.

11. *Euchirella dubia* nov. sp. Plate XIV, figs. 1—7.

Female — length 7 mm.

The *cephalothorax* is oblong ovate and moderately robust. The head is distinctly separated from the first thoracic segment. It is without a crest but has a conspicuous rostrum. The apex of the rostrum is faintly bifurcate. The fourth and fifth thoracic segments are completely separated. The last thoracic segment is not produced, and is simply rounded off into the abdomen.

The abdomen is composed of four segments. The combined length of the abdomen and furca is distinctly less than one-fourth of the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is slightly asymmetrical in outline and is rather swollen below. It is nearly as long as broad at the widest part, and is rather longer than the combined length of the next two segments. The second segment is longer than the third. The third and fourth segments are of about equal length. The furcal joints are about half as long as broad, and are as long as the anal segment. The posterior dorso-lateral portions of the abdominal segments are clothed with fine short hairs.

The antennules are twenty-four-jointed and extend to the end of the furca.

The antennae, mandibles, maxillae, and maxillipedes are similar to those of *Euchirella dentata*.

The exopodite of the first pair of feet is indistinctly three-jointed, and is furnished with three outer-edge spines, as in the other species described above.

The exopodite of the second pair of feet is three-jointed. The endopodite is distinctly two-jointed.

The third and fourth pairs of feet have a three-jointed exopodite and endopodite. The first joint of the basiopodite of the fourth pair of feet, is furnished with a row of eight or ten spines. Fig. 7, Plate XIV shews ten spines. The first joint of the basiopodite of the other foot has eight spines.

The fifth pair of feet is absent.

Occurrence. — Three females were found in plankton collected with the HENSEN vertical net at Station 185, 1536 metres to surface.

It is quite possible that one or more of the species now described as new, may turn out to be identical with species obtained by Sars in the plankton collected by the Prince of Monaco, but as only the preliminary descriptions without figures have yet appeared, I am unable to determine whether this is so or not at present.

Genus **Undeuchaeta** Giesbrecht, 1888.

This genus is closely allied to *Euchirella*, but the females are distinguished from those

of that genus, by the absence of spines or teeth on the inner margin of the first joint of the basiopodite of the fourth pair of feet. The rostrum is one-spined, and the exopodite of the first pair of feet is two-jointed.

Three species, one of which appears to be new, were found in the plankton collected during the traverse of the 'Siboga'.

1. *Undeuchaeta major* Giesbrecht.

*Undeuchaeta major* Giesbrecht, 1888, p. 335.

*Undeuchaeta major* Giesbrecht, 1893, p. 227, pl. 37.

*Undeuchaeta major* Giesbrecht & Schmeil, 1898, p. 34.

*Undeuchaeta major* I. C. Thompson, 1900, p. 278.

*Scolecithrix cristata* I. C. Thompson, 1903 (pars), p. 21, pl. III, male.

*Undeuchaeta major* Wolfenden, 1904, p. 111.

*Undeuchaeta major* Cleve, 1904, p. 198.

*Undeuchaeta major* Farran, 1905, p. 35.

*Undeuchaeta major* Esterly, 1905 (pars), p. 148, fig. 16 (pars).

*Chirundina angulata* Sars, 1905 (a), p. 13.

*Undeuchaeta major* Pearson, 1906, p. 15.

*Undeuchaeta major* Sars, 1907 (a), p. 3.

*Undeuchaeta major* Farran, 1908, p. 37.

*Undeuchaeta major* van Breemen, 1908 (pars), p. 43, fig. 49 (pars).

Four specimens, all females, of this *Undeuchaeta* were found in the plankton collected at the following stations.

Stat. 117<sup>a</sup>. — Stat. 141 (HENSEN vertical net 1500 metres to surface). — Stat. 148 (HENSEN vertical net 1000 metres to surface). — Stat. 230 (HENSEN vertical net 2000 metres to surface).

The female of this species is distinguished from the others by the presence of a distinct and moderately high crest, by a blunt projection on the right side of the genital segment, and also by the hook on the right side of the genital opening.

*Undeuchaeta major* was first described from the Pacific Ocean, but the distribution has since been found to extend to the North Atlantic.

The 'Siboga' specimens measured 4.8—6.4 mm.

I regard the male of the species recorded by the late I. C. THOMPSON as *Scolecithrix cristata* from plankton collected during the cruise of the 'Oceana', to be the male of *Undeuchaeta major*. It is not the male of *Scaphocalanus magnus* (T. Scott). I recently had the opportunity of examining a male Copepod taken during one of the cruises of the Scottish International Fisheries Cruiser 'Goldseeker', in the deep water of the Farøe Channel. This Copepod has a similar armature on the fifth pair of feet to that shewn by THOMPSON (1903 pl. III, fig. 5), and appears to be identical with *Undeuchaeta major*. The specimen has a median crest and a one-pointed rostrum.

The form identified and illustrated by ESTERLY (1905 p. 148, fig. 16), as the male of *Undeuchaeta major*, is, I think, very doubtfully so. ESTERLY gives the length of the female as 4.5—5.5 mm. and the male as 6—6.5 mm. It is very unusual to find the males of the Calanoids so much larger than the females. The figure of the left fifth foot resembles that of a species of *Paraechaeta*.

GIESBRECHT and SCHMEIL doubtfully refer the two species described by BRADY in the 'Challenger Report', as *Euchaeta australis* and *Euchaeta pulchra*, to *Undeuchaeta major*, but I regard them to be identical with the form described by GIESBRECHT as *Undeuchaeta minor*, and more correctly with LUBBOCK'S *Undina plumosa*.

2. *Undeuchaeta plumosa* (Lubbock). Plate XXII, figs. 1—8.

- Undina plumosa* Lubbock, 1856, p. 18, pl. IX, figs. 3—5.  
*Euchaeta australis* Brady, 1883, p. 65, pl. XXI, figs. 5—11.  
*Euchaeta pulchra* Brady (pars) non Lubbock, 1883, p. 63, pl. XIV, figs. 6—9.  
*Undeuchaeta minor* Giesbrecht, 1888, p. 335.  
*Undeuchaeta minor* Giesbrecht, 1893, p. 228, pls. 14 & 37.  
*Euchaeta australis* T. Scott, 1893, p. 58, pl. VI, fig. 23.  
*Undeuchaeta minor* Canu, 1896, p. 424.  
*Undeuchaeta minor* Giesbrecht & Schmeil, 1898, p. 34.  
*Undina plumosa* Giesbrecht & Schmeil, 1898, p. 52.  
*Undeuchaeta minor* Thompson & Scott, 1903, p. 243.  
*Undeuchaeta minor* Wolfenden, 1904, p. 111.  
*Undeuchaeta minor* Cleve, 1904, p. 198.  
*Undeuchaeta minor* Farran, 1905, p. 35.  
*Undeuchaeta minor* Esterly, 1905, p. 149, fig. 17.  
*Undeuchaeta australis* Sars, 1905 (a), p. 4.  
*Undeuchaeta minor* Pearson, 1906, p. 15.  
*Undeuchaeta minor* Sars, 1907 (a), p. 3.  
*Undeuchaeta minor* Farran, 1908, p. 37.  
*Undeuchaeta minor* van Breemen, 1908, p. 44, fig. 50.

This species was well represented in the plankton collected by the 'Siboga'. Thirty-nine females and eleven males were obtained at the following stations.

- Stat. 117<sup>a</sup>, 1 specimen. — Stat. 118 (HENSEN vertical net 900 metres to surface), 3 specimens. — Stat. 128 (HENSEN vertical net 700 metres to surface), 5 specimens. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 4 specimens. — Stat. 142, 2 specimens. — Stat. 143 (HENSEN vertical net 1000 metres to surface), 6 specimens. — Stat. 189<sup>a</sup>, 1 specimen. — Stat. 203 (HENSEN vertical net 1500 metres to surface), 4 specimens. — Stat. 216, 1 specimen. — Stat. 230 (HENSEN vertical net 2000 metres to surface), 7 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 6 specimens. — Stat. 245, 4 specimens. — Stat. 276 (HENSEN vertical net 750 metres to surface), 5 specimens.

The female of *Undeuchaeta plumosa* is distinguished from *Undeuchaeta major*, by the absence of any trace of a median crest on the forehead, and also by the absence of the hooked spine on the ventral surface of the genital segment of the female.

I think there can be no doubt, after giving careful consideration to LUBBOCK'S description and figures, that the species described in the Transactions of the Zoological Society for 1856, as *Undina plumosa*, is identical with the male of *Euchaeta australis* Brady, and represents the missing male of GIESBRECHT'S *Undeuchaeta minor*. LUBBOCK'S name *plumosa* ought, therefore, to be adopted as the specific name for this *Undeuchaeta* instead of either *australis* or *minor*.

The species described and figured in the 'Challenger Report' as the female of *Euchaeta pulchra* Lubbock, is really the female of *Euchaeta australis* which I consider is identical with *Undeuchaeta minor* and to be the true female of *Undeuchaeta (Undina) plumosa*. GIESBRECHT

and SCHMEL doubtfully refer the two species described by BRADY to *Undeuchaeta major*, but I fail to see any reason for this. Neither BRADY's descriptions or figures indicate the presence of a median crest on the forehead, or of a hooked spine on the ventral surface of the genital segment. These two characters are quite obvious in the 'Siboga' specimens of the female of *Undeuchaeta major*. It is extremely unlikely that BRADY would overlook the median crest, had it been present in the 'Challenger' specimens. The hook at the genital opening might be broken, as I have noticed it to be slightly damaged in some of the 'Siboga' specimens, but none had the median crest damaged in any way. The dorso-lateral spine, on the right of the genital segment when seen from above, is not always visible when the female is lying perfectly flat on its left side, and it cannot be seen at all when lying perfectly flat on the right side. A slight movement one way or the other, from the true lateral position is sufficient to bring the spine into view. This would account for its absence in the figure on Plate XXI, and its presence in the figure on Plate XIV. The view of the furcal joints in the latter figure shews quite well, that the specimen was not lying perfectly flat. The absence of the median crest is of more importance than the want of the spine. Female — length 3,5—4,5 mm.

The fifth pair of feet of the males found in the 'Siboga' plankton is identical with the figures given by LUBBOCK and by BRADY. The right and left sides have been reversed in the figure in the 'Challenger Report'.

The exopodite of the right and left foot is three-jointed. The endopodite of the right foot is apparently two-jointed. The endopodite of the left foot is only one-jointed. The second joint of the left exopodite is furnished with a strong spine on its inner distal angle. The middle of the inner margin of the third joint bears a tuft of setae. The apex of the joint is prolonged into a spine.

The exopodite of the first pair of feet is distinctly three-jointed, but there is no outer-edge spine on the first joint. The endopodite of the second pair of feet is only one-jointed.

The various mouth organs are much reduced as in the males of *Euchaeta*.

The last thoracic segment is very slightly produced and the extremities are rounded. The rostrum is similar to the female but rather smaller. Male — length 3,2—3,6 mm.

The species is widely distributed. I have examined males and females from collections of plankton taken in the deep water of the Farøe Channel, by the Scottish International Fisheries Cruiser 'Goldseeker'. There appears to be no difference between the North Atlantic type of *Undeuchaeta plumosa*, and those taken by the 'Siboga'.

### 3. *Undeuchaeta intermedia* nov. sp. Plate XXIII, figs. 1—8.

Female — length 4,5 mm.

The *cephalothorax* is oblong ovate and moderately robust. The head is distinctly separated from the first thoracic segment, and is furnished with a very faint median crest, which may only be a slight thickening of the integument, and a moderately long, one-pointed rostrum. The fourth and fifth thoracic segments are completely fused. The last thoracic segment is slightly asymmetrical, and both sides are prolonged into fine points.

The abdomen is composed of four segments. The combined length of the abdomen and

furca is contained three and one-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is decidedly longer than the combined length of the next two segments. There is a well defined spine on the middle of the right side, and a curved spine on the right of the genital opening. The posterior margin of the segment is fringed with fine spines. The second segment is about half as long as the first. The third segment is shorter than the second, and the fourth segment is shorter than the third. The furcal joints are about half as long as broad, and are equal to fully half the length of the anal segment.

The antennules are twenty-three-jointed, and extend to the end of the second abdominal segment.

The antennae, mandibles, maxillae and maxillipedes, are similar to those of *Undeuchaeta plumosa*.

The exopodite of the first pair of feet is two-jointed, and there is no outer-edge spine on the middle of the first joint.

The endopodite of the second pair of feet is one-jointed.

The third and fourth pairs of feet have a three-jointed exopodite and endopodite. The inner margin of the first joint of the basiopodite of the third pair of feet is furnished with a fringe of fine hairs. The inner margin of the first joint of the basiopodite of the fourth pair of feet is naked.

The male is unknown.

Occurrence. — Eighteen females were found in plankton collected at the following stations.

Stat. 141 (HENSEN vertical net 1500 metres to surface), 4 specimens. — Stat. 142, 2 specimens. — Stat. 215<sup>a</sup>, 2 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 5 specimens. — Stat. 276 (HENSEN vertical net 750 metres to surface), 5 specimens.

This species appears to be an intermediate form between *Undeuchaeta major*, and *Undeuchaeta plumosa*. It is distinguished from the former by the absence of the high crest on the forehead, and from the latter by the spine on the right of the genital opening, and also by the faint crest.

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## 6. Family EUCHAETIDAE.

Genus **Euchaeta** Philippi, 1843.

In this report, the *Euchaeta marina* type has been separated from the *Euchaeta norvegica* type, on account of distinct differences in the character of the fifth pair of feet of the males, and also in the armature of the apical spines on the first maxilliped of the female.

*Euchaeta marina* (Prestandrea) appears to be the first known member of the genus *Euchaeta* established by PHILIPPI in 1852, and the characters of the appendages of the two sexes are, therefore, regarded as typical of the true *Euchaeta*. The armature of the spines on the apex of the first maxilliped of the female, and the structure of the male fifth feet in PHILIPPI's type, are decidedly different from what are found in *Euchaeta norvegica* Boeck. These differences are now made the distinguishing characters of the two genera, as established in the present report.

In the females, two of the six apical spines on the first maxilliped, in addition to being furnished with rows of very short spinules, have also a number of moderately long and conspicuous spinules. The males of typical *Euchaeta* are easily separated from those of the next genus, by the exopodite of both the right and left fifth foot terminating in a long spiniform joint.

Seven species of typical *Euchaeta* were obtained from the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Euchaeta acuta* Giesbrecht. Plate XX, figs. 1—9.

- Euchaeta acuta* Giesbrecht, 1893, p. 246, pls. 16 & 37.  
*Euchaeta acuta* Giesbrecht & Schmeil, 1898, p. 38.  
*Euchaeta acuta* I. C. Thompson, 1903, p. 18.  
*Euchaeta acuta* Thompson & Scott, 1903, p. 244.  
*Euchaeta acuta* Wolfenden, 1904, p. 111.  
*Euchaeta acuta* Cleve, 1904, p. 190.  
*Euchaeta acuta* Sars, 1905 (a), p. 4.  
*Euchaeta acuta* Farran, 1905, p. 35.  
*Euchaeta acuta* Esterly, 1905, p. 157, fig. 23.  
*Euchaeta acuta* Pearson, 1906, p. 17.  
*Euchaeta acuta* Farran, 1908, p. 40.  
*Euchaeta acuta* van Breemen, 1908, p. 51, fig. 56.

This species appeared to be very rare in the area traversed by the 'Siboga'. Only one female and three males were obtained. The specimens were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 141 (1500 metres to surface). — Stat. 148 (1000 metres to surface). — Stat. 185 (1536 metres to surface). — Stat. 203 (1500 metres to surface).

The female of *Euchaeta acuta* resembles *Euchaeta media* very closely, but it can be distinguished from it by the peculiar shape of the genital segment, when viewed from above. The proximal margin of the left side is produced into a blunt process, which is distinctly notched on the anterior surface. The posterior margin of the last thoracic segment appears evenly rounded when seen from above, and from the side. The outer-edge spine on the second joint of the exopodite of the second pair of feet, scarcely extends to the base of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint does not extend to the base of the third outer-edge spine. The appendicular seta on the furcal joints is longer than the others. Length, female 4.2 mm.

According to the records, *Euchaeta acuta* has apparently a wide distribution in tropical and temperate seas.

2. *Euchaeta concinna* Dana. Plate XIX, figs. 21—27.

- Euchaeta concinna* Dana, 1849, p. 21.  
*Euchaeta concinna* Giesbrecht, 1893, p. 246, pls. 15, 16, 37.  
*Euchaeta concinna* Giesbrecht & Schmeil, 1898, p. 39.  
*Euchaeta concinna* Cleve, 1901, p. 7.  
*Euchaeta concinna* Thompson & Scott, 1903, p. 244.  
*Euchaeta concinna* Cleve, 1903, p. 363.  
*Euchaeta concinna* Wolfenden, 1905 (a), p. 1008, pl. C, fig. 1—6.

*Euchaeta concinna*, although not very common, appeared to be well distributed throughout the area investigated by the 'Siboga' as shewn by the following records.

Stat. 16. — Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 66. — Stat. 81. — Stat. 89. — Stat. 98. — Stat. 106. — Stat. 110. — Stat. 117<sup>a</sup>. — Stat. 124. — Stat. 125 (day). — Stat. 128. — Stat. 136. — Stat. 138. — Stat. 141. — Stat. 143. — Stat. 144. — Stat. 146. — Stat. 148. — Stat. 157. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 172. — Stat. 177<sup>a</sup>. — Stat. 184. — Stat. 185. — Stat. 186. — Stat. 189. — Stat. 220 (vertical net). — Stat. 230. — Stat. 243. — Stat. 245. — Stat. 252. — Stat. 282. — Stat. 315.

The female of this species is easily recognised, by the peculiar projection on the proximal end of the right side of the genital segment. The armature on the margin of the second joint of the left exopodite of the male fifth pair is finer than in *Euchaeta marina*. The outer-edge spine on the second joint of the exopodite of the second pair of feet of the female, is moderately long and stout. It extends nearly to the apex of the first spine on the third joint. The outer-edge spines on the third joint are very short.

*Euchaeta concinna* appears to be confined to the tropical seas.

### 3. *Euchaeta longicornis* Giesbrecht.

*Euchaeta longicornis* Giesbrecht, 1888, p. 337.  
*Euchaeta longicornis* Giesbrecht, 1893, p. 246, pls. 16 & 37.  
*Euchaeta longicornis* Giesbrecht & Schmeil, 1898, p. 40.  
*Euchaeta longicornis* Cleve, 1901, p. 7.  
*Euchaeta longicornis* Cleve, 1904, p. 190.

One female belonging to this species was found in the plankton collected with the HENSEN vertical net at Station 141, 1500 metres to surface.

This species is closely related to *Euchaeta marina*, and some care is required in its identification. When the antennules are perfect these form a very good character as they extend beyond the furca.

### 4. *Euchaeta media* Giesbrecht. Plate XX, figs. 10—18.

*Euchaeta media* Giesbrecht, 1888, p. 337.  
*Euchaeta media* Giesbrecht, 1893, p. 246, pls. 16 & 37.  
*Euchaeta media* Giesbrecht & Schmeil, 1898, p. 39.  
*Euchaeta media* Cleve, 1904, p. 190.  
*Euchaeta media* Esterly, 1905, p. 160, fig. 25.

One female belonging to this species was found in the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to surface.

*Euchaeta media* resembles *Euchaeta acuta* very closely, but it can be distinguished by the following characters. The left side of the genital segment, when viewed from above, is seen to be considerably swollen. It is broadly rounded in outline, but is not produced into a pointed process. The posterior margin of the last thoracic segment appears distinctly angular, when seen from above, and from the side. The outer-edge spine on the second joint of the exopodite

of the second pair of feet, projects slightly beyond the base of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint, extends to the base of the third outer-edge spine. The appendicular seta on the furcal joints is longer than the others. Length 3.75 mm.

This species appears to have a very limited distribution.

5. *Euchaeta marina* (Prestandrea). Plate XIX, figs. 9—20.

- Cyclops marinus* Prestandrea, 1833, p. 12.  
*Euchaeta prestandrea* Philippi, 1843, p. 58, pl. 4.  
*Euchaeta marina* Giesbrecht, 1893, p. 246, pls. 1, 15, 16, 37.  
*Euchaeta marina* Giesbrecht & Schmeil, 1898, p. 38.  
*Euchaeta marina* I. C. Thompson, 1900, p. 278.  
*Euchaeta marina* Cleve, 1901, p. 7.  
*Euchaeta marina* A. Scott, 1902, p. 403.  
*Euchaeta marina* I. C. Thompson, 1903, p. 18.  
*Euchaeta marina* Thompson & Scott, 1903, p. 244.  
*Euchaeta marina* Cleve, 1903, p. 363.  
*Euchaeta marina* Cleve, 1904, p. 190.  
*Euchaeta marina* Sars, 1905(a), p. 4.  
*Euchaeta marina* Wolfenden, 1905(a), p. 1007, pl. C, figs. 19 & 20 (male).  
*Euchaeta indica* Wolfenden, 1905(a), p. 1008, pl. C, figs. 12—16 (female).  
*Euchaeta marina* Pearson, 1906, p. 16.  
*Euchaeta marina* van Breemen, 1908, p. 50, fig. 55.

This species proved to be very common and was widely distributed in the area, as shewn by the following records.

Stat. 16. — Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 38. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 66. — Stat. 71. — Stat. 81. — Stat. 89. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 106. — Stat. 109. — Stat. 110. — Stat. 111. — Stat. 112. — Stat. 117<sup>a</sup>. — Stat. 118. — Stat. 121. — Stat. 124. — Stat. 125 (day). — Stat. 128. — Stat. 129. — Stat. 133. — Stat. 136. — Stat. 138. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 144. — Stat. 148. — Stat. 149. — Stat. 157. — Stat. 165. — Stat. 184. — Stat. 185. — Stat. 189<sup>a</sup>. — Stats. 194—7. — Stat. 203 (surface). — Stat. 203 (1500 metres). — Stat. 204. — Stat. 205. — Stat. 210<sup>a</sup>. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 217 (surface). — Stat. 217 (horizontal cylinder). — Stat. 220 (vertical net). — Stat. 220 (surface). — Stat. 223. — Stat. 225. — Stat. 229. — Stat. 230. — Stat. 243. — Stat. 245. — Stat. 252. — Stat. 276. — Stat. 282. — Stat. 304. — Stat. 315.

The last thoracic segment of the female appears asymmetrical when viewed from above. The right side is distinctly more produced than the left. The genital segment is also asymmetrical. The right side is irregular in outline and is dilated near the distal end. The projecting part of the second joint of the left exopodite of the male fifth pair is coarsely toothed, and is easily distinguished from *Euchaeta concinna*.

The female form described and figured by WOLFENDEN as *Euchaeta indica*, is identical with the female of *Euchaeta marina*.

*Euchaeta marina* appears to be generally distributed in the warm seas.

6. *Euchaeta tenuis* Esterly. Plate XIX, figs. 1—8.

*Euchaeta tenuis* Esterly, 1906, p. 61, pls. IX & X.

A few specimens of a form which appears to be identical with the above species, were found in the plankton collected by the 'Siboga', at the following stations.

Stat. 117<sup>a</sup>, 1 specimen. — Stat. 141, 2 specimens. — Stat. 143, 1 specimen. — Stat. 148, 1 specimen. — Stat. 185, 2 specimens. — Stat. 203 (1500 metres), 2 specimens. — Stat. 230, 1 specimen. — Stat. 243, 1 specimen. — Stat. 252, 1 specimen.

The peculiar projection on the ventral surface of the genital segment, when seen from the side, is the most noteworthy character. The outer-edge spine on the second joint of the exopodite of the second pair of feet, extends beyond the apex of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint, reaches almost to the base of the third outer-edge spine. Two minute tubercles are visible at the middle of the dorso-lateral edges of the genital segment, when viewed from above. The second inner seta on the furcal joints is much longer than any of the others. The appendicular seta is very short. The females only were obtained. Length 6,8 mm.

*Euchaeta tenuis* was described by ESTERLY from a single specimen obtained in the Pacific Ocean, and the size is given as 6 mm.

The species is not unlike *Euchaeta grandiremis* Giesbrecht, but is easily separated from it by the difference in the proportional lengths of the spines on the exopodite of the second pair of feet.

7. *Euchaeta wolfendeni* nov. sp. Plate XVII, figs. 1—12.

*Euchaeta marina* Wolfenden, 1905 (a) pars, p. 1007, pl. C, figs. 7, 8, 10, 11, 17, 18.

Female — length 2,4—2,9 mm.

This Copepod is very like *Euchaeta marina* in general appearance, but on close examination can easily be distinguished from it. The last thoracic segment is quite symmetrical when viewed from above. The posterior margin, when seen from the side, appears narrowly rounded.

The combined length of the abdomen and furca is slightly less than half the total length of the *cephalothorax*, from the frontal projection to the base of the genital segment. The genital segment is as long as the combined length of the next three segments. The segment is irregular in outline, when viewed from the dorsal aspect. The posterior end of the right side is produced into a moderately large and well defined tubercle. A distinct swelling is visible in the region of the genital opening, when the segment is viewed from the side. The second segment is about half the length of the genital segment, and is equal to the combined length of the third and fourth segments. The appendicular seta is much longer than any of the others. The thoracic and abdominal segments are densely covered with short fine hairs.

The antennules are twenty-three-jointed and extend to the end of the second abdominal segment.

The antennae, mandibles, maxillae and maxillipedes, are similar to those of *Euchaeta marina*. The marginal spines on the two apical setae of the first maxilliped are comparatively long.

The first pair of feet is similar to that of *Euchaeta marina*.

The outer-edge spines on the exopodite of the second pair of feet are comparatively short and stout. The outer-edge spine on the second joint is longer and stouter than the others, but it falls considerably short of the base of the first outer-edge spine on the third joint.

The third and fourth pairs of feet are almost similar to those of *Euchaeta marina*.

Male — length 2,7 mm.

The males are very like those of *Euchaeta marina* in general appearance, but are easily recognised by the difference of the armature on the projection of the second joint of the exopodite of the left fifth foot. The spinules are small and closely set, and the apex of the projection is deeply notched. The second joint of the left exopodite is furnished with four long and moderately strong spines on the inner margin, opposite the apex of the projection.

The female of *Euchaeta wolfendeni*, is undoubtedly the same as the form which is wrongly described and figured by WOLFENDEN as *Euchaeta marina*, in his report on the Copepoda collected by J. STANLEY GARDINER around the Maldive Islands. There appears to be some confusion between WOLFENDEN'S description and figure of the exopodite of the second pair of feet, which renders the identification rather difficult at first sight. The description of the outer-edge spines on the exopodite of the second pair of feet agrees with what is found in typical *Euchaeta marina*, but does not agree with the figure 8 on plate C. The description of the spines both of *Euchaeta indica* and of *Euchaeta marina* in WOLFENDEN'S report, has evidently been drawn up from the figure 16 on plate C.

This species appeared to be fairly well distributed in the Malay Archipelago. Males and females were not uncommon in the plankton collected by the 'Siboga'. The species was present at the following stations.

Stat. 36. — Stat. 37. — Stat. 66. — Stat. 81. — Stat. 98. — Stat. 110. — Stat. 117<sup>a</sup>. —  
Stat. 121. — Stat. 124. — Stat. 125 (day). — Stat. 128. — Stat. 136. — Stat. 138. —  
Stat. 141. — Stat. 142. — Stat. 157. — Stat. 165. — Stat. 172. — Stat. 184. — Stat. 189<sup>a</sup>. —  
Stat. 217 (surface). — Stat. 217 (horizontal cylinder). — Stat. 220 (surface). — Stat. 220  
(vertical net). — Stat. 223. — Stat. 224. — Stat. 225. — Stat. 229. — Stat. 245. —  
Stat. 276. — Stat. 282. — Stat. 315.

*Euchaeta wolfendeni* may prove to be widely distributed in the warm seas. Owing to its general resemblance to *Euchaeta marina*, however, it may be easily overlooked. I have specimens of this species from the plankton samples collected by Professor HERDMAN between Aden and Colombo, during his traverse to Ceylon and back in 1903.

The species is named in compliment to Dr. R. N. WOLFENDEN, whose investigations of the plankton of the deep water of the North Atlantic, have revealed a number of interesting Copepoda.

#### Genus *Paraeuchaeta* nov.

This genus is established for the reception of the *Euchaeta*-like forms of which BOECK'S *Euchaeta norvegica* is the type.

The females are distinguished from true *Euchaeta* by the armature of the spines on the apex of the first maxillipedes. These spines are densely furnished with fine short spinules only. The long spinules, which are so characteristic in true *Euchaeta*, are entirely absent.

The males are easily separated by the structure of the left exopodite of the fifth pair of feet. The second joint is only slightly produced at its inner distal angle. The third joint is short and rudimentary. In true *Euchaeta* the third joint is long and spiniform.

Twelve species belonging to this genus were found in the plankton collected by the 'Siboga'. Nine of the species appear to be unknown, but four of them are males which may prove to be identical with some of the females now recorded.

1. *Paraeuchaeta barbata* (Brady). Plate XVIII, figs. 1—8.

*Euchaeta barbata* Brady, 1883, p. 66, pls. XXII, figs. 6—12.

*Euchaeta barbata* Farran, 1908, p. 40, pl. III, figs. 13 & 14.

Five females of this form, which appears to be identical with *Euchaeta barbata* Brady, were found in the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to the surface.

The figure illustrating the outer-edge spines on the exopodite of the second pair of feet given in this report, agrees very well with the figure given by BRADY, and also by FARRAN. The outer-edge spine on the second joint is long, and reaches to about midway between the base and apex of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint is very stout, and extends distinctly beyond the base of the third outer-edge spine. The sinus at the base of the second outer-edge spine on the third joint is very deep. The second inner seta on the furcal joints is long, but the appendicular seta is longer than it. Length of female 7.5 mm.

The form described and figured by SARS in 'Crustacea of Norway', although resembling *Paracuchaeta barbata* very closely, appears to be distinct. SARS states that the legs scarcely differ in structure from those of *Paracuchaeta norvegica*. The proportional lengths of the outer-edge spines on the exopodite of the second pair of feet of *Paraeuchaeta norvegica*, are very distinct from that shewn in BRADY's figure.

BRADY's specimen was obtained in the South Atlantic to the east of Monte Video. FARRAN records it from the North Atlantic off the West Coast of Ireland.

2. *Paraeuchaeta bisinuata* (Sars). Plate XVI, figs. 10—17.

*Euchaeta bisinuata* Sars, 1907 (a), p. 12.

*Euchaeta bisinuata* Farran, 1908, p. 45, pl. III, figs. 17—19; pl. IV, fig. 4.

Females similar to the form identified and figured by G. P. FARRAN as *Euchaeta bisinuata* Sars, were found in the plankton collected at the following stations in the area investigated by the 'Siboga'.

Stat. 117<sup>a</sup>, 1 specimen. — Stat. 230 (HENSEN vertical net 2000 metres to surface), 2 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 1 specimen. — Stat. 252, 1 specimen. — Stat. 276 (HENSEN vertical net 750 metres to surface), 1 specimen.

*Paracuchaeta bisinuata* is easily recognised by the peculiar arrangement of the protuberance on the ventral surface of the genital segment. The protuberance is divided into three lobules, and the two anterior ones are paired. The outer-edge spine on the second joint of

the exopodite of the second pair of feet, reaches to near the apex of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint extends to the base of the third outer-edge spine. The appendicular seta on the furcal joints is longer than any of the others. Length of female 5 mm.

This species has only been previously recorded from the North Atlantic.

3. *Paracuchaeta californica* (Esterly). Plate XV, figs. 1—8.

*Euchaeta californica* Esterly, 1906, p. 60, pls. IX & X.

Ten females of this form, which appears to be identical with the *Euchaeta californica*, described by C. O. ESTERLY, were found in the plankton collected by the 'Siboga' at the following stations.

Stat. 141 (HENSEN vertical net 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net 1000 metres to surface), 2 specimens. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 1 specimen. — Stat. 230 (HENSEN vertical net 2000 metres to surface), 2 specimens. — Stat. 252, 1 specimen. — Stat. 276 (HENSEN vertical net 750 metres to surface), 2 specimens.

The whole of the specimens from the 'Siboga' collections, possessed the peculiar curved process projecting from the genital opening. The protuberance is paired, but the one on the left side is rather longer than that on the right. When viewed from the side, the forehead appears very much contracted, and the rostrum projects forward in an almost continuous line with the cephalic margin.

The outer-edge spine on the second joint of the exopodite of the second pair of feet, extends beyond the apex of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint just reaches the base of the third outer-edge spine. The second inner seta on the furcal joints is much longer than any of the others.

The figure shewing the lateral view of the genital segment is rather different from that given by ESTERLY. The protuberances at the side of the genital opening, appear to be more pronounced than in ESTERLY'S species but this may be due to age. The 'Siboga' specimens measured 7 mm. in length.

The species was described by ESTERLY from a single specimen obtained in the Pacific Ocean and its length is given as 8 mm.

4. *Paracuchaeta propinqua* (Esterly). Plate XVII, figs. 13—20.

*Euchaeta propinqua* Esterly, 1906, p. 61, pls. IX & X.

Two females which appear to be identical with ESTERLY'S *Euchaeta propinqua*, were found in the plankton collected with the HENSEN vertical net at Station 230, 1500 metres to the surface.

The species bears a close resemblance to *Paracuchaeta californica*, but can be distinguished from it by the less swollen and more elongate genital segment, when viewed from the dorsal aspect. The outer-edge spines on the exopodite of the second pair of feet are proportionally shorter than in *Paracuchaeta californica*.

The outer-edge spine on the second joint extends to the base of the first outer-edge

spine on the third joint. The second outer-edge spine on the third joint does not reach the base of the third outer-edge spine.

The second inner seta on the furcal joints is very long but the appendicular seta is longer than any of the others. Length of female 10 mm.

ESTERLY's description and figures were drawn up from a single female obtained in the Pacific Ocean, and the size is given as 9 mm.

5. *Paraeuchaeta tonsa*. (Giesbrecht). Plate XIV, figs. 8—15.

*Euchaeta tonsa* Giesbrecht, 1895, p. 251, pl. IV, figs. 9 & 10.

*Euchaeta tonsa* Giesbrecht & Schmeil, 1898, p. 40.

*Euchaeta tonsa* Cleve, 1904, p. 190.

*Euchaeta tonsa* Sars 1905(a), p. 5.

*Euchaeta tonsa* Farran, 1905, p. 35.

*Euchaeta tonsa* Pearson, 1906, p. 17.

*Euchaeta tonsa* Esterly, 1906, p. 64, pls. IX & X.

*Euchaeta tonsa* Farran, 1908, p. 44.

*Euchaeta tonsa* van Breemen, 1908, p. 55, fig. 62.

Females belonging to this species were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 142 (1500 metres to surface), 1 specimen. — Stat. 148 (1000 metres to surface), 1 specimen. — Stat. 230 (2000 metres to surface), 1 specimens. — Stat. 276 (750 metres to surface), 1 specimen.

*Paracuchaeta tonsa* is easily recognised by the bluntly pointed last thoracic segment, and by the large projection on the genital segment when the female is viewed from the side. The outer-edge spine on the second joint of the exopodite of the second pair of feet, is longer than any of the other outer-edge spines. It reaches to about midway between the base and the apex of the first outer-edge spine on the third joint. The second inner seta on the furcal joints is much longer than any of the others. Length of 'Siboga' specimens 7 mm.

*Paracuchaeta tonsa* appears to have a moderately wide distribution.

6. *Paraeuchaeta gracilicauda* nov. sp. Plate XVIII, figs. 9—16.

Female — length 7 mm.

Seen from above. The body resembles that of *Paraeuchaeta barbata*, except that it is distinctly contracted in the middle of the cephalic segment, and the rostrum is directed downwards. The posterior margin of the last thoracic segment appears slightly angular when seen in lateral view. The epistome is hirsute, and the tuft of hairs on the last thoracic segment is well developed.

The abdomen is very slender. The combined length of the abdomen and furca is contained one and three-fourth times in the total length of the *cephalothorax*, from the frontal prominence to the base of the genital segment. The genital segment is slightly shorter than the combined length of the second and third segments. It is symmetrical in outline, and the lobules at the genital opening are similar to those of *Paracuchaeta barbata*. The distance

between the genital opening and the posterior margin of the segment, is greater than in *Paraeuchaeta barbata*. The second and third segments are of about equal length. The anal segment is about one-fourth of the length of the third segment. The furcal joints are rather longer than broad, and are equal to the length of the anal segment. The appendicular seta is longer than any of the others.

The antennules extend to about the middle of the genital segment.

The antennae, mandibles, maxillae and maxillipedes are nearly similar to those of *Paraeuchaeta barbata*.

The first pair of feet is similar to that of *Paraeuchaeta barbata*. The exopodite is indistinctly three-jointed, and the outer-edge spine at the incomplete separation of the first and second joints is very small.

The outer-edge spine on the second joint of the exopodite of the second pair of feet, extends to midway between the base and the apex of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint is short, and does not nearly reach the base of the third outer-edge spine.

The third and fourth pairs of feet are nearly similar to those of *Paraeuchaeta barbata*.

Male unknown.

This species is easily recognised by its long slender abdomen, and by the distance between the genital opening and the posterior margin of the segment.

Occurrence. — This species was found in plankton collected with the HENSEN vertical net at the following stations.

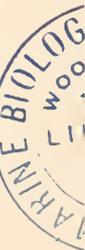
Stat. 230 (2000 metres to surface), 2 specimens. — Stat. 276 (750 metres to surface), 1 specimen.

7. *Paraeuchaeta sibogae* nov. sp. Plate XVI, figs. 1—9.

Female — length 5 mm.

Viewed from above, the body appears moderately robust. The head is much contracted in the middle, and is distinctly separated from the first thoracic segment. The last thoracic segment is asymmetrical. The left posterior margin of the segment is more produced than the right. Seen from the side, the posterior margin of the last thoracic segment appears angular in outline. The rostrum is comparatively small and is directed downwards. The epistome is hirsute, and a tuft of hairs is present on the last thoracic segment.

The abdomen is short. The combined length of the abdomen and furca is equal to rather less than one-half of the total length of the *cephalothorax*, from the frontal prominence to the base of the genital segment. The genital segment is nearly as long as the combined length of the next two segments. Viewed from above, the segment appears slightly asymmetrical, and the process on each side of the genital opening can be seen projecting beyond the lateral margins. In side view, the segment appears considerably swollen. The genital opening is flanked by anteriorly directed tubercles. The tubercle on the right side is larger than the one on the left. The second abdominal segment is nearly as long as the combined length of the third and fourth segments. The anal segment is very small, and is only one-third of the length of the



third segment. The furcal joints are longer than broad, and are nearly twice as long as the anal segment. The appendicular seta on the furcal joints is much longer than any of the others.

The antennules reach to the middle of the genital segment.

The antennae, mandibles, maxillae and maxillipedes are somewhat similar to those of *Paraechaeta barbata*.

The exopodite of the first pair of feet is indistinctly three-jointed. The outer-edge spine at the incomplete separation of the first and second joints is moderately long, and extends to near the end of the combined joint.

The outer-edge spine on the second joint of the exopodite of the second pair of feet is considerably longer than any of the other outer-edge spines. It extends to the apex of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint extends half way along the margin, towards the base of the third outer-edge spine.

The third and fourth pairs of feet resemble those of *Paraechaeta barbata*.

Male unknown.

*Paraechaeta sibogae* is easily distinguished from the other members of the genus, by the asymmetrical and slightly angular posterior margins of the last thoracic segment, and by the very swollen genital segment with its pair of strong tubercles as seen in side view.

Occurrence. — Five specimens were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 128 (700 metres to surface), 1 specimen. — Stat. 148 (1000 metres to surface), 1 specimen. — Stat. 230 (2000 metres to surface), 2 specimens. — Stat. 243 (1000 metres to surface), 1 specimen.

#### 8. *Paraechaeta weberi* nov. sp. Plate XV, figs. 9—16.

Female — length 8,5 mm.

Viewed from above, the body appears elongate and moderately robust. The head is contracted in the middle, and is distinctly separated from the first thoracic segment. The last thoracic segment is symmetrical and slightly pointed. Viewed from the side, the last thoracic segment is seen to be triangular in outline, and terminates in a small, but quite distinct point. The rostrum is moderately large and is directed forward. The epistome is hirsute, but the last thoracic segment has no tuft of hairs.

The abdomen is short. The combined length of the abdomen and furca is distinctly less than one-half of the total length of the *cephalothorax*, from the frontal process to the base of the genital segment. The genital segment is rather shorter than the combined length of the second and third segments. Viewed from above, the genital segment appears quite asymmetrical. The segment is considerably swollen at the posterior end, but the left side is more inflated than the right. The middle of the segment is traversed by a deep constriction which is slightly obscured by an overlapping of the anterior half of the segment. The overlapping part terminates in two small tubercles. When seen from the side the genital segment has a most remarkable appearance, due to the constriction on the dorsal surface, and to the pair of large oval processes that guard the genital opening. The second abdominal segment is rather

longer than the third segment. The anal segment is very small. It is only about one-fourth of the length of the third segment. The furcal joints are nearly as long as broad, and are about equal to the length of the anal segment. The second inner seta on the furcal joints is much longer than any of the others.

The antennules extend to about the middle of the genital segment.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Paracuchaeta barbata*.

The exopodite of the first pair of feet is indistinctly three-jointed. The outer edge spine at the incomplete separation of the first and second joints is very short.

The outer-edge spine on the second joint of the exopodite of the second pair of feet, extends to near the apex of the first outer-edge spine on the third joint. The second outer-edge spine on the third joint extends to near the base of the third outer-edge spine. The sinus at the base of the second outer-edge spine on the third joint is very deep.

The third and fourth pairs of feet are similar to those of *Paracuchaeta barbata*.

Male unknown.

*Paracuchaeta weberi* is easily recognised by the peculiar form of the genital segment when seen in side view. It can readily be separated by this character alone, from any of the other members of the genus.

This distinct form is named in compliment to Professor MAX WEBER, the director of the 'Siboga' expedition, which has considerably extended our knowledge regarding the distribution of the deep water Copepoda.

Occurrence. — Eleven specimens were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 185 (1536 metres to surface), 3 specimens. — Stat. 230 (2000 metres to surface), 4 specimens. — Stat. 243 (1000 metres to surface), 3 specimens. — Stat. 276 (756 metres to surface), 1 specimen.

9. *Paraeuchaeta spinifera* (Esterly). Plate XXII, figs. 9—16.

*Euchaeta spinifera* Esterly, 1906, p. 62, pls. IX, XI, XIV.

A single male specimen which is doubtfully referred to the species described by ESTERLY as *Euchaeta spinifera* was found in plankton collected with the HENSEN vertical net at Station 276, 750 metres to the surface. Length 5.5 mm.

There is very little to distinguish this species from the male of *Paracuchaeta norvegica*, except the shape and armature of the second joint of the exopodite of the left fifth foot. The inner distal angle of the joint in this species is produced into a pointed process, and both sides of the distal margin are fringed with fine spines (Plate XXII, fig. 16).

10. *Paracuchaeta sarsi* (Farran). Plate XXI, figs. 9—15.

*Euchaeta barbata* Sars, 1902, p. 41, pl. XXVIII.

*Euchaeta barbata* Wolfenden, 1904, p. 135, fig. 1, Nos. 5 & 6.

*Euchaeta sarsi* Farran, 1908, p. 41, pl. III, figs. 15 & 16.

One specimen which appears to be identical with the male figured by Sars in 'Crustacea of Norway' was obtained from the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to the surface. Length 7,8 mm.

FARRAN considers that the form which Sars doubtfully refers to *Euchaeta barbata* Brady, is distinct from that species, and is inclined to include it under the new name that he has established for the reception of a form recorded by WOLFENDEN as *Euchaeta barbata* Brady.

I see nothing to distinguish the left fifth foot of the 'Siboga' specimen from Sars' description and figure of the second joint of the left fifth foot of the male. Sars gives the size of the male as 10 mm.

11. *Paraeuchaeta dentata* nov. sp, Plate XXI, figs. 16—23.

Male — length 8 mm.

This species resembles the male of *Paraeuchaeta norvegica* (Boeck) in general appearance, but the last thoracic segment when viewed from above is seen to be asymmetrical. The left side is more produced than the right.

The exopodite of the first pair of feet is distinctly three-jointed. The first joint is furnished with a minute outer-edge spine.

The second outer-edge spine on the third joint of the exopodite of the second pair of feet is moderately stout, and is distinctly longer than any of the others. The sinus at the base of the spine is rather shallow. The apical portion of the outer margin of the joint is boldly curved.

The second joint of the left exopodite of the fifth pair of feet is moderately broad, and the inner distal angle is produced into a blunt point. The inner margin of the apex is concave, and the whole of the margin of the produced part is rather coarsely serrate. The inner surface of the proximal part of the joint is furnished with a short stout tooth. (Plate XXI, fig. 23).

The second inner seta on the furcal joints is longer than the others.

Occurrence. — One specimen was found in the plankton collected with the HENSEN vertical net at Station 276, 750 metres to the surface.

12. *Paraeuchaeta tuberculata* nov. sp. Plate XXI, figs. 1—8.

Male — length 6,8 mm.

This species resembles *Paraeuchaeta dentata* in general appearance, but is easily separated from it by the structure of the left exopodite of the fifth pair of feet. The first joint has two tubercles on the middle of the outer margin, and a small spine midway between the distal tubercle and the apex. The inner distal angle of the second joint is produced to a sharp unguiform point, not unlike that found in the male of *Paraeuchaeta norvegica*. The distal half of the inner margin of the joint is coarsely dentate.

The species has a close resemblance to the male of *Paraeuchaeta norvegica* in the structure of the left exopodite of the fifth pair of feet, and may possibly turn out to be a tropical variation of that species. The produced apex of the inner distal angle of the second joint is not so sharply pointed or curved, however, as in typical *Paraeuchaeta norvegica*. In the meantime

I prefer to regard the 'Siboga' specimens as distinct. The appendicular seta and the second inner seta on the furcal joints are of about equal length. They are longer than any of the others.

Occurrence. — Five specimens were obtained from the plankton collected with the HENSEN vertical net at the following stations.

Stat. 230 (2000 metres to surface), 2 specimens. — Stat. 243 (1000 metres to surface), 2 specimens. — Stat. 276 (750 metres to surface), 1 specimen.

Genus **Valdiviella** Steuer, 1904.

This genus was established by STEUER in 1904 for a Calanoid closely related to *Euchaeta*, but easily recognised by its bifurcate rostrum. The incomplete jointing of the exopodites of the first and second pairs of feet, and the indistinctly three-jointed endopodites of the third and fourth pairs of feet are also characters of this genus.

Two species belonging to this genus were found in the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Valdiviella gigas* (Brady). Plate XXII, figs. 17—26.

*Euchaeta gigas* Brady, 1883, p. 65, pl. XXII, figs. 1—5.

One specimen of a form apparently identical with the species described by BRADY in the report on the 'Challenger' Copepoda as *Euchaeta gigas*, was found in the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to the surface.

The rostrum is distinctly bifurcate. The fourth and fifth thoracic segments are completely separated. The last thoracic segment is produced posteriorly into small points. The specimen was immature and possessed a fifth pair of feet similar to that shown by BRADY.

The antennules are twenty-three-jointed, and a number of the joints are furnished with sensory organs.

The antennae, mandibles, maxillae and maxillipedes are of the normal female *Paraeuchaeta* type. The mandible is well developed and is provided with cutting teeth.

The exopodite of the first pair of feet is composed of two joints. The middle of the outer margin of the first joint is furnished with a strong spine.

The exopodite of the second pair of feet is very indistinctly three-jointed. The division between the first and second joint is only marked by an overlapping at the base of the outer-edge spine, and by a seta on the inner margin. The endopodite is one-jointed.

The exopodites of the third and fourth pairs of feet are indistinctly three-jointed. The endopodites are two-jointed.

The fifth pair of feet is almost symmetrical but is very rudimentary. Each foot consists of a two-jointed basiopodite, a moderately long unjointed exopodite, and a small endopodite.

The abdomen is composed of four segments. The genital segment is shorter than any of the others.

Length 8 mm. The size of the form described in the report on the 'Challenger' Copepoda is given as 5.25 mm.

The bifurcate rostrum and the incomplete segmentation of the swimming feet, indicate that the 'Siboga' specimen belongs to the genus *Valdiviella*. The specimen was evidently a female, and no doubt the rudimentary fifth pair of feet would disappear at the final ecdysis.

2. *Valdiviella* ? *brevicornis* Sars. Plate XXII, fig. 27—35.

*Valdiviella brevicornis* Sars, 1905 (a), p. 17.

A single male specimen belonging to the genus *Valdiviella*, and doubtfully included under Sars' species *Valdiviella brevicornis*, was obtained from the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to the surface.

The rostrum is small and distinctly bifurcate. The fourth and fifth thoracic segments are completely fused. The posterior margins of the last thoracic segment are narrowly rounded.

The antennules are twenty-three-jointed and are well furnished with sensory organs.

The antennae, mandibles, maxillae and maxillipedes are of the normal male *Paraeuchaeta* type. The mandibles have no toothed biting edge. The maxillae and maxillipedes are much reduced.

The exopodite of the first pair of feet is distinctly three-jointed. Each joint is furnished with an outer-edge spine.

The exopodites and endopodites of the second, third and fourth pairs of swimming feet are similar to those of *Valdiviella gigas*.

The fifth pair of feet is well developed and prehensile. The basiopodite is two-jointed. The second joint of the right basiopodite is much inflated at its proximal end. The distal portion of the joint is long and narrow. The joints of the basiopodite of the left foot are moderately long and cylindrical. The exopodite of the right foot is apparently only one-jointed. The joint is moderately long and has a lamelliform apex. The exopodite of the left foot is composed of three, short, subequal joints. The last joint is spiniform. The endopodites are one-jointed. The right endopodite is long and slender with a distinctly inflated apex. The right endopodite is very short and is somewhat club-shaped.

The abdomen is composed of five segments. The first, second, third and fourth segments are all of about equal length. The fifth segment is very small.

Length — 5 mm.

The specimen is clearly a *Valdiviella* by its bifurcate rostrum and by the incomplete segmentation of the second, third and fourth pairs of feet. It is not unusual to find the exopodite of the first pair of feet of the males of some of the Calanoids to be slightly different in the jointing from the females. From its size, the specimen may be the male of Sars' *Valdiviella brevicornis*, but as no figures of Sars' species have yet been published its relationship must be regarded as doubtful. The specimen is proportionally much smaller than either *Valdiviella oligarthra* Steuer, or *Valdiviella insignis* Farran.

Genus **Chiridiella** Sars, 1907 (a).

This genus was established by G. O. Sars in 1907 for an aberrant Calanoid form, which FARRAN suggests may lead a semi-parasitic mode of existence. Only the female is known,

and the true position of the genus in the classification will probably remain uncertain until the male is discovered.

The rostrum is entirely absent. The first pair of maxillipedes is peculiarly modified, and is furnished with powerful claw-like spines. The exopodite and endopodite of the first pair of feet is composed of a single joint. The exopodites of the second, third and fourth pairs of feet are three-jointed. The endopodite of the second pair of feet is one-jointed. The endopodites of the third and fourth pairs of feet are three-jointed. The fifth pair of feet is absent.

One species belonging to this remarkable genus, was represented in the plankton collected by the 'Siboga', during the investigations in the Malay Archipelago.

1. *Chiridiella macrodactyla* Sars Plate XXXVI, figs. 9—21.

*Chiridiella macrodactyla* Sars, 1907 (*a*), p. 8.

*Chiridiella macrodactyla* Farran, 1908, p. 46, pl. IV, figs. 6—14.

A single specimen agreeing very well with Sars' preliminary description of the above species and with the figures given by FARRAN, was obtained from the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

The specimen measured 2.73 millimetres in length. I see no other difference between the 'Siboga' form and Sars' description, than that the combined length of the abdomen and furca is very slightly less than one-third of the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment.

The specimens from the deep water off the West Coast of Ireland appear to be almost identical with the 'Siboga' form. The figure of the first maxilliped is the same as that given in this report. FARRAN points out some minor differences between his specimens, and the description given by Sars. Similar differences are also apparent between the figures given in the present report and those shewn by FARRAN.

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7. Family PHAENNIDAE.

Genus **Phaenna** Claus, 1863.

The only known member of this genus is distinguished from the other genera that are included in the family Phaennidae, by the entire absence of a fifth pair of feet in the female, by the form of the organs on the apex of the first pair of maxillipedes in both sexes, and by the structure of the fifth pair of feet of the male.

The apex of the first maxilliped is furnished with a strong claw-like spine, and a number of short cylindrical appendages which terminate in a brush of fine cilia. The fifth pair of feet is represented in the male by the exopodites only.

One species is known. A few specimens of it were found in the plankton collected by the 'Siboga'.

1. *Phaenna spinifera* Claus.

*Phaenna spinifera* Claus, 1863, p. 189, pl. XXXI, figs. 1—7.

*Phaenna spinifera* Giesbrecht, 1893, p. 293, pls. 5, 12, 37.

*Phaenna spinifera* T. Scott, 1893, p. 81, pls. VI & VII.

*Phaenna spinifera* Giesbrecht & Schmeil, 1898, p. 50.

*Phaenna spinifera* I. C. Thompson, 1903, p. 23.

*Phaenna spinifera* Thompson & Scott, 1903, p. 246.

*Phaenna spinifera* Cleve, 1903, p. 367.

*Phaenna spinifera* Wolfenden, 1904, p. 111.

*Phaenna spinifera* Cleve, 1904, p. 194.

*Phaenna spinifera* Sars, 1905 (a), p. 5.

*Phaenna spinifera* Wolfenden, 1905 (a), p. 1009.

*Phaenna spinifera* Farran, 1905, p. 43.

*Phaenna spinifera* Pearson, 1906, p. 21.

*Phaenna spinifera* Farran, 1908, p. 47.

*Phaenna spinifera* van Breemen, 1908, p. 56, fig. 63.

The species appeared to be very scarce in the area investigated by the 'Siboga'. One specimen was obtained from the plankton collected at each of the following stations.

Stat. 118 (HENSEN vertical net 900 metres to surface). — Stat. 125. — Stat. 143 (HENSEN vertical net 1000 metres to surface). — Stat. 144. — Stat. 172. — Stat. 185 (HENSEN vertical net 1536 metres to surface). — Stat. 252. — Stat. 276 (HENSEN vertical net 750 metres to surface).

*Phaenna spinifera* has evidently a moderately wide distribution. It has been recorded from the deep water off the West of Ireland by FARRAN, and from off the South African Coast by CLEVE. Its presence in various tropical regions has also been made known by other observers.

Genus **Xanthocalanus** Giesbrecht, 1893.

The females of this genus are separated from *Phaenna* by the presence of a fifth pair of feet. The body is usually more elongated and the last thoracic segment may be pointed.

The rostrum is bifurcate and the rami are moderately long. The apical lobe of the first maxillipedes is furnished with a strong claw-like spine, which is coarsely dentate on the inner margin. Cylindrical sensory appendages are also present. The female fifth pair of feet is small and three-jointed. In immature females the fifth pair may be only two-jointed. In the male, the fifth pair of feet is represented by a long slender left exopodite and a very short right exopodite.

One species was obtained from the plankton collected by the 'Siboga'.

1. *Xanthocalanus agilis* Giesbrecht. Plate XXXIII, figs. 10—18.

*Xanthocalanus agilis* Giesbrecht, 1893, p. 286, pls. 12 & 37.

*Xanthocalanus agilis* Giesbrecht & Schmeil, 1898, p. 50.

One female belonging to this species was found in the plankton collected at each of the following three stations.

Stat. 118 (HENSEN vertical net 900 metres to surface). — Stat. 141 (HENSEN vertical net 1500 metres to surface). — Stat. 203 (HENSEN vertical net 1500 metres to surface).

The species is very distinct. It is easily identified by its elongate body and greatly produced last thoracic segment.

The posterior margins of the last thoracic segment reach to near the distal end of the genital segment. The combined length of the abdomen and furca is equal to one-fourth of the total length of the *cephalothorax*, from the frontal margin to the posterior end of the last thoracic segment. The rami of the rostrum are two-jointed and the apical section is very slender. The antennules are twenty-four-jointed, and extend to the end of the second abdominal segment. The fifth pair of feet is composed of two free joints attached to a basal part. The second joint is furnished with one apical and two subapical spines (Plate XXXIII, fig. 18).

Length of female 2,68 mm.

*Xanthocalanus agilis* is apparently very rare. It has only been recorded from the Gulf of Naples by GIESBRECHT.

#### Genus *Brachycalanus* Farran, 1905.

The members of this genus are separated from the other genera belonging to the family, chiefly by the very strong, slightly bifurcate, and highly chitinised rostrum. The mouth organs and swimming feet closely resemble those of *Xanthocalanus*.

The genus was represented in the 'Siboga' plankton by a single immature specimen.

1. *Brachycalanus gigas* nov. sp. Plate XXXV, figs. 10—18.

Length — 7,2 mm.

Viewed from above, the body appears moderately robust, and elongate ovate in outline. The head is distinctly separated from the first thoracic segment, and is furnished with a low median crest. The fourth and fifth thoracic segments are separated. The last thoracic segment is produced to the end of the first abdominal segment, and terminates in distinct points that project outwards from the segment. Seen from the side, the forehead is arched, and the median crest is rounded at the apex. The last thoracic segment is irregularly triangular in outline, with a small point at the apex. The rostrum is robust, of moderate length, and is slightly bifurcate at the upturned apex. No filaments are present.

The abdomen is composed of five segments. The combined length of the abdomen and furca is contained about three and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The abdominal segments are wide, and are comparatively short. The anal segment is very small. The furcal joints are rather longer than broad, and are about twice as long as the anal segment.

The antennules are composed of twenty-four joints, and extend to the end of the third abdominal segment. The eighteenth joint is faintly divided.

The antennae, mandibles and maxillae are similar to those of *Xanthocalanus*.

The first pair of maxillipedes also resembles that of *Xanthocalanus*, but the claw-like

spines on the apical lobes are more slender and flexible. The internal and external margins of the claw-like spines are fringed with fine hairs. The apex is furnished with three long plain filaments and five short organs with inflated heads. (Plate XXXV, fig. 15).

The second pair of maxillipedes is similar to that of *Xanthocalanus*.

The exopodite of the first pair of feet is three-jointed, and the endopodite is one-jointed.

The exopodite of the second pair of feet is three-jointed, and the endopodite is two-jointed. The second joint of the endopodite is furnished with three transverse rows of strong spines.

The exopodites and endopodites of the third and fourth pairs of feet are each three-jointed. The second and third joints of the endopodite of the third pair of feet are each furnished with two transverse rows of strong spines. The second and third joints of the endopodite of the fourth pair of feet are furnished with fine spines as shewn (Plate XXXV, fig. 17).

The fifth pair of feet is symmetrical, but obviously rudimentary. The basiopodite is two-jointed. The exopodite is distinctly two-jointed. The first joint is furnished with one outer-edge spine. The second joint is broadly triangular in outline. It bears one apical and three subapical spines. (Plate XXXV, fig. 18).

Occurrence. — One specimen was obtained from the plankton collected with the HENSEN vertical net at Station 185, 1536 metres to the surface.

The specimen is apparently an immature male, and the fifth pair of feet is very similar to the figure given by FARRAN (1905 pl. XI, fig. 10). FARRAN regards his species to be closely related to *Oöthrix bidentata* (= *Neoscolecithrix koehleri* Canu). The present species, however, does not appear to belong to that genus, as the short sausage-shaped organs, on the apex of the first maxilliped, which are so characteristic of that genus are absent. FARRAN's specimens measured 3.35 mm.

#### Genus *Onchocalanus* G. O. Sars, 1905 (a).

This genus is closely related to *Xanthocalanus*, but the females are easily recognised by the strongly bifurcate rostrum, and by the apical lobe of the first pair of maxillipedes being furnished with a very stout curved claw. The posterior surface of the joints of the swimming feet is armed with numerous fine spines. The fifth pair of feet is small.

Two of the known species were represented in the plankton collected by the 'Siboga'.

##### 1. *Onchocalanus cristatus* (Wolfenden). Plate XXXIV, figs. 1—8.

*Xanthocalanus cristatus* Wolfenden, 1904, p. 119, pl. IX, figs. 18 & 19.

*Onchocalanus trigoniceps* Sars, 1905 (a), p. 20.

*Xanthocalanus cristatus* Pearson, 1906, p. 20.

*Onchocalanus cristatus* Sars, 1907 (a), p. 3.

*Onchocalanus cristatus* Farran, 1908, p. 49.

*Xanthocalanus cristatus* van Breemen, 1908, p. 62, fig. 70.

One female belonging to this species was found in the plankton collected with the HENSEN vertical net at each of the following two stations.

Stat. 148 (1000 metres to surface). — Stat. 185 (1536 metres to surface).

*Onchocalanus cristatus* is easily recognised by the presence of a median cephalic crest, and by the distinct point at the distal ends of the last thoracic segment. The fifth pair of feet of the female consists of two free joints attached to a basal part. The second free joint terminates in a strong spine. The outer margin of the joint is furnished with two spines and the inner margin with one. Length 6,6 mm.

*Onchocalanus cristatus* has been hitherto only obtained from the deep water of the North Atlantic, where it appears to be not uncommon.

2. *Onchocalanus hirtipes* Sars. Plate XXXIV, figs. 9—17.

*Onchocalanus hirtipes* Sars, 1905 (a), p. 20.

*Onchocalanus hirtipes* Farran, 1908, p. 49.

One female apparently identical with this species, was obtained from the plankton collected with the HENSEN vertical net at Station 185, 1536 metres to the surface.

*Onchocalanus hirtipes* has a general resemblance to *Onchocalanus cristatus*, but it can be distinguished from it by the absence of a median crest. The last thoracic segment is obtusely triangular in outline when seen from the side, but it is not produced into a spine at the posterior margin. The rami of the rostrum apparently terminate in a filament, but only the base was visible in the preparation. The fifth pair of feet is somewhat similar to that of the previous species. There is only one outer-edge spine on the second free joint and none on the inside.

Length — 5 mm.

This species has only been recorded from the North Atlantic.

Genus **Cornucalanus** Wolfenden, 1905.

This genus was established by WOLFENDEN in 1905 for a Calanoid closely related to *Xanthocalanus*. It is distinguished by the possession of a cephalic spine, and the apex of the first maxillipedes is furnished with a very powerful curved claw.

The cephalic spine may only be a specific difference between WOLFENDEN's type species *Cornucalanus magnus* (= *Scolocithrix chelifera* I. C. Thompson, 1903) and another form very briefly described along with the type. The appendages of the second species are identical with those of the type, but the cephalic spine is absent.

A form apparently identical with WOLFENDEN's second species was found in the plankton collected by the 'Siboga'.

1. *Cornucalanus simplex* Wolfenden. Plate XXXV, figs. 1—9.

*Cornucalanus simplex* Wolfenden, 1905, p. 22.

*Cornucalanus simplex* Sars, 1907 (a), p. 14.

Female — length 5 mm.

Viewed from above, the body appears moderately robust, and elongate ovate in outline. The head is separated from the first thoracic segment. The fourth and fifth thoracic segments are completely separated. The last thoracic segment is produced posteriorly into points. Seen from the side, the forehead is only slightly arched, and no trace of a cephalic spine can be

observed. The last thoracic segment is obtusely triangular in outline, with the apex very narrowly rounded. The rostrum is robust and strongly bifurcate. The rami are truncate at the apex and bear a moderately long curved filament.

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained about two and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is rather shorter than the combined length of the second and third segments. The anal segment is very small and is equal to about one-third of the length of the third segment. The furcal joints are as long as broad, and are equal to the length of the anal segment.

The antennules are composed of twenty-four joints, and extend to the end of the second abdominal segment. The basal joint of the antennules appears to be divided.

The antennae, mandibles, maxillae and maxillipedes are similar in structure to those of *Cornucalanus chelififer*. The curved spine on the apex of the first maxilliped, is furnished with a fringe of short hairs on the middle of the internal and external margins. The internal base of the spine carries a short stout process, which is produced at the apex into a long whip-like seta. The apex of the first maxilliped bears six short sensory organs with tufted heads, and two long simple filaments.

The four pairs of swimming feet are similar to those of *Onchocalanus*.

The fifth pair of feet is very small. Each foot consists of two free joints attached to a basal part. The first joint is furnished with a small tuft of spinules at its posterior end. The second joint is furnished with three or four transverse rows of spinules. The joint terminates in two small apical spines.

No figures of *Cornucalanus simplex* have previously been given, but so far as WOLFENDEN'S very brief description goes, the 'Siboga' form appears to agree with that species. The 'Siboga' specimen is an adult female, and by the absence of the cephalic spine is evidently distinct from *Cornucalanus chelififer*. The remarkably strong and curved claw with the peculiar process at the base, on the apex of the first pair of maxillipedes, is sufficient to separate this genus from any of the other members of the family Phaennidae.

Occurrence. — One female was obtained from the plankton collected with the HENSEN vertical net at Station 143, 1000 metres to the surface.

#### Genus *Amallophora* T. Scott, 1893.

This genus was established by my father in 1893, for a Calanoid, which was readily distinguished from any other known form by the presence of a peculiar appendage, resembling a sheaf of corn, on the apex of the first pair of maxillipedes. Other forms were included in the genus, but these are now clearly not congeneric. *Amallophora* was afterwards included under the genus *Xanthocalanus* by GIESBRECHT and SCHMEIL.

SARS has recently revived the genus for the reception of one of the species originally included in it by my father. FARRAN rightly points out, however, that this use cannot be upheld, as *Amallophora magna* is not congeneric with *Amallophora typica*.

The genus *Amallophora* is restored in the present report for the typical species, which was represented in the plankton collected by the 'Siboga'.

*Amallophora* can be distinguished from *Xanthocalanus*, or any of the other genera of the family Phaennidae, by the structure of the first pair of maxillipedes. The apical lobes are furnished with large flexible, densely plumose setae, and the sensory apparatus is represented by one very short and stout appendage, with a densely ciliated head. No other type of sensory organ is present in the male at any rate. The rostrum is bifurcate. The rami are drawn out into slender filaments, but have no trace of an articulation, as in *Xanthocalanus*. The various appendages are somewhat similar to those of *Xanthocalanus agilis*. The fifth pair of feet of the female is represented by two free joints attached to a basal portion. The left exopodite of the male fifth pair is long and slender. The right exopodite is short and rudimentary.

1. *Amallophora typica* T. Scott. Plate XXXVI, figs. 1—8.

*Amallophora typica* T. Scott, 1893, p. 54, pls. III & IV.

*Xanthocalanus typicus* Giesbrecht & Schmeil, 1898, p. 50.

*Xanthocalanus typicus* Farran, 1908, p. 47, pl. IV, figs. 15—17.

One male was obtained from the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

*Amallophora typica* has a close resemblance to *Xanthocalanus agilis*, but it is easily separated by the possession of a single stout sensory organ on the apex of the first pair of maxillipedes, and by the absence of the strong claw-like spines with their coarsely dentate inner margin. The rami of the rostrum are very stout at the base, and are produced into long slender filaments.

The exopodites of the four pairs of swimming feet are all distinctly three-jointed. The endopodite of the first pair of feet is one-jointed, of the second, two-jointed, of the third and fourth, three-jointed.

The exopodite of the left fifth foot consists of five free joints attached to a basal part. The inner distal angle of the fourth joint is furnished with a two-jointed appendage, the second joint of which is traversed by a transverse row of long hairs. The fifth joint bears a small apical spine. The right foot is composed of four joints and a basal part. The second joint is furnished with a small outer-edge spine. The fourth joint is truncate at the apex and bears two small apical spines. Length of male 2.66 mm.

FARRAN has recently discovered what appears to be the female of this species, in plankton collected from the deep water off the West of Ireland. It also possesses the single large sensory appendage on the apex of the first maxillipedes. The fifth pair of feet is somewhat similar in structure to that of *Xanthocalanus*, but the second free joint has a truncate apex and bears two apical spines. The terminal joint of the female fifth foot is not unlike the last joint of the right foot of the male.

*Amallophora typica* has, so far, only been recorded from the Gulf of Guinea, and from the North Atlantic off the Coast of Ireland.

Genus *Heteramalla* G. O. Sars, 1907(a).

The characteristic differences between *Heteramalla* and the other members of the family are: (1) A strong chitinised and slightly bifurcate lamelliform rostrum; (2) An extraordinary development of two of the sensory appendages on the apex of the first pair of maxillipedes; and (3) A two-jointed exopodite of the first pair of swimming feet. The exopodites and endopodites of the second, third and fourth pairs of feet resemble those of *Xanthocalanus*. The fifth pair is very small and rudimentary in the female. The fifth pair of feet of the male is almost similar to that of the male of *Scaphocalanus magnus*.

This genus was established by Sars in 1907 for a female Calanoid, apparently identical with a male form from the Gulf of Guinea, described by my father as *Amalophora dubia*.

One species is known. It was represented in the 'Siboga' plankton.

1. *Heteramalla dubia* (T. Scott). Plate XXXIII, figs. 1—9.

*Amalophora dubia* T. Scott, 1893, p. 55, pl. IV, figs. 10—18.

*Scolecithrix scotti* Giesbrecht, 1897, p. 254.

*Scolecithrix scotti* Giesbrecht & Schmeil, 1898, p. 46.

*Heteramalla dubia* Sars, 1907(a), p. 17.

Female — length 3,78 mm.

Viewed from above, the body appears moderately robust and oval in outline. The head is distinctly separated from the first thoracic segment. The fourth and fifth thoracic segments are indistinctly divided. The last thoracic segment is slightly produced and appears pointed. Seen from the side, the forehead is feebly arched, and is produced into a very stout, short, chitinised rostrum, bifurcate at the apex and without filaments. The last thoracic segment is narrowly rounded at the apex and, then slightly emarginate as it passes into the dorsal line.

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained two and three-fourth times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is equal to the combined length of the next two segments. The second, third and fourth segments are each shorter than the segment immediately in front. The furcal joints are about as long as broad, and are as long as the anal segment.

The antennules are twenty-four-jointed and extend to the end of the genital segment.

The exopodite and the endopodite of the antennae are comparatively short. The endopodite is only slightly shorter than the exopodite.

The mandibles and maxillae are almost similar to those of *Xanthocalanus*.

The apical lobes of the first pair of maxillipedes are furnished with flattened plumose setae. The apex of the first pair of maxillipedes carries three types of sensory organs. The first type is represented by three long and simple appendages which terminate in a blunt point. The second type also consists of three appendages, subequal in length, but each one terminates in a small amalliform head. One of the second series is distinctly stouter than the others and the head is more expanded. The third type is represented by two very short and stout appendages, each with an enormously developed *amalla*, resembling the single one in *Amalophora typica*.

The exopodite of the first pair of feet is composed of two joints. The second and third joints are completely fused together. The junction of the two joints is defined by an outer-edge spine. The endopodite is one-jointed.

The exopodite of the second pair of feet is three-jointed. The endopodite is two-jointed. The second joint of the endopodite is furnished with three transverse rows of spines.

The exopodites and endopodites of the third and fourth pairs of feet are three-jointed. The second and third joints of the endopodite of the third pair of feet are each furnished with two transverse rows of spines. The second joint of the endopodite of the fourth pair of feet is furnished with one transverse row, and the third joint with two transverse rows of spines. The surface of the joints is closely set with minute points.

The fifth pair of feet is very small and rudimentary. Each foot consists of two free joints attached to a basal part. The second joint is moderately stout and spiniform (Plate XXXIII, fig. 9).

Occurrence. — One specimen was obtained from the plankton collected with the HENSEN vertical net at Station 143, 1000 metres to the surface.

This species appears to be identical with the form described by Sars (1907 *a*). The only difference that can be made out between the preliminary description, and that now given, is in the jointing of the endopodite of the third pair of feet. Sars states that it is two-jointed, whereas in the 'Siboga' specimen it is distinctly three-jointed. It also appears to be identical with *Amalophora dubia*, described by my father from males only, that were found in plankton collected in the Gulf of Guinea. The two large *amalla* on the apex of the first pair of maxillipedes, are clearly shewn amongst the other illustrations (Plate IV, fig. 13) in the report, 'On Entomostraca' from the Gulf of Guinea.

I have included *Amalophora* and *Heteramalla* in the family Phaennidae, as the sensory appendages on the apex of the first maxillipedes are quite distinct from those found in the family Scolecithricidae. The ciliated heads indicate a closer relationship to *Phaenna* than to *Scolcithrix*.

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## 8. Family SCOLECITHRICIDAE.

Genus **Scolcithrix** Brady, 1883.

BRADY established this genus for the reception of a Calanoid form described by LUBBOCK as *Undina danae*, which is distinguished by the presence of a tuft of worm-like sensory filaments on the apex of the first pair of maxillipedes. The fifth pair of feet is entirely absent in the female.

A second form, *Scolcithrix minor*, with a fifth pair of feet in the female, was also included under the genus by BRADY. GIESBRECHT and SCHMEIL subsequently included a number of species under the genus, the females of which are furnished with fifth feet. Sars rightly points out, however, in 'Crustacea of Norway', that the inclusion of *Scolcithrix*-like forms with a fifth pair of feet is erroneous, and established a new genus for the reception of some of them.

Only one species, properly belonging to this genus, has yet been detected. It was well represented in the Malay Archipelago.

1. *Scolecithrix danae* (Lubbock).

- Undina danae* Lubbock, 1856, p. 15, pl. IX.  
*Scolecithrix danae* Brady, 1883, p. 57, pl. XVII.  
*Scolecithrix danae* Giesbrecht, 1893, p. 265, pls. 13 & 37.  
*Scolecithrix danae* T. Scott, 1893, p. 49.  
*Scolecithrix danae* Giesbrecht & Schmeil, 1898, p. 42.  
*Scolecithrix danae* I. C. Thompson, 1900, p. 279.  
*Scolecithrix danae* Cleve, 1901, p. 9.  
*Scolecithrix danae* A. Scott, 1902, p. 403.  
*Scolecithrix danae* I. C. Thompson, 1903, p. 20.  
*Scolecithrix danae* Thompson & Scott, 1903, p. 245.  
*Scolecithrix danae* Cleve, 1903, p. 368.  
*Scolecithrix danae* Cleve, 1904, p. 197.  
*Scolecithrix danae* Sars, 1905 (a), p. 5.  
*Scolecithrix danae* Wolfenden, 1905 (a), p. 1009.  
*Scolecithrix danae* Esterly, 1905, p. 164, fig. 26.  
*Scolecithrix danae* van Breemen, 1908, p. 70, fig. 80.

*Scolecithrix danae* was well distributed throughout the area traversed by the 'Siboga' as the following records shew. It was moderately common in some of the collections.

Stat. 19. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 66. — Stat. 75. — Stat. 81. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 109. — Stat. 117, 60 specimens. — Stat. 118. — Stat. 124. — Stat. 125 (day). — Stat. 128. — Stat. 133. — Stat. 136, 85 specimens. — Stat. 138. — Stat. 141. — Stat. 142. — Stat. 143. — Stat. 144. — Stat. 148. — Stat. 149. — Stat. 157. — Stat. 165, 70 specimens. — Stat. 168. — Stat. 169. — Stat. 172, 70 specimens. — Stat. 174. — Stat. 177<sup>a</sup>. — Stat. 184, 45 specimens. — Stat. 185. — Stat. 186. — Stat. 189<sup>c</sup>. — Stat. 193. — Stats. 194—7. — Stat. 203 (surface), 1 specimen. — Stat. 203 (1500 metres to surface), 12 specimens. — Stat. 204. — Stat. 213. — Stat. 214. — Stat. 215<sup>a</sup>, 65 specimens. — Stat. 216. — Stat. 217 (horizontal cylinder), 55 specimens. — Stat. 220 (surface), 70 specimens. — Stat. 220 (200 metres to surface), 70 specimens. — Stat. 223. — Stat. 224. — Stat. 225. — Stat. 229. — Stat. 243. — Stat. 245. — Stat. 252. — Stat. 271. — Stat. 276. — Stat. 282. — Stat. 304. — Stat. 315.

This species is easily distinguished by its very robust body and short abdomen. The female has no fifth feet. The male fifth pair is well developed and prehensile.

*Scolecithrix danae* appears to be generally distributed in tropical seas.

Genus *Scolecithricella* G. O. Sars, 1902.

The females of this genus are recognised by the presence of a fifth pair of feet. The fifth feet of the known males is well developed and forms a prehensile organ. The majority of the sensory organs on the apex of the first pair of maxillipedes have evenly rounded ends, but there appears to be a few of the filaments with the apex more or less inflated.

Fourteen species were represented in the plankton collected by the 'Siboga', two of which appear to be undescribed. It is possible that some of the forms included in the genus

*Scolecithricella* in this report, will be removed to other genera when complete information regarding the two sexes becomes available.

1. *Scolecithricella abyssalis* (Giesbrecht).

- Scolecithrix abyssalis* Giesbrecht, 1888, p. 338.  
*Scolecithrix abyssalis* Giesbrecht, 1893, p. 266, pl. 13.  
*Scolecithrix tumida* T. Scott, 1893, p. 52, pl. III, figs. 33—38.  
*Scolecithrix abyssalis* Giesbrecht & Schmeil, 1898, p. 43.

Twenty females belonging to this species were obtained from the plankton collected at the following stations.

- Stat. 141 (1500 metres to surface), 3 specimens. — Stat. 142, 1 specimens. — Stat. 143 (1000 metres to surface), 2 specimens. — Stat. 185 (1536 metres to surface), 3 specimens. — Stat. 203 (1500 metres to surface), 4 specimens. — Stat. 230 (2000 metres to surface), 4 specimens. — Stat. 243 (1000 metres to surface), 2 specimens. — Stat. 276 (750 metres to surface), 1 specimen.

*Scolecithricella abyssalis* appears to be closely related to *Scolecithricella vittata*, but can be separated from it by the proportional length of the spines on the female fifth feet. The spine on the inner margin of the free joint is longer than the apical one. In *Scolecithricella vittata* the apical spine is much longer than the one on the inner margin.

The form from the Gulf of Guinea plankton described by my father as *Scolecithrix tumida* appears to be identical with GIESBRECHT's species.

This species has only previously been recorded from the Pacific Ocean, the Gulf of Guinea, and the Farøe Channel. The male is unknown.

2. *Scolecithricella auropecten* (Giesbrecht).

- Scolecithrix auropecten* Giesbrecht, 1893, p. 266, pls. 13 & 37.  
*Scolecithrix auropecten* Giesbrecht & Schmeil, 1898, p. 45.  
*Scolecithrix auropecten* I. C. Thompson, 1903, p. 20.  
*Scolecithrix auropecten* Thompson & Scott, 1903, p. 245.  
*Scolecithricella auropecten* Sars, 1907 (a), p. 16.  
*Scolecithrix auropecten* van Breemen, 1908, p. 74, fig. 86.

Two females were found in the plankton collected with the HENSEN vertical net at the following two stations.

- Stat. 118 (900 metres to surface). — Stat. 148 (1000 metres to surface).

The free joint of the female fifth feet is very small and narrow, and it is furnished with two apical spines. The inner spine is considerably longer than the outer one.

The distribution of the species appears to be limited and the male is unknown.

3. *Scolecithricella bradyi* (Giesbrecht).

- Scolecithrix bradyi* Giesbrecht, 1888, p. 337.  
*Scolecithrix bradyi* Giesbrecht, 1893, p. 266, pls. 4, 13, 37.  
*Scolecithrix bradyi* T. Scott, 1893, p. 51, pl. V, figs. 29—39.  
*Scolecithrix bradyi* Giesbrecht & Schmeil, 1898, p. 42.



- Scolecithrix bradyi* Cleve, 1901, p. 9.  
*Scolecithrix bradyi* I. C. Thompson, 1903, p. 20.  
*Scolecithrix bradyi* Thompson & Scott, 1903, p. 245.  
*Scolecithrix bradyi* Sars, 1905 (a), p. 5.  
*Scolecithrix bradyi* Esterly, 1905, p. 165, fig. 27.  
*Scolecithrix bradyi* van Breemen, 1908, p. 71, fig. 81.

Six females and one male were obtained from the plankton collected at the following stations.

Stat. 141 (1500 metres to surface), 1 specimen. — Stat. 142, 1 specimen. — Stat. 143 (1000 metres to surface), 1 specimen. — Stat. 203 (surface), 1 specimen. — Stat. 243 (1000 metres to surface), 1 specimen. — Stat. 276 (750 metres to surface), 1 specimen.

The female is easily recognised by the asymmetrical last thoracic segment when viewed from above. The posterior margins of the segment are considerably produced, and the right side extends slightly beyond the end of the genital segment. The genital segment is large and asymmetrical. It is longer than the combined length of the other abdominal segments. The fifth pair of feet is very small and easily overlooked. Each foot consists of a lamelliform appendage with a pointed apex. The male fifth pair is moderately large and prehensile. The last joint of the right foot is forked.

*Scolecithricella bradyi* appears to have a fairly wide distribution.

#### 4. *Scolecithricella longicornis* (T. Scott.).

- Scolecithrix longicornis* T. Scott, 1893, p. 50, pl. V, figs. 20—28.  
*Scolecithrix longicornis* Giesbrecht & Schmeil, 1898, p. 45.

Four females belonging to this species were found in the plankton collected at the following stations.

Stat. 142, 1 specimen. — Stat. 143 (1000 metres to surface), 2 specimens. — Stat. 148 (1000 metres to surface), 1 specimen.

*Scolecithricella longicornis* is easily recognised by its long antennules, and by the peculiar form of the fifth pair of feet. The fifth pair of feet is composed of two free joints attached to a basal part. The apex of the second joint is produced into a point. The inner distal angle of the joint is furnished with an elongate and moderately strong spine. The male is unknown.

This species has hitherto only been recorded from the Gulf of Guinea.

#### 5. *Scolecithricella longifurca* (Giesbrecht).

- Scolecithrix longifurca* Giesbrecht, 1888, p. 338.  
*Scolecithrix longifurca* Giesbrecht, 1893, p. 266, pls. 13, 37.  
*Scolecithrix longifurca* Giesbrecht & Schmeil, 1898, p. 45.

One female of this species was found in the plankton collected with the HENSEN vertical net at Station 128, 700 metres to the surface.

*Scolecithricella longifurca* can be recognised by its moderately long abdomen, and by the proportional length of the segments. The anal segment is very short and the furcal joints are twice as long as broad. The female fifth pair is small. Each foot is composed of one free joint

and a basal part. The proximal spine on the free joint is about two and one-half times longer than the apical spine. The male is unknown.

*Scolecithricella longifurca* is only known from the Pacific Ocean.

6. *Scolecithricella ctenopus* (Giesbrecht).

*Scolecithrix ctenopus* Giesbrecht, 1888, p. 337.

*Scolecithrix ctenopus* Giesbrecht, 1893, p. 266, pls. 13 & 37.

*Scolecithrix ctenopus* T. Scott, 1893, p. 48, pl. V, figs. 2—9.

*Scolecithrix ctenopus* Giesbrecht & Schmeil, 1898, p. 46.

One male belonging to this species was found in the plankton collected with the HENSEN vertical net at Station 118, 900 metres to the surface.

The male is easily identified by the structure of the fifth pair of feet. The left foot is long and narrow and the end joint is furnished on its inner margin with a comb-like row of fine spines. The right foot is very small. Only the male of this form is known.

When the female is discovered it will probably be found necessary to remove this species to another genus, as the fifth pair of feet of the male is more closely related to *Xanthocalanus* than to *Scolecithricella*.

*Scolecithricella ctenopus* has only been recorded from the Pacific Ocean and from the Gulf of Guinea.

7. *Scolecithricella marginata* (Giesbrecht).

*Scolecithrix marginata* Giesbrecht, 1888, p. 338.

*Scolecithrix marginata* Giesbrecht, 1893, p. 266, pl. 13.

*Scolecithrix marginata* Giesbrecht & Schmeil, 1898, p. 44.

Thirteen females were obtained from the plankton collected at the following stations.

Stat. 16, 1 specimen. — Stat. 40, 1 specimen. — Stat. 47<sup>b</sup>, 1 specimen. — Stat. 66, 1 specimen. — Stat. 75, 1 specimen. — Stat. 118, 1 specimen. — Stat. 128, 1 specimen. — Stat. 142, 1 specimen. — Stat. 143, 1 specimen. — Stat. 185, 2 specimens. — Stat. 203 (surface), 1 specimen. — Stat. 243, 1 specimen.

*Scolecithricella marginata* bears a close resemblance to *Scolecithricella auropecten*, but can be distinguished from it by the character of the armature of the fifth feet. The inner marginal spine is moderately stout and it is fringed with fine spinules. The male is unknown.

This species is only known from the Pacific Ocean.

8. *Scolecithricella profunda* (Giesbrecht).

*Scolecithrix profunda* Giesbrecht, 1893, p. 266, pl. 13.

*Scolecithrix profunda* Giesbrecht & Schmeil, 1898, p. 43.

One female was found in the plankton collected with the HENSEN vertical net at Station 141, 1500 metres to the surface.

*Scolecithricella profunda* resembles *Scolecithricella vittata* in general appearance, and the fifth pair of feet is not unlike that of *Scolecithricella abyssalis* at first sight. The apex of the

free joint is broadly rounded in this species, whereas in *Scolecithricella abyssalis*, the apex is distinctly pointed. The apical spine on the free joint of *Scolecithricella vittata* fifth pair is very long. The male is unknown.

This species has only hitherto been known from the Mediterranean.

9. *Scolecithricella obtusifrons* (Sars). Plate XXXI, figs. 1—9.

*Amalophora obtusifrons* Sars, 1905 (a), p. 22.

*Scolecithrix emarginata* Farran, 1905, p. 36, pl. VII, figs. 6—17.

*Amalophora obtusifrons* Pearson, 1906, p. 17.

*Scolecithrix obtusifrons* Farran, 1908, p. 54.

*Scolecithrix obtusifrons* van Breemen, 1908, p. 75, fig. 87.

Five specimens apparently belonging to this species, were obtained from samples of plankton collected with the HENSEN vertical net at the following stations.

Stat. 141 (1500 metres to surface), 2 specimens. — Stat. 148 (1000 metres to surface), 2 specimens. — Stat. 185 (1536 metres to surface), 1 specimen.

The specimens agree fairly well with SARS' preliminary description, and also with the figures and description given by FARRAN (1905).

The rostrum of the 'Siboga' specimens is furnished with long and moderately stout filaments. The apex of each filament is distinctly bifurcate (Plate XXXI, fig. 4). Length of female 4.3 mm.

SARS placed the species under the genus *Amalophora*, but I do not regard the 'Siboga' specimens to be typical members of that genus.

*Scolecithricella obtusifrons* has only previously been obtained from the North Atlantic.

10. *Scolecithricella tenuipes* (T. Scott).

*Scolecithrix tenuipes* T. Scott, 1893, p. 48, pl. V, figs. 10—19.

*Scolecithrix tenuipes* Giesbrecht & Schmeil, 1898, p. 47.

*Scolecithrix tenuipes* Thompson & Scott, 1903, p. 245.

One specimen was found in the plankton collected with the HENSEN vertical net at Station 141, 1500 metres to the surface.

*Scolecithricella tenuipes* is easily distinguished from the other members of the genus by the structure of the fifth pair of feet. The left foot is long and slender and the last joint is spiniform. There is no fringe of hairs on the last joint. The right foot is very short and rudimentary. Only the male is known.

When the female is discovered, this species will probably require to be removed to another genus, as the fifth pair of feet of the male is more closely related to *Xanthocalanus*, or *Neoscolecithrix*, than to *Scolecithricella*.

*Scolecithricella tenuipes* has only been recorded from the Gulf of Guinea and from the Red Sea.

11. *Scolecithricella valida* (Farran). Plate XXXII, figs. 1—9.

*Scolecithrix valida* Farran, 1908, p. 55, pls. V & VI.

Five females apparently belonging to this species were obtained from the plankton collected with the HENSEN vertical net at the following two stations.

Stat. 148 (1000 metres to surface), 2 specimens. — Stat. 230 (2000 metres to surface), 3 specimens.

The 'Siboga' specimens appear to be rather more robust than those obtained by FARRAN from the deep water off the West of Ireland. The rami of the rostrum are very robust and terminate in a slender filament. The filament is articulated at the base. The fifth pair of feet is almost identical with FARRAN's figure. The outer edge spine is nearer the apex of the joint, however, than is shewn by FARRAN. Length 3.24 mm.

12. *Scolecithricella gracilis* Sars. Plate XXXI, figs. 10—18.

*Scolecithricella gracilis* Sars, 1905 (a), p. 21.

Two females of a form that appears to be identical with the preliminary description given by SARS of the above species, were found in the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

This species is easily identified by its slender body and moderately long abdomen, by the antennules extending beyond the furca, and by the structure of the fifth pair of feet. Each foot is composed of a single piece, without any demarkation between the basal part. The basal portion of the foot is furnished with two transverse rows of small spines, which distinguishes the species from any other member of the genus. The inner marginal spine is nearly as long as the whole foot. The apical spine is fully one-third of the length of the inner spine. The spines are fringed with short spinules. The 'Siboga' specimens are furnished with a small outer-edge spine near the middle of the foot (Plate XXXI, fig. 18).

Length of female 4 mm. Male unknown.

The fourth and fifth thoracic segments of the 'Siboga' specimens of this species appear to be indistinctly separated.

13. *Scolecithricella tydmani* nov. sp. Plate XXX, figs. 10—17.

Female — length 5.7 mm.

Seen from above, the body appears elongate and moderately robust. The head is fused with the first thoracic segment, and the combined length is nearly twice that of the next four thoracic segments. The fourth and fifth thoracic segments are completely separated. The last thoracic segment is produced and apparently pointed. Viewed from the side, the forehead is evenly rounded and produced into a moderately long rostrum. The last thoracic segment is somewhat truncate at the apex and the margin is slightly emarginate. The rostrum is composed of two rather short and moderately stout filaments attached to a projection of the forehead. Each filament is distinctly bifurcate at the apex. (Plate XXX, fig. 13).

The abdomen is short and composed of four segments. The combined length of the abdomen and furca is contained three and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is as long as

the combined length of the next two segments. The anterior portion of the ventral surface is produced into a blunt point. The second segment is equal to about two-thirds of the length of the genital segment. The third and fourth segments are of equal length and are half the length of the genital segment. The furcal joints are slightly longer than broad, and are as long as the anal segment.

The antennules are twenty-four-jointed and extend to near the end of the furca.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Scolecithricella obtusifrons* Sars.

The first pair of feet is also similar to that of *Scolecithricella obtusifrons*.

The exopodite of the second pair of feet is three-jointed and the joints are moderately wide. The surface of the second and third joints is well clothed with fine spinules. The second joint of the endopodite is furnished with three transverse rows of moderately long spinules.

The exopodite of the third pair of feet is three-jointed, and the surface of the joints is closely set with fine points. The distal end of the surface of the second joint is furnished with a horse-shoe-shaped row of small stout spines. The surface of the third joint has two horse-shoe-shaped rows of spines. The second and third joints of the endopodite are each furnished with two transverse rows of spines.

The fourth pair of feet was damaged.

The fifth pair of feet is represented by two free joints attached to a basal part. The second free joint is about twice the length of the first and is narrowly pointed at the apex. The second joint is furnished with one strong inner-edge spine, which is equal to two-thirds of the length of the joint. The posterior surface of the spine is fringed with fine spines. The apex of the joint bears one small spine. The outer margin is furnished with two spines, one is about a third from the base, and the other is close to the apex. (Plate XXX, fig. 17).

The male is unknown.

This form is easily distinguished from any of the other species by the short, stout, bifurcate filaments of the rostrum, by the broad and slightly emarginate outline of the distal end of the last thoracic segment when viewed from the side, and by the armature of the second free joint of the fifth feet.

Occurrence. — One specimen was found in the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

The species is so named in compliment to Lieutenant G. F. TYDEMAN who commanded the 'Siboga' during the expedition.

14. *Scolecithricella curticauda* nov. sp. Plate XXX, figs. 1—9.

Female — length 6 mm.

Seen from above, the body appears elongate and narrow. The head is completely fused with the first thoracic segment and its combined length is twice that of the three following thoracic segments. The last thoracic segment is slightly produced and the posterior margin is rounded. The fourth and fifth thoracic segments are completely fused, but the junction of the segments is indicated by a faint thickening of the exoskeleton. Viewed from the side, the dorsal

margin of the head is sinuate, and the front margin is boldly rounded. The last thoracic segment is contracted posteriorly. The apex of the segment is narrowly rounded, then slightly sinuate as it merges into the dorsal line. The rostrum is composed of two long and moderately stout filaments attached to a projection of the forehead. Each filament is distinctly bifurcate at the apex.

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained four times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is as long as the combined length of the second and third segments. The anterior portion of the ventral surface is only slightly produced. The second and third segments are of about equal length. The fourth segment is very small and is distinctly less than one-half of the length of the third segment. The furcal joints are about as long as broad, and are slightly longer than the anal segment.

The antennules are twenty-four-jointed and extend slightly beyond the furca.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Scolecithricella tydemani*.

The first pair of feet is also similar to that of the above species.

The exopodite of the second pair of feet is distinctly narrower than in *Scolecithricella tydemani*. The surface of the second and third joints is well clothed with fine spines. The second joint of the endopodite is furnished with three transverse rows of fine spines.

The exopodite and endopodite of the third pair of feet are almost similar in armature to that of *Scolecithricella tydemani*.

The exopodite and endopodite of the fourth pair of feet are three-jointed. The joints are comparatively narrow and the surface is closely set with small points (Plate XXX, fig. 8).

The fifth pair of feet is represented by two free joints attached to a basal part. The joints are comparatively narrow and the second joint is fully twice the length of the first. The second joint is furnished with one strong spine near the distal end of the inner margin. The spine is as long as the joint, and its outer surface is fringed with fine spinules. The apex of the joint is much contracted and bears one short, stout, naked spine. The apical spine is equal to about one-fifth of the length of the inner-edge spine. The outer margin of the joint is plain.

The male is unknown.

This species is readily separated from the other members of the genus by its long body and short abdomen, and by the structure and armature of the fifth pair of feet.

Occurrence. — Two specimens were obtained from the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

#### Genus *Scaphocalanus* G. O. Sars, 1900.

SARS established this genus in 1900 for a Calanoid found in the plankton collected during NANSEN'S North Polar expedition, but was then unaware that it had previously been described by my father and placed in the genus *Amallophora* (1893), as well as by GIESBRECHT in 1895, who placed it in the genus *Scolecithrix*. The genus *Amallophora* was disestablished by GIESBRECHT and SCHMEIL in 1898. These authors placed *Amallophora typica* in the genus *Xanthocalanus*. The other species described by my father were included in *Scolecithrix*.

SARS in 1902 recognised the identity of *Scollecithrix* (*Amallophora*) *magna* (T. Scott) with his *Scaphocalanus acrocephalus*, and revived the generic name of *Amallophora* for *magna*, and two other species that were originally established in the genus. SARS left the type species, *Amallophora typica*, in the genus *Xanthocalanus*. FARRAN (1908) points out that this revival cannot be upheld as *Amallophora magna* is not congeneric with *Amallophora typica*, with which I quite agree. The sensory appendages at the apex of the first pair of maxillipedes of *Amallophora magna* and *Amallophora typica* are quite distinct, and very important differences exist between the structure of the fifth pair of feet of the two sexes of both species. I agree with SARS, however, that the differences between *Amallophora magna*, and typical *Scollecithrix* or *Scollecithricella*, are worthy of generic distinction. I have already employed the name *Amallophora*, for the separation of the type species from the genus *Xanthocalanus*, and another generic name is necessarily required. I have, therefore, revived SARS' generic name *Scaphocalanus* for *Scollecithrix* (*Amallophora*) *magna*, and the other allied species. The following are the characters by which the genus can be distinguished from the other members of the family.

The female, in general appearance, resembles the females of the genus *Scollecithricella*, except, that it is less robust and rather more attenuated. A median crest may be present or absent on the forehead. The rostrum consists of two, very long, simple filaments. The filaments are slender and are gradually attenuated to a fine point at the apex. The antennules are composed of twenty-three joints. The endopodite and exopodite of the antennae are of about equal length. The apical portion of the first maxillipedes is similar to that of *Scollecithricella*. Two types of sensory organs are present. Some are moderately long and simple, others are short, with distinctly swollen heads. The four pairs of swimming feet are similar to those of *Scollecithricella*, but the spines on the surface of the joints are stronger and more irregularly placed. The terminal spine on the exopodite of the second, third and fourth pairs of feet is more coarsely toothed than in *Scollecithricella*. The fifth pair of feet is represented by one or two free joints attached to a basal part. The inner marginal spine, and the apical spine on the last free joint is of considerable length.

The male resembles the female in appearance, but there is no trace of a crest in the males of those females that possess one. The mouth organs are considerably reduced. The fifth pair of feet forms a well developed prehensile organ. Each foot consists of a two-jointed basiopodite, an exopodite and an endopodite. The second joint of the basiopodite of the right foot is greatly swollen in its proximal part, where it bears a styliiform endopodite. The distal end of the joint is much attenuated, and the apex is produced on the inside, into a short blunt process. The endopodite is two-jointed, short, and slightly curved. The second joint is usually lamelliform. The two-jointed basiopodite of the left foot is long and cylindrical. The endopodite and exopodite are three-jointed and subequal. The endopodite is usually a little longer than the exopodite.

The long slender filamentary rami of the rostrum, the long spines on the apical joint of the female fifth pair, and the structure of the male fifth pair of feet, easily separate this genus from any of the other known members of the family.

Three species were represented in the plankton collected by the 'Siboga', one of which appears to be new.

1. *Scaphocalanus magnus* (T. Scott).

- Amalophora magna* T. Scott, 1893, p. 55, pl. IV, figs. 5—9.  
*Scolecithrix cristata* Giesbrecht, 1895, p. 252, pls. II & III.  
*Scolecithrix cristata* Giesbrecht & Schmeil, 1898, p. 48.  
*Scaphocalanus acrocephalus* Sars, 1900, p. 36, pls. VII, VIII & IX.  
*Amalophora magna* Sars, 1902, p. 51, pls. XXXIV & XXXV.  
*Scolecithrix cristata* I. C. Thompson, 1903, p. 21 (female only).  
*Amalophora magna* Wolfenden, 1904, p. 111.  
*Scolecithrix cristata* Farran, 1905, p. 36.  
*Amalophora magna* Sars, 1905 (a), p. 6.  
*Amalophora magna* Pearson, 1906, p. 17.  
*Scolecithrix magna* Esterly, 1906, p. 66, pls. 9, 11, 12, 13.  
*Scolecithrix magna* Farran, 1908, p. 51.  
*Scolecithrix magna* van Breemen, 1908, p. 76, fig. 89.

Males and females of this species were obtained from the plankton collected at the following stations.

Stat. 96 (day), 1 specimen. — Stat. 118 (HENSEN vertical net 900 metres to surface), 1 specimen. — Stat. 138, 1 specimen. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net 1000 metres to surface), 2 specimens. — Stat. 168, 2 specimens. — Stat. 203 (surface), 2 specimens. — Stat. 276 (HENSEN vertical net 750 metres to surface), 1 specimen.

The females of *Scaphocalanus magnus* are easily distinguished from the other members of the genus, by the presence of a distinct helmet-shaped crest on the forehead. Nine females and three males were obtained.

Length. — Female 4.5—5 mm. Male 4.5 mm.

*Scaphocalanus magnus* is apparently widely distributed. It ranges from the tropical Atlantic and Pacific, to the North Polar basin. FARRAN records it from the West of Ireland, and my father has obtained it from the Farøe Channel.

2. *Scaphocalanus major* (T. Scott).

- Scolecithrix major* T. Scott, 1893, p. 52, pls. III & V.  
*Scolecithrix major* Giesbrecht & Schmeil, 1898, p. 47.  
*Scolecithrix major* I. C. Thompson, 1903, p. 20.  
*Scolecithrix major* van Breemen, 1908, p. 79, fig. 92.

Five females belonging to this species, were obtained from the plankton collected with the HENSEN vertical net at the following stations.

Stat. 128 (700 metres to surface), 1 specimen. — Stat. 141 (1500 metres to surface), 1 specimen. — Stat. 143 (1000 metres to surface), 1 specimen. — Stat. 185 (1536 metres to surface), 1 specimen. — Stat. 243 (1000 metres to surface), 1 specimen.

The female of this species has no trace of a median cephalic crest. The last thoracic segment when viewed from the side, appears very narrowly rounded, but there is no indication of a point, as in *Scaphocalanus magnus*, or *Scaphocalanus elongatus*.

The species was described by my father as a *Scolecithrix*, but the character of the spines on the fifth pair of feet, shew that it is a true member of this genus.



Length of 'Siboga' females 2,9 mm.

The known distribution at present is very limited.

3. *Scaphocalanus elongatus* nov. sp. Plate XXXII, figs. 10—16.

Female — length 2,9 mm.

Seen from above, the body is elongate and narrow. The head is fused with the first thoracic segment, and its combined length is nearly twice that of the three following segments together. The fourth and fifth thoracic segments are completely fused. The last thoracic segment is slightly produced and is distinctly pointed. Viewed from the side, the forehead appears narrowly rounded. The last thoracic segment terminates in a small but distinctly curved point. The rostrum is represented by two long slender filaments (Plate XXXII, fig. 13).

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained two and two-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is slightly longer than the second segment, and the anterior portion of the ventral surface is slightly produced. The second and third segments are of equal length. The anal segment is equal to two-thirds of the length of the third segment. The furcal joints are fully twice as long as broad, and are slightly longer than the anal segment.

The antennules were incomplete.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Scaphocalanus magnus*.

The four pairs of swimming feet are also similar to those of that species.

The fifth pair of feet consists of two free joints attached to a basal part. The first joint is short. The second joint is of moderate length, and it is considerably contracted from the middle to the apex. The inner marginal spine arises from the middle of the joint, and is fully twice as long as the joint. The apical spine is equal to half of the length of the inner spine. The outer marginal spine is placed near the apex, and is contained two and a half times in the length of the apical spine. The outer marginal spine of the right foot is wanting, but this is probably accidental.

This species is easily distinguished from the other members of the genus, by the distinctly pointed last thoracic segment when seen in side view, and by the shape of the second free joint of the fifth foot. The forehead is faintly thickened in the middle line, which may indicate a very weak crest, but the material was too limited to make certain.

Occurrence. — One female was found in the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

Genus **Lophothrix** Giesbrecht, 1895.

The members of this genus are distinguished by the very short end joint of the exopodite of the antennae, and by the stout bifurcate rostrum. The rami of the rostrum terminate in a small spine, but there is no articulation between the spine and the basal portion. The female

fifth pair of feet is composed of two free joints attached to a basal part. The second joint is furnished with one apical and two subapical spines.

The male has hitherto been unknown and is described below for the first time. The exopodite of the right and left fifth foot is three-jointed. The endopodite is present on each foot and is composed of a single joint.

GIESBRECHT described the genus in 1895, but it was withdrawn on the publication of the part on the Copepoda in 'Das Tierreich' in 1898. The genus has since been revived and set aside at intervals, but with the discovery of the male, the position of *Lophothrix* as a separate genus now appears to be firmly established.

The type species only, was represented in the plankton collected by the 'Siboga'.

1. *Lophothrix frontalis* Giesbrecht. Plate XXVI, figs. 11—20 (female). Plate XXIX, figs. 1—10 (male).

- Lophothrix frontalis* Giesbrecht, 1895, p. 254, pl. II.  
*Scolecithrix frontalis* Giesbrecht & Schmeil, 1898, p. 49.  
*Scolecithrix frontalis* I. C. Thompson, 1903, p. 21.  
*Lophothrix frontalis* Wolfenden, 1904, p. 111, pl. IX.  
*Lophothrix frontalis* Sars, 1905(a), p. 6.  
*Lophothrix frontalis* Pearson, 1906, p. 19.  
*Scolecithrix frontalis* Esterly, 1906, p. 65, pls. 9 & 13.  
*Lophothrix frontalis* Farran, 1908, p. 58.  
*Scolecithrix frontalis* van Breemen, 1908, p. 79, fig. 93.

Ten females and two males were obtained from the plankton collected at the following stations.

- Stat. 118 (HENSEN vertical net 900 metres to surface), 1 specimen. — Stat. 128 (HENSEN vertical net 700 metres to surface), 1 specimen. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 1 specimen. — Stat. 148 (HENSEN vertical net 1000 metres to surface), 1 specimen. — Stat. 168 1 specimen. — Stat. 184, 1 specimen. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 1 specimen. — Stat. 203 (HENSEN vertical net 1500 metres to surface), 2 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 1 specimen. — Stat. 276. — (HENSEN vertical net 750 metres to surface), 1 specimen.

The female is easily identified by the moderately high and narrowly rounded median crest on the forehead, when viewed from the side; — By the stout bifurcate rostrum and the small spine at the apex of the rami, and by the structure of the fifth feet. The two free joints are comparatively short. The second joint is distinctly expanded near the apex and bears three spines, one apical and two subapical. The inner subapical spine is moderately long and somewhat irregular in shape. The apical spine is slightly curved inwards, and is equal to two-thirds of the length of the inner subapical spine. The outer subapical spine is about half the length of the apical spine. The three spines are fringed with fine spinules. Length of female 7.4 mm.

The male has only a slight resemblance to the female. Viewed from above it appears elongate in outline. The fourth and fifth thoracic segments are fused, and the junction is marked by a sudden constriction near the posterior end. The apex of the segment is lamelliform and pointed. Seen from the side, the forehead is furnished with a low rounded median crest, and a moderately strong rostrum. The last thoracic segment is narrowly rounded, with a slight

emargination as the apex merges into the dorsal line. The rostrum is moderately large and the rami are more elongated than in the female.

The abdomen is composed of five segments. The total length of the abdomen and furca is contained two and one-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The second segment is longer than any of the others, and is distinctly expanded at its distal end. The fifth segment is very small. The furcal joints are about as long as broad, and are twice the length of the anal segment.

The antennules are composed of nineteen joints, and extend to the end of the second abdominal segment. The eighth joint is long and represents the result of the fusing of three or four joints. The basal joints are furnished with sensory organs.

The antennae, mandibles, maxillae and maxillipedes are nearly similar to those of the female, and are only slightly modified.

The four pairs of swimming feet are also similar to those of the female, except that the surface of the second and third joints of the exopodite and endopodite of the fourth feet, is beset with groups of fine points.

The fifth pair of feet is moderately large and prehensile. It is not unlike the male fifth pair of *Scaphocalanus* in general appearance. The second joint of the right basiopodite is dilated at the proximal end, where it bears a moderately long styliiform endopodite. The endopodite appears to be one-jointed with a lamelliform distal portion. The distal portion of the second joint of the right basiopodite is much contracted, and simply merges into the three-jointed exopodite. The second joint of the exopodite bears a small outer-edge spine at its distal end. The third joint is irregularly curved, and has a distinct knee-like projection on its inner surface. The joints of the basiopodite of the left foot are elongated and somewhat cylindrical. The exopodite is composed of three joints. The terminal joint is short and spiniform and bears a fringe of short hairs on its inner surface. The endopodite is one-jointed. The joint is of irregular shape and is rather longer than the exopodite. The outer margin of the distal end is slightly crenulate.

Length of male 5.75 mm.

The character of the male fifth pair with its one-jointed endopodite of both feet, the structure of the fifth pair of the female, the bifurcate rostrum, and the short terminal joint of the exopodite of the antennae, are sufficient to separate this genus from the other members of the family.

*Lophothrix frontalis* has a distribution somewhat similar to that of *Scaphocalanus magnus* in the tropical and temperate regions. It has been recorded by FARRAN from the deep water plankton taken off the West of Ireland, and my father has obtained it from the deep water plankton of the Farøe Channel.

#### Genus *Macandrewella* nov.

Female. The head is completely fused with the first thoracic segment and possesses a circular lens-like organ on the frontal margin. The fourth and fifth thoracic segments are completely separated. The rostrum is represented by slender filaments attached to a common

bifurcate base. The antennules are composed of twenty-three joints. The antennae, mandibles, maxillae and maxillipedes are similar in structure to those of the genus *Scolecithricella*. The four pairs of swimming feet are also similar to those of that genus. The fifth pair is very small. Each foot is composed of a single joint attached to a basal part.

Male. In general appearance it resembles the female. The frontal lens-like organ is present. The rostral filaments are much longer and the basal part may possess a small secondary apical spine. The antennules are composed of twenty joints. The antennae, mandibles, maxillae and maxillipedes are similar to those of the female and are not modified. The four pairs of swimming feet are also similar to those of the female, but the surface of the joints is less spinulose. The fifth pair is well developed and prehensile. The basiopodite is two-jointed. The exopodites of both feet are composed of two joints. The first joint of the right exopodite has the basal part more or less produced internally. The second joint is forked. The apex of the second joint of the left exopodite is furnished with a spine, and a tuft of hairs. The endopodite is present on each foot, and is composed of a single joint.

The form described by GIESBRECHT in 1896 as *Scolecithrix chelipes*, undoubtedly belongs to this genus. I have compared specimens of it that were found in plankton samples taken by Professor HERDMAN in the Red Sea, during his traverse to Ceylon in 1903. The male fifth pair of these specimens is identical with GIESBRECHT'S figure, and the forehead possesses the frontal lens-like organ referred to above.

The peculiar lens-like organ on the forehead of both sexes, along with the structure of the male fifth pair of feet, readily separates this genus from any of the other members of the family.

One species belonging to this new genus was found in the plankton collected by the 'Siboga'. Both male and female were obtained. The species is distinct from GIESBRECHT'S *Macandrewella (Scolccithrix) chelipes*.

1. *Macandrewella joanae* nov. sp. Plate VI, figs. 12—23 (female). Plate XXIII, figs. 9—15 (male).

Female — length 3,6 mm.

Seen from above, the body is oval and robust. The head is considerably contracted in front, and the last thoracic segment is quite asymmetrical. Each side of the thoracic segment is produced, and terminates in a curved spine. The spine of the left side is longer than the one on the right side (Plate VI, fig. 12). Viewed from the side, the forehead appears rounded and possesses a distinct lens-like organ, situated just behind the base of the rostrum. In end view the organ is circular and chitinised (Plate VI, fig. 16). The left side of the last thoracic segment is boldly but narrowly rounded, and is produced into a terminal curved spine, which extends beyond the middle of the genital segment. The upper basal part of the spine forms a distinct indentation with the dorsal margin (Plate VI, fig. 14). The right side of the last thoracic segment is also boldly rounded, but the curved spine only reaches to the middle of the genital segment. The basal part of the spine forms a distinct tooth with the dorsal margin of the segment (Plate VI, fig. 15). The rostrum has a stout bifurcate base, and each ramus has a filament articulated to it.

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained three and two-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. When viewed from above, the genital segment appears asymmetrical in outline. The right side is more inflated than the left. The ventral surface is produced posteriorly into a small blunt lobe. The genital segment is as long as the combined length of the next three segments and furca. The second and third segments are of about equal length. The fourth segment is slightly shorter than the third segment. The furcal joints are about as long as broad, and are slightly longer than the anal segment. The middle seta of the left furcal joint is much longer than any of the others. The posterior margin of the first, second and third segments is fringed with fine spines.

The antennules are composed of twenty-three joints and extend to the end of the genital segment.

The exopodite of the antennae is one and a half times the length of the endopodite.

The mandibles, maxillae and maxillipedes are similar to those of *Scolecithricella*. The apex of the first maxilliped is furnished with two types of sensory organs. Some are moderately long and rounded at the apex. Others are short with distinctly swollen heads.

The exopodites and endopodites of the four pairs of swimming feet are similar in structure to those of *Scolecithricella*, but the spines on the surface of the second, third and fourth pairs of feet are fewer in number and stronger.

The fifth pair is symmetrical and very small. Each foot consists of a single cylindrical joint attached to a basal part. The apex of the joint bears two short spines. The inner apical spine is longer than the outer one.

Male — length 3,4 mm.

In general appearance it resembles the female, but the last thoracic segment is symmetrical, and is furnished with small spines. The abdomen is composed of five joints. The anal segment is very small and is almost obsolete. The posterior margin of the second, third and fourth segments is fringed with fine spines. The filaments of the rostrum are longer than in the female, and the bifid basal part is furnished with one small spine on the inner angle of each lobe.

The antennules are composed of twenty joints. The proximal half of the antennule is furnished with numerous sensory organs.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female. Some of the sensory organs on the apex of the first maxilliped appear to be hollow tubes when seen in end view.

The four pairs of swimming feet are similar to those of the female, but the surface of the joints is less spinulose.

The fifth pair is large and prehensile. The second joint of the basiopodite of the right foot is dilated at its proximal part, where it bears a long sinuous one-jointed endopodite, which extends to the end of the exopodite. The exopodite is two-jointed. The base of the first joint is produced internally into a strong curved claw, which exceeds the length of the joint. The middle of the inner margin of the joint is produced into a short stout tooth. The second joint is forked at the apex. The joints of the basiopodite of the left foot are long and narrow. The

exopodite is composed of two joints. The first joint is elongate and narrow. The second joint is short and dilated. The apex of the joint is furnished with a pad of hairs and a spine. The endopodite is one-jointed, and is in the form of a sickle-shaped spine, which extends to the end of the exopodite. The distal half of the inner margin of the endopodite is finely serrate (Plate XXIII, fig. 14).

Occurrence. — Four females and one male were found in the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

The fifth pair of the male of GIESBRECHT's species is not unlike the figure given in this report, but when a comparison is made, it is seen to be distinct. The base of the exopodite of the right foot is only slightly produced internally, and the endopodite of the left foot is very broad and strong. It is not sickle-shaped as in *Macandrewella joanae*.

This genus and species is dedicated to the memory of my mother, whose encouragement did much to help me over many difficulties encountered in the study of the Copepoda.

Genus **Scottocalanus** G. O. Sars, 1905 (*b*).

This genus was established by SARS in 1905 for a *Scolecithrix*-like form with a peculiar median crest and a very strong bifurcate rostrum. The structure of the fifth feet of the two sexes was also made a character of the genus.

The typical species of the genus was first obtained by my father in the plankton collected in the Gulf of Guinea. It was described in the report 'On Entomostraca from the Gulf of Guinea' as *Scolecithrix securifrons*. Both male and female were described, but it has since been shewn by CANU and FARRAN, that the form regarded as the male really belongs to another species. GIESBRECHT in 1895 described a closely allied species as *Scolecithrix persecans*. A good deal of confusion appears to have arisen in the identification of the two forms during the past few years, and an attempt is made to put these species on their true basis in the present report.

Female. The head is completely fused with the first thoracic segment, and possesses a well defined chitinised crest on the forehead. The fourth and fifth thoracic segments are completely fused. The rostrum is bifurcate and highly chitinised. Each ramus bears an apical spine and there is a distinct articulation between the spine and the basal portion. The abdomen is composed of four segments. The antennules are twenty-four-jointed. The antennae, mandibles, maxillae and maxillipedes are somewhat similar to those of *Scolecithricella*, except that the apical lobe of the first maxilliped is furnished with a moderately stout and slightly curved claw. There are two types of sensory organs. Some are long and rounded at the apex. Others are shorter with distinctly swollen heads. The four pairs of swimming feet are similar to those of *Scolecithricella*, but the surface of the joints is only sparsely furnished with spines. The fifth pair is composed of one free joint attached to a basal part. The apex of the free joint bears one long curved spine, and one very short spine. The small spine is situated on the apex of the joint. The long spine is outside the small one and its position is usually subapical.

Male. In general appearance it resembles the female. The abdomen is composed of five joints, and the genital segment is asymmetrical. The antennules are composed of nineteen to twenty joints. The antennae, mandibles, maxillae and maxillipedes are similar to those of the

female. There is practically no modification in their structure. The four pairs of swimming feet are also similar to those of the female. The fifth pair is large and prehensile. The basiopodite is composed of two joints. The exopodite of the right foot is usually very short and may be one, two, or three-jointed. The endopodite may be quite small, or of moderate length, but it is always present, and is composed of a single joint. The second joint of the basiopodite of the right foot has frequently an articulated appearance in the swollen region, but this is probably due to defects in the mounted preparation. The two joints of the basiopodite of the left foot are slender and cylindrical. The exopodite is two-jointed. The apex of the second joint is usually furnished with two spines and a pad of hairs. The endopodite is small and one-jointed. It does not exceed the length of the exopodite. The males appear to be slightly larger than the females, but this, no doubt, is due to the longer abdomen.

Seven species, four of which appear to be undescribed, were obtained from the plankton collected by the 'Siboga' during the investigations in the Malay Archipelago.

1. *Scottocalanus securifrons* (T. Scott). Plate XXV, figs. 1—9 (female). Plate XXVIII, figs. 1—9 (male).

*Scolecithrix securifrons* T. Scott, 1893 (pars), p. 47, pls. IV & V.

*Scolecithrix securifrons* Canu, 1896, p. 425.

*Scolecithrix securifrons* Giesbrecht & Schmeil, 1898, p. 49

*Scolecithrix securifrons* I. C. Thompson, 1903, p. 20.

*Scolecithrix securifrons* Cleve, 1904, p. 197.

*Lophothrix securifrons* Wolfenden, 1904, p. 120, pl. IX.

*Scottocalanus acutus* Sars, 1905 (b), p. 7.

*Scottocalanus securifrons* Pearson, 1906, p. 19.

*Scottocalanus securifrons* Farran, 1908, p. 57.

*Scolecithrix securifrons* van Breemen, 1908, p. 76, fig. 88.

Ten females and four males belonging to this species were obtained from the plankton collected at the following stations.

Stat. 118 (HENSEN vertical net 900 metres to surface), 1 specimen. — Stat. 128 (HENSEN vertical net 700 metres to surface), 1 specimen. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 1 specimen. — Stat. 143 (HENSEN vertical net 1000 metres to surface), 1 specimen. — Stat. 148 (HENSEN vertical net 1000 metres to surface), 2 specimens. — Stat. 184, 1 specimen. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 1 specimen. — Stat. 203 (HENSEN vertical net 1500 metres to surface), 2 specimens. — Stat. 216, 1 specimen. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 1 specimen. — Stat. 276 (HENSEN vertical net 750 metres to surface), 1 specimen.

The females of this species are easily recognised by the produced, outwardly curved, and pointed terminations of the last thoracic segment. The abdomen is very short. The combined length of the abdomen and furca is contained three and a half times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The genital segment is considerably swollen at the distal end, and its length is nearly equal to the combined length of the next three segments. The ventral surface of the segment is much swollen, and is produced posteriorly into a process, which partly overlaps the second segment. The posterior margin of the segment is fringed with fine spines. The rostrum is short and stout, and the apical

spines are very minute. The antennules are twenty-four-jointed and extend to the end of the furca. The long spines on the apex of the free joints of the fifth pair of feet are asymmetrical. The spine on the left foot is distinctly thicker than the one on the right. The spines are two and one-third times the length of the joint. The small apical spines are equal to one-eighth of the length of the long ones. Length of female 4,3 mm.

The males can easily be separated from the males of the other species, by the minute spine on the apex of the rami of the rostrum. The last thoracic segment when viewed from above, is seen to be much contracted near the posterior end, then curved outwards and terminates in conspicuous spines.

The combined length of the abdomen and furca is contained two and one-third times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The second segment is longer than the others.

The antennules are twenty-jointed and extend to the middle of the fourth abdominal segment.

The distal part of the second joint of the basiopodite of the right fifth foot is distinctly swollen, and is produced internally into two knob-like processes. The exopodite is one-jointed and is slightly forked at the apex. The inner surface of the joint is hollowed out, and is furnished with a lamelliform appendage. The endopodite is very short and is pointed at the apex. The second joint of the exopodite of the left fifth foot is much longer than the first joint. It is furnished with an outer subapical lamelliform process. The proximal part of the inner margin bears a strong tooth, and the distal half of the inner margin is furnished with a pad of fine spines. The endopodite is of moderate length, and is distinctly forked in the middle into two lateral processes. The outer margin of the second joint of the basiopodite bears a large tubercle at its proximal end. Length of male 4,75 mm.

The form recorded by SARS as *Scottocalanus acutus*, is, according to FARRAN, identical with the female of the above species.

*Scottocalanus securifrons* has been recorded from the Gulf of Guinea by my father, from the South Atlantic in the vicinity of the Cape of Good Hope by Cleve, and from the North Atlantic by FARRAN, SARS, and WOLFENDEN. I have also seen males and females that were obtained from the plankton collected in the deep water of the Farøe Channel.

2. *Scottocalanus persecans* (Giesbrecht). Plate XXVII, figs. 10—18.

*Scolecithrix persecans* Giesbrecht, 1895, p. 253, pl. III.

*Scolecithrix persecans* Giesbrecht & Schmeil, 1898, p. 48.

*Scolecithrix persecans* I. C. Thompson, 1903, p. 20.

*Scolecithrix persecans* Cleve, 1904, p. 197.

*Scolecithrix persecans* Esterly, 1905, p. 166, fig. 28.

*Scolecithrix persecans* van Breemen, 1908, p. 80, fig. 94.

Four males belonging to this species were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 118 (900 metres to surface), 1 specimen. — Stat. 128 (700 metres to surface), 1 specimen. — Stat. 148 (1000 metres to surface), 2 specimens.

The male of *Scottocalanus persekans* is readily distinguished from the males of any of the other species, by the moderately long spine on the rami of the rostrum. No other known species belonging to the genus has the rostral spines so much elongated. The apex of each spine is distinctly bifid.

When viewed from the side, the posterior margin of the last thoracic segment is seen to be broadly rounded, and there is a deep notch at the junction with the ventral edge. The crest is high and rather narrowly rounded at the apex.

The combined length of the abdomen and furca is contained two and a half times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The first four segments of the abdomen are of about equal length.

The antennules are nineteen-jointed and extend to the furca.

The exopodite of the right fifth foot is two-jointed and sickle-shaped. The endopodite is moderately long and spiniform. It is only slightly curved and extends to the distal end of the second joint of the basiopodite. The two joints of the exopodite are cylindrical and of nearly equal length. The inner margin of the second joint terminates in a sharp point. The apex of the joint bears two curved spines and a pad of short hairs. The endopodite is simple and somewhat spiniform. It is nearly as long as the exopodite. Length of male 4,4 mm.

I do not think there can be any doubt, that this species is identical with the form described by GIESBRECHT as *Scolocithrix persekans*. The side view of the rostrum, and the figure of the fifth pair of feet given by that author, are the same as the figures given in this report. This species is not the same as the male form illustrated in my father's report 'On Entomostraca from the Gulf of Guinea', which FARRAN has recently erroneously made out to be the male of *Scottocalanus persekans*.

The female is partly described by FARRAN, but this probably requires further verification, as to the correctness of the identity with GIESBRECHT's species.

Some of the records of this species must be regarded with suspicion, owing to the confusion that has occurred between two of the known species. ESTERLY's record of the male is correct, and I have seen specimens of the male from the deep water of the Farøe Channel.

3. *Scottocalanus farrani* nov. sp. Plate XXIV, figs. 1—9 (female). Plate XXIX, figs. 11—18 (male).

Female — length 3,5 mm.

Viewed from above, the body appears elongate ovate and moderately robust. The forehead is furnished with a high crest. The last thoracic segment is produced posteriorly, and is angular in outline. Seen from the side, the crest appears high and the apex is narrowly rounded. The rostral points are short, and the posterior margin of the last thoracic segment is very narrowly rounded. The basal portion of the rostrum is moderately robust, and the apical points are equal to the depth of the excavation.

The combined length of the abdomen and furca is contained three and a half times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The genital segment is nearly as long as the combined length of the next three

segments. The ventral surface of the genital segment is only slightly dilated. The second segment is as long as the combined length of the third and fourth segments. The furcal joints are as long as broad, and are equal to the length of the third segment.

The antennules are twenty-four-jointed and extend to the furcal joints.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Scottocalanus securifrons*.

The four pairs of swimming feet are also similar to those of that species.

The free joint of the fifth pair of feet is distinctly swollen at the distal end, and the inner margin is sharply concave in the middle. The long spine is three times the length of the joint, and the small one is only equal to one-twenty-fifth of the length of the long spine.

Male — 3,54 mm.

Viewed from above, the body is elongate and narrow. It is less robust than in the male of *Scottocalanus persekans*. Seen from the side, the apex of the crest appears quite angular, and the rostral spines are much shorter than those of *Scottocalanus persekans*. The last thoracic segment is narrowly rounded at the apex, and the notch is less obvious.

The combined length of the abdomen and furca is contained two and one-third times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment.

The antennules are composed of twenty joints and extend to the end of the fourth abdominal segment.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female.

The four pairs of swimming feet are also similar to those of the female.

The fifth pair of feet has a general resemblance to that of *Scottocalanus persekans*, but can be separated on careful examination. The narrow part of the second joint of the basiopodite of the right foot, is produced into a strong tooth near the proximal end of the inner margin. The distal inner margin is distinctly swollen, then concave, and again dilated. The exopodite is two-jointed. The first joint is comparatively long and is greatly curved. The second joint is small and lamelliform. Its length is contained fully four times in the total length of the first joint. The shape and the proportional length of the joints of exopodite are quite different from *Scottocalanus persekans*. The endopodite extends beyond the distal end of the second joint of the basiopodite, and the apex is lamelliform. The joints of the exopodite of the left foot are cylindrical and of nearly equal length. The apex of the second joint terminates in a rather complicated process, and bears two curved spines. The endopodite is moderately stout and is much shorter than the exopodite.

The male of *Scottocalanus farrani*, although apparently resembling the male of *Scottocalanus persekans* in appearance, can readily be separated by the comparatively short and undivided apical spines of the rostrum, by the difference in the proportional length of the joints of the exopodite of the right fifth foot, and by the endopodite of the left fifth foot being much shorter than the exopodite.

Occurrence. — Twenty-three females and thirty males were obtained from the plankton collected at the following stations.

Stat. 128 (HENSEN vertical net 700 metres to surface), 3 specimens. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 9 specimens. — Stat. 148 (HENSEN vertical net 1000 metres to surface), 8 specimens. — Stat. 184, 6 specimens. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 4 specimens. — Stat. 230 (HENSEN vertical net 2000 metres to surface), 8 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 3 specimens. — Stat. 276 (HENSEN vertical net 750 metres to surface), 6 specimens.

This species is named in compliment to Mr. G. P. FARRAN, B.A., whose work amongst the Copepoda of the deep water of the Atlantic slope off the West of Ireland, has considerably extended the knowledge of the deep sea forms in the North Atlantic.

4. *Scottocalanus setosus*, nov. sp. Plate XXIV, figs. 10—18.

Female — length 3,3 mm.

Viewed from above, the body appears ovate and moderately robust. The last thoracic segment is produced somewhat abruptly into a lamelliform extension having a pointed apex. Seen from the side, the crest is high and distinctly angular at the apex. The last thoracic segment terminates in a short curved point. The distal portion of the ventral margin of the segment is sinuate in outline. The rostral points are stout and their length is about equal to the depth of the excavation.

The combined length of the abdomen and furca is contained nearly four times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The genital segment is slightly longer than the combined length of the next three segments. The ventral margin of the segment is tumid and broadly rounded. The second segment is as long as the combined length of the next two segments. The third segment is equal to two-thirds of the length of the second segment. The furcal joints are distinctly longer than broad, and are equal to the length of the second abdominal segment. The middle setae on the right furcal joint, is considerably longer than the corresponding setae on the left furcal joint.

The antennules are twenty-four-jointed and extend to about the base of the furca.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Scottocalanus securifrons*.

The four pairs of swimming feet are also similar to those of that species.

The inner margin of the free joint of the fifth pair of feet is slightly concave, and the apex of the joint is considerably dilated. The long subapical spine is three and a half times the length of the joint, and its apex is distinctly bifurcate. The apical spine is very small, and is equal to about one-fifteenth of the length of the long spine.

Male unknown.

This species is readily distinguished from the other members of the genus, by the somewhat abrupt prolongations of the last thoracic segment, by the bifurcate apex of the subapical spine on the fifth pair of feet, and by the long setae on the right furcal joint.

Occurrence. — Thirty-six specimens were obtained from the plankton collected at the following stations.

Stat. 118 (HENSEN vertical net 900 metres to surface), 2 specimens. — Stat. 141 (HENSEN vertical net 1500 metres to surface), 6 specimens. — Stat. 145, 4 specimens. — Stat. 148

(HENSEN vertical net 1000 metres to surface), 3 specimens. — Stat. 184, 5 specimens. — Stat. 185 (HENSEN vertical net 1536 metres to surface), 4 specimens. — Stat. 230 (HENSEN vertical net 2000 metres to surface), 3 specimens. — Stat. 243 (HENSEN vertical net 1000 metres to surface), 3 specimens. — Stat. 276 (HENSEN vertical net 750 metres to surface), 6 specimens.

5. *Scottocalanus longispinus* nov. sp. Plate XXV, figs. 10—18.

Female — length 4,75 mm.

Seen from above, the body appears elongate ovate and moderately robust. The anterior and posterior ends are equally contracted. The greatest width is at the junction of the *cephalothorax* with the thoracic segments. The crest is high and conspicuous. The posterior margins of the last thoracic segment are produced into broadly triangular processes with a pointed apex. Viewed from the side, the crest is seen to have a distinctly angular apex. The last thoracic segment terminates in a sharp point, and the proximal portion of the ventral margin is inflated. The rostral points are stout and their length is equal to half the depth of the excavation.

The combined length of the abdomen and furca is contained three and a half times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The genital segment is distinctly longer than the combined length of the next three segments. The segment appears nearly cylindrical when seen from above, but when viewed from the side the dorsal and ventral surfaces are distinctly gibbous. The second segment is nearly as long as the combined length of the next two segments. The furcal joints are longer than broad and are equal to the length of the second abdominal segment.

The antennules are composed of twenty-four joints and extend a little beyond the furca.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Scottocalanus securifrons*.

The four pairs of swimming feet are also similar to those of that species.

The inner margin of the free joint of the fifth pair of feet is sharply concave near the middle. The apex of the joint is dilated. The long subapical spine is fully four times as long as the joint, and the distal end is not bifurcate. The apical spine is very short, and is only equal to one-twenty-seventh of the length of the long spine.

Male unknown.

This species is easily separated from the other forms, by the broadly triangular terminations of the last thoracic segment, by the short almost cylindrical abdomen, and by the length of the spines on the free joint of the fifth pair of feet.

Occurrence. — One specimen was found in the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

6. *Scottocalanus thomasi* nov. sp. Plate XXVI, figs. 1—10 (female). Plate XXVIII, figs. 10—17 (male).

Female — length 5,8 mm.

Seen from above, the body is elongate ovate, but is rather less robust than in the previous species. The outline of the forehead is sharply triangular and the crest is not very

prominent. The lateral margins of the last thoracic segment are evenly contracted, and terminate in a short point. Viewed from the side, the crest is rather low and is broadly rounded at the apex. The posterior margin of the last thoracic segment is triangular in outline and sharply pointed. The middle of the ventral margin is distinctly pointed. The rostrum is short and very broad. The apical spines are very small and stout.

The combined length of the abdomen and furca is contained fully three and a half times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The genital segment appears cylindrical when viewed from above, and is equal to the combined length of the next two segments. The proximal portion of the ventral surface is produced into a broadly triangular process. The second and third segments are of equal length. The furcal joints are slightly longer than broad, and are equal to about two-thirds of the length of the second abdominal segment.

The antennules are composed of twenty-four joints and extend a little beyond the furca.

The antennae, mandibles, maxillae and maxillipedes are nearly similar to those of *Scotocalanus securifrons*.

The four pairs of swimming feet are also nearly similar to those of that species.

The free joint of the fifth pair of feet is of almost equal width throughout. The inner margin is slightly concave, and the outer margin is flatly rounded. The long subapical spine is fully four and a half times as long as the joint, and is bifid at the apex. The apical spine is short, and is equal to one-nineteenth of the length of the long spine.

Male — length 6 mm.

In general appearance it resembles the female. The crest is low and the last thoracic segment terminates in small points. Viewed from the side, the crest appears low and broadly rounded. The last thoracic segment is rather flatly rounded at the distal end, and is furnished with a small spine near the lower edge. The ventral margin of the segment is slightly inflated, and is sinuous in outline. The rostrum is moderately long and wide. It is narrower than in the female, and the excavation is deeper. The apical spines are also slightly longer.

The combined length of the abdomen and furca is contained two and one-third times in the total length of the *cephalothorax*, from the apex of the crest to the base of the genital segment. The furcal joints are very small.

The antennules are composed of nineteen joints, and extend to the middle of the fourth abdominal segment.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female.

The four pairs of swimming are also similar to those of the female.

The exopodite of the right fifth foot is three-jointed and is only slightly curved. The third joint is moderately long and lamelliform. The endopodite is spiniform and extends to the end of the first joint of the exopodite. The exopodite of the left fifth foot is cylindrical, and the first joint is rather longer than the second. The apex of the second joint is furnished with two curved spines and a pad of hairs. The endopodite is lamelliform, and is only a little longer than the first joint of the exopodite.

The male and female of this species are easily distinguished from the other members of

the genus, by the rounded form of the crest when seen from the side, by the shape of the last thoracic segment, and by the structure of the fifth pair of feet of both sexes.

Occurrence. — One female and three males were found in the plankton collected with the HENSEN vertical net at Station 203, 1500 metres to the surface.

This species is named in compliment to my father Mr. THOMAS SCOTT, L.L.D., to whom I owe any knowledge I possess in Natural History. His advice and experience have been of the greatest value in the preparation of this report.

7. *Scottocalanus helenae* (Lubbock). Plate XXVII, figs. 1—9.

*Undina helenae* Lubbock, 1856, p. 19, pls. IV & VII.

*Scolecithrix securifrons* T. Scott, 1893, p. 47, pl. IV (male).

*Undina helenae* Giesbrecht & Schmeil, 1898, p. 52.

*Scolecithrix persecans* Farran, 1908, p. 58.

Male — length 4.9 mm.

Viewed from above, the body appears elongate and moderately robust. The anterior and posterior ends are evenly contracted. The crest is high and conspicuous. The lateral margins of the last thoracic segment are much constricted near the distal end, and are produced into angularly pointed terminations. Seen from the side, the crest is moderately high and is narrowly rounded at the apex. The posterior margin of the last thoracic segment is slightly produced and is narrowly rounded, with a considerable slope on each side of the apex. The rostrum is short and stout with moderately long apical spines. Their length exceeds the depth of the excavation.

The antennules are nineteen-jointed and extend to the end of the third abdominal segment.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the male of *Scottocalanus securifrons*.

The four pairs of swimming feet are also similar to the four pairs of feet of the male of that species.

The exopodite of the right fifth foot is two-jointed and sickle-shaped. The second joint is lamelliform, and is equal to half the length of the first joint. The endopodite extends to the distal end of the second joint of the basiopodite. The distal half of the endopodite is sickle-shaped, and the outer margin is furnished near the middle with a tooth-like process. The joints of the exopodite of the left fifth foot are of about equal length. The proximal end of the inner margin of the second joint is considerably dilated. The apex is furnished with two curved spines and a pad of hairs. The endopodite is very short and stout. It is only half the length of the first joint of the exopodite.

Female unknown.

Occurrence. — One specimen of this species was obtained from the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

This form appears to be identical with the species described and figured by LUBBOCK in the Transactions of the Zoological Society for 1856, as *Undina helenae*. It is identical with the male described and illustrated in the report, 'On Entomostraca from the Gulf of Guinea', as the male of *Scolecithrix securifrons*.

The figure of the fifth pair of feet given by LUBBOCK shews the right and left sides in a reversed condition. The endopodite of the true right side is moderately long and curved. It has a distinct tooth on the middle of the outer margin. These two points distinguish this fifth pair of feet from that of any of the other known males belonging to the genus *Scottocalanus*. The strongly curved endopodite of the right fifth foot, the very short endopodite of the left foot along with the dilated inner margin of the second joint of the exopodite, are at once obvious on comparing the figure of the Gulf of Guinea specimen, with the illustration given in this report. This species differs entirely from *Scottocalanus persecaus* (Giesbrecht), in the length of the rostral spines, in the shape of the exopodite of the left fifth foot, and also in the shape of the endopodite of the right and left sides. FARRAN's suggestion that it is the male of *Scottocalanus persecaus* is erroneous, as it differs from that species in the particular points already mentioned.

The absence of a terminal spine on the distal ends of the last thoracic segment shews that this form cannot be the male of *Scottocalanus setosus*, or of *Scottocalanus longispinus* described in the present report.

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Tribe HETERARTHANDRIA.

9. Family CENTROPAGIDAE.

Genus **Centropages** Kroyer, 1848.

This genus was established by KROYER in 1848. The forms belonging to it are readily recognised by the structure of the fifth pair of feet of the two sexes. The exopodite of the female fifth pair of feet is three-jointed. The second joint of the exopodite of the right and left sides is produced internally into a strong spiniform process. The shape, length and armature of the projection varies in the different species, and forms one of the characters that assist in distinguishing them. In the male fifth pair of feet, the left exopodite is composed of two joints. The right exopodite is three-jointed. The second and third joints are greatly developed, and form a powerful chela.

Five species were represented in the plankton collected in the Malay Archipelago by the 'Siboga'.

1. *Centropages calaninus* (Dana).

*Cyclopsina calanina* Dana, 1849, p. 25.

*Centropages calaninus* Giesbrecht, 1893, p. 305, pls. 17, 18 & 38.

*Centropages calaninus* Giesbrecht & Schmeil, 1898, p. 58.

*Centropages calaninus* Cleve, 1901, p. 5.

*Centropages calaninus* A. Scott, 1902, p. 404.

*Centropages calaninus* Thompson & Scott, 1903, p. 247.

*Centropages calaninus* Wolfenden, 1905(a), p. 1014, pl. XCVIII.

This species was rather scarce in the area investigated. Fifteen specimens were obtained from the following six stations.

Stat. 81, 2 specimens. — Stat. 93, 3 specimens. — Stat. 96 (day), 2 specimens. — Stat. 96 (night), 2 specimens. — Stat. 282, 3 specimens. — Stat. 304, 3 specimens.

*Centropages calaninus* is not unlike *Centropages violaceus* in general appearance. The female can readily be separated, however, by the moderately long anal segment, and by the structure of the fifth pair of feet. The spiniform projection of the second joint of the exopodite is nearly straight. It extends beyond the distal end of the third joint. The claw-like third joint of the exopodite of the right fifth foot of the male, has a distinct knee near the proximal end.

The species has already been recorded by CLEVE from the Malay Archipelago.

## 2. *Centropages elongatus* Giesbrecht.

*Centropages elongatus* Giesbrecht, 1896, p. 322, pl. 5, figs. 3—6.

*Centropages elongatus* Giesbrecht & Schmeil, 1898, p. 58.

*Centropages elongatus* A. Scott, 1902, p. 404, pl. 1, figs. 13 & 14.

*Centropages elongatus* Thompson & Scott, 1903, p. 246.

*Centropages elongatus* Cleve, 1903, p. 359.

*Centropages elongatus* Wolfenden, 1905 (a), p. 1014, pl. XCVIII.

This *Centropages* was very rare. Only five specimens were obtained from the plankton collected during the traverse. The following are the stations where it was noted.

Stat. 66, 1 specimen. — Stat. 96 (day), 1 specimen. — Stat. 96 (night), 1 specimen. — Stat. 128 (HENSEN vertical net, 700 metres to surface), 2 specimens.

The females are readily separated from the females of the other species, by the proportional length of the segments of the abdomen, and by the length of the projection of the second joint of the exopodite of the fifth pair of feet. The second and third abdominal segments are of nearly equal length. When viewed from above, the lateral margins appear regular in outline. The projection of the second joint of the exopodite of the fifth pair of feet, is very little longer than the third joint.

GIESBRECHT described this *Centropages* from specimens found in plankton collected from the water pumped into the sanitary tank of a steamship, when the vessel was traversing the Red Sea in 1895. I also obtained the species from plankton collected in a similar manner by Mr. H. C. ROBINSON, while making a voyage between Suez and Colombo in 1901, and again from Professor HERDMAN'S samples taken on the same route in 1902. WOLFENDEN found the species in the plankton collected by Mr. J. STANLEY GARDINER around the Maldivé Islands.

## 3. *Centropages furcatus* (Dana).

*Catopia furcata* Dana, 1849, p. 25.

*Centropages furcatus* Brady, 1883, p. 83, pl. XXVIII.

*Centropages furcatus* Giesbrecht, 1893, p. 304, pls. 17, 18 & 38.

*Centropages furcatus* T. Scott, 1893, p. 77.

*Centropages furcatus* Giesbrecht & Schmeil, 1898, p. 56.

*Centropages furcatus* I. C. Thompson, 1900, p. 279.



- Centropages furcatus* Cleve, 1901, p. 5.  
*Centropages furcatus* A. Scott, 1902, p. 403.  
*Centropages furcatus* Thompson & Scott, 1903, p. 246.  
*Centropages furcatus* Cleve, 1903, p. 359.  
*Centropages furcatus* Cleve, 1904, p. 187.  
*Centropages furcatus* Wolfenden, 1905(a), p. 1016.

This was by far, the most common and widely distributed member of the genus represented in the plankton collected by the 'Siboga' as the following records shew.

- Stat. 16. — Stat. 35. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 66. — Stat. 71. — Stat. 81. — Stat. 89. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 109. — Stat. 117<sup>a</sup>. — Stat. 125 (day). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 165. — Stat. 169. — Stat. 174. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204. — Stat. 205. — Stat. 213. — Stat. 214. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 224. — Stat. 245. — Stat. 282. — Stat. 304. — Stat. 315.

*Centropages furcatus* can readily be recognised by its slender body, by the spiniform prolongations of the last thoracic segment, and by the very short middle segment of the abdomen of the female. The structure of the fifth pair of feet of both sexes is also characteristic.

This species has apparently a moderately wide distribution in the tropical seas.

#### 4. *Centropages gracilis* (Dana).

- Cyclopsina gracilis* Dana, 1849, p. 25.  
*Centropages gracilis* Giesbrecht, 1893, p. 305, pls. 17 & 38.  
*Centropages gracilis* Giesbrecht & Schmeil, 1898, p. 57.  
*Centropages gracilis* Cleve, 1901, p. 5.  
*Centropages gracilis* Thompson & Scott, 1903, p. 247.  
*Centropages gracilis* Cleve, 1903, p. 359.  
*Centropages gracilis* Wolfenden, 1905(a), p. 1013, pl. XCVIII.

This *Centropages* was not uncommon in the plankton obtained during the investigations in the Malay Archipelago. The distribution was comparatively wide. Examples of it were found at the following stations.

- Stat. 37. — Stat. 66. — Stat. 81. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 138. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 217 (horizontal cylinder). — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282.

*Centropages gracilis* resembles *Centropages violaceus* in general appearance. The females however, can easily be distinguished by the distinct knob-like projection on the lateral margins of the second abdominal segment when seen from above. The surface of each knob is covered with fine short spines. The fifth pair of feet of both sexes is also distinct. The projection of the second joint of the exopodite of the female fifth pair is nearly straight. It is moderately stout and is almost as long as the third joint. In *Centropages violaceus* the projection is somewhat

sinous in shape, and the distal end is more contracted than in *Centropages gracilis*. The right fifth foot of the male is quite distinct from that of the male of *Centropages violaceus*.

WOLFENDEN 1905(a) is inclined to doubt the correctness of the record of *Centropages violaceus* in the report on the Ceylon Copepoda by the late I. C. THOMPSON and the present writer. He suggests that the species is really *Centropages gracilis*. Both species however, are recorded in that report from the neighbourhood of Ceylon, in addition to the other records obtained by examining the samples collected during the voyages out to the Island and back. Although WOLFENDEN did not find *Centropages violaceus* in the Maldive plankton, it does not follow that it ought to be absent from the Ceylon fauna. WOLFENDEN'S experience amongst the Copepoda ought to have taught him, that it does not always follow that a marine species, no matter where it be originally found, will not prove through some future investigation, to have a wider distribution than its describer could be aware of. The present report gives striking examples of this. *Centropages violaceus* was described by CLAUS (not GIESBRECHT as WOLFENDEN has it) from Mediterranean specimens. I have undoubted examples of it from the Atlantic, off Cape Town, obtained from plankton collected by Professor HERDMAN, during his ocean journeys to and from the meeting of the British Association, in South Africa in 1905.

*Centropages gracilis*, so far, is only known from the Indian and Pacific Oceans.

##### 5. *Centropages orsinii* Giesbrecht.

- Centropages orsinii* Giesbrecht, 1889, p. 811.  
*Centropages orsinii* Giesbrecht, 1893, p. 305, pls. 17, 18 & 38.  
*Centropages orsinii* Giesbrecht & Schmeil, 1898, p. 57.  
*Centropages orsinii* Cleve, 1901, p. 5.  
*Centropages orsinii* A. Scott, 1902, p. 404.  
*Centropages orsinii* Thompson & Scott, 1903, p. 247.  
*Centropages orsinii* Cleve, 1903, p. 359.  
*Centropages orsinii* Wolfenden, 1905(a), p. 1015 pl. XCVIII.

This member of the genus appeared to be more common than the last species. It had also a slightly wider distribution as shewn by the following records.

- Stat. 16. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 71. — Stat. 96 (day). — Stat. 96 (night). — Stat. 109. — Stat. 110. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 122. — Stat. 133. — Stat. 142. — Stat. 213. — Stat. 282. — Stat. 304.

*Centropages orsinii* has a certain amount of resemblance to *Centropages kroyeri*, but it can readily be separated from that species by the structure of the fifth pair of feet of the two sexes. The projection of the second joint of the exopodite of the female fifth pair is short and stout. It is beset with small spines. In *Centropages kroyeri* the projection is comparatively slender, and it is without spines. The claw-like joint of the male right fifth foot is longer than the projection of the second joint. In *Centropages kroyeri* the projection is longer than the claw-like joint.

GIESBRECHT'S type specimens were obtained from the Red Sea. The species is evidently well distributed in the Indian Ocean as proved by the later records.

## 10. Family PSEUDODIAPTOMIDAE.

Genus *Pseudodiaptomus* Herrick, 1884.

The members of this genus, established by HERRICK in 1884, are readily recognised by the structure of the fifth pair of feet of the two sexes. The fifth pair of the female consists of a two-jointed basiopodite and an exopodite composed of two or three joints. The endopodite is stated to be entirely absent, but one of the species found in the plankton collected by the 'Siboga', shews an indication of what appears to be a very rudimentary endopodite. The male fifth pair forms a prehensile appendage. The basiopodite is two-jointed. The exopodite of the right side is composed of two or three joints. The last joint is usually claw-like. The exopodite of the left side consists usually of two joints. The last joint is frequently lamelliform.

Two species were represented in the plankton collected by the 'Siboga'.

1. *Pseudodiaptomus aurivillii* Cleve.

*Pseudodiaptomus aurivillii* Cleve, 1901, p. 48, pls. VI & VII.

*Pseudodiaptomus aurivillii* Thompson & Scott, 1903, p. 248, pl. II, figs. 24—26.

This species although very limited in its distribution, proved to be rather plentiful in one of the gatherings. It was present at the following stations.

Stat. 16, 4 specimens. — Stat. 71, 6 specimens. — Stat. 133, 3 specimens. — Stat. 174, 8 specimens. — Stat. 213, 96 specimens.

*Pseudodiaptomus aurivillii* is easily separated from the other members of the genus, by the characters of the fifth pair of feet of the two sexes. The second joint of the exopodite of the female fifth pair is very small. It terminates in a moderately long spiniform claw. The right foot only of the male is furnished with an endopodite. The second joint of the basiopodite, and the first joint of the exopodite of the right foot have each a strong outer edge spine.

CLEVE obtained the type specimens from plankton collected in the Malay Archipelago. It has also been recorded, and partly illustrated from specimens found in the collections taken by Professor HERDMAN, during his investigations on the pearl banks in the Gulf of Manaar, Ceylon.

2. *Pseudodiaptomus clevei* nov. sp. Plate XXXVII, figs. 1—8.

Female — length 1.75 mm.

Seen from above, the female bears a general resemblance to *Pseudodiaptomus aurivillii*. The last thoracic segment is produced into strong spines. Two dorsal spines are also present on the surface of the last thoracic segment, just in front of the junction with the abdomen. Viewed from the side, the forehead appears evenly rounded. The last thoracic segment is rather narrowly rounded at the posterior end, and the dorsal spines are quite visible (Plate XXXVII, fig. 3).

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained one and a half times in the total length of the *cephalothorax*, from the

frontal margin to the base of the genital segment. The genital segment is distinctly shorter than the combined length of the second and third segments. Viewed from above, the segment appears much dilated in the anterior region. In side view the dorsal line is nearly straight. The ventral surface is much inflated. It is furnished with a well defined tooth-like process at the proximal end. There are no spines at the genital opening as in *Pseudodiptomus aurivillii*. The second, third and fourth segments are subequal in length. The furcal joints exceed the combined length of the third and fourth abdominal segments. The joints are asymmetrical. The right joint is distinctly narrower than the left. The posterior margin of the first, second and third segments is fringed with fine spines.

The antennules are composed of twenty-one joints and extend to the end of the third abdominal segment.

The antennae, mandibles, maxillae and maxillipedes are somewhat similar to those of *Pseudodiptomus serricaudatus* (T. Scott).

The four pairs of swimming feet also resemble those of that species.

The exopodite of the fifth pair of feet is three-jointed. It approaches the shape of that of *Pseudodiptomus salinus* and *Pseudodiptomus serricaudatus*, but the internal distal projection of the second joint is nearly as long as the claw-like joint. The second joint of the basiopodite is produced internally, and bears two small spines which may indicate a rudimentary endopodite (Plate XXXVII, fig. 5).

Male — length 1.52 mm.

The male resembles the female except, that the right antennule is modified for grasping, the abdomen is composed of five segments, and the furcal joints are shorter than in the female.

The right antennule is composed of nineteen joints. The seventh joint is incompletely separated. The eleventh, twelfth, thirteenth and fourteenth joints are swollen. The hinge is situated between the sixteenth and seventeenth joints.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female.

The four pairs of swimming feet are also similar to those of the female.

The endopodite is entirely absent in the fifth pair of feet. The apical joint of the exopodite of the right foot is in the form of a long sickle shaped claw-like spine. The apical joint of the exopodite of the left foot is subcircular in outline and lamelliform. The apex is very broad and bears two small spines. The middle of the outer margin is furnished with one strong spine (Plate XXXVII, fig. 8).

*Pseudodiptomus clevei* is easily separated from the other members of the genus, by the presence of two dorsal spines on the last thoracic segment, in addition to the strong posterio-lateral spines, and by the structure of the fifth pair of feet of the two sexes.

Occurrence. — Two females and two males were found in the plankton collected at Station 16.

This species is dedicated to the memory of the late Professor P. T. CLEVE whose researches amongst the oceanic plankton organisms are of the greatest value.

## 11. Family TEMORIDAE.

Genus **Temora** W. Baird, 1850.

The species belonging to this genus are easily distinguished from the other members of the family by their compact body, cylindrical abdomen and long slender furcal joints, and by the structure of the fifth pair of feet of both sexes.

Two species were represented in the plankton collected by the 'Siboga'.

1. *Temora discaudata* Giesbrecht.

- Temora discaudata* Giesbrecht, 1889, p. 814.  
*Temora discaudata* Giesbrecht, 1893, p. 328, pls. 17 & 38.  
*Temora discaudata* Giesbrecht, 1895, p. 257.  
*Temora discaudata* Giesbrecht & Schmeil, 1898, p. 101.  
*Temora discaudata* I. C. Thompson, 1900, p. 280.  
*Temora discaudata* Cleve, 1901, p. 9.  
*Temora discaudata* A. Scott, 1902, p. 405.  
*Temora discaudata* Thompson & Scott, 1903, p. 248.  
*Temora discaudata* Cleve, 1903, p. 369.  
*Temora discaudata* Cleve, 1904, p. 198.  
*Temora discaudata* Wolfenden, 1905 (a), p. 1023.

This species was moderately common and proved to be widely distributed in the Malay Archipelago as shewn by the following records.

Stat. 16. — Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 66. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 89. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 109. — Stat. 110. — Stat. 112. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 121. — Stat. 122. — Stat. 124. — Stat. 125 (day). — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 144. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 172. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 186. — Stat. 189<sup>a</sup>. — Stat. 193. — Stats. 194—7. — Stat. 203 (surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204. — Stat. 205. — Stat. 210<sup>a</sup>. — Stat. 213. — Stat. 214. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 220 (surface). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 223. — Stat. 225. — Stat. 229. — Stat. 230 (HENSEN vertical net, 2000 metres to surface). — Stat. 245. — Stat. 252. — Stat. 271. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304. — Stat. 315.

The females are easily identified by the spiniform projections of the last thoracic segment, and by the very asymmetrical furcal joints.

*Temora discaudata* appears to be widely distributed in tropical seas.

2. *Temora turbinata* (Dana).

- Calanus turbinatus* Dana, 1849, p. 12.  
*Temora turbinata* Giesbrecht, 1893, p. 329, pls. 17 & 38.

*Temora turbinata* Giesbrecht & Schmeil, 1898, p. 101.

*Temora turbinata* Thompson & Scott, 1903, p. 249.

*Temora turbinata* Sars, 1905 (*b*), p. 2.

The forms belonging to this species although less numerous in the plankton than the representatives of the previous one, were found to have a moderately wide distribution in the area investigated, as shewn by the following records.

Stat. 16. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 71. — Stat. 75. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 144. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 165. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 204. — Stat. 205. — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 225. — Stat. 229. — Stat. 230 (HENSEN vertical net, 2000 metres to surface). — Stat. 245. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 315.

This *Temora* has a very close resemblance to *Temora longicornis* (Müller), found in the plankton of the North Atlantic, off the coast of Europe, and can only with difficulty be separated from it. It may simply be a tropical variation of the well known northern form.

#### Genus **Temoropia** T. Scott, 1893.

This genus is separated from the other members of the family by the structure of the fifth pair of feet of both sexes. The fifth pair of the female is not quite symmetrical in the type form, but it is quite symmetrical in North Atlantic examples of a nearly related species. The female fifth pair is represented by two free joints attached to a basal part. The first free joint is furnished at its inner distal angle with a spiniform process, which may represent a rudimentary endopodite. The male fifth pair is large and conspicuous.

One species was obtained from the plankton collected by the 'Siboga'.

##### 1. *Temoropia mayumbaensis* T. Scott.

*Temoropia mayumbaensis* T. Scott, 1893, p. 79, pls. VIII & IX.

*Temoropia mayumbaensis* Giesbrecht & Schmeil, 1898, p. 96.

*Temoropia mayumbaensis* Thompson & Scott, 1903, p. 248.

The typical member of the genus was rather rare in the area investigated. Males and females were obtained from the plankton collected at the following stations.

Stat. 35, 2 specimens. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 6 specimens. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 4 specimens. — Stat. 184, 3 specimens. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), 1 specimen. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 8 specimens. — Stat. 220 (HENSEN vertical net, 200 metres to surface), 4 specimens. — Stat. 243 (HENSEN vertical net, 1000 metres to surface), 4 specimens.

*Temoropia mayumbaensis* is a very characteristic form and is readily recognised by the structure of the fifth pair of feet of both sexes. The ventral surface of the genital segment of the female is greatly inflated. Length, female .94 mm., male .9 mm.

This species has hitherto only been known from the Gulf of Guinea and from the Gulf of Suez.

The form recorded by G. P. FARRAN (1908), from the deep water off the West of Ireland as this species, is apparently not identical. Farran states that the fifth pair of feet of the female is symmetrical, and his illustration shews that the last joint is furnished with a claw-like spine at the apex. In *Temoropia mayumbacnsis* the last joint of the female fifth pair is asymmetrical and the apex is dentate. The 'Siboga' specimens are identical with the illustrations given in the report 'On Entomostraca from the Gulf of Guinea'. FARRAN's specimens measured 7.2—8 mm. in length.

## 12. Family METRIDIIDAE.

Genus *Metridia* Boeck, 1864.

The members of this genus are separated from *Pleuromamma*, chiefly by the absence of a pigmented luminous organ on the side of the first thoracic segment.

Five species were represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

### 1. *Metridia boeckii* Giesbrecht. Plate XXXVII, figs. 12—14.

*Metridia boeckii* Giesbrecht, 1889, p. 24.

*Metridia boeckii* Giesbrecht, 1893, p. 340, pl. 33.

*Metridia boeckii* Giesbrecht & Schmeil, 1898, p. 107.

*Metridia boeckii* Esterly, 1905, p. 178, fig. 35*d*.

One female belonging to this species, was obtained from the plankton collected with the HENSEN vertical net at each of the following five stations.

Stat. 118 (900 metres to surface). — Stat. 141 (1500 metres to surface). — Stat. 148, (1000 metres to surface). — Stat. 203 (1500 metres to surface). — Stat. 276 (750 metres to surface).

The females of *Metridia boeckii* bear a close resemblance to the females of *Metridia lucens*, but the furcal joints are as long as the anal segment, and the fifth pair is composed of three free joints attached to a basal part. The fifth pair of *Metridia lucens* has only two free joints.

The species, so far, has only been recorded by GIESBRECHT in the Fauna und Flora des Golfes von Neapel and by ESTERLY from the Pacific, off San Diego.

### 2. *Metridia brevicauda* Giesbrecht. Plate XXXVII, figs. 9—11.

*Metridia brevicauda* Giesbrecht, 1889, p. 24.

*Metridia brevicauda* Giesbrecht, 1893, p. 340, pl. 33.

*Metridia brevicauda* Giesbrecht & Schmeil, 1898, p. 108.

*Metridia brevicauda* Wolfenden, 1904, p. 111.

*Metridia brevicauda* Cleve, 1904, p. 192.

*Metridia brevicauda* Pearson, 1906, p. 24.

*Metridia brevicauda* Farran, 1908, p. 60.

*Metridia brevicauda* van Breemen, 1908, p. 111, fig. 128.

Females apparently identical with the above species, were obtained from the plankton collected with the HENSEN vertical net at the following stations.

Stat. 118 (900 metres to surface), 3 specimens. — Stat. 141 (1500 metres to surface), 4 specimens. — Stat. 143 (1000 metres to surface), 4 specimens. — Stat. 185 (1536 metres to surface), 3 specimens. — Stat. 203 (1500 metres to surface), 4 specimens. — Stat. 276 (750 metres to surface), 4 specimens.

The genital segment of the 'Siboga' specimens, is equal to the combined length of the second and third abdominal segments. The fifth pair of feet is composed of two free joints attached to a basal part. The apical joint of one foot is furnished with two setae, and the other with one only. (Plate XXXVII, fig. 11). Length 1,9 mm.

The female fifth pair of feet of *Metridia curticauda*, a species closely related to *Metridia brevicauda*, has three free joints and a basal part.

*Metridia brevicauda* has been recorded from the Atlantic and Pacific Oceans.

3. *Metridia macrura* G. O. Sars. Plate XXXVIII, figs. 8—11.

*Metridia macrura* Sars, 1905 (b), p. 7.

A single female agreeing with the preliminary description of the above species, was found in the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to the surface. Length 10,5 mm.

The furcal joints are nearly three times the length of the anal segment. The joints are twelve times longer than broad. The fifth pair of feet is very similar to that of the female of *Metridia princeps*.

4. *Metridia princeps* Giesbrecht. Plate XXXVIII, figs. 1—7.

*Metridia princeps* Giesbrecht, 1889, p. 24.

*Metridia princeps* Giesbrecht, 1893, p. 340, pl. 33.

*Metridia princeps* Giesbrecht & Schmeil, 1898, p. 107.

*Metridia princeps* I. C. Thompson, 1903, p. 24, pl. VI, figs. 3 & 4.

*Metridia princeps* Cleve, 1904, p. 192.

*Metridia princeps* Sars, 1905 (b), p. 2.

*Metridia princeps* Farran, 1905, p. 43.

*Metridia princeps* Pearson, 1906, p. 24.

*Metridia princeps* Esterly, 1906, p. 69, pls. 11, 13 & 14.

*Metridia princeps* Farran, 1908, p. 61.

*Metridia princeps* van Breemen, 1908, p. 110, fig. 127.

Nine females and six males were obtained from the plankton collected chiefly with the HENSEN vertical net at the following stations.

Stat. 118 (900 metres to surface). — Stat. 128 (700 metres to surface). — Stat. 141 (1500 metres to surface). — Stat. 148 (1000 metres to surface). — Stat. 185 (1536 metres to surface). — Stat. 203 (1500 metres to surface). — Stat. 217 (horizontal cylinder). — Stat. 243 (1000 metres to surface).

The furcal joints of both sexes are twice as long as the anal segment, and five times longer than broad. Length, female 7,9—8,8, male 8,3 mm.



This species has been found to be widely distributed. I have seen examples obtained from the deep water of the Farøe Channel.

5. *Metridia venusta* Giesbrecht. Plate XXXVII, figs. 15—20.

- Metridia venusta* Giesbrecht, 1889, p. 24.  
*Metridia venusta* Giesbrecht, 1893, p. 340, pl. 33 (female).  
*Metridia normani* Giesbrecht, 1893, p. 340, pl. 33 (male).  
*Metridia venusta* Giesbrecht & Schmeil, 1898, p. 107.  
*Metridia normani* Giesbrecht & Schmeil, 1898, p. 107.  
*Metridia normani* Wolfenden, 1904, p. 125, pl. IX, fig. 39.  
*Metridia venusta* Cleve, 1904, p. 192.  
*Metridia venusta* Farran, 1905, p. 43.  
*Metridia venusta* Pearson, 1906, p. 23.  
*Metridia venusta* Farran, 1908, p. 60.  
*Metridia venusta* van Breemen, 1908, p. 110, fig. 126.  
*Metridia normani* van Breemen, 1908, p. 109, fig. 125.

Twelve females and six males belonging to the above species were found in the plankton collected, with one exception, by means of the HENSEN vertical net at the following stations.

- Stat. 118 (900 metres to surface), 2 specimens. — Stat. 128 (700 metres to surface), 3 specimens. — Stat. 141 (1500 metres to surface), 3 specimens. — Stat. 142, 1 specimen. — Stat. 143 (1000 metres to surface), 4 specimens. — Stat. 148 (1000 metres to surface), 2 specimens. — Stat. 203 (1500 metres to surface), 2 specimens. — Stat. 276 (750 metres to surface), 1 specimen.

The two sexes of this *Metridia* can readily be recognised by the asymmetrical furcal joints. The right furcal joint is distinctly shorter than the left. The fifth pair of feet of the female, consists of one free joint attached to a basal part. Length, female 3,1, male 2,8 mm.

I do not think that there can now be any doubt that the species described by GIESBRECHT as *Metridia normani*, is only the male of *Metridia venusta*. The male fifth pair illustrated in this report is identical with the figure given by GIESBRECHT. WOLFENDEN's figure of the fifth pair of the supposed female of *Metridia normani* is simply the fifth pair of the female of *Metridia venusta*. If a line be drawn across from the outer edge setae to the inner margin in the figure now given, one would practically have a similar illustration to that shewn by WOLFENDEN. The joint shewn by that author is probably due to a defective preparation. GIESBRECHT's figure of the female fifth pair, shews the apex of the free joint to be furnished with two setae. The 'Siboga' females have three as illustrated. (Plate XXXVII, fig. 17).

*Metridia venusta* has a distribution almost similar to that of *Metridia princeps*.

Genus **Pleuromamma** Giesbrecht, 1898.

The members of this genus are readily recognised by the presence of a pigmented luminous organ on the right or left side of the first thoracic segment.

Three species were represented in the area traversed by the 'Siboga'.

1. *Pleuromamma abdominalis* (Lubbock).

- Diaptomus abdominalis* Lubbock, 1856, p. 22, pl. X.

- Pleuromma abdominale* Claus, 1863, p. 197, pls. V & VI.  
*Pleuromma abdominale* Brady, 1883, p. 46, pls. XI, XII & XXXI.  
*Pleuromma abdominale* Giesbrecht, 1893, pp. 347 & 356, pls. 5, 32 & 33.  
*Pleuromma abdominale* T. Scott, 1893, p. 41.  
*Pleuromamma abdominalis* Giesbrecht & Schmeil, 1898, p. 109.  
*Pleuromma abdominale* Cleve, 1901, p. 8.  
*Pleuromma abdominale* Wolfenden, 1902, p. 362.  
*Pleuromamma abdominalis* A. Scott, 1902, p. 405.  
*Pleuromamma abdominalis* I. C. Thompson, 1903, p. 25.  
*Pleuromamma abdominalis* Thompson & Scott, 1903, p. 249.  
*Pleuromamma abdominalis* Cleve, 1903, p. 367.  
*Pleuromamma abdominalis* Wolfenden, 1904, pp. 111 & 112.  
*Pleuromamma abdominalis* Cleve, 1904, p. 195.  
*Pleuromamma abdominalis* Wolfenden, 1905 (a), p. 1010.  
*Pleuromamma abdominalis* Sars, 1905 (b), p. 2.  
*Pleuromamma abdominalis* Esterly, 1905, p. 174, fig. 33 a & b.  
*Pleuromamma abdominalis* Farran, 1908, p. 61.  
*Pleuromamma abdominalis* van Breemen, 1908, p. 104, fig. 119.

This form appeared to be moderately common. It had a wide distribution in the Malay Archipelago as shewn by the records now given.

- Stat. 37. — Stat. 40. — Stat. 66. — Stat. 71. — Stat. 106. — Stat. 110. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 177<sup>a</sup>. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 189<sup>a</sup>. — Stat. 194—7. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 216. — Stat. 230 (HENSEN vertical net, 2000 metres to surface). — Stat. 245. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 304. — Stat. 315.

*Pleuromamma abdominalis* can readily be separated from the other species by the structure of the fifth pair of feet of the two sexes. The luminous organ may be either on the right or left side. The right antennule of the male is modified for grasping.

The species is widely distributed in all the great oceans. It has been recorded by many observers.

BRADY has apparently included figures of the next species, and also of *Metridia lucens* in his illustrations of *Pleuromamma abdominalis*.

## 2. *Pleuromamma gracilis* (Claus).

- Pleuromma gracile* Claus, 1863, p. 197, pl. V.  
*Pleuromma abdominale* Brady, 1883, p. 46 (pars), pl. XI, fig. 11, pl. XII, fig. 12.  
*Pleuromma gracile* Giesbrecht, 1893, p. 347, pls. 5, 32 & 33.  
*Pleuromma gracile* T. Scott, 1893, p. 42.  
*Pleuromamma gracilis* Giesbrecht & Schmeil, 1898, p. 110.  
*Pleuromma gracile* Cleve, 1901, p. 8.  
*Pleuromamma gracilis* A. Scott, 1902, p. 405.  
*Pleuromamma gracilis* I. C. Thompson, 1903, p. 25.  
*Pleuromamma gracilis* Thompson & Scott, 1903, p. 249.  
*Pleuromamma gracilis* Cleve, 1903, p. 367.

- Pleuromamma gracilis* Cleve, 1904, p. 195.  
*Pleuromamma gracilis* Wolfenden, 1905 (a), p. 1012.  
*Pleuromamma gracilis* Sars, 1905 (b), p. 2.  
*Pleuromamma gracilis* Esterly, 1905, p. 175, fig. 33 (c).  
*Pleuromamma gracilis* Farran, 1908, p. 61.  
*Pleuromamma gracilis* van Breemen, 1908, p. 106, fig. 122.

This *Pleuromamma* proved to be almost as numerous, and nearly as widely distributed as the previous species. It was found in the plankton collected by the 'Siboga' at the following stations.

- Stat. 37. — Stat. 40. — Stat. 66. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 96 (night). — Stat. 117<sup>1</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 189<sup>1</sup>. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204. — Stat. 216. — Stat. 225. — Stat. 230 (HENSEN vertical net, 2000 metres to surface). — Stat. 243 (HENSEN vertical net, 1000 metres to surface). — Stat. 245. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 304. — Stat. 315.

The luminous organ in this species is present on the right side only. The left antennule of the male is modified for grasping. The fifth pair of feet of the female is composed of a single joint attached to a basal part. The apex of the free joint is furnished with three short spines.

This species appears to be nearly as widely distributed as the previous form.

Some of BRADY'S figures in the report on the 'Challenger' Copepoda refer to *Pleuromamma gracilis*.

### 3. *Pleuromamma xiphias* (Giesbrecht).

- Pleuromamma xiphias* Giesbrecht, 1889, p. 25.  
*Pleuromamma xiphias* Giesbrecht 1893, p. 347, pls. 32 & 33.  
*Pleuromamma xiphias* Giesbrecht & Schmeil, 1898, p. 109.  
*Pleuromamma xiphias* Thompson & Scott, 1903, p. 249.  
*Pleuromamma xiphias* Cleve, 1904, p. 195.  
*Pleuromamma xiphias* Wolfenden, 1905 (a), p. 1012.  
*Pleuromamma xiphias* Sars, 1905 (b), p. 2.  
*Pleuromamma xiphias* Esterly, 1905, p. 176, fig. 34.  
*Pleuromamma xiphias* Farran, 1908, p. 61.  
*Pleuromamma xiphias* van Breemen, 1908, p. 105, fig. 120.

This species although represented in fewer plankton samples than either of the other two was moderately frequent where it did occur. It was noted at the following stations.

- Stat. 117<sup>1</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 189<sup>1</sup>. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 216. — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 243 (HENSEN vertical net, 1000 metres to surface). — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 304.

*Pleuromamma xiphias* resembles *Pleuromamma abdominalis* in the structure of the fifth feet of the two sexes. The males and females, however, can readily be separated by the presence of a prominent spiniform process on the forehead.

This species appears to have a moderately wide distribution in the great oceans.

### 13. Family LUCICUTHIDAE.

Genus **Lucicutia** Giesbrecht, 1898.

The members of this genus can be recognised by the moderately long abdomen, and quite symmetrical furcal joints. The fifth pair of feet of the female is somewhat similar to the third and fourth pairs, but the inner distal angle of the second joint of the exopodite is furnished with an awl-like spine. The exopodite and endopodite of the male left fifth foot are three-jointed. The exopodite and endopodite of the right foot are two-jointed. The right exopodite is claw-like.

Seven species were represented in the plankton collected during the investigations of the 'Siboga' in the Malay Archipelago. Two of the species appear to be undescribed.

#### 1. *Lucicutia flavicornis* (Claus).

- Leuckartia flavicornis*, Claus, 1863, p. 183, pl. XXXII.  
*Leuckartia flavicornis*, Giesbrecht, 1893, p. 358, pls. 5, 19 & 38.  
*Lucicutia flavicornis*, Giesbrecht & Schmeil, 1898, p. 111.  
*Leuckartia flavicornis*, Cleve, 1901, p. 7.  
*Leuckartia flavicornis*, Wolfenden, 1902, p. 363.  
*Lucicutia flavicornis*, A. Scott, 1902, p. 405.  
*Lucicutia flavicornis*, I. C. Thompson, 1903, p. 25.  
*Lucicutia flavicornis* Thompson & Scott, 1903, p. 249.  
*Lucicutia flavicornis* Cleve, 1903, p. 364.  
*Lucicutia flavicornis* Wolfenden, 1904, p. 111 & 112.  
*Lucicutia flavicornis* Cleve, 1904, p. 192.  
*Lucicutia flavicornis* Wolfenden, 1905(a), p. 1012.  
*Lucicutia flavicornis* Sars, 1905(b), p. 3.  
*Lucicutia flavicornis* Farran, 1905, p. 43.  
*Lucicutia flavicornis* Esterly, 1905, pl. 180, fig. 36.  
*Lucicutia flavicornis* Pearson, 1906, p. 25.  
*Lucicutia flavicornis* Farran, 1908, p. 64.  
*Lucicutia flavicornis* van Breemen, 1908, p. 112, fig. 129.

This species proved to be well distributed in the Malay Archipelago. It was found in the plankton collected at the following stations.

- Stat. 16. — Stat. 35. — Stat. 37. — Stat. 47'. — Stat. 66. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 96 (night). — Stat. 98. — Stat. 110. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 205. — Stat. 213. — Stat. 220

(surface). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 230 (HENSEN vertical net, 2000 metres to surface). — Stat. 243 (HENSEN vertical net, 1000 metres to surface). — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304. — Stat. 315.

The antennules extend to about the middle of the furcal joints. The anal segment is shorter than the segment immediately in front. The furcal joints are equal to the combined length of the second, third and fourth abdominal segments.

*Lucicutia flavicornis* is a comparatively small species. It appears to be widely distributed throughout the great oceans.

## 2. *Lucicutia clausi* (Giesbrecht).

*Leuckartia clausi* Giesbrecht, 1889, p. 812.

*Leuckartia clausi* Giesbrecht, 1893, p. 359, pls. 19 & 38.

*Lucicutia clausi* Giesbrecht & Schmeil, 1898, p. 111.

*Leuckartia clausi* Cleve, 1901, p. 7.

*Lucicutia clausi* I. C. Thompson, 1903, p. 26.

*Lucicutia clausi* Cleve, 1904, p. 192.

*Lucicutia clausi* Sars, 1905 (*b*), p. 3.

Eight specimens belonging to the above species were obtained from the plankton collected at the following stations.

Stat. 141 (HENSEN vertical net, 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 1 specimen. — Stat. 184, 1 specimen. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 3 specimens. — Stat. 230 (HENSEN vertical net, 2000 metres to surface), 1 specimen.

*Lucicutia clausi* is a slightly larger form than *Lucicutia flavicornis*. The two sexes can easily be distinguished by the presence of a tooth-like projection on each side of the cephalic segment, when the specimen is viewed from above.

This species appears to be rather rare and its known distribution is limited.

## 3. *Lucicutia bicornuta* Wolfenden. Plate XXXIX, figs. 1—11.

*Lucicutia bicornuta* Wolfenden, 1905, p. 24, pl. II.

*Lucicutia aurita* G. O. Sars, 1905 (*b*), p. 8.

*Lucicutia bicornuta* Sars, 1907 (*a*), p. 3.

A single male specimen identical with the form described and illustrated by WOLFENDEN in 'Plankton Studies', Part 1, 1905, was found in the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to the surface.

The species is readily recognised by the truncate frontal margin being produced at each corner into a strong spine, and by the presence of a ventrally directed hook-like spine on each side of the cephalic segment. The furcal joints are long and slender. Each furcal joint is as long as the combined length of the whole of the abdominal segments. The rami of the rostrum are very short and stout. The second joint of the basiopodite of the male left fifth foot is produced internally into a short stout process with a dentate apex. Length of 'Siboga' male 8 mm.

WOLFENDEN'S specimens were obtained from the plankton collected by the 'Gauss'. The species recorded by SARS as *Lucicutia aurita*, was found in the plankton collected by the Prince of Monaco.

4. *Lucicutia longiserrata* (Giesbrecht).

*Leuckartia longiserrata* Giesbrecht, 1889, p. 813.

*Leuckartia longiserrata* Giesbrecht, 1893, p. 359, pls. 19 & 38.

*Lucicutia longiserrata* Giesbrecht & Schmeil, 1898, p. 112.

*Lucicutia longiserrata* I. C. Thompson, 1903, p. 25.

*Lucicutia longiserrata* Farran, 1908, p. 64, pl. VI, figs. 21—22.

*Lucicutia longiserrata* van Breemen, 1908, p. 116, fig. 134.

One female belonging to this species was found in the plankton collected with the HENSEN vertical net at Station 220, 200 metres to surface.

*Lucicutia longiserrata* has a general resemblance to *Lucicutia flavicornis*, but it can be distinguished by the more robust body, and by the antennules extending beyond the end of the furcal joints. This species is also closely related to *Lucicutia longicornis*, but the length of the furcal joints does not exceed the combined length of the third and fourth abdominal segments.

*Lucicutia longiserrata* has been recorded from the Pacific and North Atlantic Oceans.

5. *Lucicutia maxima* Steuer. Plate XLI, figs. 1—10.

*Lucicutia maxima* Steuer, 1904, p. 596, fig. 4. Female.

Two immature females and one mature male were obtained from the plankton collected with the HENSEN vertical net at the following stations.

Stat. 185 (1536 metres to surface), 1 specimen. — Stat. 230 (2000 metres to surface), 2 specimens.

The three specimens have a general resemblance to *Lucicutia clausi*, but they are much larger and more robust. When viewed from above, each side of the cephalic segment is seen to be furnished with one tooth-like projection as shewn in the illustration Plate XLI, fig. 1.

Male — length 8.4 mm.

The abdomen is composed of five segments. The combined length of the abdomen and furca is contained one and one-fourth times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The furcal joints are much longer than broad. Each joint is equal to half the length of the abdomen.

The rami of the rostrum are very short and stout. They are slightly chitinised.

The right antennule is twenty-three-jointed and reaches to the middle of the furcal joints.

The endopodite of the first pair of feet is three-jointed.

The second joint of the basiopodite of the left fifth foot is produced internally. The distal end of the process is furnished with two very stout teeth. The inner margin of the second joint of the basiopodite of the right foot is slightly inflated, and bears four short teeth. The joints of the right exopodite are of about equal length. The second joint is furnished with two

outer edge spines and two apical ones. The third joint of the left exopodite bears one outer edge, one inner edge, and one apical spine (Plate XLI, fig. 10).

This male is quite distinct from the male of *Lucicutia grandis* Giesbrecht, and from the species described as *Lucicutia flavicornis* by BRADY in the report on the 'Challenger' Copepoda.

WOLFENDEN (1905), regards *Lucicutia maxima*, to be identical with GIESBRECHT'S *Lucicutia grandis*, and also with the Atlantic form recorded by himself as *Lucicutia grandis*. When full illustrations are published by STEUER, the question of identity will probably be cleared up. In the meantime, I consider the male illustrated in this report to be that of *Lucicutia maxima* Steuer, and distinct from the male of GIESBRECHT'S *Lucicutia grandis*.

6. *Lucicutia philyra* nov. sp. Plate XL, figs. 10—18.

Female — length 3.4 mm.

Seen from above, the body appears oblong ovate, and moderately robust. The cephalic segment is moderately wide. It is without lateral processes. The rostral papilla is not visible. The last thoracic segment is much contracted posteriorly. The distal margins are narrowly rounded. Viewed from the side, the last thoracic segment is rather truncate at the distal end, and the postero-ventral margin is rounded (Plate XL, fig. 12). The rostral filaments are long and slender.

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained nearly twice in the total length of the *cephalothorax*, from the frontal margin to the distal end of the last thoracic segment. The genital segment is slightly longer than the combined length of the next two segments. The dorsal surface of the segment is nearly straight. The ventral surface is much inflated. The second and fourth segments are of nearly equal length. The third segment is much shorter than the second or fourth segments. The furcal joints are six times longer than broad. Each furcal joint is as long as the combined length of the last three abdominal segments and is furnished with one outer edge setae.

The antennules are twenty-five-jointed, and extend slightly beyond the end of the furca. The last joint is equal to about one-third of the length of the second last joint.

The antennae, mandibles, maxillae and maxillipedes are nearly similar to those of *Lucicutia bicornuta*.

The exopodites and endopodites of the five pairs of feet are three-jointed. The inner distal spine on the second joint of the exopodite of the fifth pair is moderately slender. It is much attenuated from the middle to the apex. Its length is contained rather more than one and two-third times in the length of the third joint. The terminal spine on the exopodite of the fifth pair is distinctly longer than the third joint (Plate XL, fig. 18).

Male unknown.

This species has a certain amount of resemblance to *Lucicutia longicornis*, but can readily be distinguished from it by the shorter genital segment, and by the length of the furcal joints.

Occurrence. — One specimen was obtained from the plankton collected with the HENSEN vertical net at Station 118, 900 metres to the surface.

7. *Lucicutia pera* nov. sp. Plate XL, figs. 1—9.

Female — length 4 mm.

Seen from above, the body appears elongate and narrowly ovate. The cephalic segment is moderately wide. It is very flatly rounded in front, and is without lateral processes. The postero-lateral angles of the last thoracic segment are very narrowly rounded. Viewed from the side, the distal end of the last thoracic segment is rather broadly rounded, then emarginate as it joins the dorsal line (Plate XL, fig. 3). The rostral filaments are long and slender.

The abdomen is composed of four segments. The combined length of the abdomen and furca is equal to two-thirds of the total length of the *cephalothorax*, from the frontal margin to the end of the last thoracic segment. The genital segment is as long as the combined length of the second and third segments. It is quite asymmetrical when viewed from above. The distal portion of the right side is considerably wider than the base of the second abdominal segment. It has therefore a well defined projection (Plate XL, fig. 1). Seen from the side, the dorsal surface of the segment is greatly inflated at its posterior end, and forms a well marked protuberance. The ventral surface is much swollen near the middle (Plate XL, fig. 3). The ventral swelling may be due to the presence of a spermatophore, however, as shewn in the illustration. The second and fourth segments are of nearly equal length. The third segment is shorter than the second and fourth segments. The furcal joints are nearly five times longer than broad. Each furcal joint is distinctly shorter than the combined length of the third and fourth abdominal segments. The furcal joints are furnished with two outer edge setae.

The antennules are composed of twenty-five joints and extend to about the middle of the furca. The last joint is equal to one-half of the length of the second last joint.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Lucicutia phillyra*.

The exopodites and endopodites of the five pairs of feet are three-jointed. The inner distal spine on the second joint of the exopodite of the fifth pair is very stout. Its length is contained one and two-third times in the length of the third joint. The terminal spine on the third joint of the exopodite of the fifth pair is very short. Its length is contained fully three times in the length of the joint (Plate XL, fig. 9).

Male unknown.

This species comes very near *Lucicutia lucida* Farran (1908), but differs from it in the asymmetrical genital segment when seen from above. The terminal spine on the exopodite of the fifth pair of feet is shorter than in FARRAN'S species.

Occurrence. — One specimen was obtained from the plankton collected with the HENSEN vertical net at each of the following stations.

Stat. 128 (700 metres to surface). — Stat. 276 (750 metres to surface).

The genital segment was identical in each specimen.

## 14. Family HETERORHABDIDAE.

Genus *Heterorhabdus* Giesbrecht 1898.

The members of this genus are distinguished by the asymmetrical furcal joints, and by the long second inner setae on the left furcal joint.

Four species were represented in the plankton collected during the investigations carried out in the Malay Archipelago by the 'Siboga'.

1. *Heterorhabdus clausi* (Giesbrecht).

- Heterochaeta clausi* Giesbrecht, 1889, p. 812.  
*Heterochaeta clausi* Giesbrecht, 1893, p. 372, pl. 20.  
*Heterorhabdus clausi* Giesbrecht & Schmeil, 1898, p. 115.  
*Heterorhabdus clausi* I. C. Thompson, 1903, p. 27.  
*Heterorhabdus clausi* Thompson & Scott, 1903, p. 249.  
*Heterorhabdus clausi* Esterly, 1905, p. 185, fig. 39.  
*Heterorhabdus clausi* van Breemen, 1908, p. 122, fig. 140.

Two females and one male belonging to this species were found in the plankton collected with the HENSEN vertical net at the following stations.

- Stat. 128 (700 metres to surface), 1 female. — Stat. 148 (1000 metres to surface), 1 male. —  
 Stat. 276 (750 metres to surface), 1 female.

*Heterorhabdus clausi* resembles *Heterorhabdus papilliger* in general appearance, but it can readily be distinguished by the antennules extending beyond the furcal joints. Other differences are visible between the appendages of the two species.

This species has been recorded from the North Atlantic and Pacific Oceans.

2. *Heterorhabdus spinifrons* (Claus).

- Heterochaeta spinifrons* Claus, 1863, p. 182, pl. XXXII.  
*Heterochaeta spinifrons* Giesbrecht, 1893, p. 372, pls. 20 & 39.  
*Heterorhabdus spinifrons* Giesbrecht & Schmeil, 1898, p. 114.  
*Heterochaeta spinifrons* Wolfenden, 1902, p. 362.  
*Heterorhabdus spinifrons* I. C. Thompson, 1903, p. 27.  
*Heterorhabdus spinifrons* Thompson & Scott, 1903, p. 249.  
*Heterorhabdus spinifrons* Cleve, 1904, p. 191.  
*Heterorhabdus spinifrons* Sars, 1905 (b), p. 3.  
*Heterorhabdus spinifrons* Farran, 1905, p. 44.  
*Heterorhabdus spinifrons* Esterly, 1905, p. 183, fig. 37.  
*Heterorhabdus spinifrons* Pearson, 1906, p. 27.  
*Heterorhabdus spinifrons* Esterly, 1906, p. 77.  
*Heterorhabdus spinifrons* Farran, 1908, p. 65.  
*Heterorhabdus spinifrons* van Breemen, 1908, p. 119, fig. 137.

Sixteen specimens identical with the above species were obtained from the plankton collected at the following stations.

Stat. 66, 1 specimen. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 1 specimen. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 1 specimen. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), 2 specimens. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 2 specimens. — Stat. 217 (horizontal cylinder), 1 specimen. — Stat. 220 (HENSEN vertical net, 200 metres to surface), 1 specimen. — Stat. 243 (HENSEN vertical net, 1000 metres to surface), 2 specimens. — Stat. 276 (HENSEN vertical net, 750 metres to surface), 1 specimen. — Stat. 304, 1 specimen. — Stat. 315, 1 specimen.

*Heterorhabdus spinifrons* can readily be separated from the other members of the genus by the rostral papilla ending in sharp points, and by the strong curved spine on the upper surface of the first basal joint of the second pair of maxillipedes.

This species has apparently a moderately wide distribution in the great oceans.

### 3. *Heterorhabdus longicornis* (Giesbrecht).

- Heterochaeta longicornis* Giesbrecht, 1889, p. 812.  
*Heterochaeta longicornis* Giesbrecht, 1893, p. 373, pls. 20 & 39.  
*Heterorhabdus longicornis* Giesbrecht & Schmeil, 1898, p. 116.  
*Heterorhabdus longicornis* I. C. Thompson, 1903, p. 27.  
*Heterorhabdus longicornis* Wolfenden, 1904, p. 112.  
*Heterorhabdus longicornis* Sars, 1905 (b), p. 3.  
*Heterorhabdus longicornis* Farran, 1905, p. 45.  
*Heterorhabdus longicornis* Esterly, 1905, p. 186, fig. 40.  
*Heterorhabdus longicornis* Pearson, 1906, p. 26.  
*Heterorhabdus longicornis* Esterly, 1906, p. 77.  
*Heterorhabdus longicornis* Farran, 1908, 67.  
*Heterorhabdus longicornis* van Breemen, 1908, p. 125, fig. 144.

Eight females and three males belonging to this species were found in the plankton collected at the following stations.

Stat. 128 (HENSEN vertical net, 700 metres to surface), 1 specimen. — Stat. 141 HENSEN vertical net, 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 2 specimens. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 2 specimens. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 1 specimen. — Stat. 243 (HENSEN vertical net, 1000 metres to surface), 2 specimens. — Stat. 276 (HENSEN vertical net, 750 metres to surface), 1 specimen.

This species is readily distinguished from the other members of the genus by its very long antennules. The antennules extend beyond the end of the furca by eight or nine joints.

The distribution appears to be very similar to that of *Heterorhabdus spinifrons*.

### 4. *Heterorhabdus papilliger* (Claus).

- Heterochaeta papilligera* Claus, 1863, p. 182, pl. XXXII.  
*Heterochaeta papilligera* Giesbrecht, 1893, p. 372, pls. 20 & 39.  
*Heterorhabdus papilliger* Giesbrecht & Schmeil, 1898, p. 114.  
*Heterochaeta papilligera* Cleve, 1901, p. 7.  
*Heterorhabdus papilliger* I. C. Thompson, 1903, p. 27.  
*Heterorhabdus papilliger* Thompson & Scott, 1903, p. 249.

- Heterorhabdus papilliger* Cleve, 1903, p. 363.  
*Heterorhabdus papilliger* Cleve, 1904, p. 191.  
*Heterorhabdus papilliger* Wolfenden, 1905 (a), p. 1012.  
*Heterorhabdus papilliger* Sars, 1905 (b), p. 3.  
*Heterorhabdus papilliger* Esterly, 1905, p. 184, fig. 38.  
*Heterorhabdus papilliger* van Breemen, 1908, p. 120, fig. 138.

One female identical with the above species was obtained from the plankton collected at each of the three following stations.

Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 216. — Stat. 276 (HENSEN vertical net, 750 metres to surface).

*Heterorhabdus papilliger* has a close resemblance to *Heterorhabdus clausi* but it can be separated from that species by the much shorter antennules. The antennules scarcely reach to the end of the furcal joints. Other differences can be detected on comparing the various appendages of the two species.

This species appears to have a moderately wide distribution. It has been recorded from the tropical and colder areas of the great oceans by various observers.

Genus **Mesorhabdus** G. O. Sars, 1905 (b).

This genus was established by Sars in 1905 for the reception of a Calanoid closely related to *Heterorhabdus* and *Disseta*. It is separated from these genera, by the great development of the spines on the two apical lobes of the first maxillipedes. The furcal joints are quite symmetrical.

One species, apparently undescribed, was represented in the plankton collected by the 'Siboga'.

1. *Mesorhabdus truncatus* nov. sp. Plate XXXIX, figs. 12—21.

Female — length 7 mm.

Seen from above, the body appears robust and irregularly oval. The greatest width is in the middle of the first thoracic segment. The frontal margin of the cephalic segment is boldly rounded. The rostral papilla is very slightly indicated in the middle of the frontal curve. The distal end of the last thoracic segment is moderately wide. It is almost truncate. The lateral margins are slightly extended into very small projections (Plate XXXIX, fig. 12). Viewed from the side, the distal end of the last thoracic segment is broadly rounded, then slightly emarginate as it joins the dorsal line. The rostral filaments are long and slender (Plate XXXIX, fig. 14).

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained nearly three times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment when viewed from above appears almost rectangular in outline. It is nearly as broad as long. Its length is slightly less than the combined length of the next three segments. The ventral surface is considerably inflated, and is produced in the middle into a blunt pointed process. The second, third and fourth segments are comparatively short. They are of nearly equal length. The furcal joints

are short. The joints are quite symmetrical, and are rather longer than the anal segment. Each furcal joint is twice as long as broad. The second inner setae on the left furcal joint is much longer and thicker than any of the others.

The antennules are twenty-five-jointed and reach to the middle of the third abdominal segment. The last joint is equal to two-thirds of the length of the second last joint.

The antennules, mandibles and maxillae are nearly similar to those of *Heterorhabdus*.

The apical portion of the first maxillipedes is furnished with two very stout and moderately long spines. The inner surface of the spines is coarsely serrate (Plate XXXIX, fig. 18).

The second maxillipedes are similar to those of *Heterorhabdus*.

The exopodite and endopodite of the first, second, third and fourth pairs of swimming feet are three-jointed.

The exopodite and endopodite of the fifth pair of feet are also three-jointed. The joints are short. The inner distal angle of the second joint of the exopodite is furnished with a short, stout spine. The spine is rather suddenly contracted in the distal portion. The inner margin of the first and second joints of the endopodite bears one moderately strong spine. The proximal portion of each spine is finely plumose. The distal portion is rather coarsely dentate (Plate XXXIX, fig. 21).

Male unknown.

This species is readily recognised by the truncate form of the last thoracic segment when viewed from above, by the proportional length of the segments of the abdomen, by the short symmetrical furcal joints, and by the armature of the two strong spines on the inner margin of the endopodite of the fifth pair of feet.

Occurrence. — One specimen was obtained from the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to the surface.

#### Genus *Disseta* Giesbrecht, 1889.

The members of this genus appear to be intermediate between *Lucicutia* and *Heterorhabdus*. The various appendages shew a close relationship to those of *Lucicutia*. The biting edge of the mandible is almost identical in both types but it is quite distinct from *Heterorhabdus*. The furcal joints are asymmetrical and resemble those of *Heterorhabdus*. The left joint is longer and distinctly stouter than the right one. The male fifth pair of feet is quite distinct from that of the male of *Lucicutia* or *Heterorhabdus*.

Two species were represented in the plankton collected by the 'Siboga'.

#### 1. *Disseta palumboi* Giesbrecht. Plate XLI, figs. 11—21.

*Disseta palumboi* Giesbrecht, 1889, p. 812.

*Disseta palumboi* Giesbrecht, 1893, p. 369, pls. 29 & 38.

*Disseta palumboi* Giesbrecht & Schmeil, 1898, p. 112.

*Heterorhabdus grandis* Wolfenden, 1904, p. 120, pl. IX, fig. 36.

*Disseta palumboi* Sars, 1905 (b), p. 3.

*Heterorhabdus grandis* Wolfenden, 1905, p. 8, pl. IV, figs. 7 & 8 (male).

*Heterorhabdus grandis* Pearson, 1906, p. 26.

*Disseta grandis* Esterly, 1906, p. 72, pls. 9, 11, 13 & 14.

*Disseta palumboi* Farran, 1908, p. 67.

*Heterorhabdus grandis* van Breemen, 1908, p. 126, fig. 145.

Four females and four males apparently identical with GIESBRECHT's species were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 141 (1500 metres to surface), 3 specimens. — Stat. 230 (2000 metres to surface), 4 specimens. — Stat. 243 (1000 metres to surface), 2 specimens.

Length — female 8 mm., male 7.75 mm.

With the exception of the difference in size I see nothing to separate the 'Siboga' females from the description and figures given by GIESBRECHT.

The male was unknown when the original description was given but it has been found within recent years by WOLFENDEN in the plankton collected by the 'Gauss' and by ESTERLY in the Pacific. WOLFENDEN described the female and male as *Heterorhabdus grandis*. ESTERLY recognised the identity of his specimens with the genus *Disseta*, and named the form *Disseta grandis*.

With the exception of an apparent difference in the proportional length of the abdominal segments of the female, and an asymmetrical genital segment, the specimens from the Pacific are identical with those obtained by the 'Siboga'. The abdominal segments of the Copepoda are apt to become telescoped at death, and an unnatural shortening may, therefore, easily take place, which will give rise to incorrect proportional lengths. The asymmetry of the genital segment of ESTERLY's specimens may be due to accident. The genital segment of the 'Siboga' females is quite symmetrical as shewn in the illustration.

The last abdominal segments, and the furcal joints of the male, are similar to those of the female. ESTERLY's figure of the male left fifth foot, shews the apical spine on the third joint of the exopodite to be short and stout, but the more slender distal portion may easily have been damaged. WOLFENDEN's figure of the fifth pair of the male of *Heterorhabdus grandis* is identical with the one given in this report.

Difference in size unless accompanied by some other decided feature is of little or no specific value.

*Disseta palumboi* appears to have a fairly wide distribution.

## 2. *Disseta scopularis* (Brady). Plate XLII, figs. 1—9.

*Leuckartia scopularis* Brady, 1883, p. 51, pl. XIV, figs. 1—5.

*Leuckartia scopularis* Giesbrecht & Schmeil, 1898, p. 125.

A single male specimen, evidently identical with BRADY's *Leuckartia scopularis*, was found in the plankton collected with the HENSEN vertical net at Station 230, 2000 metres to the surface.

The specimen was rather mutilated. The antennules, antennae, mandible palps and second maxillipedes were incomplete. The more important characters, however, were intact. The biting edge of the mandible (Plate XLII, fig. 4) clearly shews that this Calanoid is not, as stated by WOLFENDEN in 'Plankton Studies' part I, page 23, a *Heterorhabdus*. The biting

edge of the mandible is of the *Lucicutia* and *Disseta* type. The furcal joints are asymmetrical, and are similar to those of *Disseta* and *Heterorhabdus*. The true place of this 'Incerti Generis' GIESBRECHT and SCHMEIL, is in the genus *Disseta*.

The minor differences between the figure of the fifth pair of feet given by BRADY, and the illustration given in this report, are probably due to the 'Challenger' specimen having been more mutilated than the one captured by the 'Siboga'. The curious apical joint of the exopodite of the right fifth foot, and the long, stout, sinuous terminal spine on the exopodite of the left fifth foot are quite sufficient to make the identity of the 'Siboga' form with BRADY's *Leuckartia scopularis* a matter of very little doubt.

Length of 'Siboga' male 9.75 mm.

The long furcal joints, and the character of the fifth pair of feet, readily separate this male from the male of *Disseta palumboi*.

BRADY's type specimen was found in a surface collection taken in the Pacific between Japan and Honolulu.

#### 15. Family AUGAPTILIDAE.

Genus **Augaptilus** Giesbrecht, 1889.

The members of this genus are closely allied to *Haloptilus*, but the females can readily be recognised by the segmentation of the abdomen. The abdomen of the females of this genus is composed of three segments.

Seven species belonging to this genus were represented in the plankton collected in the Malay Archipelago by the 'Siboga'. Two of the species appear to be undescribed.

##### 1. *Augaptilus bullifer* Giesbrecht.

*Augaptilus bullifer* Giesbrecht, 1889, p. 813.

*Augaptilus bullifer* Giesbrecht, 1893, p. 400, pls. 28 & 39.

*Augaptilus bullifer* Giesbrecht & Schmeil, 1898, p. 122.

*Augaptilus bullifer* Sars, 1905 (b), p. 4.

*Augaptilus bullifer* Farran, 1908, p. 75.

Specimens of this species were obtained from the plankton collected with the HENSEN vertical net at the following stations.

Stat. 141 (1500 metres to surface), 2 specimens. — Stat. 276 (750 metres to surface).

*Augaptilus bullifer* resembles *Augaptilus filigerus* in general appearance, but it is more robust and the genital segment of the female is quite symmetrical.

GIESBRECHT's specimens of this form were obtained from the Pacific. FARRAN has recently recorded it from the North Atlantic. SARS obtained it from the plankton collected by the Prince of Monaco.

2. *Augaptilus filigerus* (Claus).

- Hemicalanus filigerus* Claus, 1863, p. 179.  
*Augaptilus filigerus* Giesbrecht, 1893, p. 400, pls. 3, 27, 28, 29 & 39.  
*Augaptilus filigerus* Giesbrecht & Schmeil, 1898, p. 121.  
*Augaptilus filigerus* I. C. Thompson, 1903, p. 28.  
*Augaptilus filiger* Sars, 1905 (b), p. 4.  
*Augaptilus filigerus* Farran, 1908, p. 77.  
*Augaptilus filigerus* van Breemen, 1809, p. 133, fig. 150.

One specimen belonging to this species was found in the plankton collected with the HENSEN vertical net at each of the following stations.

Stat. 118 (900 metres to surface). — Stat. 141 (1500 metres to surface). — Stat. 143 (1000 metres to surface). — Stat. 148 (1000 metres to surface). — Stat. 276 (750 metres to surface).

*Augaptilus filigerus* can be separated from the other members of the genus, by the proportional length of the abdominal segments and furcal joints. The second and third segments of the abdomen are of about equal length. The furcal joints are slightly longer than broad. They are as long as the anal segment.

This species was originally obtained from the Mediterranean by CLAUS. It has since been recorded from the North Atlantic.

3. *Augaptilus hecticus* Giesbrecht.

- Augaptilus hecticus* Giesbrecht, 1889, p. 814.  
*Augaptilus hecticus* Giesbrecht, 1893, p. 400, pls. 1, 27, 28, 29 & 39.  
*Augaptilus hecticus* Giesbrecht & Schmeil, 1898, p. 122.  
*Augaptilus hecticus* I. C. Thompson, 1903, p. 29.  
*Augaptilus hecticus* van Breemen, 1908, p. 135, fig. 153.

One specimen of this *Augaptilus* was found in the plankton collected with the HENSEN vertical net at each of the two following stations.

Stat. 141 (1500 metres to surface). — Stat. 276 (750 metres to surface).

This species is a comparatively small one. It can be distinguished by the proportional length of the abdominal segments and furcal joints. The second and third segments of the abdomen are of about equal length. The furcal joints are as long as the anal segment. They are three times longer than broad.

*Augaptilus hecticus* has a moderately wide distribution. It has been recorded from the Atlantic and Pacific Oceans and from the Mediterranean.

4. *Augaptilus longicaudatus* (Claus).

- Hemicalanus longicaudatus* Claus, 1863, p. 179, pl. XXIX.  
*Augaptilus longicaudatus* Giesbrecht, 1893, p. 400, pls. 27, 28, 29 & 39.  
*Augaptilus longicaudatus* T. Scott, 1893, p. 34, pls. I & II.  
*Augaptilus longicaudatus* Giesbrecht & Schmeil, 1898, p. 123.  
*Augaptilus longicaudatus* I. C. Thompson, 1903, p. 29.

- Augaptilus longicaudatus* Wolfenden, 1904, p. 112.  
*Augaptilus longicaudatus* Sars, 1905 (*b*), p. 4.  
*Augaptilus longicaudatus* Esterly, 1905, p. 188, fig. 41.  
*Augaptilus longicaudatus* Pearson, 1906, p. 28.  
*Augaptilus longicaudatus* Farran, 1908, p. 78.  
*Augaptilus longicaudatus* van Breemen, 1908, p. 135, fig. 154.

Six specimens of this form were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 185 (1536 metres to surface), 3 specimens. — Stat. 203 (1500 metres to surface), 2 specimens. — Stat. 276 (750 metres to surface), 1 specimen.

*Augaptilus longicaudatus* can be distinguished from the other members of the genus, by its moderately long abdomen and furcal joints. It is closely related to *Augaptilus hecticus* and *Augaptilus megalurus*. It differs from the former species, by the furcal joints being five times longer than broad, and from the latter, by the equal length of the second and third abdominal segments. In *Augaptilus hecticus* the furcal joints are three times longer than broad. The third abdominal segment of *Augaptilus megalurus* is distinctly shorter than the second segment.

This species appears to have a moderately wide distribution.

##### 5. *Augaptilus palumboi* Giesbrecht.

- Augaptilus palumboi* Giesbrecht, 1889, p. 813.  
*Augaptilus palumboi* Giesbrecht, 1893, p. 400, pls. 27, 28 & 39.  
*Augaptilus palumboi* Giesbrecht & Schmeil, 1898, p. 122.  
*Augaptilus palumboi* I. C. Thompson, 1903, p. 28.  
*Augaptilus palumboi* Sars, 1905 (*b*), p. 4.  
*Augaptilus palumboi* Farran, 1908, p. 75.  
*Augaptilus palumboi* van Breemen, 1908, p. 134, fig. 151.

Eight specimens of this species were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 118 (900 metres to surface), 1 specimen. — Stat. 128 (700 metres to surface), 1 specimen. — Stat. 141 (1500 metres to surface), 1 specimen. — Stat. 143 (1000 metres to surface), 2 specimens. — Stat. 148 (1000 metres to surface), 1 specimen. — Stat. 203 (1500 metres to surface), 2 specimens.

*Augaptilus palumboi* is readily distinguished by its small size, by the short second abdominal segment, and by the anal segment being twice the length of the second segment.

This species was originally found in the Pacific Ocean. It has been recorded within recent years from the North Atlantic.

##### 6. *Augaptilus placitus* nov. sp. Plate XLII, figs. 10—19.

Female — length 10 mm.

Seen from above, the body is elongate ovate, and rather slender. The last thoracic segment is contracted posteriorly, and the distal ends are somewhat narrowly rounded. Viewed

from the side, the cephalic segment appears slightly vaulted. The forehead is decidedly truncate in outline. The distal end of the last thoracic segment is narrowly rounded below, then slopes steeply forward till it joins the almost straight dorsal line (Plate XLII, fig. 12). The rostral filaments are slender and of moderate length (Plate LXII, fig. 13).

The combined length of the abdomen and furca is contained nearly four times in the total length of the *cephalothorax*, from the frontal margin to the distal end of the last thoracic segment. The genital segment is distinctly longer than the combined length of the next two segments. It is not quite symmetrical. The left side is slightly more inflated than the right. The ventral surface of the segment is produced near the middle into a rounded knob-like process. The second segment is short. It is about half the length of the third segment. The third segment is equal to half the length of the genital segment. The furcal joints are slightly longer than broad. The joints are rather shorter than the anal segment.

The antennules are composed of twenty-five joints and extend beyond the furca by the last three joints.

The exopodite of the antennae is eight-jointed. It is distinctly less than half the length of the endopodite (Plate XLII, fig. 15).

The teeth on the biting edge of the mandible are arranged in three sets. The two inner sets are each represented by two teeth. The outer set is composed of three teeth (Plate XLII, fig. 16).

The exopodite of the maxillae is furnished with six setae. Three of the setae are long and stout. The other three are short and very slender.

The two pairs of maxillipedes are of the normal *Augaptilus* type.

The first four pairs of feet are also of the usual *Augaptilus* form.

The outer edge spine on the first joint of the exopodite of the first pair of feet extends to the middle of the third joint.

The terminal spine on the exopodite of the fifth pair of feet is as long as the third joint. The inner edge spine on the second joint of the exopodite is comparatively short and straight. It extends to the base of the third inner edge spine on the third joint.

Male unknown.

This species is closely related to *Augaptilus squamatus* Giesbrecht, but it can be separated by the difference in the proportional length of the abdominal segments and furcal joints, and by the exopodite of the maxillae being furnished with three long and three short setae.

Occurrence. — One specimen was found in the plankton collected with the HENSEN vertical net at each of the following stations.

Stat. 143 (1000 metres to surface). — Stat. 148 (1000 metres to surface).

7. *Augaptilus validus* nov. sp. Plate XLIII, figs. 1—10.

Female — length 8.77 mm.

Seen from above, the body is ovate and very robust. The last thoracic segment is contracted posteriorly, and the distal ends are broadly rounded. Viewed from the side, the

cephalic segment is seen to be very much depressed. The forehead is extremely narrow (Plate XLIII, fig. 2). The distal end of the last thoracic segment is broadly rounded below, then slightly emarginate as it rises to join the dorsal line. The rostrum consists of a bifurcate papilla without filaments (Plate XLIII, fig. 4).

The combined length of the abdomen and furca is contained three and one-half times in the total length of the *cephalothorax*, from the frontal margin to the end of the last thoracic segment. The genital segment is very slightly asymmetrical. It is fully one and a half times longer than the combined length of the next two segments. The ventral surface of the segment is produced into a rounded knob. The second segment is equal to two-thirds of the length of the third segment. The third segment is equal to one-third of the length of the genital segment. The furcal joints are small. They are rather longer than broad, and are nearly as long as the anal segment (Plate XLIII, fig. 1).

The antennules are composed of twenty-five joints and reach to the end of the furca.

The exopodite of the antennae is eight-jointed. It is distinctly less than half the length of the endopodite.

The biting edge of the mandible is furnished with three pairs of teeth (Plate XLIII, fig. 6).

The exopodite of the maxillae is furnished with two moderately long setae.

The two pairs of maxillipedes are similar to those of the previous species.

The five pairs of feet are also similar to those of *Augaptilus placitus*. The outer edge spine on the first joint of the exopodite of the first pair of feet does not reach the middle of the third joint.

Male — length 7.6 mm.

The male resembles the female in general appearance. The abdomen is composed of five segments. The rostral papilla is more bifurcate, and the apex of each ramus is pointed (Plate XLIII, fig. 8). The left antennule is prehensile.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female.

The first four pairs of feet are similar to the first four pairs of the female.

The joints of the exopodite of the fifth pair are very short. The last joint of the right exopodite is somewhat narrowly rounded at the apex. The inner distal end is furnished with a short curved spine. The joint is also furnished with one outer marginal, and one inner marginal spine. The last joint of the exopodite of the left foot is broadly rounded at the apex. The distal end bears two spines. The joint is also furnished with one outer marginal setae. The proximal end of the inner margin of the second joint of the left exopodite, bears a small spiniform process which is distinctly bifurcate at the apex (Plate XLIII fig. 10).

This species is easily identified by the very depressed cephalic segment, and by the pointed forehead when seen from the side. The rather feebly bifurcate papilla of the female rostrum, and the more pointed rami of the male, along with the spiniform process on the inner margin of the second joint of the exopodite of the left fifth foot, are also characters that help to separate this species from any of the others.

Occurrence. — Two males and one female were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 128 (700 metres to surface), 1 male. — Stat. 141 (1500 metres to surface), 1 female. — Stat. 276 (750 metres to surface), 1 male.

My father has obtained specimens of a male form from the plankton collected in the Farøe Channel, by the Scottish International Fisheries Cruiser 'Goldseeker', that is identical with the male of the present species.

The two species now described as new, may eventually prove to be the same as some of the new *Augaptilus*, described by Professor G. O. Sars, in 'Bulletin du Musée Océanographique de Monaco', part 2, (N° 40) 1905. Only the preliminary descriptions are there given. It is very difficult to identify the members of this genus without illustrations.

#### Genus *Haloptilus* Giesbrecht, 1898.

The members of this genus are readily recognised by their transparent and flattened body. The abdomen is comparatively short. It is composed of four segments in the female. The endopodite of the antennae is much longer than the exopodite.

Four species belonging to this genus were present in the plankton collected by the 'Siboga'.

##### 1. *Haloptilus longicornis* (Claus).

*Hemicalanus longicornis* Claus, 1863, p. 179, pl. XXIX.

*Hemicalanus longicornis* Brady, 1883, p. 44, pl. IX, figs. 1 & 7.

*Hemicalanus longicornis* Giesbrecht, 1893, p. 384, pls. 1, 2, 27.

*Hemicalanus longicornis* T. Scott, 1893, p. 32.

*Haloptilus longicornis* Giesbrecht & Schmeil, 1898, p. 118.

*Haloptilus longicornis* Sars, 1902, p. 121, pls. LXXXII & LXXXIII.

*Haloptilus longicornis* I. C. Thompson, 1903, p. 28.

*Haloptilus longicornis* Wolfenden, 1904, p. 135.

*Haloptilus longicornis* Sars, 1905 (b), p. 4.

*Haloptilus longicornis* Farran, 1905, p. 45.

*Haloptilus longicornis* Pearson, 1906, p. 27.

*Haloptilus longicornis* Farran, 1908, p. 67.

*Haloptilus longicornis* van Breemen, 1908, p. 128, fig. 146.

Twenty-two specimens belonging to this species were obtained from the plankton collected at the following stations.

Stat. 118 (HENSEN vertical net, 900 metres to surface), 2 specimens. — Stat. 128 (HENSEN vertical net, 700 metres to surface), 2 specimens. — Stat. 129, 1 specimen. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 3 specimens. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 4 specimens. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 4 specimens. — Stat. 220 (HENSEN vertical net, 200 metres to surface), 2 specimens. — Stat. 252, 1 specimen. — Stat. 276 (HENSEN vertical net, 750 metres to surface), 3 specimens.

*Haloptilus longicornis* is a comparatively small form. It can readily be recognised by the knob-like projection on the forehead when viewed from above, and by the very long antennules.

This species has a wide distribution in the great oceans. It has been recorded from the North Atlantic off the Coast of Norway, by Professor G. O. Sars.

2. *Haloptilus ornatus* (Giesbrecht).

*Hemicalanus ornatus* Giesbrecht, 1893, p. 384, pls. 27 & 42.

*Haloptilus ornatus* Giesbrecht & Schmeil, 1898, p. 120.

*Haloptilus ornatus* I. C. Thompson, 1903, p. 28.

*Haloptilus ornatus* Sars, 1905 (*b*), p. 4.

*Haloptilus ornatus* van Breemen, 1908, p. 130, fig. 148.

One specimen of this *Haloptilus* was found in the plankton collected with the HENSEN vertical net at each of the following stations.

Stat. 118 (900 metres to surface). — Stat. 128 (700 metres to surface).

This species can easily be separated from the other members of the genus by its narrowly rounded forehead, and by the strong curved spines on the apical lobes of the first pair of maxillipedes. The antennules extend beyond the end of the furca by about four joints.

*Haloptilus ornatus* was originally described by GIESBRECHT from Mediterranean specimens. THOMPSON, SARS and VAN BREEMEN have since recorded it from other areas.

3. *Haloptilus plumosus* (Claus).

*Hemicalanus plumosus* Claus, 1863, p. 178, pls. XXVIII & XXIX.

*Hemicalanus plumosus* Giesbrecht, 1893, p. 384.

*Hemicalanus plumosus* T. Scott, 1893, p. 33, pls. II & VI.

*Haloptilus plumosus* Giesbrecht & Schmeil, 1898, p. 119.

One specimen belonging to this species was found in the plankton collected with the HENSEN vertical net at Station 141, 1500 metres to the surface.

*Haloptilus plumosus* resembles *Haloptilus ornatus* in general appearance. It can be distinguished by its shorter antennules, and by the endopodite of the maxillae being furnished with four setae.

This species has hitherto only been known from the Mediterranean and from the Gulf of Guinea.

4. *Haloptilus spiniceps* (Giesbrecht).

*Hemicalanus spiniceps* Giesbrecht, 1893, p. 384, pls. 27 & 42.

*Haloptilus spiniceps* Giesbrecht & Schmeil, 1898, p. 120.

*Haloptilus spiniceps* I. C. Thompson, 1903, p. 28.

*Haloptilus spiniceps* Sars, 1907 (*a*), p. 19.

*Haloptilus spiniceps* van Breemen, 1908, p. 130, fig. 149.

One specimen of this *Haloptilus* was obtained from the plankton collected at each of the following stations.

Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 315.

This species can readily be separated from the other members of the genus by the short,

hooked, spiniform projection of the forehead when viewed from the side. It is not always possible, however, to make out the hooked projection of the forehead. It is easily telescoped and some care is necessary in identification.

*Haloptilus spiniceps* has apparently hitherto only been recorded from the Mediterranean and from the Atlantic Ocean.

## 16. Family ARIETELLIDAE.

### Genus *Arietellus* Giesbrecht, 1893.

The members of this genus can be recognised by the rather tumid body, and by the characters of the fifth pair of feet of both sexes.

The female fifth pair is represented by two free joints attached to a basal part. The male fifth pair is well developed and prehensile. The exopodite of each foot is three-jointed and asymmetrical. The last joint of the right exopodite is lamelliform, and the apex is rounded. The last joint of the left exopodite bears two apical claw-like spines. The endopodite of each foot is lamelliform, asymmetrical and apparently two-jointed. The basiopodite is two-jointed.

The characters that separate the various members of the genus depend almost entirely on the form of the body, the length of the frontal spine, the shape of the last thoracic segment, and the length of the furcal joints. Obvious differences can be noticed, however, in the structure of the fifth pair of feet of both sexes.

Three species were obtained from the plankton collected by the 'Siboga' in the Malay Archipelago.

#### 1. *Arietellus setosus* Giesbrecht. Plate XLIV, figs. 8—13.

*Arietellus setosus* Giesbrecht, 1893, p. 415, pls. 29 & 39.

*Arietellus setosus* Giesbrecht & Schmeil, 1898, p. 124.

*Arietellus setosus* Sars, 1905 (*b*), p. 5.

*Arietellus setosus* Esterly, 1905, p. 189, fig. 42.

*Arietellus setosus* van Breemen, 1908, p. 139, fig. 158.

One adult and one immature male belonging to this species, were found in the plankton collected with the HENSEN vertical net at the following stations.

Stat. 141 (1500 metres to surface). — Stat. 203 (1500 metres to surface).

Length of adult male 4 mm.

*Arietellus setosus* can readily be separated from the other members of the genus by the short and slightly hooked frontal spine, and by the strong spiniform projections of the last thoracic segment. The apical spines on the exopodite of the left fifth foot of the male are of moderate length. The outer one is longer than the third joint. It has a distinct angular bend near the middle. ESTERLY'S figure of the female fifth foot, shews that the second free joint is nearly as long as the first joint. The terminal spine is as long as the second joint. In the

figure of the entire female given by that author, the spiniform projections of the last thoracic segment are shewn to be nearly straight, and extend to the end of the second abdominal segment.

This species has been recorded from the Atlantic and Pacific Oceans and from the Mediterranean.

2. *Arietellus aculeatus* (T. Scott). Plate XLIV, figs. 4—7.

*Rhincalanus aculeatus* T. Scott, 1893, p. 31, pl. II, figs. 11—22.

*Arietellus setosus* Giesbrecht & Schmeil, 1898 (pars), p. 124.

One adult female identical with the above species was obtained from the plankton collected with the HENSEN vertical net at Station 148, 1000 metres to the surface.

Length of female 4.56 mm.

This species was originally described by my father from a rather immature male as *Rhincalanus aculeatus*. It was afterwards included under *Arietellus setosus* by GIESBRECHT and SCHMEIL.

The discovery of the adult female shews that it is apparently quite distinct from the type of the genus. The frontal spine is very strong, much elongated and directed almost straight in front (Plate XLIV, fig. 5). The spiniform projections of the last thoracic segment are slightly asymmetrical and rather divergent. The spine of the right side is slightly longer than that of the left, but it does not reach the distal end of the genital segment when the animal is viewed from above. The fifth pair of feet of the female is asymmetrical. The right foot is obviously longer than the left. The second free joint of each foot is very broad. The distal end of the inner margin is considerably inflated. The apical spine on the right foot is as long as the joint. The joint bears an indication near the middle, of an outer marginal spine. The apical spine on the left foot is decidedly longer than the joint (Plate XLIV, fig. 7).

This *Arietellus* has hitherto only been known from the Gulf of Guinea.

3. *Arietellus simplex* Sars. Plate XLIV, figs. 14—18.

*Arietellus simplex* Sars, 1905 (*b*), p. 22.

*Arietellus major* Esterly, 1906, p. 74, pls. 9, 11, 12 & 13.

One male agreeing very well with the preliminary description of the above species given by SARS, was found in the plankton collected with the HENSEN vertical net at Station 141, 1500 metres to the surface.

Length of 'Siboga' male 6.2 mm.

The forehead appears only very slightly produced, when viewed from above. The distal ends of the last thoracic segment are boldly rounded. A feeble indication of a projection is visible near the junction of the *cephalothorax* with the first abdominal segment (Plate XLIV, fig. 14). The anal segment and furcal joints are decidedly longer than in the previous species. The furcal joints are nearly three times longer than broad. The fifth pair has a general resemblance to the fifth pair of the male of *Arietellus setosus*, but the outer margin of the apical

joint of the left exopodite is distinctly notched. The apical spines are short and stout. The longer one is considerably shorter than the joint (Plate XLIV, fig. 17).

The rounded last thoracic segment, and the long furcal joints readily separate this form from any of the other known species.

The female described by ESTERLY as *Arietellus major* appears to be identical with Sars' *Arietellus simplex*. The figure of the fifth foot given by ESTERLY, and reproduced in this report, shews the apical spine of the second free joint to be very short. It is only about equal to one-half of the length of the joint.

#### Genus *Paraugaptilus* Wolfenden, 1904.

This genus was established by WOLFENDEN in 1904, for a form found in the warm area of the North Atlantic, that appeared to be closely related to *Augaptilus* and *Arietellus*. Sars (1907a) recorded WOLFENDEN's type species from the plankton collected by the Prince of Monaco, but placed it under the genus *Arietellus*. VAN BREEMEN, however, regards the genus as distinct and restores it in 'Nordisches Plankton' 1908. This genus appears to be more closely related to *Arietellus* than to *Augaptilus*. I have therefore included in under the Family Arietellidae.

The two sexes are readily separated from either *Augaptilus* or *Arietellus*, by the structure of the fifth pair of feet. The fifth pair of the female is rudimentary. Each foot is composed of a single joint. The male fifth pair is well developed and prehensile. The right and left feet are not symmetrical. The basiopodite is two-jointed. The exopodite of each foot is two-jointed. The endopodite is very small. It is apparently two-jointed.

Males and females of a form closely related to the type of the genus were obtained from the plankton collected by the 'Siboga' in the Malay Archipelago.

#### 1. *Paraugaptilus similis* nov. sp. Plate XLIII, figs. 11—19.

Female — length 3.75 mm.

Viewed from above, the body appears ovate and robust. The forehead is considerably contracted in front. The posterior margins of the last thoracic segment are broadly rounded. The segment is furnished with a small tooth on each side of the junction with the abdomen. Seen from the side, the dorsal surface of the cephalic segment is much depressed, and the forehead is very narrowly rounded. The ventral margin of the last thoracic segment is boldly rounded. The distal end is hollowed out. It is produced into a small tooth at the upper angle, where it joins the dorsal line (Plate XLIII, fig. 13). The dorsal and lateral surfaces of the thoracic segments, are clothed with fine short hairs as shewn in the figures. The rostrum is represented by two slender filaments.

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained two and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is moderately large. It is distinctly inflated on each side. The lateral surface is furnished with a small, dorsally directed pointed process. The genital opening is provided with a pointed knob (Plate XLIII,

fig. 13). The second and third segments are of about equal length. The anal segment is equal to two-thirds of the length of the third segment. The furcal joints are one and a half times longer than broad. They are slightly longer than the third abdominal segment. The second and third inner setae are each furnished with a dense tuft of dark coloured hairs. The ova are few in number and are very large.

The antennules are composed of twenty joints and are of nearly equal length. The left antennule extends to the end of the fourth abdominal segment. The terminal joint of the right antennule only is furnished with two densely plumose setae (Plate XLIII, fig. 14).

The antennae, mandibles, maxillae and maxillipedes are somewhat similar to those of *Arietellus setosus*.

The first four pairs of feet are also similar to those of that species.

The fifth pair is slightly asymmetrical. Each foot consists of a single joint. There is no distinctly defined basal part. The proximal portion of the outer margin is furnished with a moderately long seta. The setae on the right foot is longer than the one on the left foot. The distal portion of the outer margin bears two very small hairs. The apex is furnished with one long plumose seta (Plate XLIII, fig. 16).

Male — length 3.37 mm.

The male resembles the female in general appearance, but the abdomen is composed of five segments. The first and third segments are larger, and the second is smaller than the others. The fourth and fifth segments are of about equal length.

The left antennule is modified for grasping. It is composed of eighteen joints. The eleventh, twelfth and thirteenth joints are distinctly enlarged. The fifteenth, sixteenth and seventeenth joints are furnished on the upper edge with a narrow hyaline plate. The hinge is situated between the sixteenth and seventeenth joints (Plate XLIII, fig. 18).

The mouth organs and swimming feet are nearly similar to those of the female. The inner margin of the second joint of the endopodite of the antennae is furnished with a long seta (Plate XLIII, fig. 15), which appears to be entirely absent in the female.

The fifth pair is large and prehensile. The second joint of the right exopodite is lamelliform. It is much dilated at the middle. The apex is narrow and sinuous. The inner margin of the joint is distinctly notched. The second joint of the left exopodite is broadly triangular in outline. It is well supplied with muscles. The apex of the joint bears two moderately long curved spines. The spines are rather shorter than the joint. The distal end of the inner spine is sickle-shaped. The apex of this spine is distinctly bifurcate (Plate XLIII, fig. 19).

This species appears to come very close to WOLFENDEN's type species (*Paraugaptilus buchani*) and I was inclined at first to regard it as identical. Dr. WOLFENDEN, to whom I submitted copies of the figures now given, is of the opinion, however, that it is distinct. The fifth pair of the female of the present form differs from WOLFENDEN's species, in having two small outer edge hairs near the distal end of the joint. The male of the genus has hitherto been unknown.

Occurrence. — Males and females were found in the plankton collected at the following stations.

Stat. 141 (HENSEN vertical net, 1500 metres to surface), 2 females. — Stat. 142, 2 males. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 8 females and five males. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), 2 females and 1 male. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 2 females and 4 males.

Genus **Metacalanus** Cleve, 1901.

This genus was established in 1901 by the late Professor P. T. CLEVE for a small Calanoid found in plankton collected near the Island of Langkuss, N.W. of Billiton in the Malay Archipelago. It is nearly related to *Arietellus* in the structure of some of the appendages. It also comes remarkably close to the genus *Scottula* established by Professor G. O. SARS in 1902 in 'Crustacea of Norway'.

The only obvious difference between this genus and *Scottula*, is in the structure of the female fifth pair of feet. The fifth pair in *Scottula* has two free joints and a basal part. *Metacalanus* has only one free joint and a basal part.

One species is known. It was well represented in the area investigated by the 'Siboga'.

1. *Metacalanus aurivillii* Cleve.

*Metacalanus aurivillii* Cleve, 1901, p. 43, pls. IV & V.

*Metacalanus aurivillii* Thompson & Scott, 1903, p. 243, pl. II.

Males and females belonging to this species were found in the plankton collected at the following stations.

Stat. 16. — Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 75. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 106. — Stat. 109. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 125 (day). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 184. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 205. — Stat. 213. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304. — Stat. 315.

*Metacalanus aurivillii* is a very small Calanoid and is easily overlooked. The female is .65 mm. and the male .5 mm. in length.

The right antennule of the male and female is distinctly shorter than the left. The fifth pair of feet of the female is composed of one free joint attached to a basal part. The free joint is broad and lamelliform. It is furnished with one outer marginal seta, one apical seta, and one long plumose inner marginal seta. The male fifth pair is quite symmetrical. It consists of four free joints attached to a basal part. The apical joint of the right and left foot is in the form of a long slender claw. The second and third free joints are each furnished with one outer marginal seta. The endopodite is absent.

This species was obtained by CLEVE from plankton collected in the Malay Archipelago in 1899. It was present in the plankton taken at twenty-seven stations round the Island of Ceylon by Professor HERDMAN in 1903.

Genus *Phyllopus* Brady, 1883.

The members of this genus are readily recognised by the structure of the fifth pair of feet of the two sexes. The female fifth pair has a two-jointed basiopodite, and a three-jointed exopodite. There is no trace of an endopodite on either foot. The terminal joint of the exopodite is leaf-like. The apex is rather deeply and irregularly serrate. The male fifth pair is well developed and prehensile. The exopodite of each foot is two-jointed. The left foot only is furnished with a rudimentary lamelliform endopodite.

The genus was established by BRADY in 1883 from a single specimen that was undoubtedly a female. WOLFENDEN's statement, in the Journal of the Marine Biological Association, April 1904, page 124, that it was a male is a curious error as he describes the male in the same report. The late I. C. THOMPSON appears to have been the first observer to give an account of the male, but he wrongly identifies his species with the type of the genus. THOMPSON, WOLFENDEN and ESTERLY state that the right foot has a rudimentary endopodite. This is an error due to an imperfect preparation or a reversal of the right and left sides. ESTERLY, however, only found one female and his description of the male was taken from WOLFENDEN's report.

There appears to be some confusion regarding the type species. Other forms have been recorded by some writers as *Phyllopus bidentatus* that are clearly distinct. FARRAN (1908) has done much to clear up the difficulty, and has established two additional species.

Four species belonging to this genus were obtained from the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Phyllopus bidentatus* Brady. Plate XLV, figs. 1—9.

*Phyllopus bidentatus* Brady, 1883, p. 78, pl. V, figs. 7—16.

*Phyllopus bidentatus* T. Scott, 1893, p. 74, pl. VI, fig. 26.

*Phyllopus bidentatus* Sars, 1905 (*b*), p. 5.

Eight males and three females apparently identical with BRADY's type species were found in the plankton collected at the following stations.

Stat. 118 (HENSEN vertical net, 900 metres to surface), 1 male. — Stat. 128 (HENSEN vertical net, 700 metres to surface), 1 male, 1 female. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 1 male, 1 female. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), 2 males. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 1 male. — Stat. 216, 1 male. — Stat. 276 (HENSEN vertical net, 750 metres to surface), 1 male and 1 female.

The females although resembling BRADY's type in the prolongation of the last thoracic segment, differ from it by the projection being obliquely truncate at the apex, when seen from the side, instead of distinctly forked as shewn by that author. The terminations of the last thoracic segment are asymmetrical, both in length and in shape. The left side extends to the middle of the genital segment. The apex is pointed (Plate XLV, fig. 3). The right side extends to near the distal end of the genital segment. The apex is obliquely truncate, with a very minute point at each extremity (Plate XLV, fig. 4).

The combined length of the abdomen and furca is equal to slightly more than one

half of the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is as long as the combined length of the second and third segments. It is rather cylindrical in outline, and appears slightly asymmetrical when viewed from above. Seen from the side, the dorsal surface is acutely pointed (Plate XLV, figs. 3 & 4). The furcal joints are one and a half times longer than broad. They are about a third less than the length of the anal segment.

The apex of the last joint of the exopodite of the fifth pair of feet is divided into six teeth. The third outer tooth is rather larger than the others (Plate XLV, fig. 6). Length of female, 3.2 mm.

The outer margin of the apical joint of the exopodite of the left foot of the male fifth pair is boldly rounded. The distal end of the joint is produced into a short stout tooth-like projection. The strong distal outer edge hook is about half the length of the joint (Plate XLV, fig. 9).

Length of male, 3 mm.

The figure of the animal shewn on plate VI in the report 'On Entomostraca from the Gulf of Guinea' by my father, is identical with the female of the present species. The fifth pair of feet shewn on the same plate does not belong to that individual. This is due to the fact that drawings of two forms were prepared for publication, but through an error, the fifth pair of feet belonging to the form represented by the figure of the copepod was omitted. The fifth pair of the second form was inserted instead. The number of plates allowed by the Linnean Society for the illustration of doubtful forms proved insufficient, and many figures had to be suppressed although completed. I have compared the drawings that were intended for publication with those identified in this report as *Phyllopus bidentatus*, and find that the fifth pairs of feet are identical.

The single specimen described by BRADY was obtained from plankton collected by the 'Challenger' in the South Atlantic, between Rio de la Plata, and the Island of Tristan da Cunha. SARS records this species from the plankton collected by the Prince of Monaco, but as no illustrations have yet been given one must regard the identity as doubtful.

## 2. *Phyllopus helgae* Farran. Plate XLVI, fig. 7—14.

*Phyllopus bidentatus* I. C. Thompson, 1903, p. 29, pl. III, figs. 6—9.

*Phyllopus bidentatus* Wolfenden, 1904, p. 124, pl. IX, fig. 16.

*Phyllopus bidentatus* Farran, 1905 (pars), p. 45, pl. XI, figs. 18, 19 & 21.

*Phyllopus bidentatus* van Breemen, 1908 (pars), p. 143, fig. 16 (*d—e*).

*Phyllopus helgae* Farran, 1908, p. 83, pl. IX, figs. 5 & 6.

One female and one male belonging to this species was found in the plankton collected with the HENSEN vertical net at Station 128, 700 metres to the surface.

The female of this form is readily recognised by the almost symmetrical and only slightly produced distal ends of the last thoracic segment. The genital segment is asymmetrical. It has a large protuberance on the right side. The fifth pair of feet is slightly asymmetrical. The serration at the distal end of the apical joint of the fifth pair of the 'Siboga' female is rather different from that shewn by FARRAN (Plate XLVI, fig. 11).

The male can readily be separated from the males of the other species, by the elongate and very pointed apex of the last joint of the exopodite of the left fifth foot, and by the long curved spine on the outer distal half of the joint (Plate XLVI, fig. 14).

Length — female, 2,6 mm., male 2,45 mm.

The male described by the late I. C. THOMPSON (1903) as *Phyllopus bidentatus*, is identical with the male of the present species. The figures of the male fifth pair given by WOLFENDEN (1904) and VAN BREEMEN (1908) as *Phyllopus bidentatus* are the same as that of the male of *Phyllopus helgae* Farran.

3. *Phyllopus impar* Farran. Plate XLV, figs. 10—18.

*Phyllopus bidentatus* T. Scott, 1893 (pars), p. 74, pl. VI, fig. 28.

*Phyllopus bidentatus* Farran, 1905 (pars), p. 45, pl. XI, fig. 20.

*Phyllopus impar* Farran, 1908, p. 84, pl. IX, figs. 1—4.

Three females and two males that are clearly identical with this species were obtained from the plankton collected with the HENSEN vertical net at the following stations.

Stat. 128 (700 metres to surface), one female and one male. — Stat. 141 (1500 metres to surface), one female. — Stat. 143 (1000 metres to surface), one female and one male.

The two sexes have a general resemblance to those of *Phyllopus bidentatus*. The female, however, is easily separated by the genital segment appearing greatly inflated on each side when viewed from above, and by the character of the serration of the apical joint of the exopodite of the fifth pair of feet. The teeth are arranged in pairs. The outer tooth of each set is decidedly larger than the inner one (Plate XLV, fig. 15). The terminal joint of the left exopodite of the male fifth pair has the outer margin distinctly angled at the middle. The outer distal curved spine on this joint is proportionally shorter than in the males of *Phyllopus bidentatus* or *Phyllopus helgae* (Plate XLV, fig. 18).

Length — female 3 mm., male 2,7 mm.

The fifth pair of feet shewn on plate VI in the report 'On Entomostraca from the Gulf of Guinea', and identified by my father as that of *Phyllopus bidentatus* Brady, is undoubtedly identical with the female fifth pair of *Phyllopus impar* Farran.

This species has hitherto only been known from the Atlantic Ocean.

4. *Phyllopus giesbrechti* nov. sp. Plate XLVI, figs. 1—6.

*Phyllopus bidentatus* Giesbrecht, 1893, p. 419, pls. 18 & 38.

*Phyllopus bidentatus* Giesbrecht & Schmeil, 1898 (pars), p. 124.

*Phyllopus bidentatus* Esterly, 1905, p. 191, fig. 43.

*Phyllopus bidentatus* van Breemen, 1908 (pars), p. 143, fig. 161 (a—b).

Female — length 2,8 mm.

Viewed from above, this species has a general resemblance to *Phyllopus bidentatus* Brady. The last thoracic segment is considerably produced, but the distal ends are only very slightly asymmetrical. The distal end of the right side has a small notch. It is not lamelliform. Seen from the side, the produced ends of the last thoracic segment are narrowly rounded at

the apex. They are not pointed as in *Phyllopus bidentatus* or *Phyllopus impar* (Plate XLVI, figs. 3 and 4).

The combined length of the abdomen and furca is equal to half of the total length of the *cephalothorax*, from the frontal margin to the distal end of the last thoracic segment. The genital segment is slightly longer than the combined length of the second and third segments. It is somewhat cylindrical in outline, and appears very nearly symmetrical when seen from above. The dorsal surface is flatly rounded when viewed from the side (Plate XLVI, figs. 3 and 4). The furcal joints are twice as long as broad. Each joint is slightly longer than the anal segment.

The antennules are twenty-four-jointed and reach to the middle of the genital segment.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Phyllopus bidentatus*.

The four pairs of swimming feet are also similar to those of that species.

The fifth pair of feet resembles that of *Phyllopus bidentatus* but the last two joints of the exopodite are proportionally wider (Plate XLVI, fig. 6).

Male unknown.

This species appears to be identical with the form described and illustrated as *Phyllopus bidentatus* by GIESBRECHT. It differs from BRADY'S species, however, by the nearly symmetrical prolongations of the last thoracic segment, and by their narrowly rounded apex when viewed from the side. The figure given by ESTERLY (1905), and also some of those shown by VAN BREEMEN (1908), evidently represent this *Phyllopus*.

Occurrence. — Three females were obtained from the plankton collected with the HENSEN vertical net at the following stations.

Stat. 203 (1500 metres to surface), two specimens. — Stat. 276 (750 metres to surface), one specimen.

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## 17. Family CANDACIIDAE.

Genus **Candacia** Dana, 1846.

This genus is at present the only known representative of the family, but it contains a considerable number of species. The species are distinguished chiefly by the form of the last thoracic segment, and by the structure of the fifth pair of feet of the two sexes.

Twelve species were obtained from the plankton collected by the 'Siboga' during the investigations conducted in the Malay Archipelago. One of the species does not appear to have previously been described.

### 1. *Candacia aethiopica* (Dana).

*Candace aethiopica* Dana, 1849. p. 23.

*Candace melanopus* Claus, 1863, p. 191, pl. XXXIII.

*Candace aethiopica* Giesbrecht, 1893, p. 424, pls. 4, 21, 22 & 39.

*Candacia aethiopica* Giesbrecht & Schmeil, 1898, p. 128.

*Candacia aethiopica* I. C. Thompson, 1900, p. 281.

*Candacia aethiopica* A. Scott, 1902, p. 405.

*Candacia aethiopica* Thompson & Scott, 1903, p. 250.

*Candacia aethiopica* Cleve, 1903, p. 358.

*Candacia aethiopica* Sars, 1905 (*b*), p. 5.

*Candacia aethiopica* Esterly, 1905, p. 196, fig. 47.

Thirty-three specimens belonging to this species were obtained from the plankton collected at the following stations.

Stat. 36. — Stat. 81. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 110. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1000 metres to surface). — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface).

The males and females can readily be separated from the other members of the genus by the shape of the terminations of the last thoracic segment, and by the structure of the fifth pairs of feet. The dorsal surface of the body is usually quite black.

*Candacia aethiopica* appears to have a moderately wide distribution in tropical seas.

## 2. *Candacia bipinnata* (Giesbrecht).

*Candace pectinata* Brady, 1883 (pars), p. 67, pl. XXX, figs. 1 & 2.

*Candace truncata* Brady, 1883 (pars), p. 69, pl. XXIX, fig. 13.

*Candacia bipinnata* Giesbrecht, 1889, p. 815.

*Candace bipinnata* Giesbrecht, 1893, p. 424, pls. 22 & 39.

*Candacia bipinnata* Giesbrecht & Schmeil, 1898, p. 129.

*Candacia bipinnata* Cleve, 1904, p. 186.

*Candace bipinnata* Sars, 1905 (*b*), p. 5.

*Candacia bipinnata* Esterly, 1905, p. 195, fig. 45.

Seven specimens identical with this species were found in the plankton collected at the following stations.

Stat. 129. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 243 (HENSEN vertical net, 1000 metres to surface). — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 315.

The very spiniform wing-like lateral projections of the genital segment, easily distinguish the females from those of the other species. Some of the 'Challenger' specimens that were identified by BRADY as *Candace pectinata*, and *Candace truncata*, undoubtedly belong to this species. This is obvious on comparing the illustrations with GIESBRECHT's figures.

*Candacia bipinnata* has been recorded from the Atlantic and Pacific Oceans.

## 3. *Candacia bispinosa* (Claus).

*Candace bispinosa* Claus, 1863, p. 191, pls. XXVII & XXXIII.

*Candace truncata* Brady, 1883 (pars), p. 69, pl. XXIX, fig. 11.

*Candace bispinosa* Giesbrecht, 1893, p. 424, pls. 21, 22 & 39.

*Candacia bispinosa* Giesbrecht & Schmeil, 1898, p. 129.

*Candacia bispinosa* A. Scott, 1902, p. 406.

*Candacia bispinosa* Thompson & Scott, 1903, p. 250.

*Candacia bispinosa* Cleve, 1903, p. 358.

One female belonging to the above species was found in the plankton collected at each of the three following stations.

Stat. 110. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133.

The genital segment of the female is considerably expanded at the distal end. Each side of the segment is produced into a small spine. BRADY considered that this form was only a variety of *Candacia truncata*, but the spiniform projections of the last thoracic segment, and the shape of the genital segment of the females clearly shew that it is quite distinct.

*Candacia bispinosa* has been recorded from the Atlantic and Pacific Oceans, and from the Mediterranean.

#### 4. *Candacia catula* (Giesbrecht).

*Candace truncata* Brady, 1883 (pars), p. 69, pl. XXIX, fig. 10.

*Candace catula* Giesbrecht, 1889, p. 815.

*Candace catula* Giesbrecht, 1893, p. 425, pls. 21 & 22.

*Candacia catula* Giesbrecht & Schmeil, 1898, p. 129.

*Candace catula* Cleve, 1901, p. 5.

*Candacia catula* A. Scott, 1902, p. 405.

*Candacia catula* Thompson & Scott, 1903, p. 250.

*Candacia catula* Cleve, 1903, p. 358.

*Candacia catula* Cleve, 1904, p. 186.

*Candace catula* Wolfenden, 1905 (a), p. 1012.

This species appeared to be fairly well distributed throughout the area investigated. Forty specimens were obtained from the plankton collected at the following stations.

Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 101. — Stat. 121. — Stat. 125. — Stat. 138. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stats. 194—7. — Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 220 (surface). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 225. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304. — Stat. 315.

The structure of the fifth pair of feet of both sexes readily separates this species from the other members of the genus.

One of the illustrations given on plate XXIX in the report on the 'Challenger' Copepoda, as the female fifth pair of *Candace truncata* clearly belongs to *Candacia catula*.

*Candacia catula* has been recorded from the Atlantic, Indian and Pacific Oceans.

#### 5. *Candacia curta* (Dana).

*Candace curta* Dana, 1849, p. 23.

*Candace pectinata* Brady, 1883 (pars), p. 67, pl. XXX, figs. 10, 12 & 13.

- Candace curta* Giesbrecht, 1893, p. 424, pls. 21, 22 & 39.  
*Candace intermedia* T. Scott, 1893, p. 61, pl. IV, figs. 30—37.  
*Candacia curta* Giesbrecht & Schmeil, 1898, p. 129.  
*Candacia curta* Thompson & Scott, 1903, p. 251.  
*Candacia curta* Cleve, 1903, p. 358.  
*Candacia curta* Cleve, 1904, p. 186.  
*Candacia curta* Sars, 1905 (*b*), p. 5.  
*Candacia curta* Esterly, 1905, p. 196, fig. 46.  
*Candace curta* Wolfenden, 1905 (*a*) p. 1013.

Thirty-six specimens of the above species were found in the plankton collected at the following stations.

Stat. 47<sup>b</sup>. — Stat. 81. — Stat. 89. — Stat. 98. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 124. — Stat. 125. (day). — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface) — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 157. — Stat. 165. — Stat. 169. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 189<sup>a</sup>. — Stat. 194—7. — Stat. 213. — Stat. 282. — Stat. 304.

*Candacia curta* has a certain amount of resemblance to *Candacia armata* (Boeck), but the two sexes are readily separated from it by the structure of the fifth pairs of feet. The apical joint of the female fifth pair terminates in three strong teeth.

This species has been recorded from the Atlantic and Pacific Oceans and from the Red Sea.

#### 6. *Candacia longimana* (Claus).

- Candace longimana* Claus, 1863, p. 190, pls. XXVII & XXXIII.  
*Candace longimana* Giesbrecht, 1893, p. 423, pls. 21, 22 & 39.  
*Candacia longimana* Giesbrecht & Schmeil, 1898, p. 127.  
*Candacia longimana* I. C. Thompson, 1900, p. 281.  
*Candacia longimana* Thompson & Scott, 1903, p. 250.  
*Candacia longimana* Sars, 1905, p. 5.

Two females identical with this species were obtained from the plankton collected at the following stations.

Stat. 112. — Stat. 128 (HENSEN vertical net, 700 metres to surface).

The female of *Candacia longimana* can be recognised by the apical joint of the fifth pair of feet terminating in three very short teeth.

This species has only previously been known from the Pacific Ocean and from the Mediterranean.

#### 7. *Candacia pachydactyla* (Dana).

- Candace pachydactyla* Dana, 1849, p. 23.  
*Candace pachydactyla* Brady, 1883, p. 68, pl. XXXI, figs. 2—9.  
*Candace pachydactyla* Giesbrecht, 1893, p. 424, pls. 21, 22 & 39.  
*Candace pachydactyla* T. Scott, 1893, p. 60.  
*Candacia pachydactyla* Giesbrecht & Schmeil, 1898, p. 128.

- Candace pachydactyla* Cleve, 1901, p. 5.  
*Candacia pachydactyla* Thompson & Scott, 1903, p. 251.  
*Candacia pachydactyla* Cleve, 1903, p. 358.  
*Candacia pachydactyla* Cleve, 1904, p. 187.  
*Candacia pachydactyla* Sars, (1905*b*), p. 5.  
*Candace pachydactyla* Wolfenden 1905(*a*), p. 1013.

This species proved to be moderately common. It was well distributed throughout the area investigated by the 'Siboga' as shewn by the following records.

- Stat. 19. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 50. — Stat. 66. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 96 (night). — Stat. 98. — Stat. 110. — Stat. 124. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133. — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 157. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 172. — Stat. 184. — Stat. 189<sup>1</sup>. — Stat. 193. — Stats. 194—7. — Stat. 203 (surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204. — Stat. 205 — Stat. 210<sup>3</sup>. — Stat. 213. — Stat. 214. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 223. — Stat. 224. — Stat. 225. — Stat. 245. — Stat. 252. — Stat. 271. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304. — Stat. 315.

The two sexes can readily be separated from the other members of the genus by the structure of the fifth pairs of feet. The genital segment of the female has two large ventrally directed spines. The right side of the last thoracic segment of the male terminates in a slightly bifurcate prolongation. The distal end of the right side of the male genital segment is greatly produced.

*Candacia pachydactyla* is widely distributed in tropical seas.

#### 8. *Candacia simplex* (Giesbrecht).

- Candace simplex* Giesbrecht, 1889, p. 815.  
*Candace simplex* Giesbrecht, 1893, p. 424, pls. 21, 22 & 39.  
*Candacia simplex* Giesbrecht & Schmeil, 1898, p. 130.  
*Candace simplex* Cleve, 1901, p. 5.  
*Candacia simplex* Thompson & Scott, 1903, p. 250.  
*Candacia simplex* Cleve, 1903, p. 358.  
*Candacia simplex* Sars, 1905(*b*), p. 5.

One hundred and twenty specimens belonging to this species were obtained from the plankton collected at the following stations.

- Stat. 16. — Stat. 35. — Stat. 36. — Stat. 66. — Stat. 71. — Stat. 93. — Stat. 96 (day). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 110. — Stat. 117<sup>1</sup>. — Stat. 129. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 165. — Stat. 172. — Stat. 174. — Stat. 177<sup>1</sup>. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 189<sup>1</sup>. — Stats. 194—7. — Stat. 204. — Stat. 205. — Stat. 210<sup>3</sup>. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 252. — Stat. 315.

The fifth pairs of feet of the two sexes are very similar to those of *Candacia bispinosa*, but the females can easily be separated by the quite symmetrical genital segment. The segment has no spiniform projection on the sides.

*Candacia simplex* has been recorded from the Pacific and Indian Oceans, and from the Mediterranean.

9. *Candacia tenuimana* (Giesbrecht).

- Candace tenuimana* Giesbrecht, 1889, p. 814.  
*Candace tenuimana* Giesbrecht, 1893, p. 424, pls. 21 & 22.  
*Candacia tenuimana* Giesbrecht & Schmeil, 1898, p. 128.  
*Candacia tenuimana* Cleve, 1904, p. 187.

Two females belonging to this species were found in the plankton collected with the HENSEN vertical net at Station 141, 1500 metres to the surface.

*Candacia tenuimana* is closely related to *Candacia longimana*, but the female can readily be separated by the long spiniform termination of the apical joint of the fifth pair of feet.

This species is known from the Pacific Ocean and from the Mediterranean.

10. *Candacia truncata* (Dana).

- Candace truncata* Dana, 1849, p. 24.  
*Candace truncata* Brady, 1883 (pars), p. 69, pl. XXIX, fig. 9.  
*Candace truncata* Giesbrecht, 1893, p. 425, pls. 21, 22 & 39.  
*Candacia truncata* Giesbrecht & Schmeil, 1898, p. 130.  
*Candacia truncata* I. C. Thompson, 1900, p. 282.  
*Candacia truncata* A. Scott, 1902, p. 406.  
*Candacia truncata* Thompson & Scott, 1903, p. 250.  
*Candacia truncata* Cleve, 1903, p. 358.  
*Candacia truncata* Cleve, 1904, p. 187.  
*Candace truncata* Wolfenden, 1905(a), p. 1013.

This species appeared to be well distributed throughout the area investigated by the 'Siboga' as shewn by the following records. Eighty-eight specimens were obtained.

Stat. 35. — Stat. 37. — Stat. 66. — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 109. — Stat. 110. — Stat. 112. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 121. — Stat. 125 (night). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 157. — Stat. 169. — Stat. 172. — Stat. 177<sup>a</sup>. — Stat. 184. — Stat. 186. — Stat. 189<sup>a</sup>. — Stat. 203 (surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 229. — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304. — Stat. 315.

The females can readily be separated from any of the other members of the genus, by the truncate distal ends of the last thoracic segment, and by the small tooth at the posterior extremity of the ventral margin of this segment.

*Candacia truncata* has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Red Sea.

11. *Candacia bradyi* A. Scott. Plate XLVII, figs. 1—9.

*Candace pectinata* Brady, 1883 (pars), p. 67, pl. XXX, fig. 9.

*Candacia bradyi* A. Scott, 1902, p. 406, pl. 1, figs. 9—12.

*Candacia bradyi* Thompson & Scott, 1903, p. 250.

*Candace tuberculata* Wolfenden, 1905 (a), p. 1013, pl. XCVI, figs. 40—44.

Fifty-seven specimens of this species were obtained from the plankton collected at the following stations. Only the males have yet been discovered.

Stat. 16. — Stat. 98. — Stat. 99. — Stat. 117<sup>a</sup>. — Stat. 124. — Stat. 125 (night). — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface. — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 169. — Stat. 172. — Stat. 174. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 189'. — Stats. 194—7. — Stat. 215<sup>a</sup>. — Stat. 223. — Stat. 225. — Stat. 315.

This species is easily distinguished from any of the other known males belonging to the genus, by the toothed tubercle on the right side of the genital segment (Plate XLVII, fig. 2) and by the structure of the fifth pair of feet. The third free joint of the left foot, is produced at the outer distal angle into a short stout tooth-like process. The tooth is of a dark colour. When seen from the side it appears very broad, and the apex is divided into three blunt points. The apical joint of the left foot appears elongate and narrow when seen from the posterior aspect. In side view, the joint appears very thin. The apex of the joint is furnished with three small spines (Plate XLVII, figs. 8 and 9).

The left antennule is composed of twenty-three joints and extends to the end of the abdomen.

The middle joint of the first pair of maxillipedes is furnished with three very short spines. The first proximal spine on the third joint is much thicker than the second proximal spine (Plate XLVII, fig. 6).

The terminal spine of the exopodite of the third pair of feet is contained one and a half times in the length of the last joint (Plate XLVII, fig. 7). The terminal spine of the exopodite of the second and fourth pairs of feet is similar to that of the third. The endopodite of the first pair of feet is only one-jointed, and there is no setae on the second joint of the basiopodite. The endopodite of the second, third and fourth pairs of feet is two-jointed.

Length — 2 mm.

The fifth pair of feet of this species is identical with the fifth pair figured by BRADY in the report on the 'Challenger' Copepoda (Plate XXX, fig. 9), and identified as that of *Candace pectinata* (= *Candace armata* Boeck). The fifth pair of feet of the male of *Candacia armata* (Boeck), is very different from the illustration in the 'Challenger' report, and from that now presented. The genital segment also differs by having a large tooth-like projection on the right side.

The species described by WOLFENDEN 1905 (a), as *Candace tuberculata* is certainly the same as the present form. My original figures were rather indifferently reproduced by the lithographer, but the peculiar characters of the fifth pair are quite obvious. WOLFENDEN's two

figures of the fifth pair are very little different from the figures published by me in 1902. The small differences mentioned by WOLFENDEN are due to the preparation being examined from a slightly different position. My paper was published some three years before the appearance of WOLFENDEN's report on the Copepoda collected by J. STANLEY GARDINER around the Maldive Islands.

G. SMITH (1909), p. 60, makes the following statement regarding the distribution of the Candaciidae. "Some species, e. g. *C. pectinata* Brady, have a practically world-wide distribution, "this species being recorded from the Shetlands and from the Phillipines". I am unable to find any record from the *Phillipine arca* except the one given by BRADY in the report on the 'Challenger' Copepoda. The form illustrated in that report as *Candace pectinata* represents at least four distinct species, none of which are identical with it. The illustrations on Plate XXX in the 'Challenger' report represent *Candacia bipinnata*, *C. curta*, *C. varicans* and *C. bradyi*. *Candace pectinata* Brady (1878), was shewn by SARS (1902) to be identical with *Candace armata* Boeck (1872), and the distribution is stated to be British Isles (BRADY), Atlantic Ocean, between Lat. 33° and 50° N. (CLEVE), Mediterranean (GIESBRECHT). SARS records it from the Coast of Norway and from the East of Iceland. ESTERLY records and illustrates *Candacia pectinata* from the Pacific in the vicinity of San Diego, California. WHEELER (1900) records it from Woods Hole.

12. *Candacia discaudata* nov. sp. Plate XLVII, figs. 10—20.

Female — length 1.94 mm.

Seen from above, the body appears rather short and moderately robust. The frontal margin is truncate. The distal ends of the last thoracic segment terminate in short spiniform projections. Viewed from the side, the cephalic segment is considerably vaulted. The spiniform projection of the last thoracic segment is directed ventrally (Plate XLVII, fig. 11).

The combined length of the abdomen and furca is contained two and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is slightly asymmetrical when viewed from above. It is without lateral projections. Each side is furnished with one short setae. The length of the segment is nearly equal to the combined length of the next two segments. The second segment is broadly wedge-shaped. Its length is equal to fully one-half of the length of the genital segment. The anal segment is very short. It is distinctly asymmetrical. The furcal joints are twice as long as broad (Plate XLVII, fig. 10). When viewed from the side, the distal end of the second segment is seen to be considerably expanded. The distal end is much wider than the proximal end of the next segment. The anal segment is very narrow. It is only equal to one-half of the width of the distal end of the second segment (Plate XLVII, fig. 11).

The antennules are composed of twenty-three joints, and reach to the middle of the genital segment.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Candacia norvegica* (Boeck). The middle joint of the first maxillipedes is furnished with two spines. The proximal spine is slightly longer and thicker than the distal one. The first proximal spine on the third joint is much thicker than the second proximal spine (Plate XLVII, fig. 13).

The endopodite of the first pair of feet is one-jointed. There is no setae on the second joint of the basipodite.

The endopodite of the second, third and fourth pairs of feet is two-jointed. The terminal spine on the exopodite of the third pair of feet is contained one and a half times in the length of the last joint. The terminal spine on the exopodite of the second and fourth pairs of feet, is similar to that on the exopodite of the third pair.

The last joint of the fifth pair of feet is long and slender. The joint of one foot is distinctly longer than that of the other. This gives the fifth pair an asymmetrical appearance. The apex of the joint is produced into three closely set teeth. The outer margin is furnished with two small spines. The inner margin bears two moderately long setae (Plate XLVII, figs. 15 and 16).

Male — length 1,8 mm.

The male resembles the female in general appearance. The abdomen is composed of five joints. The genital segment is asymmetrical. Viewed from above, the distal end of the right side is seen to be much inflated. Seen from the right side, the inflated region bears a small tooth at each end. The anal segment is asymmetrical as in the female (Plate XLVII, figs. 17 and 18).

The right antennule is twenty-three-jointed. The hinge is situated between the seventeenth and eighteenth joints. The upper margin of the sixteenth, seventeenth and eighteenth joints, is furnished with a row of dark coloured teeth as in *Candacia bradyi*.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female.

The four pairs of swimming feet are also similar to those of the female.

The joints of the left exopodite of the fifth pair of feet are moderately long and broad. The terminal joint is furnished with two outer edge spines and two apical spines. The spines are very small. The right exopodite is short. The moveable claw has a large projection near the distal end of the inner margin (Plate XLVII, fig. 20).

The males and females of this species are readily separated from the other members of the genus, by the structure of the fifth pair of feet. When viewed from the side, the abdomen of the female is seen to have a general resemblance to that of *Candacia cheirura* Cleve (1904), but the fifth pair of feet is quite distinct.

Occurrence. — One hundred and eighteen females and fifty-six males were obtained from the plankton collected at the following stations.

Stat. 35, 3 specimens. — Stat. 36, 4 specimens. — Stat. 47<sup>b</sup>, 3 specimens. — Stat. 66, 6 specimens. — Stat. 71, 3 specimens. — Stat. 81, 3 specimens. — Stat. 89, 8 specimens. — Stat. 93, 8 specimens. — Stat. 98, 7 specimens. — Stat. 99, 6 specimens. — Stat. 117<sup>a</sup>, 12 specimens. — Stat. 118 (HENSEN vertical net, 900 metres to surface), 10 specimens. — Stat. 122, 7 specimens. — Stat. 136, 8 specimens. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 7 specimens. — Stat. 142, 6 specimens. — Stat. 144, 10 specimens. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 12 specimens. — Stat. 157, 5 specimens. — Stat. 168, 6 specimens. — Stat. 174, 10 specimens. — Stat. 189<sup>a</sup>, 8 specimens. — Stat. 205, 6 specimens. — Stat. 252, 6 specimens. — Stat. 315, 10 specimens.

## 18. Family PONTELLIDAE.

Genus **Pontella** Dana, 1846.

The members of this genus are separated from the other genera belonging to the family, by the three-jointed endopodite of the first pair of feet, by the presence of a pair of dorsal eye-lenses, and by the comparatively short rami of the rostrum. A lens for the ventral eye is occasionally developed in the base of the rostrum.

Eight species of *Pontella* were represented in the plankton collected by the 'Siboga' during the investigations in the Malay Archipelago. Four of the species do not appear to have previously been described.

1. *Pontella danae* Giesbrecht.

*Pontella danae* Giesbrecht, 1889, p. 28.

*Pontella danae* Giesbrecht, 1893, p. 461, pls. 24 & 40.

*Pontellina (Ivellina) danae* Claus, 1893, p. 274.

*Pontella danae* Giesbrecht, 1895, p. 260.

*Pontella danae* Giesbrecht & Schmeil, 1898, p. 143.

Two females belonging to this species were found in the plankton collected at Station 117<sup>a</sup>.

The specimens appeared to be slightly immature, and the abdomen was covered with the cement for attaching spermatophores to the genital opening. The fifth pair of feet of the two specimens is not quite symmetrical. The exopodite of the left foot is distinctly longer than the exopodite of the right foot. The fifth pair of the 'Siboga' specimens is similar to the fifth pair of *Pontella danae* var. *ceylonica* Thompson and Scott, but the furcal joints are identical with GIESBRECHT'S figure.

*Pontella danae* has only been recorded from the Pacific Ocean.

2. *Pontella fera* Dana.

*Pontella fera* Dana, 1849 (pars), p. 34.

*Pontella fera* Giesbrecht, 1893, p. 462, pls. 24 & 40.

*Pontellina (Eupontellina) fera* Claus, 1893, p. 273.

*Pontella fera* Giesbrecht & Schmeil, 1898, p. 144.

*Pontella fera* A. Scott, 1902, p. 408.

*Pontella fera* Thompson & Scott, 1903, p. 252.

*Pontella fera* Wolfenden, 1905 (*a*), p. 1021.

One specimen identical with this species was obtained from the plankton collected at each of the following twelve stations. Six males and six females were found.

Stat. 66. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 93. —  
Stat. 109. — Stat. 110. — Stat. 144. — Stat. 203 (surface). — Stat. 205. — Stat. 213. —  
Stat. 215. — Stat. 282.

The last thoracic segment of the female is symmetrical and the abdomen is composed

of two segments. The structure of the fifth pair of feet of the two sexes readily distinguishes this species from any of the other known members of the genus.

*Pontella fera* has been recorded from the Indian and Pacific Oceans.

### 3. *Pontella princeps* Dana.

*Pontella princeps* Dana, 1849, p. 34.

*Pontella princeps* Giesbrecht, 1893, p. 461, pls. 24 & 40.

*Pontellina (Iva) princeps* Claus, 1893, p. 273.

*Pontella princeps* Giesbrecht & Schmeil, 1898, p. 142.

*Pontella princeps* Thompson & Scott, 1903, p. 252.

Two females and two males belonging to this species were obtained from the plankton collected at the following stations.

Stat. 35, male. — Stat. 66, female. — Stat. 117<sup>a</sup>, female. — Stat. 138, male.

The females are closely allied to *Pontella atlantica*, but they differ from that species in the structure of the abdomen.

This *Pontella* has been recorded from the Indian and Pacific Oceans.

### 4. *Pontella securifer* Brady.

*Pontella securifer* Brady, 1883, p. 96, pl. XLV, figs. 1—9.

*Pontella securifer* Giesbrecht, 1893, p. 461, pls. 24 & 40.

*Pontella securifer* T. Scott, 1893, p. 86.

*Pontellina (Icellina) securifer* Claus, 1893, p. 274.

*Pontella securifer* Giesbrecht & Schmeil, 1898, p. 142.

*Pontella securifer* Thompson & Scott, 1903, p. 252.

*Pontella securifer* Cleve, 1904, p. 195.

*Pontella securifer* Wolfenden, 1905 (a), p. 1021.

Seventeen females and twenty males belonging to the above species were obtained from the plankton collected at the following stations.

Stat. 19, 2 specimens. — Stat. 35, 3 specimens. — Stat. 36, 1 specimen. — Stat. 37, 1 specimen. — Stat. 66, 4 specimens. — Stat. 98, 2 specimens. — Stat. 110, 3 specimens. — Stat. 117<sup>a</sup>, 2 specimens. — Stat. 203 (surface), 2 specimens. — Stat. 229, 2 specimens. — Stat. 230 (HENSEN vertical net, 2000 metres to surface), 2 specimens. — Stat. 282, 1 specimen. — Stat. 315, 2 specimens.

This species can readily be recognised by the prominent lens in the base of the rostrum, and by the structure of the fifth pair of feet of the two sexes.

*Pontella securifer* has been recorded from the warm parts of the Atlantic and Indian Oceans.

### 5. *Pontella alata* nov. sp. Plate LI, figs. 11—15.

Female — length 3.58 mm.

Seen from above, the body is elongate and moderately robust. The cephalic segment is furnished with side hooks and a pair of dorsal eye-lenses. The last thoracic segment is

produced into strong and slightly divergent points. The left side is slightly more elongated than the right side (Plate LI, fig. 11). The points of the rostrum are moderately strong, but there is no trace of a rostral lens.

The abdomen is composed of two segments. The combined length of the abdomen and furca is contained three and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is quite asymmetrical. When viewed from above, the left side is seen to be expanded into a large wing-like projection with a pointed distal end. The dorso-lateral surface of the right side is furnished with a strong spine. The furcal joints are asymmetrical. The joint of the right side is longer and broader than the one on the left side (Plate LI, fig. 11).

The antennules are composed of twenty-four joints and extend to near the end of the last thoracic segment.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Pontella princeps*.

The endopodite of the first pair of feet is three-jointed.

The other three pairs of feet are of the usual *Pontella* type.

The exopodites of the fifth pair of feet are asymmetrical. The left exopodite is considerably longer than the right. The exopodites are spiniform, and are drawn out to a single point at the apex. The left exopodite only is furnished with two outer edge spines. The endopodites are asymmetrical and terminate in two spines of medium length (Plate LI, fig. 15).

Male unknown.

This species resembles *Pontella danae* in the two-jointed abdomen, the asymmetrical furcal joints, and in the shape of the exopodite of the fifth pair of feet. The large projection on the left side of the genital segment, and the asymmetrical condition of the fifth pair feet readily separate it, however, from that species.

Occurrence. — Four specimens were found in the plankton collected at Station 117a.

6. *Pontella denticauda* nov. sp. Plate LII, figs. 1—12.

Female — length 3,3 mm.

Seen from above, the body appears elongate ovate, and rather narrow. The cephalic segment is furnished with side hooks, and a pair of dorsal eye-lenses. The last thoracic segment is symmetrical. The postero-lateral angles are narrowly rounded, and are only very slightly produced (Plate LII, fig. 1). The points of the rostrum are moderately strong, and there is a distinct trace of a lens in the basal part (Plate LII, fig. 2).

The abdomen is composed of two segments. The combined length of the abdomen and furca is contained three and one-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is asymmetrical. The proximal portion of the lateral margin of the left side is produced into a large spiniform process (Plate LII, fig. 1). The furcal joints are asymmetrical. The left furcal joint is distinctly broader than the right.

The antennules are twenty-two-jointed and reach to the end of the third thoracic segment.

The antennae, mandibles, maxillae and maxillipedes are of the usual *Pontella* type.

The endopodite of the first pair of feet is composed of three joints.

The second, third and fourth pairs of feet are of the usual type.

The fifth pair of feet is symmetrical and somewhat similar to that of *Pontella fera*.

The apex of the exopodite is spiniform. The distal portion of the inner margin is furnished with three spines. The outer margin has also three spines, but they are much wider apart. The endopodite is very slightly bifurcate at the apex (Plate LII, fig. 5).

Male — length 2,9 mm.

The male resembles the female in general appearance, but the abdomen is composed of five segments, and the furcal joints are nearly symmetrical. The combined length of the abdomen and furca is contained nearly three times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The rami of the rostrum are asymmetrical, but this may be accidental (Plate LII, fig. 7).

The right antennule has the middle joints much inflated. The proximal hinge joint is narrow. It is furnished with a large saucer-shaped process with a serrate upper edge. The distal hinge joint has a simple lamella terminating in a distinct tooth (Plate LII, fig. 9).

The fifth pair is large and well developed. The thumb-like process on the exopodite of the right foot is large and spiniform. It is greatly curved and the apex is directed outwards. The middle of the first joint is furnished with a moderately long tube-like process. The last joint is lamelliform and spoon-shaped. There appears to be a rudimentary endopodite on the right foot, but this may be abnormal (Plate LII, fig. 12). The last joint of the exopodite of the left foot terminates in two strong spines. The inner spine is contracted to a fine point. The outer spine is of nearly equal width throughout its length. The distal end is rather bluntly rounded (Plate LII, fig. 11). The setae on the second joint of the basipodite is attached to a tooth-like projection.

This species has a general resemblance to *Pontella tenuiremis* Giesbrecht, but the female is easily separated by the large spiniform projection on the left side of the genital segment. The structure of the male fifth pair readily distinguishes it from any of the known males.

Occurrence. — Thirty-two females and eighteen males were obtained from the plankton collected at the following stations.

Stat. 66, 5 specimens. — Stat. 81, 6 specimens. — Stat. 93, 2 specimens. — Stat. 98, 2 specimens. — Stat. 99, 5 specimens. — Stat. 109, 18 specimens. — Stat. 110, 2 specimens. — Stat. 124, 1 specimen. — Stat. 128 (HENSEN vertical net, 700 metres to surface), 3 specimens. — Stat. 157, 1 specimen. — Stats. 194—7, 1 specimen. — Stat. 213, 2 specimens. — Stat. 282, 2 specimens.

7. *Pontella forficula* nov. sp. Plate LIII, figs. 1—7.

Male — length 3,1 mm.

Viewed from above, the body appears elongate ovate, and rather slender. The cephalic segment is furnished with side hooks, and a pair of dorsal eye lenses. The last thoracic segment is symmetrical. The postero-lateral angles are rounded, and the ends are only slightly produced. The rami of the rostrum are asymmetrical, but this may be accidental. There is no trace of a lens in the basal part of the rostrum (Plate LIII, fig. 2).

The abdomen is composed of five segments. The combined length of the abdomen and furca is contained almost three times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The furcal joints are nearly symmetrical (Plate LIII, fig. 1).

The left antennule is composed of nineteen joints, and extends to the end of the second thoracic segment. The middle joints of the right antennule are much inflated. They are furnished with three very strong and forked processes. The proximal hinge joint has a large saucer-like process with blunt teeth. The distal hinge joint is short. The upper margin is furnished with two simple plates (Plate LIII, fig. 4).

The antennae, mandibles, maxillae and maxillipedes are of the usual *Pontella* type.

The endopodite of the first pair of feet is three-jointed.

The second, third and fourth pairs of feet are of the normal *Pontella* structure.

The fifth pair of feet is rather small. The thumb-like process on the first joint of the exopodite of the right foot is long and spiniform. The distal portion is curved inwards. There is no process on the middle of the joint. The claw-like joint is long and curved. It is furnished with one apical and three marginal spines. The end joint of the exopodite of the left foot has no apical spines. The outer margin of the joint is furnished with three small spines (Plate LIII, fig. 7).

Female unknown.

The male of this species is very similar to the male of *Pontella denticauda*, but it is easily separated by the remarkable forked horns on the right antennule, and by the structure of the fifth pair of feet.

Occurrence. — Two specimens were found in the plankton collected at Station 93.

*S. Pontella ccrami* nov. sp. Plate LIII, figs. 8—15.

Male — length 3.45 mm.

Viewed from above, the body appears elongate and moderately robust. The cephalic segment is furnished with side hooks, and a pair of dorsal eye lenses. The last thoracic segment is symmetrical, and both sides terminate in spiniform projections. The points are slightly divergent (Plate LIII, fig. 8). The rami of the rostrum are short, and the basal part is provided with a well defined circular lens (Plate LIII, fig. 9).

The abdomen is composed of five segments. The combined length of the abdomen and furca is contained fully three times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The furcal joints are moderately long, and are nearly symmetrical.

The left antennule is twenty-four-jointed, and extends to the middle of the third thoracic segment. The middle joints of the right antennule are greatly swollen. The upper margin of the first swollen joint is furnished with a strong curved spine. The upper margin of the proximal hinge joint has a strongly serrate lamella. The second and third teeth are much longer than any of the others (Plate LIII, fig. 12). The outer part of the upper margin of the distal hinge joint is furnished with two serrate plates. One of the plates has a double row of teeth (Plate LIII, fig. 13). The end of the joint is produced into a short stout spine.

The antennae, mandibles, maxillae and maxillipedes are of the usual *Pontella* type.

The endopodite of the first pair of feet is composed of three joints.

The second, third and fourth pairs of feet are of the normal *Pontella* form.

The fifth pair is moderately large. The thumb-like process on the proximal end of the first joint of the right exopodite is very long. It is curved inwards. The middle of the joint is provided with a nearly straight spine. The claw-like joint is long and slender and is much curved. It is furnished with two marginal spines and one apical spine. The last joint of the exopodite of the left foot bears three moderately strong apical spines. The inner margin has a large pad of fine hairs. The outer dorso-lateral margin is furnished with a small spine (Plate LIII, fig. 15).

Female unknown.

This species may easily be passed over as the male of *Pontella securifer*, as it resembles it in the possession of a circular lens in the base of the rostrum, and also of a serrate plate on the proximal hinge joint of the right antennule. The structure of the fifth pair of feet, however, is quite distinct.

Occurrence. — Two specimens were found in the plankton collected with the HENSEN vertical net at Station 203, 1500 metres to the surface.

#### Genus *Labidocera* Lubbock, 1853.

The members of this genus are closely related to *Pontella*, but they can readily be separated by the structure of the first pair of feet. The endopodite of the first pair is two-jointed, like the endopodites of the second, third and fourth pairs of feet. The cephalic segment is usually without side hooks. One pair of dorsal eye lenses is present. The basal part of the rostrum has no lens.

Seven species of *Labidocera* were represented in the plankton collected by the 'Siboga' in the Malay Archipelago. Two of the species do not appear to have previously been described.

##### 1. *Labidocera acuta* (Dana).

*Pontella acuta* Dana, 1849, p. 30.

*Pontellina acuta* Dana, 1852, p. 1150, pl. 80.

*Pontella acuta* Brady, 1883, p. 89, pl. XXXVI, figs. 1—12.

*Labidocera acutum* Giesbrecht, 1893, p. 445, pl. 23, 25 & 41.

*Labidocera acuta* T. Scott, 1893, p. 85.

*Labidocera acutum* Giesbrecht, 1895, p. 259.

*Labidocera acuta* Giesbrecht & Schmeil. 1898, p. 134.

*Labidocera acuta* I. C. Thompson, 1900, p. 282.

*Labidocera acutum* Cleve, 1901, p. 7.

*Labidocera acuta* A. Scott, 1902, p. 407.

*Labidocera acuta* Thompson & Scott, 1903, p. 251.

*Labidocera acutum* Cleve, 1903, p. 363.

*Labidocera acuta* Cleve, 1904, p. 191.

*Labidocera acuta* Wolfenden, 1905(a), p. 1016.

*Labidocera acuta* van Breemen, 1908, p. 150, fig. 168.

This species proved to be moderately common. It was widely distributed throughout the area investigated as shewn by the following records.

Stat. 16. — Stat. 19. — Stat. 35. — Stat. 37. — Stat. 40. — Stat. 50. — Stat. 66. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 109. — Stat. 112. — Stat. 117<sup>a</sup>, 200 specimens. — Stat. 122. — Stat. 124, 440 specimens. — Stat. 125 (night). — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 144. — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 157. — Stat. 165. — Stat. 169. — Stat. 172. — Stat. 174. — Stat. 177<sup>a</sup>. — Stat. 184. — Stat. 189<sup>a</sup>. — Stats. 194—7. — Stat. 203 (surface). — Stat. 204. — Stat. 205. — Stat. 213. — Stat. 214. — Stat. 215<sup>a</sup>. — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 223. — Stat. 224. — Stat. 225. — Stat. 229. — Stat. 245. — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304. — Stat. 315.

*Labidocera acuta* is readily distinguished by the presence of a median crest on the forehead, and by the structure of the fifth pair of feet of both sexes.

This species appears to have a fairly wide distribution in the warm regions of all the great oceans.

## 2. *Labidocera detruncata* (Dana).

*Pontella detruncata* Dana, 1849, p. 29.

*Pontellina detruncata* Dana, 1852, p. 1143, pl. 80.

*Pontella detruncata* Brady, 1883, p. 90, pls. XXVI & XLV.

*Labidocera detruncatum* Giesbrecht, 1893, p. 445, pls. 23, 25 & 41.

*Labidocera detruncata* Giesbrecht & Schmeil, 1898, p. 135.

*Labidocera detruncata* Thompson & Scott, 1903, p. 251.

*Labidocera detruncata* Wolfenden, 1905 (a), p. 1017, pl. XCVIII.

This *Labidocera* appeared to be rather rare and the distribution was very limited in the area investigated by the 'Siboga'. It was found in the plankton collected at the following eight stations.

Stat. 16, 10 specimens. — Stat. 96 (night), 5 specimens. — Stat. 98, 3 specimens. — Stat. 110, 20 specimens. — Stat. 111, 10 specimens. — Stat. 203 (surface), 7 specimens. — Stat. 282, 4 specimens. — Stat. 315, 5 specimens.

Twenty-four females and forty males were obtained.

*Labidocera detruncata* is only known from the Indian and Pacific Oceans.

## 3. *Labidocera kroyeri* (Brady).

*Pontella kroyeri* Brady, 1883, p. 93, pl. XXXIX, figs. 1—19.

*Labidocera kroyeri* Giesbrecht, 1893, p. 446, pls. 23, 25 & 41.

*Labidocera kroyeri* Giesbrecht & Schmeil, 1898, p. 135.

*Labidocera kroyeri* Cleve, 1901, p. 7.

*Labidocera kroyeri* Thompson & Scott, 1903, p. 251.

*Labidocera kroyeri* Pearson, 1906, p. 30.

*Labidocera kroyeri* van Breemen, 1908, p. 151.

*Labidocera kroyeri*, although represented by fewer specimens, appeared to be more widely distributed than *Labidocera detruncata*. Seventeen females and nine males were obtained from the plankton collected at the following fourteen stations in the area investigated by the 'Siboga'.

Stat. 35, 2 specimens. — Stat. 37, 3 specimens. — Stat. 81, 3 specimens. — Stat. 98, 1 specimen. — Stat. 99, 2 specimens. — Stat. 109, 3 specimens. — Stat. 110, 1 specimen. — Stat. 117<sup>a</sup>, 1 specimen. — Stat. 142, 1 specimen. — Stat. 144, 2 specimens. — Stat. 165, 1 specimen. — Stat. 189<sup>a</sup>, 3 specimens. — Stat. 213, 1 specimen. — Stat. 315, 2 specimens.

This species is readily recognised when mixed with the other members of the genus, by the following characters. The abdominal segments of the female are furnished with strong spines and teeth. The right side of the last thoracic segment of the male is produced into a bifid process. The males appear to be rather variable, both in the form of the right projection of the last thoracic segment, and in the length of the thumb-like process on the first joint of the exopodite of the right fifth foot. Two varieties of the male fifth pair are shewn in the report on the Ceylon Copepoda. By a misprint it is stated in that report that the left side of the last thoracic segment of *Labidocera kroyeri* var. *gallensis* has a trifid projection. It ought to read right side of course. Only the typical form was obtained from the 'Siboga' plankton.

*Labidocera kroyeri* has been recorded from the Indian and Pacific Oceans. It has also been found in the North Atlantic off the West of Ireland.

4. *Labidocera laevidentata* (Brady). Plate LI, figs. 1—10.

*Pontella laevidentata* Brady, 1883, p. 93, pl. XXXVIII, figs. 1—6.

*Labidocera laevidentatum* Giesbrecht, 1893, p. 446.

*Labidocera laevidentata* Giesbrecht & Schmeil, 1898, p. 137.

*Labidocera laevidentata* Wolfenden, 1905 (a), p. 1019, pl. XCVIII, figs. 20, 26, 27, 28, 38 (male).

*Labidocera kroyeri* var. *similis* Wolfenden, 1905 (a), p. 1016, figs. 22, 23, 33 (female).

This rare form was found in the plankton collected at the following two stations in the area traversed by the 'Siboga'.

Stat. 66, 75 females and 76 males. — Stat. 71, 1 male.

BRADY described the species from a single male specimen found in plankton collected off Sibago Island, Philippines, on October 23rd, 1874. The species was not again met with until WOLFENDEN recorded the male in 1905, from the plankton collected around the Maldives by J. STANLEY GARDINER. WOLFENDEN states that only the males are known, but the form he describes as *Labidocera kroyeri* var. *similis*, is undoubtedly the female of *Labidocera laevidentata*. The fifth pair of feet has not the slightest resemblance to the fifth pair of the female of *Labidocera kroyeri*.

The *cephalothorax* of the female is very similar to that of the male. The cephalic segment is furnished with lateral hooks. Seen from above, the forehead is broadly angular in outline. The side hooks are much nearer the frontal margin than in any of the other members of this genus that have hooks (Plate LI, fig. 1). The last thoracic segment is symmetrical. The postero-lateral angles are produced into spines. The spines are rather divergent. The rami of the rostrum are stout at the base, and are drawn out to a moderately fine point at the apex. There does not appear to be any articulation between the rami and the basal part. The excavation between the rami is wedge-shaped (Plate LI, fig. 3).

The abdomen is moderately long. It is composed of three segments. The combined length of the abdomen and furca is contained two and one-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is symmetrical. It is as long as the combined length of the next two segments. The dorso-lateral surface is furnished with a strong spine on each side near the distal end. The second segment is asymmetrical. The distal end is provided with a double pointed process. The anal segment is asymmetrical. It is much shorter on the right side than on the left. The distal end of the first and second segments, and the ventro-lateral surface of the second segment, is fringed with fine spines (Plate LI, figs. 1 and 2). The furcal joints are asymmetrical. The right furcal joint is much broader, and slightly longer than the left furcal joint.

The antennules are composed of twenty-four joints and extend to the end of the anal segment.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the male. The apical portion of the second maxillipedes is four-jointed.

The exopodites of the four pairs of swimming feet are three-jointed. The endopodites are two-jointed.

The fifth pair of feet is slightly asymmetrical. The right exopodite is rather shorter and stouter than the left. Each exopodite is armed with three outer edge spines. The distal part of the inner margin bears two spines set close together. The proximal spine of this pair is longer and stouter than the distal one. The apex terminates in a strong and slightly curved spine. The endopodite of each foot is short. The apex is very feebly bifurcate. The figure shews the fifth pair in a reversed position (Plate LI, fig. 6).

Length of 'Siboga' specimens, female 1.95 mm., male 1.7 mm.

Professor BRADY described the species as a *Pontella*. GIESBRECHT placed it in the genus *Labidocera* on account of the two-jointed endopodite of the first pair of feet. BRADY and WOLFENDEN appear to be the only authors who have hitherto met with this form.

##### 5. *Labidocera minuta* Giesbrecht.

*Labidocera minutum* Giesbrecht, 1889, p. 27.

*Labidocera minutum* Giesbrecht, 1893, p. 446, pl. 23, 25 & 41.

*Labidocera minuta* Giesbrecht & Schmeil, 1898, p. 137.

*Labidocera minutum* Cleve, 1901, p. 7.

*Labidocera minuta* A. Scott, 1902, p. 407.

*Labidocera minuta* Thompson & Scott, 1903, p. 251.

*Labidocera minutum* Cleve, 1903, p. 363.

*Labidocera minuta* Wolfenden, 1905(a), p. 1018, pl. XCVIII, figs. 18, 24, 25, 29, 32, 37.

Eighteen females and nine males belonging to this species were obtained from the plankton collected at the following stations.

Stat. 16. — Stat. 35. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 71. — Stat. 81. — Stat. 96 (night). — Stat. 106. — Stat. 109. — Stat. 110. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 169. — Stat. 174. — Stat. 189<sup>a</sup>. — Stat. 204. — Stat. 205. — Stat. 213. — Stat. 216. — Stat. 229. — Stat. 315.

The two sexes can readily be distinguished by the structure of the fifth pairs of feet, and by the shape of the abdominal segments.

*Labidocera minuta* has been recorded from the Indian and Pacific Oceans, and from the Red Sea.

6. *Labidocera bataviac* nov. sp. Plate L, figs. 1—8.

Female — length 2.3 mm.

Viewed from above, the body appears broadly ovate. The greatest width lies in the middle of the first thoracic segment. The width is contained nearly two and one-half times in the total length. The cephalic segment is without side hooks. The last thoracic segment is symmetrical. The lateral margins are produced posteriorly into short divergent points. The basal part of the rostrum is wide. The excavation is concave but it is very shallow. The rami are distinctly articulated to the base (Plate L, fig. 2).

The abdomen is very short. It is composed of two segments. The combined length of the abdomen and furca is contained fully six times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is asymmetrical. It is comparatively large, and the distal end, when seen from above, is unequally dilated. The furcal joints are asymmetrical. The left furcal joint is one and a half times broader than long. It has the appearance of being set at right angles to the abdomen, and its setae placed on the inner margin. The setae are borne on the side and apex, however, as in the other members of the genus. The right furcal joint is practically normal. It is one and a half times longer than broad (Plate L, fig. 1).

The antennules are twenty-three-jointed and extend to the end of the last thoracic segment.

The antennae, mandibles, maxillae and maxillipedes are nearly similar to those of *Labidocera laevidentata*. The apical portion of the second maxillipedes is composed of four joints.

The endopodites of the first four pairs of feet are two-jointed. The exopodites are three-jointed.

The fifth pair of feet is slightly asymmetrical. The left exopodite is rather longer than the right exopodite. The outer margin is furnished with two spines. The apex terminates in three unequal spines. The endopodite is small, and is slightly bifurcate at the apex (Plate L, fig. 5).

Male — length 1.96 mm.

The male has a general resemblance to the female, but the abdomen is composed of five segments. The furcal joints are broad and symmetrical (Plate L, fig. 6).

The middle joints of the right antennule are considerably inflated. The upper margin of the two proximal hinge joints, and of the distal hinge joint is armed with fine teeth (Plate L, fig. 7).

The thumb-like process at the proximal end of the outer margin of the first joint of the exopodite of the right fifth foot is long and stout. There is a distinct tooth-like spine close to the base of the thumb. The middle of the outer margin is furnished with a low broad tooth. The claw-like second joint has a distinct tooth on the middle of the outer margin. The terminal joint of the left exopodite is about twice as long as broad. It is provided with one outer edge, and three apical spines. The inner margin has a pad of fine hairs (Plate L, fig. 8).

This species at first sight may easily be mistaken for *Labidocera pavo* Giesbrecht, of which only the female is known. The genital segment of the female of *Labidocera bataviae* is without the large protuberance that is so conspicuous in *Labidocera pavo*. The fifth pairs of feet of the two females are also rather different in shape.

Occurrence. — One hundred and fifty-six females and thirty males were obtained from the plankton collected at the following stations.

Stat. 16, 29 specimens. — Stat. 66, 22 specimens. — Stat. 71, 60 specimens. — Stat. 81, 26 specimens. — Stat. 98, 22 specimens. — Stat. 282, 27 specimens.

7. *Labidocera madurae* nov. sp. Plate L, figs. 9—16.

Female — length 2,5 mm.

Seen from above, the body appears elongate ovate, and rather narrow. The cephalic segment is without side hooks, and the forehead is boldly rounded. The last thoracic segment is symmetrical. The lateral margins are produced posteriorly into pointed processes. The basal part of the rostrum is wide. There is practically no excavation. The rami are long and are distinctly articulated to the base (Plate L, fig. 10).

The abdomen is short. It is composed of two segments. The combined length of the abdomen and furca is contained five times in the total length of the *cephalothorax*, from the frontal margin to the distal end of the last thoracic segment. The genital segment is moderately large. It is quite asymmetrical. The middle of the right side is considerably inflated. The anal segment is very short. The furcal joints are symmetrical. They are rather longer than broad (Plate L, fig. 9).

The antennules are composed of twenty-three joints and extend to the end of the abdomen.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the previous species. The apical portion of the second pair of maxillipedes is composed of four joints.

The endopodites of the four pairs of swimming feet are two-jointed. The exopodites are three-jointed.

The fifth pair of feet is nearly symmetrical. The exopodite is furnished with two outer marginal spines. The apex terminates in three subequal spines. The apex of the endopodite is not bifurcate (Plate L, fig. 13).

Male — length 1,9 mm.

The male resembles the female except that the abdomen is composed of five segments. The fourth and fifth segments are much shorter than any of the others (Plate L, fig. 14).

The middle joints of the right antennule are only slightly swollen. The upper margin of the proximal hinge joint and of the distal hinge joint is fringed with fine teeth (Plate L, fig. 15).

The thumb-like process on the proximal end of the outer margin of the first joint of the right exopodite of the fifth pair of feet, is comparatively short and curved. There is no tooth at the base of the process as in *Labidocera bataviae*. The palm is simple. The claw-like joint is long and narrow. The apical joint of the left exopodite is elongate ovate. It is twice as long as broad. The outer margin is furnished with one spine, and the apex bears three spines. The inner margin has a pad of fine hairs.

This species approaches *Labidocera nerii* (Kroyer) in general appearance, but the structure of the fifth pair of both sexes readily separates it from that form, and from any of the other known members of the genus.

The name is derived from Madura Strait, where the series of investigations in the Malay Archipelago carried out by this expedition began, and finally ended, after a year of exploring the seas and straits in the area.

Occurrence. — One hundred and sixty females and four males were obtained from the plankton collected at the following stations.

Stat. 16, 80 specimens. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 60 specimens. — Stats. 194—7, 5 specimens. — Stat. 203 (surface), 13 specimens. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 2 specimens. — Stat. 282, 2 specimens. — Stat. 315, 2 specimens.

#### Genus *Pontellopsis* Brady, 1883.

The members of this genus are separated from *Pontella* and *Labidocera* by the complete absence of dorsal and rostral lenses, and by the long slender rami of the rostrum. The structure of the fifth pair of feet of the two sexes is something similar to that found in *Pontella*. The endopodite of the first pair of feet is three-jointed.

Eight species of *Pontellopsis* were obtained from the plankton collected by the 'Siboga'. Two of the species do not appear to have previously been described.

##### 1. *Pontellopsis armata* (Giesbrecht).

*Monops armatus* Giesbrecht, 1889, p. 28

*Monops armatus* Giesbrecht, 1893, p. 487, pls. 26 & 41.

*Pontellopsis armata* Giesbrecht & Schmeil, 1898, p. 148.

*Monops armatus* Cleve, 1901, p. 7.

*Pontellopsis armata* Thompson & Scott, 1903, p. 253.

*Pontellopsis armata* Wolfenden, 1905(a), p. 1022, pl. XCIX.

This species proved to be the most abundant and generally distributed member of the genus, as shewn by the records of its occurrence.

Stat. 35. — Stat. 89. — Stat. 98, 23 females and 17 males. — Stat. 117<sup>a</sup>, 1 specimen. — Stat. 124, 8 specimens. — Stat. 138, 1 specimen. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 1 specimen. — Stat. 144. — Stat. 157, 2 specimens. — Stat. 184. — Stat. 186, 1 specimen. — Stat. 189<sup>a</sup>, 3 specimens. — Stat. 193, 1 specimen. — Stats. 194—7, 2 specimens. — Stat. 203 (surface), 9 specimens. — Stat. 213, 20 specimens. — Stat. 215<sup>a</sup>, 2 specimens. — Stat. 216, 2 specimens. — Stat. 217 (surface), 2 specimens. — Stat. 217 (horizontal cylinder), 2 specimens. — Stat. 222, 3 specimens. — Stat. 223, 2 specimens. — Stat. 229, 15 specimens. — Stat. 245, 1 specimen.

The female of *Pontellopsis armata* can readily be recognised by the hirsute body, by the elongate spiniform projections of the last thoracic segment, and by the structure of the fifth pair of feet.

This species has been recorded from the Indian and Pacific Oceans.

2. *Pontellopsis krameri* (Giesbrecht).

- Monops krameri* Giesbrecht, 1896, p. 323, pl. V, figs. 1—2.  
*Pontellopsis krameri* Giesbrecht & Schmeil, 1898, p. 147.  
*Pontellopsis krameri* A. Scott, 1902, p. 423, pls. I & II.  
*Pontellopsis krameri* Thompson & Scott, 1903, p. 253.  
*Pontellopsis krameri* Wolfenden, 1905(a), p. 1021, pl. XCVIII.

Twenty-two specimens belonging to this distinct species, were obtained from the plankton collected at the following stations.

- Stat. 16, 2 specimens. — Stat. 35, 3 specimens. — Stat. 71, 1 specimen. — Stat. 109, 3 specimens. — Stat. 110, 2 specimens. — Stat. 124, 3 specimens. — Stat. 144, 1 specimen. — Stats. 194—7, 2 specimens. — Stat. 204, 3 specimens. — Stat. 210', 2 specimens.

The female of this *Pontellopsis* can readily be recognised by the structure of the fifth pair of feet, and by the right furcal joint being about double the size of the left furcal joint.

*Pontellopsis krameri* is apparently a rare species. It has hitherto only been known from the Indian Ocean and from the Red Sea.

3. *Pontellopsis perspicax* (Dana).

- Pontella perspicax* Dana, 1849, p. 32.  
*Pontellina perspicax* Dana, 1852, p. 1155, pl. 81,  
*Pontellina pulchra* Dana, 1852, p. 1157, pl. 81.  
*Monops perspicax* Giesbrecht, 1893, p. 486, pls. 26 & 41.  
*Pontellopsis perspicax* Giesbrecht & Schmeil, 1898, p. 147.  
*Pontellopsis perspicax* Thompson & Scott, 1903, p. 253.

Four females and one male identical with the above species were found in the plankton collected at Station 35.

This species has a certain amount of resemblance to *Pontellopsis armata*, but the two sexes can readily be separated by the structure of the fifth pair of feet.

*Pontellopsis perspicax* has only yet been recorded from the Atlantic and Indian Oceans.

4. *Pontellopsis regalis* (Dana).

- Pontella regalis* Dana, 1849, p. 31.  
*Pontellina regalis* Dana, 1852, p. 1154, pl. 81.  
*Monops grandis* Lubbock, 1853, p. 122, pls. 5 & 7.  
*Pontella strenua* Brady, 1883 (pars), p. 95, pl. XLV, fig. 18.  
*Monops regalis* Giesbrecht, 1893, p. 486, pls. 1, 26 & 41.  
*Monops grandis* Claus, 1893 (pars), p. 277.  
*Monops regalis* Giesbrecht, 1895, p. 260.  
*Pontellopsis regalis* Giesbrecht & Schmeil, 1898, p. 147.  
*Pontellopsis regalis* I. C. Thompson, 1900, p. 283.  
*Monops regalis* Wheeler, 1900, p. 182, fig. 19.  
*Monops regalis* Cleve, 1901, p. 7.  
*Pontellopsis regalis* Thompson & Scott, 1903, p. 253  
*Pontellopsis regalis* Sars, 1905(b), p. 6.

Thirteen specimens of this form were obtained from the plankton collected at the following stations.

Stat. 98, 2 specimens. — Stat. 117<sup>a</sup>, 1 specimen. — Stat. 124, 2 specimens. — Stat. 144, 3 specimens. — Stat. 157, 1 specimen. — Stat. 213, 4 specimens.

This is the largest known member of the genus. The two sexes can easily be identified by the structure of the fifth pair of feet.

*Pontellopsis regalis* has a moderately wide distribution. It has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

#### 5. *Pontellopsis strenua* (Dana).

*Pontella strenua* Dana, 1849, p. 32.

*Pontellina strenua* Dana, 1852, p. 1158, pl. 81.

*Monops strenuus* Giesbrecht, 1893, p. 486, pls. 26 & 41.

*Monops grandis* Claus, 1893 (pars), p. 277.

*Pontellopsis strenua* Giesbrecht & Schmeil, 1898, p. 147.

*Monops strenuus* Cleve, 1901, p. 7.

*Pontellopsis strenua* Thompson & Scott, 1903, p. 253.

Ten specimens were found in the plankton obtained from the following two stations.

Stat. 96 (night), 4 specimens. — Stat. 117<sup>a</sup>, 6 specimens.

This species is closely related to *Pontellopsis regalis*, but it can easily be distinguished by its smaller size, and by the structure of the fifth pair of feet of the two sexes.

*Pontellopsis strenua* appears to be rather limited in its distribution. It has only been recorded from the Indian and Pacific Oceans.

The figures of *Pontella strenua* given by Professor BRADY in the report on the 'Challenger' Copepoda evidently represent two forms, but neither of them are identical with DANA's *Pontella strenua*. Fig. 17, Plate XLV, seems to be identical with the male fifth pair of *Pontella atlantica* (M. Edwards). Fig. 18, Plate XLV, appears to be the abdomen of the male of *Pontellopsis regalis*.

#### 6. *Pontellopsis villosa* Brady.

*Pontellopsis villosa* Brady, 1883, p. 86, pls. XXXIV & XXXV.

*Monops pilosus* Giesbrecht, 1889, p. 28.

*Monops villosus* Giesbrecht, 1893, p. 486, pls. 26 & 41.

*Monops edwardsii* Claus, 1893 (pars), p. 277.

*Pontellopsis villosa* T. Scott, 1893, p. 87, pl. VI, figs. 29—34.

*Monops villosus* Giesbrecht, 1894, p. 92.

*Pontellopsis villosa* Giesbrecht & Schmeil, 1898, p. 148.

*Pontellopsis villosa* Sars, 1905 (b), p. 6.

One female identical with the above species was found in the plankton collected at Station 138.

The female of this *Pontellopsis* is somewhat similar to *Pontellopsis armata*. The abdomen, however, is composed of a single joint. The abdomen of the female of *Pontellopsis armata* is two-jointed.

*Pontellopsis villosa* has been recorded from the Atlantic and Pacific Oceans, and from the Mediterranean.

7. *Pontellopsis pexa* nov. sp. Plate LIV, figs. 11—14.

Female — length 2.2 mm.

Seen from above, the body appears of the usual *Pontellopsis* shape. It is robust, and the last thoracic segment is produced into bluntly rounded processes (Plate LIV, fig. 11). The cephalic segment and the first three thoracic segments, have narrow bands of short hairs. The dorsal surface of the last thoracic segment is covered with short hairs as shewn in the figure. The rami of the rostrum are long and slender (Plate LIV, fig. 12).

The abdomen is composed of two segments. The genital segment is long and asymmetrical. The distal end of the right side is considerably inflated. The furcal joints are comparatively short and are nearly symmetrical. The abdominal segments are without spines.

The antennules are twenty-jointed. The third to the eighth joints are rather indistinctly separated.

The antennae, mandibles, maxillae and maxillipedes are similar to those *Pontellopsis armata*. The first four pairs of feet are also similar to those of that species.

The fifth pair of feet is quite asymmetrical. The exopodite of the right foot is much shorter than the exopodite of the left foot. The distal end of the inner margin is produced into a strong spine. The apex of the right exopodite terminates in three small teeth. The exopodite of the left foot is moderately long and spiniform. There is no inner edge spine and the apex terminates in a single point. The endopodites are asymmetrical and the apex is bifurcate (Plate LIV, fig. 14).

This species has a certain amount of resemblance to *Pontellopsis tenuicauda* (Giesbrecht), but it can readily be separated from that species, or any of the other known members of the genus, by the bluntly rounded projections of the last thoracic segment, and by the structure of the fifth pair of feet.

Male unknown.

Occurrence. — One specimen was found in the plankton collected at each of the following two stations.

Stat. 138. — Stat. 145.

8. *Pontellopsis macronyx* nov. sp. Plate LIV, Figs. 1—10.

Female — length 1.97 mm.

Viewed from above, the body appears moderately robust. The last thoracic segment is symmetrical. It is produced posteriorly into pointed processes (Plate LIV, fig. 1). The rami of the rostrum are long and slender.

The abdomen is composed of two segments. The combined length of the abdomen and furca is contained two and a half times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is moderately long. It is slightly asymmetrical. The proximal and distal regions of the margin of each side are furnished with spines. The right distal spine is shorter than the left distal spine. The furcal joints are short (Plate LVI, fig. 1).

The antennules are twenty-jointed and extend to the end of the thorax.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Pontellopsis armata*. The apical portion of the second maxillipedes is composed of four joints.

The four pairs of swimming feet are also similar to those of *Pontellopsis armata*.

The fifth pair of feet is asymmetrical. The inner margin of the right exopodite is produced into a strong spine. The exopodite of the left foot is distinctly shorter than the exopodite of the right foot. The inner margin has no spine. The endopodites are nearly symmetrical, and the apex is bifurcate (Plate LIV, fig. 6).

Male — length 1.67 mm.

The male bears a general resemblance to the female, but the last thoracic segment is distinctly asymmetrical and the abdomen is five-jointed. The left distal end of the last thoracic segment is the same as that of the female. The right side is produced into a moderately strong, curved, spiniform process, that extends to the end of the third abdominal segment. The right side of the third abdominal segment is expanded into a well defined tooth. The furcal joints are proportionally longer than those of the female (Plate LIV, fig. 7).

The right antennule is composed of about twelve distinct joints. The three middle joints are greatly inflated. The upper margin of the second proximal hinge joint is produced distally into a serrate tooth. The lamina on the upper margin of the proximal hinge joint is also serrate. The proximal portion of the upper margin of the distal hinge joint is furnished with moderately long slender spines (Plate LIV, fig. 9).

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female.

The first four pairs of feet are also the same as in the female.

The thumb-like projection of the first joint of the right exopodite of the fifth pair is slender, and is of very remarkable length. The claw-like terminal joint is comparatively short. The produced outer distal end of the first joint of the left exopodite extends to near the end of the second joint. The second joint is short. It is furnished with one outer marginal spine, two sub-apical spines, and one apical spine (Plate LIV, fig. 10).

The females of this species can readily be separated from any of the other females of the genus, by the spines on the dorsal surface of the genital segment. The structure of the fifth pair of feet of the two sexes readily distinguishes this species from any of the other members of the genus. The remarkably long thumb-like projection of the first joint of the right exopodite of the male fifth pair, is sufficient to separate the male of this species, from any of the other known males.

Occurrence. — Seven specimens were obtained from the plankton collected at the following stations.

Stat. 37, 1 female and 1 male. — Stat. 109, 2 females and 1 male. — Stat. 213, 1 female and 1 male.

#### Genus *Pontellina* Dana, 1852.

*Pontellina* is closely related to the genus *Pontellopsis*, but the last thoracic segment of both the male and female is asymmetrical. The right furcal joint of the two sexes is very

indistinctly separated from the anal segment. The antennae and mandible palps are furnished with very long and densely plumose setae.

The only known representative of this genus appeared to be well distributed throughout the area investigated by the 'Siboga'.

1. *Pontellina plumata* (Dana).

*Pontella plumata* Dana, 1849, p. 27.

*Pontella turgida* Dana, 1849, p. 28.

*Pontellina plumata* Dana, 1852, p. 1135, pl. 79.

*Pontellina turgida* Dana, 1852, p. 1136, pl. 79.

*Calanops messinensis* Claus, 1863, p. 212, pls. XXXVI & XXXVII.

*Pontella plumata* Brady, 1883, p. 92, pl. XXXVII.

*Pontellina plumata* Giesbrecht, 1893, p. 497, pls. 4, 25 & 40.

*Pontellina plumata* T. Scott, 1893, p. 88.

*Pontellina plumata* Giesbrecht, 1895, p. 260.

*Pontellina plumata* Giesbrecht & Schmeil, 1898, p. 149.

*Pontellina plumata* I. C. Thompson, 1900, p. 283.

*Pontellina plumata* Cleve, 1901, p. 8.

*Pontellina plumata* A. Scott, 1902, p. 408.

*Pontellina plumata* Thompson & Scott, 1903, p. 253.

*Pontellina plumata* Cleve, 1903, p. 367.

*Pontellina plumata* Cleve, 1904, p. 195.

*Pontellina plumata* Wolfenden, 1905 (a), p. 1022.

*Pontellina plumata* Sars, 1905 (b), p. 6.

This characteristic form, although not common, proved to have a wide distribution in the Malay Archipelago. The following are the stations where it was noted.

Stat. 19. — Stat. 35. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 66. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 110. — Stat. 112. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 121. — Stat. 122. — Stat. 124. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 129. — Stat. 133. — Stat. 136. — Stat. 138. — Stat. 144. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 157. — Stat. 172. — Stat. 177<sup>a</sup>. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 186. — Stat. 189<sup>a</sup>. — Stats. 194—7. — Stat. 203 (surface). — Stat. 210<sup>a</sup>. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 217 (surface). — Stat. 217 (horizontal cylinder). — Stat. 220 (surface). — Stat. 223. — Stat. 224. — Stat. 229. — Stat. 245. — Stat. 271. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 315.

This species is readily identified by its short robust body, and by the long plumose setae on the antennae and mandible palps.

*Pontellina plumata* appears to be generally distributed in all the warm regions of the great oceans.

Genus **Calanopia** Dana, 1852.

The members of this genus are readily separated from the other genera, by the structure of the fifth pair of feet of the two sexes. The fifth pair of the female consists of a two-jointed basiopodite, and a one or two-jointed exopodite. The endopodite is entirely absent. The

male fifth pair has a two-jointed basiopodite and exopodite. The exopodite of the right foot is prehensile as in the other genera belonging to the family.

The members of this genus that are already known have no side hooks on the cephalic segment. A species that appears to be undescribed was obtained from the 'Siboga' plankton, and although it agrees quite well with *Calanopia* in the structure of its appendages, the cephalic segment is provided with side hooks.

Four species were represented in the plankton collected during the traverse in the Malay Archipelago. Two of the species do not appear to have previously been described.

Illustrations of two other known forms, that were not obtained from the plankton collected by the 'Siboga', are included in this report, in order that the differences between the six species of *Calanopia* now known can clearly be observed.

1. *Calanopia elliptica* (Dana). Plate XLVIII, figs. 1—5.

*Pontella elliptica* Dana, 1849, p. 27.

*Calanopia elliptica* Dana, 1852, p. 1132, pl. 79.

*Calanopia elliptica* Brady, 1883, p. 85, pl. XXXIV, figs. 1—9.

*Calanopia elliptica* Giesbrecht, 1893, p. 441, pls. 31 & 38.

*Calanopia elliptica* Giesbrecht, 1896, p. 325, pl. 5, figs. 7—9.

*Calanopia elliptica* Giesbrecht & Schmeil, 1898, p. 132.

*Calanopia elliptica* I. C. Thompson, 1900, p. 282.

*Calanopia elliptica* Cleve, 1901, p. 5.

*Calanopia elliptica* A. Scott, 1902, p. 406.

*Calanopia elliptica* Thompson & Scott, 1903, p. 251.

*Calanopia elliptica* Cleve, 1903, p. 356.

*Calanopia elliptica* Wolfenden, 1905 (a), p. 1023.

This species is the type of the genus. It was well distributed throughout the area investigated by the 'Siboga', as shewn by the following records

Stat. 16. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 96 (day). — Stat. 98. — Stat. 99. — Stat. 109. — Stat. 117<sup>a</sup>. — Stat. 125 (day). — Stat. 128 (HENSEN vertical net, 900 metres to surface). — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). Stat. 144. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 149. — Stat. 165. — Stat. 174. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 205. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 223. — Stat. 229. — Stat. 245. — Stat. 271 (horizontal cylinder). — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 304. — Stat. 315.

Examples of this species were not numerous in any of the collections except the one from Station 142. This was a night gathering, and 1241 specimens were obtained from the sample. This number was represented by 268 females and 973 males.

Length of female, 1.9 mm.

The combined length of the abdomen and furca is contained nearly twice in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The second abdominal segment is about as long as the genital segment. It is three times longer than broad. The furcal joints are nearly three times longer than broad.

The fifth pair of feet is asymmetrical. The exopodite is composed of two joints. The joints of the left exopodite are distinctly longer than the joints of the right exopodite (Plate XLVIII, fig. 3).

Length of male, 1,8 mm.

The distal end of the right side of the second abdominal segment is produced into a well defined tooth (Plate XLVIII, fig. 4).

The inner margin of the last joint of the left exopodite of the fifth pair of feet is furnished with a pad of fine hairs. The palm-like margin of the first joint of the right exopodite is produced into three strong blunt teeth. The claw-like second joint has three small pointed teeth (Plate XLVIII, fig. 5).

The apical portion of the second maxillipedes of both sexes is composed of five joints.

*Calanopia elliptica* appears to be generally distributed in the warm regions of the Indian and Pacific Oceans. It has also been found in the Red Sea.

2. *Calanopia minor* A. Scott. Plate XLVIII, figs. 6—10.

*Calanopia minor* A. Scott, 1902, p. 406, pl. I, figs. 1—5.

*Calanopia minor* Thompson & Scott, 1903, p. 251.

*Calanopia minor* Cleve, 1903, p. 356.

*Calanopia minor* Wolfenden, 1905(a), p. 1023.

This form may easily be passed over as a small variety of *Calanopia elliptica*. On careful examination it is seen to be very distinct. This small form was not so widely distributed as *Calanopia elliptica*, but it was rather more plentiful in the samples where it was noted. *Calanopia minor* was found in the plankton collected at the following stations.

Stat. 35. — Stat. 36. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 71. — Stat. 81. — Stat. 96 (day). — Stat. 99. — Stat. 109. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 168. — Stat. 184. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 205. — Stat. 213. — Stat. 217 (horizontal cylinder). — Stat. 282. — Stat. 304. — Stat. 315.

The collection taken at Station 142 yielded 1850 specimens. This number was represented by 983 females and 867 males.

Length of female, 1,4 mm.

The combined length of the abdomen and furca is contained one and three-fourth times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The second abdominal segment is distinctly longer than the genital segment. The furcal joints are twice as long as broad.

The fifth pair of feet is quite symmetrical. The exopodite is one-jointed. It terminates in one long spine and one short spine. The long spine is on the inside. The distal part of the outer margin is furnished with one short spine (Plate XLVIII, fig. 8).

Length of male, 1,2 mm.

The second abdominal segment has no spiniform process on the right side.

The second joint of the left basiopodite of the fifth pair of feet is considerably swollen at the proximal end of the inner margin. The swollen part is produced into a small curved tooth. The length of the second joint of the left exopodite is contained two and a half times in length of the first joint. The palm-like margin of the first joint of the right exopodite is simple, but it is furnished with a thumb-like projection at the proximal end. The claw-like second joint is spoon-shaped, and it is without teeth (Plate XLVIII, fig. 10).

The apical portion of the second maxillipedes of both sexes is composed of four joints.

The males and females of *Calanopia minor* are similar in general appearance to *Calanopia americana*, and *Calanopia aurivillii*, but the structure of the fifth pair of feet of the two sexes readily distinguishes them from either DAHL'S or CLEVE'S species. The exopodite of the female fifth pair is furnished with three spines only. The inner apical spine is long and comparatively stout. The second joint of the left basiopodite of the male fifth pair has a small but quite distinct tooth on the inflated portion of the inner margin. The fifth pairs of the two sexes are very different from those of *Calanopia elliptica*.

This species has hitherto only been recorded from the Red Sea, and from the northern area of the Indian Ocean.

3. *Calanopia thompsoni* nov. sp. Plate XLIX, figs. 1—8.

Female — length 2,6 mm.

Seen from above, the body appears elongate ovate, and rather slender. The forehead is angular in outline. The cephalic segment is furnished with side hooks. The last thoracic segment is produced posteriorly on each side into strong spiniform projections. The rami of the rostrum are moderately stout. The distal end of the inner margin of each ramus is barbed (Plate XLIX, fig. 3). The excavation is rather broadly rounded.

The abdomen is composed of two segments. The combined length of the abdomen and furca is contained two and one-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is nearly twice the length of the second segment. The ventral surface is produced posteriorly at the distal end into a rounded knob (Plate XLIX, fig. 2). The length of the second segment is equal to rather less than twice the width. The furcal joints are twice as long as broad.

The antennules are composed of nineteen joints and extend to near the middle of the genital segment. The third joint is very small (Plate XLIX, fig. 4).

The antennae, mandibles, maxillae and maxillipedes are almost similar to those of *Calanopia elliptica*. The apical portion of the second pair of maxillipedes is composed of five joints.

The four pairs of swimming feet are also similar to those of that species.

The fifth pair of feet is symmetrical. The exopodite is composed of two joints. The first joint is moderately long. The distal portion of the outer margin is furnished with two very strong spiniform projections. The second joint is narrow and spiniform. It terminates in a moderately long and stout spine. The proximal end of the outer margin is furnished with two spines. The inner margin bears one spine (Plate XLIX, fig. 5).

Male — length 2,4 mm.

The male resembles the female in general appearance, but the abdomen is composed of five segments. The second segment has no spiniform process on the right side.

The middle joints of the right antennule are considerably inflated. The upper margin of the proximal and distal hinge joints is fringed with fine spines (Plate XLIX, fig. 7).

The antennae, mandibles, maxillae, maxillipedes and first four pairs of swimming feet are similar to those of the female.

The exopodite of the left fifth foot is moderately broad. The second joint is short. It is equal to two-thirds of the length of the first joint. The apex is furnished with two spines, and a broad, flat, finely denticulated process. The distal end of the posterior surface of the joint bears a curved spine, like a small chela. This spine is almost invisible when the preparation is reversed and the anterior surface placed uppermost. The claw-like joint of the right exopodite is spoon-shaped. It is furnished with one small basal tooth (Plate XLIX, fig. 8).

This species is easily separated from any of the other members of the genus, by the presence of distinct side hooks on the cephalic segment of both sexes. It is a true *Calanopia* and is larger than any of the other species.

Occurrence. — Seventy-two females and eighty-eight males were obtained from the plankton collected at the following stations.

Stat. 16, twenty-two females and ten males. — Stat. 142, twenty-nine females and sixty-nine males. — Stat. 205, twelve females and five males. — Stat. 213, nine females and four males.

This species is dedicated to the memory of my friend the late I. C. THOMPSON of Liverpool, a well known worker amongst the Copepoda. He was the first to seriously investigate the pelagic and littoral forms of the Irish Sea. He also did a considerable amount of valuable research in the plankton of the great oceans.

4. *Calanopia herdmani* nov. sp. Plate XLIX, figs. 9—16.

Female — length 1,8.

Viewed from above, the body appears elongate ovate, and moderately robust. The forehead is narrowly rounded. The cephalic segment is without side hooks. The last thoracic segment is produced posteriorly into spiniform processes. The rami of the rostrum are rather stout. The distal end of the inner margin of each ramus is slightly barbed. The excavation is wedge-shaped (Plate XLIX, fig. 11).

The abdomen is composed of two segments. The combined length of the abdomen and furca is contained nearly two and one-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment appears short and tumid in dorsal view. The ventral surface is furnished with a small spine near the anterior end, but it is not produced into a knob at the distal end as in *Calanopia thompsoni*. The genital segment is very slightly longer than the second segment. The second segment is about twice as long as broad. The furcal joints are two and a half times longer than broad (Plate XLIX, figs. 9 and 10).

The antennules are eighteen-jointed and extend to the end of the genital segment. The third joint is very small (Plate XLIX, fig. 12).

The antennae, mandibles, maxillae, maxillipedes and the four pairs of swimming feet are almost similar to those of *Calanopia elliptica*. The apical portion of the second pair of maxillipedes is composed of five joints.

The fifth pair is symmetrical. The first joint of the exopodite is comparatively long and slender. The distal portion of the outer margin is furnished with two moderately stout spines. The second joint is narrow and spiniform. It terminates in a moderately long and slender spine. The outer margin of the joint is furnished with two small spines. There is no inner edge spine as in *Calanopia thompsoni* (Plate XLIX, fig. 13).

Male — length 1.7 mm.

The male resembles the female in general appearance, but the abdomen is composed of five segments. The second segment has no spiniform process on the right side.

The middle joints of the right antennule are slightly inflated. The upper margin of the proximal and distal hinge joints is fringed with fine spines.

The antennae, mandibles, maxillae, maxillipedes and first four pairs of swimming feet are similar to those of the female.

The exopodite of the left fifth foot is slender and rather cylindrical. The second joint is equal to two-fifths of the length of the first joint. The apex terminates in two moderately long spines. The outer one is distinctly longer and stouter than the inner one. The outer margin is furnished with one slender spine. The first joint of the right exopodite is nearly oval in outline, and the palm is simple. The claw-like second joint is spoon-shaped, but it has no basal tooth (Plate XLIX, fig. 16).

This species has a general resemblance to *Calanopia elliptica*, but the two sexes can readily be separated by the difference in the proportional length of the abdominal segments, by the absence of a tooth on the right side of the second segment of the male abdomen, and by the structure of the fifth pairs of feet.

Occurrence. — One female and five males were obtained from the plankton collected at the following stations.

Stat. 109, one male. — Stat. 117<sup>a</sup>, one male. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), one male. — Stat. 142, one female and one male. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), one male.

This species is named in compliment to Professor W. A. HERDMAN, F.R.S., whose enthusiasm and example have done so much to encourage the systematic investigation of the fauna of the Irish Sea, that has been carried on during the last twenty years by the Liverpool Marine Biology Committee. His Oceanic Researches have also been extensive. The reports on the 'Challenger' Ascidians and the Investigation of the Ceylon Pearl Oyster Beds are well known works. The late I. C. THOMPSON and the present writer have had many facilities to study Oceanic Copepoda by the examination of collections of plankton obtained by him at various times.

5. *Calanopia americana* Dahl. Plate XLVIII, figs. 11—15.

*Calanopia americana* Dahl, 1894, p. 21, pl. 1, figs. 23—26.

*Calanopia americana* Giesbrecht & Schmeil, 1898, p. 132.

The two sexes of this species are easily separated from the other small forms of *Calanopia* by the structure of the fifth pairs of feet.

The combined length of the abdomen and furca of the female is slightly less than one-half of the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The second joint of the abdomen is nearly as long as the genital segment. It is twice as long as broad. The furcal joints are two and a half times longer than broad. The spiniform projections of the last thoracic segment are comparatively short.

The fifth pair of the female is symmetrical. The exopodite is one-jointed. The apex of the joint terminates in three moderately strong spines. The middle spine is considerably longer than either of the other two spines. This spine is proportionally much shorter than the long spine on the apex of the exopodite of the female fifth pair of *Calanopia minor*, or *Calanopia aurivillii*. It does not appear to be plumose (Plate XLVIII, fig. 13).

Length of female, 1.3 mm.

The inner margin of the second joint of the basiopodite of the left side of the male fifth pair is inflated at the proximal end. The swollen part is produced into a prominent tooth-like process. The second joint of the left exopodite is comparatively long. It is equal to two-thirds of the length of the first joint. The claw-like second joint of the right exopodite is furnished with a distinct tooth. The first joint is very different in shape from that of the male of *Calanopia minor*, or *Calanopia aurivillii*. There is also a deep incision at the base of the thumb-like process that is not present in the other two species (Plate XLVIII, fig. 15).

Length of male, 1.23 mm.

The apical portion of the second pair of maxillipedes of both sexes is composed of four joints.

DAHL's type specimens were found in plankton collected at the mouth of the Tocantins River, a branch of the Amazon Estuary. The illustrations given in this report are from specimens obtained from plankton collected in 1903 at Hamilton, in the Bermuda Islands, by a brother of Professor HERDMAN.

6. *Calanopia aurivillii* Cleve. Plate XLVIII, figs. 16—20.

*Calanopia aurivillii* Cleve, 1901, p. 37, pls. II & III.

*Calanopia aurivillii* Thompson & Scott, 1903, p. 251.

This species bears a close resemblance to *Calanopia minor* and to *Calanopia americana*, but it is quite distinct from either of these forms.

The spiniform projections of the last thoracic segment are moderately long. The combined length of the abdomen and furca of the female is distinctly longer than one-half of the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The second segment is slightly longer than the genital segment. It is nearly three times longer than broad. The furcal joints are almost twice as long as broad.



The fifth pair of feet of the female is symmetrical. The exopodite is one-jointed. The apex of the joint terminates in three spines. The inner spine is distinctly longer than the other two. It is distinctly plumose. The distal portion of the outer margin of the joint is furnished with one outer edge spine (Plate XLVIII, fig. 18).

Length of female, 1.34 mm.

The inner margin of the second joint of the basiopodite of the left side of the male fifth pair is much inflated. The inflated part is broadly rounded and is fringed with fine spines. There is no tooth as in *Calanopia minor*, or *Calanopia americana*. The second joint of the left exopodite is equal to two-fifths of the length of the first joint. The first joint of the exopodite of the right foot is moderately broad. The thumb-like projection is well developed. The palm is simple. The claw-like second joint is spoon-shaped. It has no marginal tooth (Plate XLVIII, fig. 20).

Length of male, 1.12 mm.

The apical portion of the second pair of maxillipedes of both sexes is composed of four joints.

*Calanopia aurivillii* approaches *Calanopia americana* in the structure of the female fifth pair of feet, but there is a noteworthy difference in the proportional length of the spines on the apex of the exopodite. The distinctions between the female fifth pair of *Calanopia americana*, *Calanopia aurivillii*, and *Calanopia minor*, are readily seen on comparing the figures given on Plate XLVIII.

CLEVE'S type specimens were obtained from plankton collected in the Malay Archipelago in 1899. The illustrations given in this report are from specimens found in plankton collected by Professor HERDMAN in the vicinity of Galle, Ceylon, in 1903.

#### 19. Family PARAPONTELLIDAE.

Genus **Bathypontia** Sars, 1905 (*b*).

This genus was established by Professor G. O. SARS in 1905 from a female specimen, and placed provisionally in the family Parapontellidae owing to the similarity in the structure of the first pair of maxillipedes with that of the genus *Parapontella*. The other appendages, however, are quite distinct, and the abdomen of the female is composed of four segments.

G. P. FARRAN (1908), gives a very short description of the male, with an illustration of the right antennule and of the fifth pair of feet.

The rostrum is a moderately strong, cylindrical, and slightly curved process. There is a very slight trace of bifurcation at the apex. The exopodites of the four pairs of swimming feet are three-jointed. The endopodite of the first pair of feet is two-jointed. The endopodites of the second, third and fourth pairs of feet are three-jointed. The fifth pair of the female is small. There is no endopodite. Each foot consists of two free joints attached to a one-jointed basal part. The right antennule of the male is modified for grasping. The distal hinge joint is strongly arched. The male fifth pair is very indistinctly prehensile.

The fifth pairs of feet of the two sexes are quite distinct from the definition given by Sars for the family Parapontellidae, in 'Crustacea of Norway' vol. IV, Calanoida, and it may be found necessary at some future period to establish a new family for the reception of the members of this genus.

One species, apparently distinct from the type, was obtained from the plankton collected by the 'Siboga'.

1. *Bathypontia spinifera* nov. sp. Plate III, figs. 1--16.

Female — length 3,3 mm.

Seen from above, the body appears considerably elongated, and of nearly cylindrical form. The head is separated from the first thoracic segment. The fourth and fifth thoracic segments are completely segmented. The last thoracic segment is symmetrical. It is produced on each side into wing-like expansions with pointed ends. Seen from the side, the last thoracic segment is broadly triangular in outline. It terminates in small, bluntly rounded, posteriorly directed points. The rostrum is represented by a moderately strong cylindrical filament with a very slight trace of bifurcation at the apex.

The abdomen is composed of four segments. The combined length of the abdomen and furca is contained nearly three and one-third times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is longer than the others. It appears considerably inflated in the region of the genital opening, when viewed from the side. The posterior margin of the first, second and third segments is fringed with fine spines. The furcal joints are very small (Plate III, fig. 3). The illustration shews the segments in a rather telescoped condition.

The antennules are composed of twenty-three joints and extend to the middle of the fourth thoracic segment.

The endopodite and exopodite of the antennae are of nearly equal length. The exopodite is composed of seven joints. The intermediate joints are very small and indistinct.

The mandible and palp are quite distinct from those of *Parapontella*. The upper end of the biting part of the mandible is armed with two spiniform teeth. The lower end is furnished with a short, stout and densely spinulose seta. The upper half of the intermediate part of the cutting edge is finely serrate. The lower half is fringed with short hairs. The basal part of the palp is short and broad. The exopodite is four-jointed. It is distinctly longer and stouter than the two-jointed endopodite (Plate III, fig. 7). The maxillae are rather more highly developed than in *Parapontella* (Plate III, fig. 8).

The first pair of maxillipedes is very strong and resembles slightly that of *Parapontella*. The spines on the apical portion are long and curved. The distal portion of the spines is slightly flattened, and the inner margin is fringed with fine short hairs (Plate III, fig. 9).

The second pair of maxillipedes is of the ordinary Calanoid type. The basal part is two-jointed. The distal part is composed of five joints (Plate III, fig. 10).

The exopodites of the four pairs of swimming feet are three-jointed. The endopodite of

the first pair is two-jointed. The endopodites of the second, third and fourth pairs are three-jointed. The outer edge spine on the first joint of the exopodite of the third pair of feet is considerably elongated, and extends to the end of the outer edge spine on the second joint. The outer edge spine on the first joint of the exopodites of the second and fourth pairs of feet is normal (Plate III, fig. 12).

The fifth pair of feet is symmetrical and is without any trace of an endopodite. Each foot is composed of two free joints attached to a one-jointed basal part. The second free joint is rather long and slender. The apex is furnished with one long and one very small spine. The long spine is on the inner edge of the apex (Plate III, fig. 16).

Male — length 3 mm.

Seen from above, the male appears somewhat shorter and more robust than the female. The last thoracic segment is produced similar to that of the female. When seen from the side, the terminations appear bluntly rounded and are directed ventrally (Plate III, figs. 1 and 2).

The abdomen is composed of five segments.

The right antennule is twenty-jointed. The middle joints are very little inflated. The distal hinge joint is boldly arched (Plate III, fig. 5).

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female.

The first, third and fourth pairs of feet are also similar to those of the female. The outer edge spine on the first joint of the exopodite of the third pair of feet extends to the end of the outer edge spine on the second joint.

The outer edge spine on the first joint of the exopodite of the second pair of feet is moderately long and stout. It reaches to the base of the spine on the second joint. The outer edge spine on the second joint is very long and stout. It is slightly curved, and extends distinctly beyond the distal end of the third joint (Plate III, fig. 13).

The fifth pair of feet is asymmetrical. The basiopodite is two-jointed. The exopodite of the right foot is composed of two joints. The first joint is nearly twice the length of the second joint. The second joint is somewhat spiniform. The distal end is furnished with one long and one very short spine. There is no trace of an endopodite on the right foot. The exopodite of the left foot is composed of three short and nearly equal joints. The third joint is narrower than the first or second joints. It is furnished with one long and one short apical spine. The long spine is on the inner angle of the apex. The inner distal angle of the second joint of the basiopodite of the left foot is furnished with a long, stout and densely plumose spine. This may represent a rudimentary endopodite (Plate III, fig. 15).

The female of this species is apparently very closely related to the form described by Professor Sars as *Bathypontia elongata*, but until figures are given by that author it is perhaps better to regard it as distinct, especially as the male is evidently different. The male fifth pair is quite distinct from the figure given by FARRAN. This author states "The fifth feet are almost symmetrical, and consist on each side of four elongate tapering joints, the last joint terminated by a small spine". The figure does not agree very well with the description. The end joint of one of the exopodites is shown as spiniform, but there is no small terminal spine. This slight defect, however, is probably due to an error in lithographing the plate. The

second joint of the left basiopodite apparently does not possess the strong spine that is present in the 'Siboga' male, and no reference is made to the long outer edge spine on the second joint of the exopodite of the second pair of feet.

Occurrence. — Two females and one male were obtained from the plankton collected with the HENSEN vertical net at Station 143, 1000 metres to the surface.

#### Genus *Neopontella* nov.

This genus is very closely related to *Parapontella*, and at first sight I was inclined to regard its representative to be a true member of that genus. A closer examination of the two sexes, however, shewed that it is clearly distinct.

The generic differences between this genus and *Parapontella*, are in the structure of the fifth pair of feet of the female, and in the segmentation of the abdomen of the male.

The female fifth pair of feet has no trace of an endopodite. The abdomen of the male is composed of four segments.

The antennules, antennae, mandibles, maxillae and maxillipedes are almost identical with those of *Parapontella brevicornis* (Lubbock). The four pairs of swimming feet are also similar to those of that species.

One species belonging to this new genus was obtained from the plankton collected during the traverse of the 'Siboga'.

#### 1. *Neopontella typica* nov. sp. Plate LV, figs. 1—15.

Female — length 1.13 mm.

Seen from above, the body appears elongate ovate in outline. The greatest width is in the middle. The width is contained two and a half times in the total length of the body. The head is distinctly separated from the first thoracic segment. The frontal margin is rather broadly rounded. The fourth and fifth thoracic segments are completely fused. The last thoracic segment is very slightly produced. The posterior margin of the segment is narrowly rounded. Viewed from the side, the apex of the last thoracic segment is seen to be evenly and rather bluntly rounded. The rostrum is almost similar to that of *Parapontella brevicornis*, but the filaments appear to be rather shorter (Plate LV, fig. 3).

The abdomen is composed of three segments. The combined length of the abdomen and furca is contained fully twice in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is considerably swollen. It is nearly equal to the combined length of the next two segments. Seen from the side, the segment appears greatly inflated in the region of the genital opening. The second and third segments are of nearly equal length. The second segment is not armed with spines. The furcal joints are nearly twice as long as broad, and are almost as long as the anal segment (Plate LV, figs. 1 and 2).

The antennules are composed of eighteen joints. The third and fourth joints are very small. The last joint is indistinctly segmented at the distal end.

The antennae, mandibles, maxillae and maxillipedes are almost similar to those of *Parapontella brevicornis*.

The four pairs of swimming feet are also nearly similar to those of *Parapontella*. The exopodites are three-jointed. The endopodite of the first pair is three-jointed. The endopodites of the second, third and fourth pairs are two-jointed. The outer edge spines on the joints of the exopodite of the second, third and fourth pairs of feet are coarsely spinulose. The terminal spine on the last joint of the exopodites of the second, third and fourth pairs of feet is coarsely serrate (Plate LV, fig. 11).

The fifth pair is symmetrical. Each foot is composed of a two-jointed basiopodite, and a one-jointed exopodite. The apex of the exopodite is armed with three strong spines. The middle spine is considerably longer than the other two spines. The inner spine is short and very stout. It is equal to nearly twice the length of the outer spine. The inner margin is fringed with a few short hairs. There is no outer edge spine as in *Parapontella brevicornis*. The fifth pair of feet has no trace of an endopodite (Plate LV, fig. 12).

Male — length 1 mm.

The male differs very little in general appearance from the female. The abdomen is composed of four segments. The segments are without armature of any kind (Plate LV, fig. 13).

The right antennule is somewhat similar to that of *Parapontella brevicornis*, but the last joint is not produced into a tooth-like process as in that species. The proximal hinge joint has no serrated lamina (Plate LV, fig. 14).

The antennae, mandibles, maxillae, maxillipedes and first four pairs of swimming feet are similar to those of the female.

The fifth pair of feet is asymmetrical. The last joint of the right and left foot is lamelliform. The last joint of the right foot has a claw-like appearance, but there is no articulation between the inner thumb-like process and the palm. The outer margin of the last joint of each foot is furnished with two spines. The apex is spiniform (Plate LV, fig. 15).

This species is easily recognised by the structure of the fifth pairs of feet of the two sexes.

Occurrence. — Four females and one male were obtained from the plankton collected with the HENSEN vertical net at Station 143, 1000 metres to the surface.

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## 20. Family ACARTIIDAE.

Genus **Acartia** Dana, 1846.

This was the only member of the family obtained from the plankton collected during the traverse of the 'Siboga' in the Malay Archipelago.

Representatives of the closely allied genus *Paracartia* have been found in the plankton of the Gulf of Guinea, the Antarctic, and from off the coast of Norway. Future research may reveal the presence of this genus in the plankton of the Indian and Pacific Oceans. WOLFENDEN, in the results of the British 'National Antarctic Expedition' Natural History, Vol. IV, Zoology,

British Museum, 1908, has described a new genus and species of Copepod as *Paralabidocera hodgsoni*. This form is undoubtedly identical with *Paracartia antarctica* described by the late I. C. THOMPSON some ten years earlier, in 'Transactions of the Liverpool Biological Society', Vol. XII, 1898, page 295.

The members of the genus *Acartia* are easily identified by their slender and almost transparent body, and by the structure of the various appendages.

Four species were represented in the plankton collected by the 'Siboga'.

1. *Acartia danae* Giesbrecht.

- Acartia danae* Giesbrecht, 1889, p. 26.  
*Acartia danae* Giesbrecht, 1893, p. 508, pls. 30 & 43.  
*Acartia danae* Giesbrecht & Schmeil, 1898, p. 154.  
*Acartia danae* Cleve, 1903, p. 355.  
*Acartia danae* Cleve, 1904, p. 184.  
*Acartia danae* Wolfenden, 1905 (a), p. 1023.  
*Acartia danae* van Breemen, 1908, p. 159, fig. 176.

This species is closely related to *Acartia negligens*, but the last thoracic segment is produced into strong spines. It was obtained from the plankton collected at the following two stations.

Stat. 203 (HENSEN vertical net, 1500 metres to surface), 4 specimens. — Stat. 217, horizontal cylinder, 1 specimen.

*Acartia danae* appears to be rather limited in its distribution. It has been recorded from the Atlantic and Pacific Oceans, and from the Mediterranean.

2. *Acartia erythraea* Giesbrecht.

- Acartia erythraea* Giesbrecht, 1889, p. 26.  
*Acartia erythraea* Giesbrecht, 1893, p. 508, pls. 30 & 43.  
*Acartia erythraea* Giesbrecht & Schmeil, 1898, p. 155.  
*Acartia erythraea* I. C. Thompson, 1900, p. 284.  
*Acartia erythraea* Cleve, 1901, p. 4.  
*Acartia erythraea* A. Scott, 1902, p. 408.  
*Acartia erythraea* Thompson & Scott, 1903, p. 254.  
*Acartia erythraea* Cleve, 1903, p. 355.  
*Acartia erythraea* Wolfenden, 1905 (a), p. 1023.

This proved to be the most common member of the genus in the plankton collected by the 'Siboga'. It was present at the following stations.

Stat. 16. — Stat. 35. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 71. — Stat. 96 (night). — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 109. — Stat. 117<sup>a</sup>. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 121. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 149. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 174. — Stat. 177<sup>a</sup>. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 205. — Stat. 210<sup>a</sup>. — Stat. 213. — Stat. 230 (HENSEN vertical net, 2000 metres to surface). — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 315.

The female can readily be recognised by the long naked claw-like spine on the fifth pair of feet.

This species was first recorded from the Red Sea, but it has since been obtained from various parts of the Indian Ocean.

### 3. *Acartia negligens* Dana.

- Acartia negligens* Dana, 1849, p. 26.  
*Acartia negligens* Giesbrecht, 1893, p. 508, pls. 30 & 43.  
*Acartia negligens* Giesbrecht & Schmeil, 1898, p. 154.  
*Acartia negligens* Cleve, 1901, p. 4.  
*Acartia negligens* A. Scott, 1902, p. 408.  
*Acartia negligens* Thompson & Scott, 1903, p. 254.  
*Acartia negligens* Cleve, 1903, p. 355.  
*Acartia negligens* Wolfenden, 1905(a), p. 1023,  
*Acartia negligens* Sars, 1907(a), p. 27.

The spine on the fifth pair of feet of the female of this species is somewhat similar to that on the fifth pair of *Acartia danae*. The two forms can readily be separated, however, by the form of the last thoracic segment. In the present species the posterior margins of the last thoracic segment are rounded and the distal ends are each furnished with a very small spine. The last thoracic segment of *Acartia danae* is produced on each side into a strong spine.

*Acartia negligens* appeared to have a fairly wide distribution in the area traversed by the 'Siboga'. It was found at the following stations.

- Stat. 36. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 71. — Stat. 96 (day). — Stat. 110. — Stat. 125 (day). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 165. — Stat. 168. — Stat. 174. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 205. — Stat. 213. — Stat. 217 (horizontal cylinder). — Stat. 245. — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304.

This *Acartia* has been recorded from the Mediterranean, Arabian and Red Seas, Indian and Pacific Oceans, and from the Malay Archipelago.

### 4. *Acartia spinicauda* Giesbrecht.

- Acartia spinicauda* Giesbrecht, 1889, p. 25.  
*Acartia spinicauda* Giesbrecht, 1893, p. 508, pls. 30 & 43.  
*Acartia spinicauda* Giesbrecht & Schmeil, 1898, p. 155.  
*Acartia spinicauda* Cleve, 1901, p. 4.  
*Acartia spinicauda* Cleve, 1903, p. 355.

This *Acartia* resembles *Acartia centrura* in general appearance, but it can readily be separated by the form of the spine on the fifth pair of feet of the female. The spine is long and slender. It appears to be articulated to a short stout basal part attached to the end of the free joint.

One specimen was obtained from the plankton collected at each of the following ten stations.

Stat. 93. — Stat. 99. — Stat. 110. — Stat. 142. — Stat. 169. — Stat. 174. — Stat. 203  
(HENSEN vertical net, 1500 metres to surface). — Stat. 225. — Stat. 229. — Stat. 315.

*Acartia spinicauda* has been recorded from the Chinese Coast, the Arabian Sea, and the Malay Archipelago.

## 21. Family TORTANIDAE.

Genus **Tortanus** Giesbrecht, 1898.

The members of this genus are readily separated from the other Calanoids by the peculiarly twisted form of the anal segment, and by the very large eye that gives the head, when seen from the side, an appearance very similar to some of the Cladocera.

Four species were found in the plankton collected by the 'Siboga'. Two of the species appear to be undescribed.

### 1. *Tortanus barbatus* (Brady). Plate LV, figs. 16—18.

*Corynura barbata* Brady, 1883, p. 71, pl. XXXI, figs. 10—12.

*Corynura denticulata* Giesbrecht, 1889, p. 26.

*Corynura denticulata* Giesbrecht, 1893, p. 525, pls. 31 & 42.

*Corynura barbata*, Giesbrecht, 1893, p. 525.

*Tortanus barbatus* Giesbrecht & Schmeil, 1898, p. 158.

*Tortanus denticulatus* Giesbrecht & Schmeil, 1898, p. 158.

Four females belonging to the above species were found in the plankton collected with the HENSEN vertical net at Station 185, 1536 metres to the surface.

The abdomen is composed of three segments. The anal segment is long and narrow. The fifth pair of feet consists of two free joints attached to a basal part. The second free joint of the left foot is long and comparatively stout. The middle of the inner margin is furnished with a tuft of five curved lamelliform teeth. The second free joint of the right foot is scarcely equal to half the length of the second free joint of the left foot. The inner margin has no tuft of teeth (Plate LV, fig. 18).

The difference between *Tortanus barbatus* and *Tortanus denticulatus* appears to be so very slight that I am inclined to regard the two forms as identical. The tuft of teeth on the second free joint of the left foot is more compact than in *Tortanus denticulatus*. That appears to be the only difference, except that *Tortanus denticulatus* has no whip-like ends to the teeth as shewn in BRADY'S figure. The tuft of teeth in the 'Siboga' specimens is compact, but the ends are not whip-like.

I have specimens of *Tortanus barbatus* from plankton collected in Patani Bay, Siam, with the whip-like ends of the teeth reaching to midway between the tuft and the distal end of the joint. The whole of the teeth in these specimens have whip-like ends. The thin ends

appear to be very flexible and are easily damaged or entirely destroyed. This may account for their absence in the 'Siboga' specimens and in GIESBRECHT's *Tortanus denticulatus*.

Length of 'Siboga' females, 1,6 mm.

BRADY'S species was described from a single female found in the plankton collected by the 'Challenger' in Zebu Harbour, Philippine Islands. The form described by GIESBRECHT as *Corynura denticulata* was taken in the Red Sea.

## 2. *Tortanus gracilis* (Brady).

*Corynura gracilis* Brady, 1883, p. 71, pl. XXXIII, figs. 1—14.

*Corynura gracilis* Giesbrecht, 1893, p. 525.

*Tortanus gracilis* Giesbrecht & Schmeil, 1898, p. 258.

*Tortanus gracilis* Cleve, 1901, p. 51, pl. VII, figs. 11—14.

*Tortanus gracilis* Thompson & Scott, 1903, p. 254.

*Tortanus gracilis* Cleve, 1903, p. 369.

*Tortanus gracilis* Wolfenden, 1905(a), p. 1026.

Females and males of this species were obtained from the plankton collected at the following stations in the area traversed by the 'Siboga'.

Stat. 16. — Stat. 50. — Stat. 66. — Stat. 71. — Stat. 142. — Stat. 213, 42 specimens.

The female can easily be recognised by the comparatively long abdomen and furcal joints, and by the structure of the fifth pair of feet. The fifth pair of the female of this species is symmetrical or only very slightly asymmetrical. In some cases the second free joint of the left foot is a little longer than the right foot, but this appears to be due to age. The 'Siboga' females measured 1,52 mm. to 1,68 mm. The fifth pair of the small form is quite symmetrical, but in the larger specimens there is a very slight difference between the length of the left and right sides.

WOLFENDEN has followed CLEVE in doubting the distinction between *Tortanus gracilis* (Brady), and *Tortanus forcipatus* (Giesbrecht). CLEVE says "Fifth pair of legs nearly symmetrical, still, the left leg slightly longer than the right". I regard the asymmetry between the figure of *Tortanus forcipatus* given by GIESBRECHT and that of *Tortanus gracilis* shewn by CLEVE, as well as what prevails in the 'Siboga' specimens, to be too great to justify any doubt regarding the distinctness of the two forms. GIESBRECHT'S figure shews the terminal joint of the left foot to be twice the length of the terminal joint of the right foot. The inner margin of the long joint is comparatively straight and it is fringed with fine spines. There is no trace of spines on the inner margin of the last joint of either foot of the 'Siboga' females of *Tortanus gracilis*.

I have specimens of *Tortanus forcipatus* from Patani Bay, Siam. The fifth pair of the female agrees with GIESBRECHT'S figure, except that there does not appear to be any fine spines on the inner margin of the last joint of the left foot. These specimens are quite distinct from those of *Tortanus gracilis* obtained during the traverse of the 'Siboga', and also from the plankton collected by Professor HERDMAN in the Gulf of Suez in 1903.

This species has been recorded from the Arabian and Red Seas, Indian and Pacific Oceans, and from the Malay Archipelago.

3. *Tortanus murrayi* nov. sp. Plate LVI, figs. 1—8.

Female — length 2,65 mm.

Seen from above, the body appears elongate and rather slender. The length is slightly less than three times the width. The head is separated from the first thoracic segment. The fourth and fifth thoracic segments are completely fused together. The last thoracic segment is symmetrical. It is slightly produced posteriorly and the distal margins are rounded. The eye is large and conspicuous. A small triangular spine is visible under each eye when the Copepod is viewed from the side (Plate LVI, fig. 2).

The abdomen is composed of two segments. The combined length of the abdomen and furca is contained three times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is almost symmetrical in outline. The distal end of the left side is furnished with a distinct tubercle. The anal segment and furcal joints are fused together. The furcal joints are asymmetrical and comparatively short. The joints appear to be almost as long as the anal segment. The left furcal joint is much broader than the right joint. The setae are placed at the apex of each joint. The lateral margins are naked (Plate LVI, fig. 1).

The antennules are composed of seventeen joints and extend to about the middle of the furcal joints.

The antennae, mandibles, maxillae, maxillipedes and first four pairs of feet are similar to those of *Tortanus gracilis*.

The fifth pair is composed of two free joints attached to a basal part. The second free joint is long and comparatively slender. The distal end of this joint is produced into three very strong spines. The last joint of the right foot is as long as the last joint of the left foot, but is slightly wider (Plate LVI, fig. 5).

Male — length 2,25 mm.

The male is similar in general appearance to the female, but the abdomen is composed of five segments. The middle joints of the right antennule are considerably inflated. The proximal hinge joint is furnished with a fringe of fine spines on the upper margin. The distal hinge joint is armed with a comparatively strong spine and a slender seta at the distal end of the upper margin (Plate LVI, fig. 6).

The antennae, mandibles, maxillae, maxillipedes and first four pairs of feet are similar to those of the female.

The fifth pair is large and prehensile. The right foot is cheliform and is much shorter than the left foot. It is composed of two free joints. The proximal end of the inner margin of the first joint is produced into two strong tooth-like processes. The second joint is claw-like. The left foot is composed of three free joints. The second joint has a well defined tubercle on the middle of the inner surface. The third joint is nearly as long as the second joint, but it is slightly narrower. The apex is furnished with two slender curved spines (Plate LVI, fig. 7).

This species is quite distinct from any of the known members of the genus. The female is easily identified by the left furcal joint being broader than the right, and by the three large spines at the apex of the second free joint of the fifth pair of feet.

Occurrence. — Six females and two males were obtained from the plankton collected at the following stations.

Stat. 16, one female and one male. — Stat. 118 (HENSEN vertical net, 900 metres to surface), one female. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), two females. — Stat. 213, two females and one male.

This species is so named in compliment to Sir JOHN MURRAY, K.C.B., the well known hydrographer, one of the pioneers of oceanic research, whose name is inseparably connected with the Scientific Results of the Exploring Voyage of H. M. S. 'Challenger', 1873—1876.

4. *Tortanus brevipes* nov. sp. Plate LVI, figs. 9—13.

Female — length 2.3 mm.

Viewed from above, the body appears elongate ovate, and moderately robust. The length is distinctly less than three times the width. The head is separated from the first thoracic segment. The fourth and fifth thoracic segments are completely fused together. The last thoracic segment is quite asymmetrical. The right side is produced posteriorly into a wing-like process that reaches to the middle of the genital segment. The left side is also produced, but the prolongation is much shorter, and it is directed at almost right angles to the body (Plate LVI, fig. 9). The eye is large and conspicuous. A small triangular spine is visible under each eye when the Copepod is viewed from the side.

The abdomen is composed of two segments. The combined length of the abdomen and furca is contained three times in the total length of the *cephalothorax*, from the frontal margin to the base of the genital segment. The genital segment is asymmetrical. Its length exceeds the combined length of the anal segment and furcal joints. The anal segment is not separated from the furcal joints. It is comparatively short. The furcal joints are slender and of moderate length. The joints are twice the length of the anal segment and are asymmetrical. The right furcal joint is distinctly shorter and more slender than the left furcal joint. The second inner seta on each furcal joint is long and stout. The furcal joints are furnished with one outer marginal seta (Plate LVI, fig. 9).

The antennules are composed of sixteen joints and extend slightly beyond the end of the furcal joints.

The antennae, mandibles, maxillae, maxillipedes and first four pairs of feet are similar to those of *Tortanus gracilis*.

The fifth pair is very small. Each foot is composed of a single free joint attached to a basal part. The free joints are short and broad and slightly asymmetrical (Plate LVI, fig. 13).

Male unknown.

This species is rather different from the typical members of the genus. It is easily recognised by the asymmetrical last thoracic segment, and by the abnormal structure of the fifth pair of feet. The apparent abnormality does not arise from any accident to the preparation. The peculiar structure of the fifth pair was quite obvious before the dissection was made.

Occurrence. — Two females were found in the plankton collected at Station 213. The fifth pairs of feet of the two specimens were identical.

The triangular spine under each eye in the two species now described is readily seen when the Copepod is so placed that it rests midway between the dorsal and lateral positions.

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Tribe AMPHARTHANDRIA.

22. Family MORMONILLIDAE.

Genus *Mormonilla* Giesbrecht, 1891.

The members of this genus are readily distinguished by their transparent, elongate narrow body, by the slender abdomen, and by the long furcal joints. The antennules are composed of three or four joints, and are furnished with very long setae. The structure of the other appendages is also characteristic of the genus.

One species was represented in the plankton collected by the 'Siboga'.

1. *Mormonilla phasma* Giesbrecht.

*Mormonilla phasma* Giesbrecht, 1891, pp. 474 & 475.

*Mormonilla phasma* Giesbrecht, 1893, p. 532, pl. 43.

*Mormonilla phasma* T. Scott, 1893, p. 64, pl. VII, figs. 11—21.

*Mormonilla phasma* I. C. Thompson, 1903, p. 31.

*Mormonilla phasma* Farran, 1908, p. 88.

*Mormonilla phasma* van Breemen, 1908, p. 166, fig. 181.

Six females belonging to this species were obtained from the plankton collected at the following stations.

Stat. 118 (HENSEN vertical net, 900 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 2 specimens. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 1 specimen. — Stat. 205, 1 specimen.

The last joint of the antennules of this species is equal to very little more than half the length of the second last joint. In *Mormonilla minor* Giesbrecht, the last joint of the antennules is as long as the second last joint.

*Mormonilla phasma* has been recorded from the Atlantic and Pacific Oceans.

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23. Family OITHONIDAE.

Genus *Oithona* Baird, 1843.

The members of this well known genus are readily recognised by the very elongate ovate and transparent body, and by the moderately long abdomen. The structure of the mandible palp and of the second pair of maxillipedes is quite distinct from that found in *Cyclops*. This

difference appears to be worthy of more than generic rank. *Oithona* ought, I think, to be separated from the Cyclopidae and form the type of a distinct family.

Three species of *Oithona* were obtained from the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Oithona rigida* Giesbrecht.

*Oithona rigida* Giesbrecht, 1896, p. 324, pl. 5, figs. 10—15.

*Oithona rigida* Cleve, 1901, p. 45, pl. V, figs. 7—18.

*Oithona rigida* Thompson & Scott, 1903, p. 255.

*Oithona rigida* Cleve, 1903, p. 365.

*Oithona rigida* Cleve, 1904, p. 193.

*Oithona rigida* Wolfenden, 1905 (a), p. 1023, pl. XCIX, fig. 42.

This characteristic form appeared to have a moderately wide distribution in the area investigated by the 'Siboga'. It was present in the plankton collected at the following stations.

Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 71. — Stat. 142. — Stat. 165. — Stat. 168. — Stat. 174. — Stat. 205. — Stat. 213, 27 specimens. — Stat. 230 (HENSEN vertical net, 2000 metres to surface).

*Oithona rigida* is closely related to *Oithona nana* Giesbrecht, but it can readily be distinguished by the structure of the fifth pair of feet of the female, and also by the difference in the proportional length of the abdominal segments.

This species has been recorded from the Red Sea, from the Indian Ocean, and from off the coast of South Africa.

2. *Oithona plumifera* Baird.

*Oithona plumifera* Baird, 1843, p. 193.

*Oithona plumifera* Dana, 1852, p. 1100, pl. 76.

*Oithona plumifera* I. C. Thompson, 1888, p. 151.

*Oithona plumifera* Giesbrecht, 1893, p. 537, pls. 4, 34 & 44.

*Oithona plumifera* T. Scott, 1893, p. 89.

*Oithona plumifera* Giesbrecht, 1895, p. 260.

*Oithona plumifera* I. C. Thompson, 1900, p. 284.

*Oithona plumifera* Wheeler, 1900, p. 186, fig. 22.

*Oithona plumifera* Cleve, 1901, p. 8.

*Oithona plumifera* A. Scott, 1902, p. 408.

*Oithona plumifera* Thompson & Scott, 1903, p. 255.

*Oithona plumifera* Cleve, 1903, p. 365.

*Oithona plumifera* Cleve, 1904, p. 193.

*Oithona plumifera* Wolfenden, 1905 (a), p. 1023.

*Oithona plumifera* Farran, 1905, p. 46.

*Oithona plumifera* Esterly, 1905, p. 207, fig. 50.

*Oithona plumifera* Norman & T. Scott, 1906, p. 185.

*Oithona plumifera* Pearson, 1906, p. 32.

*Oithona plumifera* Williams, 1906, p. 651.

*Oithona plumifera* Farran, 1908, p. 89.

*Oithona plumifera* van Breemen, 1908, p. 167, fig. 183.

This *Oithona* proved to be moderately common. It was widely distributed throughout the area investigated by the 'Siboga', as shewn by the following records.

Stat. 16. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 96 (day). — Stat. 99. — Stat. 110. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 121. — Stat. 125 (day). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133. — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 157. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 205. — Stat. 213. — Stat. 214. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 2000 metres to surface). — Stat. 230. — Stat. 243 (HENSEN vertical net, 1000 metres to surface). — Stat. 252. — Stat. 271. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 315.

This species is a moderately large form with a pointed forehead. It appears to be generally distributed throughout the great oceans.

### 3. *Oithona minuta* T. Scott.

*Oithona minuta* T. Scott, 1893, p. 90, pl. IX, figs. 14—25.

*Oithona minuta* A. Scott, 1902, p. 409.

*Oithona minuta* Thompson & Scott, 1903, p. 255.

Twenty specimens belonging to this small form were obtained from the plankton collected at Station 142.

This species is very readily overlooked and requires some care in its determination. VAN BREEMEN (1908) states that *Oithona minuta* Kriczagin is identical with *Oithona nana* Giesbrecht, but not with *Oithona minuta* T. Scott.

*Oithona minuta* has only hitherto been recorded from the Gulf of Guinea, from the Red Sea, and from the Indian Ocean round Ceylon.

## 24. Family LONGIPEDIIDAE.

Genus **Longipedia** Claus, 1863.

The members of this genus are readily separated from all the other Harpacticoida by the very long endopodite of the second pair of feet.

Three species were represented in the material collected by the 'Siboga' in the Malay Archipelago. One of the species does not appear to have previously been described.

### 1. *Longipedia coronata* Claus. Plate LIX, figs. 5—8.

*Longipedia coronata* Claus, 1863, p. 111, pl. XIV, figs. 14—24.

*Longipedia coronata* Sars, 1903(a), p. 10, pls. III & IV.

*Longipedia coronata* Thompson & Scott, 1903, p. 257.

*Longipedia coronata* T. Scott, 1905, p. 143.

Two females that agree fairly well with the illustrations of the above species given by

Professor G. O. Sars, in 'Crustacea of Norway' Vol. V, were found in the washings from dredged invertebrata collected at Station 164, at a depth of 32 metres.

The 'Siboga' specimens measured .8 mm. in length. This is considerably less than the size of the European examples of the species and may be due to some unfavourable condition in the particular area where they were living. The outer edge spine on the endopodite of the second pair of feet is placed behind the proximal spine on the inner margin. The distal joint of the fifth pair of feet is distinctly narrower than in Sars' figure, and agrees better with the illustration given by Claus. The central spiniform elongation of the anal operculum is moderately stout and of considerable length. Two secondary spines are present on each side of the central one. The 'Siboga' specimens have a certain amount of resemblance to *Longipedia minor* T. and A. Scott (1893), especially in the size, in the arrangement of the spines on the margin of the endopodite of the second pair of feet, and in the elongate distal joint of the fifth pair of feet, but no very small spines are present on the anal operculum.

*Longipedia coronata* has been recorded from the Coast of Norway, Heligoland, from the Gulf of Naples and Ceylon.

2. *Longipedia scotti* G. O. Sars. Plate LIX, figs. 1—4.

*Longipedia coronata* Brady, 1880 (non Claus), vol. II, p. 6, pls. XXXIV & XXXV.

*Longipedia coronata* T. & A. Scott, 1893 (non Claus), p. 91, pl. II, figs. 4—6.

*Longipedia coronata* T. Scott, 1893(a), (non Claus), p. 198, pl. II, figs. 1—13.

*Longipedia scotti* G. O. Sars, 1903(a), p. 11, pl. V, fig. 1.

*Longipedia scotti* Pearson, 1905, p. 5.

*Longipedia scotti* T. Scott, 1906(a), p. 305.

*Longipedia scotti* Norman & T. Scott, 1906, p. 134.

One female apparently identical with the above species described by Professor G. O. Sars, was found in the washings from dredged invertebrata collected at Station 273, at a depth of 13 metres.

This species is readily separated from the other known members of the genus, by the outer edge spine on the endopodite of the second pair of feet being placed in front of the proximal spine on the inner margin. The anal operculum terminates in a very stout and elongate spiniform projection. The margin of the operculum on each side of the median spine is furnished with one large and three small teeth. Length of the 'Siboga' specimen 1.5 mm.

*Longipedia scotti* has hitherto only been recorded from the British and Norwegian Coasts.

3. *Longipedia weberi* nov. sp. Plate LIX, figs. 9—12.

Female — length .95 mm.

This species resembles *Longipedia coronata* in general appearance. The lateral spine on each side of the genital segment is comparatively strong. The distal margin of the first and second abdominal segments is fringed with fine short spines. The anal operculum is provided with two rather strong teeth on each side of the median terminal spine. The median spine is short and slender. It is not very much longer than the lateral teeth (Plate LIX, fig. 12).

The outer marginal spine on the endopodite of the second pair of feet is placed distinctly behind the proximal spine on the inner margin. The inner sub-apical spine is longer than the two apical spines (Plate LIX, fig. 10).

The distal joint of the fifth pair of feet is considerably expanded at the middle and bears a close resemblance to the distal joint of the fifth pair of *Longipedia scotti*. The curved spine on the basal joint is furnished with a moderately long secondary spine near the base of the inner margin (Plate LIX, fig. 11).

Male unknown.

This species resembles *Longipedia coronata*, in the number of spines on the distal end of the anal operculum, but it can readily be separated from that species by the much shorter median terminal spine. This spine is very little longer than the lateral spines. In *Longipedia coronata* the median terminal spine is much longer and thicker than the lateral spines. The absence of very small secondary spines on the anal operculum renders the separation of this species from *Longipedia scotti*, and *Longipedia rosca* Sars, a matter of simplicity.

Occurrence. — One specimen was found in the washings from dredged invertebrata collected at Station 273 from a depth of 13 metres.

#### Genus **Canuella** T. & A. Scott, 1893.

This genus is closely related to *Longipedia* and *Sunaristes*. It can be distinguished from the former genus by the nearly equal length of the exopodite and endopodite of the second pair of feet. It differs from *Sunaristes* by the presence of a well defined suture traversing the dorso-lateral surface of the genital segment of the female, by the exopodite of the mandible palp being composed of a single large joint, and by the presence of a strong tooth on the surface of the first joint of the endopodite of the second pair of feet of both sexes.

One species was represented in the material collected by the 'Siboga' in the Malay Archipelago.

1. *Canuella curticaudata* (Thompson & A. Scott). Plate LXIV, figs. 1—6.

*Sunaristes curticaudata* Thompson & Scott, 1903, p. 256, pl. III, figs. 12—17.

Five females and one male were obtained from the washings from dredged invertebrata collected at the following stations.

Stat. 164, 32 metres, three females and one male. — Stat. 273, 13 metres, two females.

The illustrations given in the Supplementary Report VII 'On The Copepoda', in Professor HERDMAN'S 'Report to the Government of Ceylon, on the Pearl Oyster Fisheries of the Gulf of Manaar', were taken from a single immature specimen and are obviously rather unsatisfactory. The 'Siboga' females were quite adult, and the figures now given shew the perfect condition.

The most conspicuous character that separates this species from any of the other known members of the genus, is the very short furcal joints. The inner marginal spine on each joint in *Canuella curticaudata* is placed very near the apex. Length — female 1.27 mm., male .94 mm.

The three species of *Sunaristes* that were described as new in the Report on the Ceylon

Copepoda, have proved on re-investigation to belong to the genus *Canuella*. They are quite distinct from the type of the genus, and also from the species described by Professor G. O. Sars in 'Crustacea of Norway' Vol. V.

Genus **Sunaristes** Hesse, 1867.

The female of this genus is readily separated from *Canuella* by the entire absence of a subdivision of the genital segment, and by the normal structure of the endopodite of the second pair of feet. There is no spine on the first joint of the endopodite of this pair of feet.

The male antennules are developed into powerful prehensile appendages and are furnished with a very strong terminal claw. The outer distal end of the first and second joints of the endopodite of the second pair of feet is produced into a strong spine. The exopodite of the mandible palp of both sexes is three jointed.

One species was represented in the material collected by the 'Siboga'.

1. *Sunaristes paguri* Hesse.

*Sunaristes paguri* Hesse, 1867, p. 205, pl. IV, figs. 11—25.

*Longipodina paguri* W. Muller, 1884, p. 19, pl. XIII.

*Sunaristes paguri* A. Scott, 1896, p. 11.

*Sunaristes paguri* J. C. Thompson, 1896, p. 24.

*Sunaristes paguri* T. & A. Scott, 1897, p. 490, pls. XI & XII.

*Sunaristes paguri* Thompson & Scott, 1903, p. 255.

*Sunaristes paguri* Sars, 1903(a), p. 15, pls. VI & VII.

*Sunaristes paguri* Norman & T. Scott, 1906, p. 135.

A single male identical with the above species was found in the washings from dredged invertebrata collected at Station 164, at a depth of 32 metres.

The terminal claw of the antennules and the strong spiniform projection of the first and second joints of the endopodite of the second pair of feet are of a very dark colour, and were easily visible in the 'Siboga' specimen.

HESSE's type specimen was obtained from a molluscan shell inhabited by a hermit crab. I occasionally find both males and females by simply washing the molluscan shells containing hermit crabs (*Pagurus bernhardus*) in dilute methylated spirit, and examining the residue. Hermit crabs caught in the fish trawl in the Mersey estuary invariably yield one or two specimens of *Sunaristes paguri* when submitted to the treatment mentioned. I have not found this Copepod anywhere else in the Irish Sea.

*Sunaristes paguri* has been recorded from various parts of the British coast, from the coasts of France and Norway, and from Ceylon.

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25. Family ECTINOSOMIDAE.

Genus **Microsetella** Brady and Robertson, 1873.

The members of this genus are readily recognised by their small size, by the cylindrical

body and rounded forehead when seen from the side, and by the rather swollen middle joint of the second pair of maxillipedes.

Two species were represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Microsetella norvegica* (Boeck).

- Setella norvegica* Boeck, 1864, p. 281.  
*Microsetella atlanticum* Brady & Robertson, 1873, p. 130, pl. IX, figs. 11—16.  
*Ectinosoma atlanticum* Brady, 1880, vol. II, p. 13, pl. XXXVIII.  
*Ectinosoma atlanticum* Brady, 1883, p. 100, pl. IV, figs. 10—14.  
*Microsetella atlantica* Giesbrecht, 1893, p. 550, pl. 44.  
*Microsetella atlantica* T. Scott, 1893, p. 91.  
*Microsetella atlantica* Giesbrecht, 1895, p. 261.  
*Ectinosoma atlanticum* I. C. Thompson, 1896, p. 24.  
*Ectinosoma atlanticum* T. & A. Scott, 1896, p. 437, pls. 36, 37 & 38.  
*Microsetella atlantica* I. C. Thompson, 1900, p. 285.  
*Microsetella atlantica* Cleve, 1901, p. 7.  
*Ectinosoma atlanticum* T. Scott, 1901(a), p. 352.  
*Microsetella atlantica* I. C. Thompson, 1903, p. 31.  
*Microsetella atlantica* Cleve, 1903, p. 364.  
*Ectinosoma atlanticum* Thompson & Scott, 1903, p. 257.  
*Microsetella norvegica* Sars, 1904, p. 44, pl. XXIV.  
*Ectinosoma atlantica* Wolfenden, 1905(a), p. 1030.  
*Ectinosoma atlanticum* Pearson, 1905, p. 6.  
*Microsetella atlantica* Farran, 1905, p. 46.  
*Microsetella norvegica* T. Scott, 1906(a), p. 309.  
*Microsetella norvegica* Norman & T. Scott, 1906, p. 137.  
*Microsetella norvegica* Williams, 1906, p. 652.  
*Microsetella norvegica* van Breemen, 1908, p. 173, fig. 188.  
*Microsetella norvegica* Sars, 1909, p. 18.

This species although very limited in its distribution in the area investigated, was not uncommon in one of the collections. It was found at the following stations.

Stat. 99. — Stat. 217, 277 specimens. — Stat. 271. — Stat. 304.

The comparatively short furcal setae and the distinctly narrow form of the fifth pair of feet readily separate this species from *Microsetella rosea*.

*Microsetella norvegica* appears to be widely distributed in all the great oceans.

2. *Microsetella rosea* (Dana).

- Harpacticus roseus* Dana, 1847, p. 153.  
*Canthocamptus roseus* Dana, 1852, p. 1189, pl. 183, figs. 1—10.  
*Microsetella rosea* Giesbrecht, 1893, p. 550, pl. 44.  
*Microsetella rosea* I. C. Thompson, 1900, p. 284.  
*Microsetella rosea* I. C. Thompson, 1903, p. 32.  
*Ectinosoma roseum* Thompson & Scott, 1903, p. 257.  
*Microsetella rosea* Cleve, 1903, p. 364.  
*Microsetella rosea* Esterly, 1905, p. 211, fig. 52.  
*Microsetella rosea* Farran, 1908, p. 91.  
*Microsetella rosea* van Breemen, 1908, p. 174, fig. 189.

Seventeen specimens of this species were obtained from the plankton collected at the following stations.

Stat. 16, 3 specimens. — Stat. 35, 4 specimens. — Stat. 217, 3 specimens. — Stat. 271, 4 specimens. — Stat. 304, 3 specimens.

*Microsetella rosca* is readily distinguished from *Microsetella atlantica* by its larger size, by the very long furcal setae, and by the form of the fifth pair of feet.

This *Microsetella* has a moderately wide distribution in all the great oceans.

## 26. Family HARPACTICIDAE.

Genus **Harpacticus** M. Edwards, 1838.

The feature that separates this genus from the other members of the family is the peculiar transformation of the exopodite of the third pair of feet of the male. The exopodite of this pair forms a powerful prehensile appendage.

Three species were obtained from the plankton collected by the 'Siboga' in the Malay Archipelago. Two of the species do not appear to have previously been described.

### 1. *Harpacticus cristatus* nov. sp. Plate LXI, figs. 1—8.

Female — length .49 mm.

Seen from above, the body appears rather slender and depressed. It resembles a *Laophonte* in general appearance. The cephalic segment is large and is provided with a distinct crest traversing the whole of the middle line. The crest is quite obvious both in the lateral and dorsal positions (Plate LXI, figs. 1 & 2). The anterior portion of the ventral margin is considerably expanded as shewn in the illustration. The rostrum is moderately wide. The apex is bluntly rounded. The ventral margins of the thoracic segments are distinctly pointed at the distal ends.

The abdomen is composed of four segments. The combined length of the abdominal segments and furcal joints is contained fully twice in the total length of the *cephalothorax*, from the apex of the rostrum to the end of the last thoracic segment. The genital segment is moderately large. It is equal to the combined length of the next two segments. The ventral surface is traversed by a distinct suture. The second and third segments are of nearly equal length, but the lateral margins of the third segment appear rather hollowed out. The furcal joints are longer than broad (Plate LXI, fig. 8).

The antennules are composed of eight joints. The first four joints are long and narrow. The last four joints are very short. The combined length of the last four joints is only about one-seventh of the combined length of the first four joints.

The antennae, mandibles, maxillae, and first pair of maxillipedes resemble those of *Harpacticus chelifera* (Müller). The second joint of the second pair of maxillipedes is long and very slender. The terminal claw is also long and slender. It is much longer than the second joint.

The first pair of feet is rather slender. The exopodite is much longer than the endopodite. The first joint of the exopodite is short. Its length is contained two and one-half times in the

total length of the second joint. The third joint is very small. The endopodite is equal to twice the length of the first joint of the exopodite. The second joint is small and shows no trace of division to indicate a third joint. The terminal claws of the exopodite and endopodite are of the normal *Harpacticus* type (Plate LXI, fig. 6).

The second, third and fourth pairs of feet are nearly similar to those of *Harpacticus chelifer*.

The fifth pair of feet is rather slender. The inner portion of the basal joint is very little expanded. It is furnished with three marginal and two apical setae. The distal joint is comparatively narrow and elongate. The distal portion of the outer margin is furnished with two rather strong spines. The joint is also provided with one outer marginal seta, one apical seta, and one inner marginal seta (Plate LXI, fig. 7).

Male unknown.

This species is quite distinct from any of the known members of the genus. It can readily be recognised by the well defined dorsal crest on the cephalic segment. The second pair of maxillipedes is not of the normal *Harpacticus* type, but in the absence of a male it is perhaps well for the present to regard the species as a member of the genus *Harpacticus*.

Occurrence. — One specimen was obtained from the plankton collected at Station 35 (Paternoster Islands), on March 28th.

2. *Harpacticus clausi* nov. sp. Plate LXI, figs. 9—14 A.

Female — length .67 mm.

Seen from above, the body appears rather slender and slightly depressed, with a moderately prominent rostrum. Viewed from the side, the distal ends of the ventral margin of the cephalic and thoracic segments appear narrowly rounded.

The abdomen is composed of four segments. The combined length of the abdominal segments and furcal joints is contained fully twice in the total length of the *cephalothorax*, from the apex of the rostrum to the end of the last thoracic segment. The genital segment is as long as the combined length of the next three segments. Its ventral surface is traversed by a distinct suture. The second segment is as long as the combined length of the third and fourth segments. The fourth segment is short. The furcal joints are only half as long as broad.

The antennules are composed of nine joints and are of moderate length. The combined length of the last five joints is equal to one-third of the combined length of the first four joints. The second last joint is very small.

The antennae, mandibles, maxillillae and maxillipedes are of the normal *Harpacticus* type. The second pair of maxillipedes is very similar to that of *Harpacticus uniremis* Kroyer.

The four pairs of swimming feet are similar to those of *Harpacticus gracilis*. The second joint of the exopodite of the first pair of feet is rather shorter than the first joint. The endopodite is very little longer than the first joint of the exopodite (Plate LXI, fig. 14).

The fifth pair of feet is moderately large. The inner portion of the proximal joint is considerably expanded. The distal end of the expansion is broadly rounded. It is furnished with two subapical spines and one outer marginal spine. There is a considerable space between the inner marginal spine and the inner subapical spine. The surface of the expansion is furnished

with two small setae near the distal end of the inner margin. The distal joint is elongate and rather narrow. The distal end of the joint is furnished with five spines of various degrees of stoutness (Plate LXI, fig. 13).

*Note.* — In the explanation of this plate, fig. 13, is given as first foot and fig. 14, the fifth foot. Fig. 13, should be read fifth foot and fig. 14, first foot.

Male unknown.

This species appears to be closely related to *Harpacticus gracilis* Claus, but it can readily be separated by the quite distinct shape and armature of the inner expansion of the proximal joint of the fifth pair of feet.

Occurrence. — One specimen was obtained from the plankton collected at the surface at Station 35 (Paternoster Islands), on March 28th.

### 3. *Harpacticus glaber* Brady. Plate LXI, Figs. 15—21.

*Harpacticus glaber* Brady, 1899, p. 44, pl. XII, figs. 6—11.

One female apparently identical with the above species was obtained from the plankton collected at the surface at Station 35 (Paternoster Islands), on March 28th.

The apex of the expanded portion of the proximal joint of the fifth pair of feet is armed with three moderately strong setae. The distal joint is oval in outline and is comparatively short. The antennules are not so elongate as in *Harpacticus clausi*. BRADY'S single specimen is described as having eight-jointed antennules, but the antennules of the present specimen are nine-jointed. The eighth joint is short and agrees fairly well with the length of the last joint of *Harpacticus glaber*. It is quite possible that the antennules of BRADY'S specimen may have been imperfect. The shape and armature of the inner expansion of the proximal joint of the fifth pair of feet is quite distinct from any of the other known members of the genus *Harpacticus*, or its closely related ally *Tigriopus*. *Harpacticus glaber* is the only known species with three setae arranged closely together on the apex of the inner expansion of the basal joint of the fifth pair of feet. The distal ends of the ventral margin of the thoracic segments of this species are broadly rounded.

Length of 'Siboga' female — .56 mm.

BRADY'S single specimen was found in surface plankton collected in Otago Harbour, New Zealand.

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## 27. Family PELTIDIIDAE.

Genus **Peltidium** Philippi, 1839.

The conspicuous anastomosing chitinous bands that traverse every segment of the animal, assist very considerably in the separation of the members of this genus from any of the other genera belonging to the family. The endopodite of the first pair of feet is comparatively broad and two-jointed. The fifth pair of feet is two-jointed and is entirely obscured, when viewed from above, by the very wide genital segment.

The genus *Oniscidium* CLAUS (1860) and the genus *Reticulina* CLEVE (1901) are both

identical with PHILIPPI's genus *Peltidium*. The description of the exopodite and endopodite of the first pair of feet in the report on the Ceylon Copepoda is erroneous. The endopodite should be exopodite and *vice versa*.

Four species, all apparently undescribed, were obtained from the material collected by the 'Siboga' in the Malay Archipelago.

1. *Peltidium falcatum* nov. sp. Plate LXIV, figs. 7—11.

Female — length 1.1 mm.

Seen from above, the body appears very broad and considerably depressed. It is oblong ovate in outline. The greatest width is at the posterior end of the cephalic segment and is contained one and two-third times in the total length of the animal. The distal ends of the cephalic and thoracic segments are pointed. The segments are produced dorsally in the median line into triangular projections. The rostrum is very large and prominent. The frontal margin is broadly rounded. The genital segment is very large and much produced posteriorly. The distal ends of the segment project slightly beyond the end of the furcal joints. The furcal joints are two and one-third times longer than broad. The outer margin of each joint is furnished near the middle with a short seta (Plate LXIV, fig. 7).

The antennules are composed of seven joints. The fifth and sixth joints are very short.

The antennae, mandibles, maxillae and first pair of maxillipedes are nearly similar to those of *Peltidium purpurcum* Philippi. The terminal claw of the second pair of maxillipedes is nearly as long as the second joint. It is moderately stout at the base and contracts gradually to point at the distal end (Plate LXIV, fig. 9).

The exopodite of the first pair of feet is very slender. The second joint is distinctly longer than the first joint. The third joint is very short. It is armed with one stout and one slender curved claw. The endopodite is shorter than the exopodite. The joints are of equal length, but the first joint is much wider than the second joint. The apex of the second joint is furnished with two stout blunt pointed spines, and two setae (Plate LXIV, fig. 10).

The second, third and fourth pairs of feet are similar to those of *Peltidium purpurcum*.

The fifth pair of feet is very small. The second joint is furnished with four outer marginal setae and one apical seta. The fourth outer marginal seta is short (Plate LXIV, fig. 11).

Male unknown.

This species can readily be recognised by the very wide body, by the slender exopodite of the first pair of feet, and by the short second joint of the fifth pair of feet.

Occurrence. — One specimen was found in the washings from dredged invertebrata collected at Station 226, from a depth of 1595 metres.

2. *Peltidium intermedium* nov. sp. Plate LXV, figs. 6—10.

Female — length .87 mm.

Seen from above, the body appears moderately broad and rather depressed. It is somewhat quadrangular in outline. The greatest width is near the posterior end of the cephalic segment and is contained one and three-fourth times in the total length of the animal. The distal ends

of the cephalic and thoracic segments are pointed. The segments are produced dorsally in the middle line into triangular projections. The rostrum is large and prominent. The frontal margin is truncate. The genital segment is large and much produced posteriorly. The distal ends of the genital segment extend to about the middle of the furcal joints. The furcal joints are three times longer than broad. The outer margin of the joints is not furnished with a seta (Plate LXV, fig. 6).

The antennules are composed of seven joints. The fifth and sixth joints are very small.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the previous species.

The exopodite of the first pair of feet is slender. The first joint is distinctly longer than the second joint. The third joint is very short. It is armed with one stout and one slender curved claw. The endopodite is much shorter than the exopodite. The joints are of nearly equal length, but the first joint is wider than the second joint. The apex of the second joint is furnished with two pointed spines and two seta (Plate LXV, fig. 9).

The second, third and fourth pairs of feet are similar to those of *Peltidium purpurcum*.

The fifth pair of feet is moderately stout. The second joint is furnished with two outer edge setae, two apical setae, and one inner edge seta (Plate LXV, fig. 10).

Male unknown.

This species can readily be separated from the other members of the genus by the comparatively slender furcal joints which have no median outer marginal seta, and by the arrangement of the setae on the fifth pair of feet.

Occurrence. — One specimen was found in the surface plankton collected at Station 213, Saleyer Island.

3. *Peltidium exiguum* nov. sp. Plate LXV, figs. 11—15.

Female — length .98 mm.

Seen from above, the body appears moderately broad and rather depressed. It is oblong ovate in outline. The greatest width is at the distal end of the cephalic segment and is equal to rather less than half the length of the entire animal. The distal ends of the cephalic and thoracic segments are pointed. The segments are produced dorsally in the median line into triangular projections. The rostrum is rather wide but it is not very prominent. The frontal margin is broadly rounded. The genital segment is large and broad. The pointed distal ends of the segment scarcely reach to the end of the anal segment. The furcal joints are moderately broad and fully twice as long as wide. The middle of the outer margin of the joints is furnished with a short seta (Plate LXV, fig. 11).

The antennules are composed of six joints. The fifth joint is very small.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Peltidium intermedium*. The terminal claw on the second joint of the second pair of maxillipedes is comparatively stout and is blunt pointed.

The exopodite of the first pair of feet is moderately stout. The first and second joints are of nearly equal length. The third joint is very small and is furnished with three curved claws. The outer one is smaller than the others. The middle claw is comparatively stout. The

endopodite is rather shorter than the exopodite. The joints are of nearly equal length, but the first joint is slightly wider than the second joint. The apex of the second joint is furnished with two finely pointed spines and two setae (Plate LXV, fig. 14).

The second, third and fourth pairs of feet are nearly similar to those of *Peltidium intermedium*.

The fifth pair of feet is short and moderately robust. The second joint is furnished with two marginal and three apical setae. The distal marginal seta is moderately stout and the distal portion is clothed with short spines (Plate LXV, fig. 15).

Male unknown.

This species can readily be recognised by its oblong ovate body, by the six-jointed antennules, by the arrangement of the setae on the fifth pair of feet, and by one of these setae being stouter than the others.

Occurrence. — One specimen was found in the washings from dredged invertebrata collected at Station 273, at a depth of 13 metres.

4. *Peltidium minutum* nov. sp. Plate LXV, figs. 16—20.

Female — length .8 mm.

Seen from above, the body appears comparatively narrow. It is elongate ovate in outline. The greatest width is at the distal end of the cephalic segment and is contained fully one and two-third times in the total length of the animal. The distal ends of the cephalic and thoracic segments are pointed. The segments are produced dorsally in the middle line into triangular projections. The rostrum is moderately large and prominent. The frontal margin is broadly rounded. The genital segment is large and broad. The pointed distal ends of the segment reach to near the middle of the furcal joints. The furcal joints are short and moderately stout. Each joint is twice as long as broad and the middle of the outer margin is furnished with a short seta (Plate LXV, fig. 16).

The antennules are composed of seven joints. The fifth and sixth joints are very short.

The antennae, mandibles, maxillae and maxillipedes are nearly similar to those of *Peltidium exiguum*. The second joint of the second pair of maxillipedes is broad. The terminal claw is comparatively short and is bluntly pointed.

The exopodite of the first pair of feet is moderately stout. The first joint is much shorter than the second joint. The third joint is very short and is furnished with two rather stout curved claws. The endopodite is considerably shorter than the exopodite. The joints are of nearly equal length but the second joint is much narrower than the first joint. The apex of the second joint is furnished with four setae (Plate LXV, fig. 19).

The second, third and fourth pairs of feet are similar to those of *Peltidium exiguum*.

The fifth pair of feet is comparatively long and slender. The second joint is furnished with two outer marginal, and three apical setae (Plate LXV, fig. 20).

Male unknown.

This species can be distinguished from the other members of the genus by the comparatively short and stout furcal joints, by the rather slender fifth pair of feet, and by the arrangement of the setae on the second joint of this pair of feet.

Occurrence. — One specimen was found in the washings from dredged invertebrata collected at Station 273, from a depth of 13 metres.

Genus **Eupeltidium** nov.

The body is rather short and somewhat depressed. The exoskeleton is dense and has no trace of anastomosing chitinous bands. The lateral margins of the thoracic segments are considerably expanded. The abdomen is short and broad. The genital segment is much larger and wider than the other abdominal segments. The antennules are composed of six joints. The endopodite of the antennae is indistinctly three-jointed. The exopodite is short and two-jointed. The mandibles are moderately strong and are furnished with a small one-branched palp. The first pair of maxillipedes is similar to that of the genus *Alteutha* Baird (1845). The terminal joint is produced into a short stout claw. The second pair of maxillipedes is similar to that of the genus *Alteutha* and *Peltidium*. The five pairs of feet are similar to those of *Peltidium*.

This genus appears to be somewhat intermediate between *Alteutha* and *Peltidium*. It resembles *Alteutha* in the general appearance of the animal and in the structure of the first pair of maxillipedes. The five pairs of feet are nearly similar to those of *Peltidium*. The biting edge of the mandible is distinct from that found in either of the two genera.

One species belonging to this genus was found in the material collected by the 'Siboga' in the Malay Archipelago.

1. *Eupeltidium glabrum* nov. sp. Plate LXIV, figs. 12—19.

Female — length 1,2 mm.

Seen from above, the body appears moderately robust. It is elongate ovate in outline. The greatest width is near the posterior end of the cephalic segment and is equal to half the entire length of the animal. The distal ends of the cephalic and thoracic segments are narrowly rounded. The rostrum is moderately large but it is not very prominent. The frontal margin is broadly rounded. The genital segment is large and broad. It is marked by a distinct suture traversing the dorsal surface. The distal ends of the segment are very narrowly rounded and are only very slightly produced. The furcal joints are somewhat cylindrical in shape. Each joint is two and a half times longer than broad and the middle of the outer margin is furnished with a short seta. The principal terminal seta is long and moderately stout (Plate LXIV, fig. 12).

The antennules are composed of six joints. The fifth joint is very short. The fourth and fifth joints each carry one long sensory organ.

The antennae are similar to those of *Alteutha depressa* Baird, but the apical spines on the last joint of the endopodite are rather stronger (Plate LXIV, fig. 14).

The cutting edge of the mandible is provided with seven short and moderately stout teeth. The palp is comparatively small, one-branched, and two-jointed (Plate LXIV, fig. 15).

The first and second pairs of maxillipedes are nearly similar to those of *Alteutha depressa*.

The exopodite of the first pair of feet is short, comparatively stout, and three-jointed. The second joint is longer than the other two joints. The third joint is small. It is furnished with one stout and one slender curved claw. The endopodite is two-jointed and is nearly as

long as the exopodite. The first joint is broad and is distinctly longer than the second joint. The second joint is much contracted at the apex. It is furnished with one apical and two subapical setae (Plate LXIV, fig. 18).

The second, third and fourth pairs of feet are similar to those of *Peltidium purpureum*.

The fifth pair of feet is small and slender. The inner margin of the second joint is produced into a small tooth at the distal end. The outer margin is furnished with three moderately strong setae. The apex bears a single stout seta (Plate LXIV, fig. 19).

• Male unknown.

Occurrence. — One specimen was found in the washings from dredged invertebrata collected at Station 226, between the Lucipara and Schildpad Islands, from a depth of 1595 metres.

#### Genus *Eupelte* Claus, 1860.

This genus was established by CLAUS in 1860 for a Harpacticoid with a broad depressed body and closely related to *Allcutha*, but having the endopodite of the first pair of feet composed of two joints. The mandible palp is one-branched and two or three-jointed. The fifth pair of feet is biarticulate. The species described by CLAUS have not, so far, again been met with, and owing to the rather imperfect illustrations given by that author much doubt has existed regarding the true character of the first pair of feet.

One species agreeing with *Eupelte* in possessing a slender two-jointed endopodite to the first pair of feet, but differing in the antennules being seven-jointed, in the mandible palp being distinctly two-branched, and in the fifth pair of feet being only one-jointed, was obtained from the material collected by the 'Siboga' in the Malay Archipelago.

The difference of the jointing of the antennules is not of very great importance in a generic distinction. The presence of a small secondary branch to the mandible palp may have been overlooked by CLAUS. The two-jointed appearance of the fifth pair of feet may have been due to some defect in the preparation. The possession of a two-jointed endopodite by the first pair of feet is a very important character and is the chief reason for placing the 'Siboga' species in the genus *Eupelte*.

1. *Eupelte oblivia* nov. sp. Plate LXVI, figs. 1—12.

Female — length .74 mm.

Seen from above, the body appears short, wide and depressed. It is broadly oval in outline. The greatest width lies near the distal end of the cephalic segment and is equal to three-fourths of the length of the entire animal. The cephalic segment is large and represents one-half of the length of the Copepod. The distal ends are slightly produced and pointed. The distal ends of the first three thoracic segments are also pointed. The rostrum is large and moderately prominent. The frontal margin is somewhat truncate.

The abdomen is composed of four segments. The genital segment is very large and is broadly triangular in outline. The distal ends of the segment are produced into small points that extend to the end of the anal segment. The second, third and fourth segments are short and narrow. The furcal joints are very short. The joints are about as broad as long. The outer

angle of the apex of the joints is produced internally into a small tooth-like process. It is also furnished with a short seta. The inner portion of the apex is slightly produced. It bears one moderately long and four short setae. The animal is very transparent (Plate LXVI, fig. 1).

The antennules are composed of seven joints. The last three joints are much shorter than the others. The fourth joint is furnished with a moderately long sensory filament.

The antennae are comparatively small. The apex of the last joint of the endopodite is furnished with one very strong spine provided with a minute secondary spine near the base, and three very slender setae. The endopodite is small and one-jointed. It is furnished with four setae (Plate LXVI, fig. 3).

The mandible is slender and its biting edge is very feeble. The palp is two-branched and each branch is one-jointed (Plate LXVI, fig. 4).

The maxillae and first pair of maxillipedes are similar to those of *Alteutha depressa*.

The second pair of maxillipedes is comparatively powerful. The second joint is long and rather narrow. The terminal claw is short and stout (Plate LXVI, fig. 7).

The exopodite of the first pair of feet is composed of three joints. The first and second joints are of nearly equal length. The third joint is very small. It is furnished with one short stout curved claw and two very small setae. The endopodite is two-jointed. The second joint is considerably shorter than the first joint (Plate LXVI, fig. 8).

The exopodite and endopodite of the second, third and fourth pairs of feet are three-jointed. The outer marginal spine on the first joint of the exopodite of the fourth pair of feet is distinctly longer, and stouter, than the outer marginal spine on the first joint of the exopodite of the second and third pairs of feet (Plate LXVI, fig. 9).

The fifth pair of feet is composed of a single moderately large lamelliform joint. It is rather wide at the base. The apex is very narrow. The joint is furnished with four outer marginal and two apical setae. The proximal end of the inner margin bears a small tubercle carrying two slender setae (Plate LXVI, fig. 10).

Male — length .64 mm.

The male resembles the female in general appearance, but the antennules are rather stouter and prehensile. The abdomen is composed of five segments. The genital segment is produced posteriorly and terminates in a short moveable spine. The outer angle of the furcal joints has a short spine instead of the seta in the female.

The antennae, mandibles, maxillae and maxillipedes are similar to those of the female.

The five pairs of feet are somewhat similar to those of the female. The fifth pair of feet is proportionally shorter than that of the female (Plate LXVI, fig. 12).

The female differs from the species described by CLAUS in the external appearance, in the shape of the rostrum, and in the structure and armature of the fifth pair of feet.

Occurrence. — Five females and four males were found in the washings from dredged material collected at Station 164, at a depth of 32 metres.

#### Genus *Alteuthella* nov.

The body is comparatively short and depressed. The exoskeleton is thin and moderately

transparent. The antennules are short and seven-jointed. The antennae, mandibles, maxillae and maxillipedes are similar to those of *Alteutha interrupta* (Goodsir). The exopodite of the antennae is two-jointed. The mandible palp is two-branched. The exopodite is very much shorter than the endopodite. The terminal claw of the second pair of maxillipedes is shorter than the second joint. The first four pairs of feet are very slender. The exopodite and endopodite are three-jointed. The exopodite of the first pair of feet is prehensile. The third joint is very small and is furnished with a single curved claw. The fifth pair of feet is one-jointed and rather foliaceous. The fifth pair shews no trace of segmentation to indicate a proximal and distal joint.

This genus is closely related to *Alteutha* Baird in general appearance, but its members can readily be separated by the seven-jointed antennules, by the single curved claw on the apex of the third joint of the exopodite of the first pair of feet, and by the absence of a division between the proximal and distal portions of the fifth pair of feet.

Three species belonging to this genus were obtained from the material collected by the 'Siboga' in the Malay Archipelago.

1. *Alteuthella pellucida* nov. sp. Plate LXVI, figs. 13—20.

Female — length .63 mm.

Seen from above, the body appears short and depressed. It is broadly oval in outline and very transparent. The greatest width is at the distal end of the cephalic segment and is equal to two-thirds of the entire length of the animal. The cephalic segment is large and represents one-half of the length of the Copepod. The distal ends are slightly produced and pointed. The distal ends of the first three thoracic segments are also pointed. The rostrum is large and prominent. The frontal margin is broadly rounded (Plate LXVI, fig. 13).

The abdomen is composed of four segments. The genital segment is very large and is somewhat quadrangular in outline. It has no trace of a suture on the dorsal surface. The lateral margins are produced posteriorly into well defined points. The second, third and fourth segments are short and narrow. The furcal joints are very short and broad. The apex of each segment is deeply notched, but there is no tooth on the outer angle (Plate LXVI, fig. 13 A).

The antennules are short and seven-jointed. The last three joints are small.

The antennae, mandibles, maxillae and first pair of maxillipedes are similar to those of *Alteutha depressa* Baird.

The second pair of maxillipedes is rather slender. The second joint is moderately long and narrow. The terminal claw is short and curved. It is much shorter than the second joint (Plate LXVI, fig. 15).

The first pair of feet is moderately slender. The third joint of the exopodite is small and is furnished with a short curved claw. The endopodite is three-jointed and is considerably shorter than the exopodite. The first and second joints have each one inner marginal seta. The apex of the third joint is furnished with three setae (Plate LXVI, fig. 16).

The exopodite and endopodite of the second, third and fourth pairs of feet are three-jointed and very slender.

The fifth pair of feet is moderately wide at the base and contracts uniformly to a

rather narrow apex. The outer margin is furnished with three slender setae and one spine. The apex bears one sharp pointed spine and one small seta (Plate LXVI, fig. 18).

Male — length .61 mm.

The male resembles the female in general appearance, but the antennules are stouter and prehensile. The abdomen is composed of five segments. The distal ends of the genital segment are furnished with a moveable terminal spine. The principal furcal seta has a moderately stout basal portion and terminates in a whip-like hair. The fifth pair of feet is less contracted than that of the female and the terminal spines less pointed (Plate LXVI, fig. 20).

The comparatively broad and transparent body, and the shape of the fifth pair of feet, readily separate this species from the other two members of the genus.

Occurrence. — Three females and one male were found in the washings from dredged invertebrata collected at Station 164, from a depth of 32 metres.

This species has a superficial resemblance to *Eupelte oblivia*, but the endopodite of the first pair of feet is quite different.

2. *Alteuthella spinicauda* nov. sp. Plate LXVI, figs. 21—29.

Female — length .75 mm.

Seen from above, the body appears considerably depressed. It is oblong ovate in outline. The greatest width is at the distal end of the cephalic segment and is equal to slightly less than half the length of the entire animal. The cephalic segment is moderately large and is equal to three-fourths of the rest of the body. The distal ends are slightly produced and pointed. The distal ends of the first three thoracic segments are bluntly rounded. The rostrum is prominent. The frontal margin is narrowly rounded (Plate LXVI, fig. 21).

The abdomen is composed of four segments. The genital segment is large and is divided into two portions by a well defined suture. The anterior portion is very wide and the distal ends are produced posteriorly into blunt points. The posterior portion is much contracted and its distal ends are also pointed. The second, third and fourth segments are very short and narrow. The furcal joints are very short and broad. The outer portion of the apex is furnished with a short stout spine. The base of the principal seta on the inner portion is considerably thickened. The distal end is whip-like (Plate LXVI, fig. 26).

The antennules are seven-jointed and of moderate length. The last three joints are comparatively short.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Alteuthella pellucida*.

The first four pairs of feet are also similar to those of that species.

The fifth pair of feet is moderately broad at the base, but considerably narrowed towards the apex. The distal end of the outer margin is furnished with one short, stout, blunt pointed spine. The apex bears two short blunt pointed spines (Plate LXVI, fig. 25).

Male — length .61 mm.

The male resembles the female in general appearance, but the antennules are moderately stout and prehensile. The abdomen is composed of five segments. The furcal joints are short

and broad. The spine on the outer angle of the apex of the joints is stouter than in the female, and the base of the principal seta on the inner portion is not thickened very greatly (Plate LXVI, fig. 29).

The fifth pair of feet is rather smaller than that of the female, but the shape is almost the same. The inner apical spine is very short (Plate LXVI, fig. 28).

The shape of the fifth pair of feet, and the presence of a tooth-like spine on the outer angle of the apex of the furcal joints readily distinguish this species from any of the other members of the genus.

Occurrence. — One female and one male were found in the washings from dredged invertebrata collected at Station 226, from a depth of 1595 metres.

3. *Alteuthella pygmaca* nov. sp. Plate LXVII, figs. 1—5.

Female — length .56 mm.

Seen from above, the body appears moderately wide and is considerably depressed. It is oblong ovate in outline. The greatest width is at the distal end of the cephalic segment and is equal to rather more than half the length of the entire animal. The distal ends are bluntly rounded. The distal ends of the first three thoracic segments are produced into distinct points. The rostrum is very prominent. The frontal margin is rather broad and truncate (Plate LXVII, fig. 1).

The abdomen is composed of four segments. The genital segment is large and is sub-quadrangular in shape. It is marked by a distinct suture traversing the middle of the dorsal surface. The distal end is slightly contracted and the lateral margins are produced posteriorly into distinct points. The second, third and fourth segments are very short. The furcal joints are short and wide. The apex of the joints is produced internally into a distinct tooth-like process (Plate LXVII, fig. 1A).

The antennules are moderately stout and seven-jointed. The last joints are narrower and shorter than the others.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Alteuthella pellucida*. The second pair of maxillipedes is rather slender. The second joint is moderately long and narrow. The terminal claw is short and curved. It is much shorter than the second joint (Plate LXVII, fig. 3).

The first four pairs of feet are similar to those of *Alteuthella pellucida*. The third joint of the exopodite of the first pair is very short and is furnished with a single curved claw. The endopodite of this pair is much shorter than the exopodite and the inner margin of the first joint has no seta (Plate LXVII, fig. 4).

The fifth pair of feet is moderately wide at the base and contracts to a narrow apex. There is no trace of segmentation to indicate a proximal and distal joint. The outer margin is furnished with four short setae. The narrow apex bears two setae and one small tooth-like spine. The proximal portion of the inner margin is distinctly indented and is provided with two setae (Plate LXVII, fig. 5).

Male unknown.

This small species can readily be identified by the very narrow distal portion of the fifth pair of feet, and by the slender condition of the whole of the outer marginal setae.

Occurrence. — One specimen was found in the washings from dredged invertebrata collected at Station 226, at a depth of 1595 metres.

Genus *Parapeltidium* nov.

The body is comparatively short and greatly depressed. The exoskeleton is highly chitinised. It is also strengthened with broad anastomosing bands of chitin. The cephalic segment is very large and expanded. The rostrum is large and moderately prominent. The thoracic segments are slightly produced. The genital segment is large and strongly chitinised. The other abdominal segments are short. The antennules are short and five-jointed. The antennae, mandibles, maxillae and second pair of maxillipedes are similar to those of *Peltidium purpureum*. The first pair of maxillipedes is similar to that of *Alteutha depressa*. The terminal joint is of moderate length and ends in a short claw. The exopodite of the first pair of feet is slender and is three-jointed. The endopodite is two-jointed, but the basal joint is not expanded as in *Peltidium*. The second, third and fourth pairs of feet are similar to those of the genus *Peltidium*. The fifth pair of feet consists of a single, highly chitinised, spiniform joint.

This genus is closely related to *Peltidium* in the possession of the anastomosing chitinous bands, but the whole exoskeleton is much stronger and more flattened. The slender endopodite of the first pair of feet and the one-jointed spiniform fifth pair, readily separate this genus from *Peltidium*.

One species was represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

The absence of a division between the proximal and distal parts of the fifth pair of feet of the three genera, *Eupelte*, *Alteuthella* and *Parapeltidium*, appears to be of some importance. This character readily separates these genera from the members of the family Peltidiidae, as defined by Professor G. O. Sars in 'Crustacea of Norway' Vol. V, page 61. It may be found necessary, therefore, at some future period to establish a separate family for their reception.

1. *Parapeltidium johnstoni* nov. sp. Plate LXV, figs. 1—5.

Female — length 1.36 mm.

Seen from above, the body appears very wide and depressed. It is oval in outline. The cephalic segment is large. The distal ends are expanded and are produced beyond the ends of the first thoracic segment. The greatest width is at the end of the cephalic segment and is equal to two-thirds of the entire length of the animal. The distal ends of the cephalic and thoracic segments are pointed. The segments are produced dorsally in the middle line into triangular projections. The rostrum is moderately large and prominent. The frontal margin is truncate. The genital segment is large and is deeply indented in the middle. The distal ends

are considerably produced and extend beyond the end of the furcal joints. The other abdominal segments are entirely covered by the genital segment. The furcal joints are moderately long and cylindrical. The joints are nearly three times longer than broad and are furnished with an outer marginal seta (Plate LXV, fig. 1).

The antennules are short and are composed of five joints. The last joint is small. The whole of the distal margin of the first joint and the lower half of the distal margin of the second joint is fringed with short hairs. The third and fourth joints each bear one long sensory filament.

The antennae, mandibles, maxillae and second pair of maxillipedes are similar to those of *Peltidium purpureum*. The first pair of maxillipedes is similar to that of *Eupeltidium glabrum*.

The exopodite of the first pair of feet is moderately long and slender. It is three-jointed. The second joint is distinctly longer than the first joint. The third joint is very short. It bears one stout and one slender curved claw. The endopodite is narrow and two-jointed. The second joint is furnished with one subapical and two apical setae (Plate LXV, fig. 4).

The second, third and fourth pairs of feet are similar to those of *Peltidium purpureum*.

The fifth pair is composed of a single highly chitinised and somewhat spiniform joint. The outer margin is furnished with three short setae. The inner margin is furnished with two setae at the base, and one at the middle. The apex is furnished with a short curved claw (Plate LXV, fig. 5).

Male unknown.

Occurrence. — One specimen was obtained from the surface plankton collected at Station 142, when the 'Siboga' was at anchor at Laiwui, on the coast of Obi Major. This species is named in compliment to my colleague Mr. JAMES JOHNSTONE, B.Sc. His investigations and reports on the endoparasites of fishes have done much to revive the study and add to the knowledge of the British forms.

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## 28. Family PORCELLIDIAE.

Genus **Porcellidium** Claus, 1860.

The members of this genus are readily recognised by the very depressed body, and by the large flattened triangular first joint of the endopodite of the first pair of feet. The second joint is very short. It is furnished with two moderately strong claws that are densely fimbriate on one side.

One species belonging to this genus was represented in the material collected by the 'Siboga' in the Malay Archipelago.

### 1. *Porcellidium brevicaudatum* Thompson & Scott.

*Porcellidium brevicaudatum* Thompson & Scott, 1903, p. 275, pl. XII, figs. 11—14.

A single female belonging to this species was found in the washings from dredged invertebrata collected at Station 273, at a depth of 13 metres.

This species is readily recognised by the shape of the genital segment and furcal joints, and also by the comparatively slender form of the fifth pair of feet.

*Porcellidium brevicaudatum* has only previously been recorded from Ceylon.

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29. Family THALESTRIDAE.

Genus **Phyllothalestris** G. O. Sars, 1905.

Professor G. O. Sars has separated *Thalestris mysis* from true *Thalestris* on account of the enormous development of the fifth pair of feet of the female, and has established it in a distinct genus.

One species is known. It was represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Phyllothalestris mysis* (Claus). Plate LXII, figs. 1—5.

*Thalestris mysis* Claus, 1863, p. 130, pl. XVIII, figs. 12—16.

*Thalestris mysis* Brady, 1880, vol. II, p. 121, pl. LVIII, figs. 1—3.

*Thalestris mysis* T. Scott, 1901(a), p. 354.

*Thalestris mysis* Thompson & Scott, 1903, p. 272.

*Thalestris mysis* Pearson, 1905, p. 13.

*Phyllothalestris mysis* Sars, 1905, p. 116, pls. LXX & LXXI.

*Phyllothalestris mysis* T. Scott, 1906(a), p. 314.

*Phyllothalestris mysis* Norman & T. Scott, 1906, p. 168.

Two females identical with the above species were obtained from the plankton collected at the surface at Station 142, when the 'Siboga' was at anchor at Laiwui.

The illustration of the fifth pair of feet given on Plate LXII, fig. 5, is similar in shape to the figure given by Sars in 'Crustacea of Norway' Vol. V. The surface of the fifth pair of the 'Siboga' specimens is marked by numerous interrupted transverse lines as shewn by the figure. Length of 'Siboga' specimens 1.9 mm.

The very large foliaceous fifth pair of feet is a conspicuous character and enables the species to be readily recognised.

*Phyllothalestris mysis* appears to be rather widely distributed. It has been recorded from the British and Norwegian Coasts, from the Mediterranean, from the Gulf of Suez, and from the Island of Ceylon.

Genus **Rhynchothalestris** G. O. Sars, 1905.

The members of this genus can be distinguished by the unusually sharp division between the *cephalothorax* and the abdomen, and by the very large rostrum.

Two species were represented in the material collected by the 'Siboga' in the Malay Archipelago. One of the species does not appear to have previously been described.

1. *Rhynchothalestris rufocincta* (Norman). Plate LXII, figs. 12—20.

*Thalestris rufocincta* Norman, (Brady, 1880, vol. II, p. 125, pl. LVI, figs. 1—9).

*Thalestris rufocincta* I. C. Thompson, 1896, p. 25.

*Thalestris rufocincta* T. Scott, 1901 (*a*), p. 354.

*Thalestris rufocincta* Pearson, 1905, p. 13.

*Rhynchothalestris rufocincta* Sars, 1905, p. 120, pls. LXXIII & LXXIV.

*Rhynchothalestris rufocincta* T. Scott, 1906 (*a*), p. 315.

*Rhynchothalestris rufocincta* Norman & T. Scott, 1906, p. 168.

Males and females that are perfectly identical with the above species were found in the plankton, and in the washings from dredged invertebrata collected at the following stations.

Stat. 35, surface, 1 female. — Stat. 40, surface, Pulu Kawassang, Paternoster Islands, 1 female. — Stat. 164, bottom, 32 metres, 2 females and 2 males. — Stat. 273, bottom, 13 metres, 1 female and 1 male.

The female can readily be recognised by the shape and armature of the fifth pair of feet. The last joint of the endopodite of the second and third pairs of feet of the male is peculiarly modified. The illustrations of the last joint of these feet of the 'Siboga' males (Plate LXII, figs. 18 and 19), are identical with the figures given by Sars in 'Crustacea of Norway' Vol. V. The upper distal angle of the fifth last joint of the male antennules is produced into a well defined tooth (Plate LXII, fig. 17). Length of 'Siboga' specimens — female .98 mm., male .7 mm.

*Rhynchothalestris rufocincta* has been recorded from the coasts of Britain, France, and Norway.

2. *Rhynchothalestris similis* nov. sp. Plate LXII, figs. 6—11.

Female — length 1.47 mm.

This species bears a very close resemblance to *Rhynchothalestris rufocincta*, but it can be separated from it by the following characters. The proportional length of the joints of the antennules is different. The seventh and eighth joints are of nearly equal length. In *Rhynchothalestris rufocincta* the eighth joint is distinctly smaller than the seventh joint. The second joint of the second pair of maxillipedes is moderately large and comparatively narrow. The terminal claw exceeds the length of the second joint. The inner expansion of the proximal joint of the fifth pair of feet is very broad and its apex is rather truncate. The marginal setae are placed fairly close together round the apex. The distal joint is proportionally narrower than the distal joint of *Rhynchothalestris rufocincta* (Plate LXII, fig. 10). The furcal joints are one and a half times longer than broad.

Occurrence. — One female was found in the washings from dredged invertebrata collected at Station 273, from a depth of 13 metres.

Genus *Idomene* Philippi, 1843.

The members of this genus can be recognised by the very depressed body, by the

large rounded cephalic segment, by the absence of a rostrum, by the greatly developed mandible palp, and by the structure of the first pair of feet. The joints of the basiopodite of the first pair of feet are very broad and flattened. The exopodite and endopodite are three-jointed. The exopodite is comparatively short and narrow. The endopodite is longer than the exopodite. The first joint is very large and wide.

One species belonging to this genus was represented in the material collected by the 'Siboga' in the Malay Archipelago.

1. *Idomene laticaudata* (Thompson and Scott).

*Dactylopusia laticaudata* Thompson & Scott, 1903, p. 271, pl. XI, figs. 1—8.

Two females belonging to this species were found in the washings from dredged invertebrata collected at Station 273, from a depth of 13 metres.

The species was originally described as a *Dactylopusia*, but it undoubtedly belongs to the genus *Idomene* described by PHILIPPI in 1843, as suggested by Professor G. O. SARS. The very short flattened spines on the apex of the proximal joint of the fifth pair of feet readily separate this species from *Idomene forficata* Philippi.

This *Idomene* has only previously been recorded from Ceylon.

Genus **Tydemanella** nov.

The body is much dilated and slightly depressed in front, considerably attenuated behind. The cephalic segment is large and expanded, and provided with a well developed rostrum. The antennules are eight-jointed. The exopodite of the antennae is composed of a single joint. The mandibles, maxillae and maxillipedes are of the normal type of the family. The exopodites of the four pairs of feet are three-jointed. The endopodite of the first pair of feet is two-jointed and is longer than the exopodite. The first joint is long and moderately broad. The second joint is short. The endopodites of the second, third and fourth pairs of feet are three-jointed. The fifth pair is composed of two rather wide joints.

This genus is closely related to *Dactylopodella* G. O. Sars, but it can readily be separated by the long slender eight-jointed antennules, and by the one-jointed exopodite of the antennae.

One species belonging to this genus was represented in the material collected by the 'Siboga' in the Malay Archipelago.

The genus is named in compliment to Lieutenant G. F. TYDEMAN, the Commander of H. M. S. 'Siboga' when the investigations were carried out in the Malay Archipelago.

1. *Tydemanella typica* nov. sp. Plate LXIII, figs. 15—24.

Female — length 1.15 mm.

Seen from above, the body appears rather long and is pyriform in shape. The cephalic segment is large and broad. It is slightly longer than the combined length of the thoracic segments. The rostrum is large and well developed.

The abdomen is composed of four segments. The genital segment is large. It is much contracted in the distal half, which is separated from the anterior portion by a distinct suture traversing the dorsal surface of the segment. The second, third and fourth segments are comparatively short. The furcal joints are one and a half times longer than broad (Plate LXIII, fig. 24).

The antennules are moderately long and slender and are eight-jointed. The last four joints are narrower and shorter than the first four joints (Plate LXIII, fig. 16).

The exopodite of the antennae is rather long and slender, and one-jointed. It is furnished with one strong apical seta and one slender marginal seta (Plate LXIII, fig. 17).

The mandibles, maxillae and maxillipedes are nearly similar to those of *Dactylopodella flava* (Claus).

The exopodite of the first pair of feet is three-jointed. The endopodite is two-jointed. The first joint of the endopodite is moderately wide and is nearly as long as the combined length of the joints of the exopodite. The second joint is short. The apex is furnished with a long slender, slightly curved claw, and two setae (Plate LXIII, fig. 22).

The second, third and fourth pairs of feet are nearly similar to those of *Dactylopodella*.

The fifth pair of feet is somewhat foliaceous. The inner expansion of the proximal joint is furnished with three strong inner marginal spines, and two apical spines. The distal joint is short and wide. It is furnished with six setae at the distal end (Plate LXIII, fig. 23).

Male unknown.

Occurrence. — One specimen was found in the surface plankton collected at Station 40, off Pulu Kawassang, Paternoster Islands.

#### Genus *Pseudothalestris* Brady, 1883.

This genus was established by Professor G. S. BRADY in 1883, in the report on the 'Challenger' Copepoda. It is closely related to the genus *Westwoodia* Dana, in the structure of the appendages, but it differs very considerably in having the exopodite of the first pair of feet composed of two distinct joints. The exopodite is only one-jointed in true *Westwoodia*.

Professor G. O. SARS 'Crustacea of Norway' Vol. V, disestablished this genus, owing to the fact that he obtained a species (*Westwoodia assimilis*) with the exopodite of the first pair of feet composed of two joints, but in all other respects agreeing so closely with the type of the genus *Westwoodia* that a very careful examination was required to separate it from *Westwoodia nobilis* (Baird). This reason appears to be scarcely sufficient for cancelling *Pseudothalestris* especially as it is a common occurrence to find species belonging to different genera included under one family that possess some character common to all, yet differing in other points. The two-jointed exopodite of the first pair of feet is evidently not accidental, and it is surely of as much value in generic distinction as the large fifth pair of feet of *Phyllothalestris*, or the greatly developed rostrum of *Rhynchothalestris*, which are regarded by SARS of so much importance, that he separates these forms from typical *Thalestris*.

One species, apparently undescribed, but agreeing with BRADY'S definition of the genus, was obtained from the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Pseudothalestris sarsi* nov. sp. Plate LXIII, figs. 1—7.

Female — length .68 mm.

Seen from the side, the body appears short and moderately robust. The cephalic segment is large and exceeds the combined length of the thoracic segments. The rostrum is very short and is triangular in shape.

The abdomen is composed of four segments. The genital segment is longer than the combined length of the next three segments. The anal segment is much shorter than the other segments. The furcal joints are shorter than the anal segment. Each joint is one and a half times broader than long (Plate LXIII, fig. 7).

The antennules are comparatively short and six-jointed. The fifth joint is shorter than any of the others.

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Pseudothalestris imbricata* Brady.

The exopodite of the first pair of feet is short and is distinctly two-jointed. The joints are sub-equal in length. The endopodite is composed of three joints and is equal to two and a half times the length of the exopodite. The first joint is very long. The second and third joints are exceedingly short. The apex of the third joint is furnished with one long and one very short claw, and a small seta (Plate LXIII, fig. 5).

The second, third and fourth pairs of feet are similar to those of *Pseudothalestris imbricata* Brady.

The fifth pair of feet is comparatively large. The proximal joint is greatly expanded. The apex is armed with five moderately strong spines of unequal length and four small setae. The distal joint is small and is somewhat quadrangular in outline. It is furnished with one outer marginal spine, one inner marginal spine, and one apical spine. The distal end of the inner margin has also two short setae (Plate LXIII, fig. 6).

Male unknown.

This species resembles *Pseudothalestris major* T. and A. Scott (1895), in general appearance, but it can readily be distinguished from it or any of the other members of the genus by the proportional length of the joints of the antennules, and by the shape and armature of the fifth pair of feet. SARS, 'Crustacea of Norway' Vol. V, p. 143, regards *Pseudothalestris major* to be identical with *Westwoodia minuta* Claus (1863). This view cannot very well be upheld because CLAUS in his generic description of *Westwoodia* defines the exopodite of the first pair of feet to be short and one-jointed. *Pseudothalestris major* has the exopodite distinctly two-jointed. The shape and armature of the fifth pair of feet illustrated by SARS as that of the female of *Westwoodia minuta* Claus, is quite different from the figure of the same pair of *Pseudothalestris major* given by T. and A. SCOTT in the 'Annals and Magazine of Natural History, Ser. 6, Vol. XV, January 1895. SARS states that *Westwoodia minuta* Claus, has six-jointed antennules.

*Pseudothalestris major* T. and A. Scott, has eight-jointed antennules. *Pseudothalestris sarsi* differs distinctly from Sars' illustrations of *Westwoodia minuta* in the length of the joints of the antennules, and in the shape and armature of the distal joint of the fifth pair of feet. The expansion of the proximal joint is also much wider.

Occurrence. — One specimen was obtained from the surface plankton collected at Station 40, off Pulu Kawassang, Paternoster Islands.

This species is named in compliment to Professor G. O. Sars whose numerous works on the Crustacea are of the utmost value to every worker who attempts to study almost any order of that extensive class of animals.

#### Genus *Eudactylopus* nov.

The body is moderately stout in front, and rather slender behind. The anterior division is more or less depressed. The cephalic segment is provided with a well developed and very motile rostrum. The abdomen of the female is composed of four segments. The antennules are short, stout and seven-jointed. The exopodite of the antennae is two-jointed. The mandibles, maxillae and maxillipedes are normal and are similar to those of the genus *Dactylopusia* Norman. The exopodite of the first pair of feet is three-jointed, and is considerably shorter than the endopodite. The terminal joint is short and armed with claws. The endopodite is two-jointed or very indistinctly three-jointed. The first joint is long. The second joint is very short and is armed with a very powerful claw. The exopodite and endopodite of the second, third and fourth pairs of feet are three-jointed and are similar to *Dactylopusia*. The fifth pair of feet is large, foliaceous and transparent, and completely covers the ovisac below.

The type of the genus is *Dactylopusia latipes* T. Scott (1893). It approaches *Dactylopusia* in general appearance, but differs conspicuously in the two-jointed exopodite of the antennae, and in the great development of the fifth pair of feet of the female. It differs from *Dactylopodella* Sars (1905), in having the exopodite and endopodite of the second pair of feet composed of three joints, and also in the large fifth pair.

One species at present is known. It was represented in the material collected by the 'Siboga' in the Malay Archipelago.

1. *Eudactylopus latipes* (T. Scott). Plate LXIII, figs. 8—14.

*Dactylopus latipes* T. Scott (non Boeck), 1893, p. 99, pl. X, figs. 38—43.

*Dactylopusia latipes* Thompson & Scott, 1903, p. 268.

Female — length 1.4 mm.

Seen from the side, the body appears moderately robust. The cephalic segment is large and exceeds the combined length of the thoracic segments. The rostrum is well developed and is very motile.

The abdomen is composed of four segments. The genital segment is rather large and is almost equal to the combined length of the second and third segments. It is marked by a distinct suture traversing the middle of the dorsal surface. The second and third segments are

of nearly equal length. The anal segment is comparatively short. The furcal joints are as long as broad, and are equal to two-thirds of the length of the anal segment.

The antennules are short and seven-jointed. The fifth and sixth joints are shorter than the others. In some positions the seventh joint shews an indication of a sub-division, but this is due to the setae becoming folded over the surface of the joint in the preparation of the mount. The distal end of the fourth joint is furnished with a sensory filament (Plate LXIII, fig. 9).

The antennae are similar to those of *Dactylopusia*, but the exopodite is distinctly two-jointed (Plate LXIII, fig. 10).

The mandibles, maxillae and maxillipedes are similar to those of *Dactylopusia*. The second joint of the second pair of maxillipedes is long and moderately robust. The upper margin is fringed with short spines. The terminal claw is long and stout, and is nearly as long as the second joint (Plate LXIII, fig. 11).

The first pair of feet is comparatively short and stout. The exopodite is three-jointed. The last joint is short and is furnished with three claws and one seta. The endopodite is two-jointed. The first joint is longer than the exopodite. The second joint is short. It is armed with one large stout claw, one small claw, and a short seta (Plate LXIII, fig. 12).

The exopodites and endopodites of the second, third and fourth pairs of feet are three-jointed as in the genus *Dactylopusia*.

The fifth pair of feet is two-jointed and extends to the middle of the second abdominal segment. The joints are very large and foliaceous. The proximal joint is broadly wedge-shaped. The distal joint is sub-quadrangular in outline. The margin of the joints is fringed with short hairs. A few short feeble setae are also present (Plate LXIII, fig. 13).

Male unknown.

*Eudactylopus latipes* is readily recognised by the two-jointed exopodite of the antennae, by the structure of the first pair of feet, and by the very large foliaceous and transparent fifth pair of feet.

This species was described in the report 'On Entomostraca from the Gulf of Guinea' by my father from a single specimen. It has also been recorded from the Island of Ceylon by THOMPSON and A. SCOTT. SARS points out in 'Crustacea of Norway' Vol. V, p. 131, that *Dactylopus latipes* Boeck is identical with *Dactylopusia brevicornis* (Claus), but is quite distinct from *Dactylopus latipes* T. Scott.

Occurrence. — Two specimens were obtained from the washings from dredged invertebrata collected at Station 273, off Pulu Jedan, East Coast of Aru Islands, at a depth of 13 metres.

### 30. Family DIOSACCIDAE.

Genus **Amphiascus** G. O. Sars, 1905 (*c*).

SARS points out in 'Crustacea of Norway' Vol. V, that many of the species placed under the genus long known as *Dactylopus* ought properly to be included under this genus.

The body is rather slender and cylindrical in form. The anterior and posterior portions of the body are not sharply defined. The exopodite of the antennae is three-jointed. The exopodite and endopodite of the first pair of feet are three-jointed as in *Dactylopusia*, but more slender. The exopodite and endopodite of the second, third and fourth pairs of feet are three-jointed as in *Dactylopusia*. The fifth pair of feet is foliaceous and two-jointed.

Three species belonging to this genus were represented in the material collected by the 'Siboga' in the Malay Archipelago.

1. *Amphiascus havelocki* (Thompson and Scott).

*Dactylopusia havelocki* Thompson & Scott, 1903, p. 269, pl. IX, figs. 11—18.

Four females identical with the above species were found in the washings from dredged invertebrata collected at Station 273, at a depth of 13 metres.

This species can readily be recognised by the very broad distal joint of the fifth pair of feet of the female.

*Amphiascus havelocki* has hitherto only been known from Ceylon.

2. *Amphiascus hirsutus* (Thompson and Scott).

*Dactylopusia hirsuta* Thompson & Scott, 1903, p. 269, pl. IX, figs. 19—24.

One female belonging to this species was found in the washings from dredged invertebrata collected at Station 273, from a depth of 13 metres.

The peculiar pyriform distal joint, and the armature of the proximal joint of the fifth pair of feet of the female, readily separate this species from any of the other members of the genus.

*Amphiascus hirsutus* has hitherto only been recorded from Ceylon.

3. *Amphiascus ceylonicus* (Thompson and Scott).

*Dactylopusia ceylonica* Thompson & Scott, 1903, p. 269, pl. IX, figs. 25—32.

Females identical with the above species were found in the washings from dredged invertebrata collected at the following two stations.

Stat. 226, 1595 metres, 2 specimens. — Stat. 273, 13 metres, 3 specimens.

*Amphiascus ceylonicus* is closely related to *Amphiascus havelocki* in its general appearance, and in the structure of its appendages, but it can be distinguished by the distinct difference in the proportional length of the joints of the antennules, and by the moderately narrow distal joint of the fifth pair of feet of the female.

This species has hitherto only been known from Ceylon.

## 31. Family CANTHOCAMPTIDAE.

Genus *Ameira* Boeck, 1864.

The members of this genus can be distinguished by the long slender antennules, by the long slender three-jointed endopodite of the first pair of feet, by the much shorter three-jointed exopodite, and by the perfectly smooth anal operculum.

One species apparently belonging to this genus as re-defined by Sars in 'Crustacea of Norway' Vol. V, was obtained from the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Ameira sibogae* nov. sp. Plate LX, figs. 1—7.

Female — length .43 mm.

Seen from the side, the body appears moderately slender and rather cylindrical. The cephalic segment is large and is nearly as long as the combined length of the first three thoracic segments. The rostrum is small and inconspicuous.

The abdomen is composed of four segments. The genital segment is comparatively large and is equal to the combined length of the second and third segments. It is traversed by a well defined suture. The anal segment is short. The operculum is very small and is perfectly smooth. The furcal joints are short. The joints are as long as broad and are equal to about half the length of the anal segment (Plate LX, fig. 7).

The antennules are long and slender and are composed of eight joints. The last joint is distinctly smaller than the others. The fourth joint is furnished with a long sensory filament.

The antennae are very small. The exopodite appears to be indistinctly two-jointed (Plate LX, fig. 3).

The mandibles, maxillae and maxillipedes are nearly similar to those of *Ameira longipes* Boeck.

The exopodites and endopodites of the four pairs of feet are three-jointed. The endopodite of the first pair of feet is much longer than the exopodite and is distinctly prehensile. The first joint is equal to twice the combined length of the second and third joints. The inner marginal seta is placed in the distal third of the joint. The last joint is rather narrow and linear in shape. It is two and a half times longer than the second joint. The apex is furnished with one straight claw and a geniculate seta (Plate LX, fig. 5).

The fifth pair of feet is of moderate size and two-jointed. The proximal joint is wide at the base and only very slightly attenuated towards the apex of the inner expansion. The apex bears four moderately long setae. The distal joint is narrow and is somewhat pyriform in shape. It is furnished with three outer marginal setae, one apical seta, and one seta at the distal end of the inner margin (Plate LX, fig. 6).

Male unknown.

This species can readily be distinguished by its very small size, by the proportional length of the joints of the endopodite of the first pair of feet, and by the shape and armature of the fifth pair.

Occurrence. — One specimen was obtained from the plankton collected at Station 40, off Pulu Kawassang, Paternoster Islands.

Genus *Phyllopodopsyllus* T. Scott, 1896.

The females of this genus can readily be separated from the other members of the family by the very large, one-jointed, foliaceous fifth pair of feet, and by the strong claw-like projection of the second joint of the antennules. The male has hitherto been unknown. A single male specimen belonging to this genus was found in the plankton collected by the 'Siboga' and some further particulars regarding the genus now become available.

The male resembles the female in general appearance except that the antennules are prehensile, the fifth pair of feet is two-jointed, and the abdomen is composed of five segments. The other appendages are quite similar to those of the female.

1. *Phyllopodopsyllus longicaudatus* nov. sp. Plate LX, figs. 17—25.

Male — length .58 mm.

Seen from the side, the anterior part of the body appears rather robust and the abdomen is moderately long and narrow. The cephalic segment is large and inflated, and is equal to twice the combined length of the first three thoracic segments. The rostrum is very small and inconspicuous.

The abdomen is composed of five segments. The first four segments are of nearly equal length. The anal segment is shorter than the others. The anal operculum is broad and is very slightly rounded. It is fringed with short hairs. The furcal joints are long and slender, and are slightly curved. The joints are as long as the combined length of the last three abdominal segments. Each joint is furnished with two small outer edge spines and two apical setae. The principal apical seta is comparatively short (Plate LX, fig. 25).

The antennules are eight-jointed. The second joint is produced ventrally into a large well defined tooth. The fifth joint is slightly inflated and cylindrical in shape. It is furnished with a long slender sensory filament. The hinge is placed between the fifth and sixth joints. The seventh joint is very small (Plate LX, fig. 18).

The antennae, mandibles, maxillae and maxillipedes are similar to those of *Phyllopodopsyllus bradyi* (T. Scott).

The first pair of feet is moderately long and rather slender. The exopodite is three-jointed. The endopodite is two-jointed and is considerably longer than the exopodite. The first joint is distinctly longer than the combined length of the joints of the exopodite. The inner marginal seta is situated about one-third from the distal end. The second joint is short and is only one-fourth of the length of the first joint. The apex is furnished with two setae (Plate LX, fig. 21).

The second, third and fourth pairs of feet are similar to those of *Phyllopodopsyllus bradyi* (T. Scott). The exopodites are three-jointed. The endopodites are two-jointed and are very much shorter than the exopodites. The endopodite of the second and third pairs of feet is as long as the first joint of the exopodite. The two joints are of nearly equal length. The

endopodite of the fourth pair of feet is also as long as the first joint of the exopodite, but the proximal joint is very short (Plate LX, figs. 22 and 23). The armature of the four pairs of feet does not appear to differ from that of the females of the genus.

The fifth pair of feet is rather small and is distinctly two-jointed. The proximal joint is comparatively large and is only slightly expanded internally. The apex is narrow and is furnished with three setae. The distal joint is narrowly and irregularly wedge-shaped with a distinctly pointed apex. It is furnished with two outer marginal setae and three inner marginal setae (Plate LX, fig. 24).

Female unknown.

It is scarcely likely that this can be the male of either *Phyllopodopsyllus bradyi* (T. Scott) or *Phyllopodopsyllus furcifer* G. O. Sars as the size is much too small, and the furcal joints are so distinctly different in shape and proportional length. It may, however, prove on future investigation to be the male of *Phyllopodopsyllus minor* (Thompson and Scott). The type dissections of *Phyllopodopsyllus minor* shew no trace of the tooth-like processes on the inner expansion of the apex of the second joint of the basiopodite of the second, third and fourth pairs of feet. I prefer, for this reason, to regard it as distinct in the meantime.

Occurrence. — One specimen was obtained from the plankton collected at Station 40, off Pulu Kawassang, Paternoster Islands.

### 32. Family LAOPHONTIDAE.

#### Genus **Laophonte** Philippi, 1840.

The members of this genus are readily distinguished by the very feeble exopodite and greatly produced endopodite of the first pair of feet. The endopodite is two-jointed and terminates in a very powerful claw.

Two species belonging to this genus were found in the material collected by the 'Siboga' in the Malay Archipelago.

#### 1. *Laophonte cornuta* Philippi.

*Laophonte cornuta* Philippi, 1840, p. 189, pl. III, fig. 13.

*Cleta forcipata* Claus, 1866, p. 23, pl. II, figs. 25—28.

*Laophonte serrata* Brady, 1880, vol. II, p. 71, pl. LXXIII, figs. 1—14.

*Laophonte serrata* T. Scott, 1893, p. 96, pl. XII, figs. 24—28.

*Laophonte serrata* I. C. Thompson, 1893, p. 24, pl. XX, fig. 6.

*Laophonte serrata* I. C. Thompson, 1896, p. 25.

*Laophonte serrata* T. Scott, 1901 (a), p. 353.

*Laophonte serrata* Thompson & Scott, 1903, p. 266.

*Laophonte serrata* Pearson, 1905, p. 9.

*Laophonte serrata* Norman & Scott, 1905, p. 157, pls. XIII, XVI & XVII.

*Laophonte cornuta* Sars, 1907, p. 235, pls. CLVII & CLVIII.

Males and females identical with the above species as re-defined by Professor Sars,

were found in the washings from dredged invertebrata collected at the following two stations.

Stat. 226, 1595 metres, 4 females and 1 male. — Stat. 273, 13 metres, 5 females and 1 male.

*Laophonte cornuta* can readily be recognised by the large size of the animal, by the very strong tooth-like projection on the second joint of the antennules, and by the shape and armature of the fifth pair of feet.

This species appears to be widely distributed along the coast of Western Europe. The form recorded from Ceylon by I. C. THOMPSON and A. SCOTT as *Laophonte serrata* Claus, has proved on re-examination to be identical with SARS' illustrations of the above species.

## 2. *Laophonte hirsuta* Thompson and Scott.

*Laophonte hirsuta* Thompson & Scott, 1903, p. 266, pl. VIII, figs. 1—8.

Specimens belonging to this species were found in the washings from dredged invertebrata collected at the following two stations.

Station 226, 1595 metres, 8 female. — Stat. 273, 13 metres, 5 females.

This species is easily recognised by its short, depressed, and very hirsute body, by the very robust endopodite of the first pair of feet with its very short, stout and curved apical claw, and by the slender distal joint of the fifth pair of feet.

*Laophonte hirsuta* has hitherto only been known from Ceylon.

## 33. Family CLETODIDAE.

Genus **Cletodes** Brady, 1872.

The members of this genus are easily recognised by the rather slender body, by the short stout antennules, by the non-prehensile character of the first pair of feet and by the absence of a terminal claw on the apex of the endopodite.

Two species belonging to this genus were represented in the material collected by the 'Siboga' in the Malay Archipelago.

### 1. *Cletodes linearis* (Claus).

*Liljeborgia linearis* Claus, 1866, p. 22, pl. II, figs. 1—8.

*Orthopsyllus linearis* Brady & Robertson, 1873, p. 138.

*Cletodes linearis* Brady, 1880, vol. II, p. 95, pl. LXXX, figs. 1—14.

*Cletodes linearis* T. Scott, 1893, p. 98, pl. XII, figs. 29—32.

*Cletodes linearis* I. C. Thompson, 1896, p. 25.

*Cletodes linearis* T. Scott, 1901(a), p. 354.

*Cletodes linearis* Thompson & Scott, 1903, p. 267.

*Cletodes linearis* Pearson, 1905, p. 11.

*Cletodes linearis* Norman & T. Scott, 1906, p. 162.

One female identical with the above species was found in the washings from dredged invertebrata collected at Station 273, at a depth of 13 metres.

*Cletodes linearis* can readily be identified by the strong teeth that fringe the distal ends

of the segments of the body, and by the rather large and somewhat foliaceous fifth pair of feet of the female.

This species appears to be generally distributed along the coasts of Western Europe. It has also been recorded from the Gulf of Guinea, and from the coast of Ceylon.

*Note.* — Sars 1909(a) has now restored BRADY & ROBERTSON's genus *Orthopsyllus* for the reception of this Copepod.

2. *Cletodes latipes* nov. sp. Plate LX, figs. 8—16.

Female — length .57 mm.

Seen from the side, the body appears elongate, cylindrical and considerably arched in preserved specimens. The various segments are well defined. The cephalic segment is of moderate size and is nearly as long as the combined length of the first three thoracic segments. The rostrum is short, stout, and slightly recurved.

The abdomen is composed of four segments. The genital segment is moderately large and rather inflated. It is marked by a well defined suture and is as long as the combined length of the second and third segments. The second and third segments are sub-equal in length. The anal segment is short. The anal operculum is moderately wide and the free margin is boldly rounded. The furcal joints are long and slender. Each joint is fully twice the length of the anal segment, and is furnished with two short outer marginal setae and one inner marginal seta. The apex bears a moderately long spine and one small seta. The proximal end of the joints is somewhat inflated (Plate LX, fig. 16)

The antennules are short and five-jointed. The fourth joint is shorter than the others and is furnished with a stout sensory filament.

The exopodite of the antennae is small and one-jointed. It is furnished with one inner marginal seta and one apical seta (Plate LX, fig. 10).

The mandible palp is short and one-jointed (Plate LX, fig. 11).

The second joint of the second pair of maxillipedes is elongate ovate in outline. The terminal claw is rather shorter than the second joint (Plate LX, fig. 12).

The exopodites of the four pairs of feet are three-jointed. The endopodites are two-jointed and are shorter than the exopodites. The apex of the second joint of the endopodite of the first pair of feet is furnished with two short stout spines and one seta (Plate LX, fig. 13).

The fifth pair of feet is comparatively small. The proximal joint is expanded internally. The apex of the expansion is furnished with one stout spine and two rather strong setae. The distal joint is short and broad. The apex is furnished with four setae. The three outer setae are short. The innermost seta is very long (Plate LX, fig. 15).

Male unknown.

This species can be distinguished from the other members of the genus by the short, five-jointed antennules, by the shape and armature of the fifth pair of feet, and by the rather long furcal joints.

*Occurrence.* — One specimen was obtained from the plankton collected at Station 40, off Pulu Kawassang, Paternoster Islands.

## 34. Family CEYLONIIDAE NOV.

The body is rather slender and cylindrical and resembles *Cletodes* in general appearance. The abdomen is four-jointed in the female, and five jointed in the male. The antennules are comparatively short and seven-jointed in the female. The antennules of the male are prehensile. The exopodite of the antennae is small and one-jointed. The mandibles, maxillae and first pair of maxillipedes are similar to those of *Cletodes*. The second pair of maxillipedes is extremely rudimentary and non-prehensile. The first four pairs of feet are very short. The exopodites are three-jointed. The endopodites are two-jointed and shorter than the exopodites. The fifth pair of feet of the female is foliaceous and two-jointed. The male fifth pair consists of a single plate.

The type of this family is *Ceylonia armata* (Claus). This Harpacticoid is readily recognised by the very rudimentary mouth organs, but more especially by the non-prehensile second pair of maxillipedes. This pair consists of flattened triangular plates without articulated claw.

Genus **Ceylonia** Thompson and Scott, 1903.

= *Jurinia* Claus, 1866, a name preoccupied by DESVOIDY (*Diptera*), 1830.

The body is rather slender and cylindrical, with no sharp distinction between the anterior and posterior divisions. The cephalic segment is of moderate size and is provided with a small rostrum. The antennules are short and seven-jointed in the female. The last joint of the endopodite of the antennae is furnished with six short and very stout spines. The exopodite is small and one-jointed. The mandible has very few teeth. The palp is short and is indistinctly two-jointed. The maxillae consist of a biting part and one small lobe. The first pair of maxillipedes is furnished with two digitiform lobes and a terminal claw-bearing joint. The second pair of maxillipedes is very rudimentary and consists of a thin wedge-shaped non-prehensile plate which terminates in a rudimentary curved claw. The claw is not articulated. The exopodite of the first pair of feet is short and three-jointed. The endopodite is two-jointed and is shorter than the exopodite. It terminates in a moderately strong spine. The exopodites of the second, third and fourth pairs of feet are slender and three-jointed. The endopodites are two-jointed and are shorter than the exopodites. The fifth pair of feet of the female is moderately large and foliaceous, and is two-jointed. The proximal joint has the inner portion considerably expanded. The male fifth pair is also foliaceous, but there is no trace of a division.

This genus was established by the late I. C. THOMPSON and the writer in the report on the Ceylon Copepoda collected by Professor HERDMAN in 1903. We were unaware that CLAUS established the genus *Jurinia* in 1866, for a Copepod identical with the one described by us as *Ceylonia aculeata*. The name adopted by CLAUS, however, had already been used by DESVOIDY in 1830, and must necessarily lapse.

The genus is at present represented by a single species. Specimens belonging to it were found in the material collected by the 'Siboga' in the Malay Archipelago.

1. *Ceylonia armata* (Claus).

*Jurinia armata* Claus, 1866, p. 25, pl. II, figs. 15—24.

*Ceylonia aculeata* Thompson & Scott, 1903, p. 265, pl. VII, figs. 11—23.

Three females identical with the form described by the late I. C. THOMPSON and the writer as *Ceylonia aculeata* were found in the washings from dredged invertebrata collected at Station 273, off Pulu Jedan, East coast of Aru Islands, from a depth of 11 metres.

The species described by CLAUS as *Jurinia armata* although illustrated rather indifferently, is apparently the same Copepod as that found in the washings from dredged invertebrata collected off Point de Galle, Ceylon, by Professor HERDMAN, and named *Ceylonia aculeata* by THOMPSON and SCOTT. The specific name must, therefore, be discarded.

This species has hitherto only been known from the Mediterranean and from the Indian Ocean off Ceylon.

## 35. Family ILYOPSYLLIDAE NOV.

The body is short and gibbous. The cephalic segment is very large and is equal to the combined length of the rest of the animal. The rostrum is moderately strong and pointed. The abdomen of the female is composed of four segments. The antennules are very short and five-jointed. The basal joint is greatly expanded and its upper margin is projected forward into a hood-like process. The endopodite of the antennae is small and three-jointed. There is no exopodite. The mandibles, maxillae and maxillipedes are very reduced and rudimentary. The exopodites of the first four pairs of feet are three-jointed. The endopodite of the first pair is very short, non-prehensile and indistinctly two-jointed. The endopodites of the second, third and fourth pairs are three-jointed. The fifth pair of feet is very small and one-jointed.

The male resembles the female in general appearance, but the antennules are prehensile and the abdomen is composed of five segments.

The type of the genus is *Ilyopsyllus coriaccus* Brady and Robertson. The peculiar form of the body, the greatly inflated and hood-like basal joint of the antennules, and the very rudimentary mouth organs readily separate this family from any of the other Harpacticoida.

Genus *Ilyopsyllus* Brady and Robertson, 1873.

The body is very tumid. The antennules are short and five-jointed with a greatly inflated basal joint. The antennae are short and stout. The endopodite is three-jointed. There is no exopodite. The mandible is short and the cutting edge is rather coarsely toothed. The palp is small and one-jointed. The maxillae and maxillipedes are extremely rudimentary. The second pair of maxillipedes is simple and non-prehensile. The first pair of feet is moderately short and stout. The exopodite is three-jointed. The joints bear strong outer edge spines. The last joint is also furnished with two rather long setae. The endopodite is very short and appears to be indistinctly two-jointed. The first joint is very short. The apex of the second

joint is furnished with two short stout spines. The exopodites and endopodites of the second, third and fourth pairs of feet are three-jointed. The fifth pair is very small, foliaceous and one-jointed.

One species belonging to this genus was represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Ilyopsyllus affinis* T. Scott.

*Ilyopsyllus affinis* T. Scott, 1893, p. 101, pl. XI, figs. 4—17.

*Ilyopsyllus affinis* A. Scott, 1902, p. 417.

*Ilyopsyllus affinis* Thompson & Scott, 1903, p. 275.

Five males and one female identical with the above species were found in the plankton collected at the following stations.

Stat. 19, 2 males. — Stat. 89, 1 male. — Stat. 213, 1 female and 2 males.

*Ilyopsyllus affinis* is closely related to *Ilyopsyllus coriaceus* Brady and Robertson, but the female can readily be distinguished by the non-spathulate character of the principal seta on the furcal joints.

This species has been recorded from the Gulf of Guinea, the Gulf of Suez, and from the coast of Ceylon.

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36. Family TACHIDIIDAE.

Genus **Euterpina** Norman, 1903.

The only known member of the genus is readily recognised by the slender arched body, by the prominent sharp pointed rostrum, by the long slender second pair of maxillipedes, and by the one-jointed foliaceous fifth pair of feet.

This genus was represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Euterpina acutifrons* (Dana).

*Harpacticus acutifrons* Dana, 1847, p. 153.

*Harpacticus acutifrons* Dana, 1852, p. 1192, pl. 83, fig. 11 a—b.

*Euterpe gracilis* Claus, 1863, p. 110, pl. XIV, figs. 1—13.

*Euterpe gracilis* Brady, 1880, vol. II, p. 22, pl. XL, figs. 1—16.

*Euterpe acutifrons* Giesbrecht, 1893, p. 555, pl. 44.

*Euterpe acutifrons*, var. *armata* T. Scott, 1893, p. 93, pl. XII, figs. 14—23.

*Euterpe acutifrons* I. C. Thompson, 1896, p. 25.

*Euterpe gracilis* Brady, 1899, p. 39.

*Euterpe acutifrons* I. C. Thompson, 1900, p. 285.

*Euterpe acutifrons* A. Scott, 1902, p. 409.

*Euterpe acutifrons* I. C. Thompson, 1903, p. 32.

*Euterpina acutifrons* Norman, 1903, p. 368.

*Euterpina acutifrons* Thompson & Scott, 1903, p. 258.

*Euterpe acutifrons* Cleve, 1903, p. 363.

*Euterpe acutifrons* Wolfenden, 1905 (a), p. 1034, pl. XCIX, figs. 18—20.

*Euterpe acutifrons* Pearson, 1905, p. 7.

*Euterpe acutifrons* Esterly, 1905, p. 212, fig. 53.

*Euterpina acutifrons* Norman & T. Scott, 1906, p. 139.

*Euterpe acutifrons* van Breemen, 1908, p. 176, fig. 191.

Sixty specimens belonging to this species were obtained from the plankton collected at the following four stations in the area investigated by the 'Siboga.'

Stat. 35. — Stat. 142. — Stat. 213. — Stat. 304.

*Euterpina acutifrons* is readily recognised in preserved material by its arched body and very prominent rostrum, and by the moderately large foliaceous fifth pair of feet of the female.

This Harpacticoid appears to be generally distributed in all the great oceans and appears to be subject to slight local variations.

### 37. Family MACROSETELLIDAE nov.

The body is very slender and cylindrical. The cephalic segment is large, and is furnished with a prominent beak-like rostrum. The abdomen is composed of four segments in the female. The furcal joints are rather long and slender. The antennules of the female are slender and nine-jointed. The last joint is moderately long and claw-like. The endopodite of the antennae is three-jointed. The exopodite is absent. The mandibles, maxillae and first pair of maxillipedes are rudimentary. The second pair of maxillipedes is prehensile and two-jointed. The second joint is furnished with an articulated claw. The exopodites of the first four pairs of feet are three-jointed. The endopodite of the first pair is two-jointed. The endopodites of the second, third and fourth pairs are three-jointed. The fifth pair of feet is two-jointed. The male is similar to the female except that the abdomen is five-jointed and the antennules are prehensile. The endopodites of the first and second pairs of feet are two-jointed. The fifth pair is rather smaller.

Genus **Macrosetella** nov.

= *Setella* Dana, 1846, a name preoccupied by SCHRANK (*Lepidoptera*), 1802.

The only known member of this genus is easily identified by its slender body, by the long furcal joints and by the long antennules.

The entire absence of the exopodite of the antennae, and the rudimentary condition of the mandibles, maxillae and first pair of maxillipedes indicate that the genus is worthy of more than generic rank. It is not related to *Microsetella* or to any of the other members of the family Ectinosomidae.

The only representative of the genus appeared to be well distributed in the area investigated by the 'Siboga'.

#### 1. *Macrosetella gracilis* (Dana).

*Setella gracilis* Dana, 1852, p. 1198, pl. 84, fig. 3a—g.

*Setella messinensis* Claus, 1863, p. 137, pl. XXI, figs. 15—16.

- Setella gracilis* Brady, 1883, p. 108, pl. L, figs. 1—10.  
*Setella gracilis* Giesbrecht, 1893, p. 559, pls. 1 & 43.  
*Setella gracilis* T. Scott, 1893, p. 109.  
*Setella gracilis* I. C. Thompson, 1900, p. 285.  
*Setella gracilis* Wheeler, 1900, p. 188, fig. 24.  
*Setella gracilis* Cleve, 1901, p. 9.  
*Setella gracilis* A. Scott, 1902, p. 409.  
*Setella gracilis* I. C. Thompson, 1903, p. 33.  
*Setella gracilis* Thompson & Scott, 1903, p. 257.  
*Setella gracilis* Cleve, 1903, p. 368.  
*Setella gracilis* Wolfenden, 1905 (a), p. 1030.  
*Setella gracilis* van Breemen, 1908, p. 178, fig. 192.

Males and females belonging to this characteristic form were obtained from the plankton collected at the following stations.

- Stat. 19. — Stat. 35. — Stat. 36. — Stat. 37. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 50. —  
 Stat. 66. — Stat. 75 (11 metres to surface). — Stat. 81. — Stat. 96 (night). — Stat. 98. —  
 Stat. 99. — Stat. 110. — Stat. 118 (900 metres to surface). — Stat. 121. — Stat. 124. —  
 Stat. 128 (700 metres to surface). — Stat. 138. — Stat. 143 (1000 metres to surface). —  
 Stat. 146. — Stat. 148 (1000 metres to surface). — Stat. 168. — Stat. 213. — Stat. 216. —  
 Stat. 217. — Stat. 304. — Stat. 315.

*Macrosetella gracilis* appears to be an entirely pelagic species and has a moderately wide distribution in the warm regions of the great oceans.

### 38. Family CLYTEMNESTRIDAE NOV.

The body is rather slender and depressed. The distal ends of the cephalic and first three thoracic segments are considerably expanded and pointed. The thoracic segments are produced posteriorly. The cephalic segment is large and triangular in outline when seen from above, and is furnished with a blunt pointed rostrum. The antennules are eight-jointed. The exopodite of the antennae is short and one-jointed. The mandibles, maxillae and first pair of maxillipedes are very rudimentary. The second pair of maxillipedes is well developed and prehensile. The exopodite of the first pair of feet is composed of a single joint. The endopodite is three-jointed and much longer than the exopodite. The exopodites and endopodites of the second, third and fourth pairs of feet are three-jointed. The fifth pair of feet is slender and two-jointed. The female carries a single ovisac.

This family is established for the reception of the genus *Clytemnestra* Dana. It differs very considerably from any of the other Harpacticoida in the long-jointed prehensile second pair of maxillipedes, and in the structure of the first pair of feet.

#### Genus *Clytemnestra* Dana, 1852.

The members of this genus are easily recognised by the form of the body, by the pointed cephalic and thoracic segments, and by the structure of the various appendages.

Two species are at present known. One was represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Clytemnestra rostrata* (Brady).

*Goniopsyllus rostratus* Brady, 1883, p. 107, pl. XLII, figs. 9—16.

*Clytemnestra rostrata* Giesbrecht, 1893, p. 566, pl. 45.

*Clytemnestra rostrata* Wheeler, 1900, p. 189, fig. 26.

*Clytemnestra rostrata* Thompson & Scott, 1903, p. 258.

*Clytemnestra rostrata* Esterly, 1905, p. 214, fig. 54.

*Clytemnestra rostrata* Norman & T. Scott, 1906, p. 140.

*Clytemnestra rostrata* Farran, 1908, p. 91.

*Clytemnestra rostrata* van Breemen, 1908, p. 180, fig. 194.

Four males and one female identical with the species described by Professor G. S. BRADY in the report on the 'Challenger' Copepoda, were obtained from the plankton collected at the following stations.

Stat. 81, 1 male. -- Stat. 142, 1 male. — Stat. 174, 1 female. — Stat. 213, 1 male. — Stat. 304, 1 male.

GIESBRECHT in his great work distinguishes the female of *Clytemnestra rostrata* (Brady) from *Clytemnestra scutellata* Dana by the proportional length of the joints of the antennules. The second last joint of the antennules of *Clytemnestra rostrata* is very distinctly shorter than the third last joint. Its length is contained nearly six times in the length of the last joint. The second last joint of the antennules of *Clytemnestra scutellata* is slightly longer than the third last joint. Its length is contained twice in the length of the last joint.

*Clytemnestra rostrata* appears to have a moderately wide distribution in the great oceans, but some of the records of its occurrence are perhaps doubtful. The species recorded by my father from the Gulf of Guinea as *Clytemnestra rostrata* is evidently identical with DANA'S species as the illustration of the female antennule is similar to the figure given by GIESBRECHT.

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39. Family PONTOSTRATIOTIDAE nov.

The body is provided with a well defined sharp pointed rostrum. The principal furcal seta is in the form of an extremely long slender setiferous spine, with a jointed distal end carrying a plumose seta. The antennules are six to eight-jointed. The distal end of the upper margin of the first joint is produced into a knob. The exopodite of the antennae is short and one to four-jointed. The mandibles, maxillae and maxillipedes are well developed. The second pair of maxillipedes is not prehensile. The exopodite and endopodite of the four pairs of feet are three-jointed. The fifth pair of feet is elongate and two-jointed.

The type of this family is *Pontostratiotes abyssicola* Brady 1883, and it includes the genus *Aegisthus* Giesbrecht. The very pointed cephalic segment, and the extraordinary development of the principal furcal seta are quite sufficient to separate the members of this family from any of the other families belonging to the Harpacticoida.

An examination of the illustrations of the appendages of *Pontostratiotes* given by BRADY in the 'Challenger' Report shews that there is a close relationship between that genus and *Aegisthus*, described and illustrated by GIESBRECHT in his Naples Monograph. The two genera are distinct from any of the Harpacticoida and ought, I think, to be placed under a separate family. I have recently had the privilege of examining a specimen of a Copepod identical with BRADY'S *Pontostratiotes abyssicola* and find that this opinion appears quite reasonable.

The chief differences between the two genera, apart from the presence or absence of cephalic and thoracic spines, are to be found in the jointing of the exopodite of the antennae and in the development of the mandible palp. The exopodite of the antennae of *Pontostratiotes* is four-jointed. It is only one-jointed in *Aegisthus*. The mandible palp of *Pontostratiotes* is well developed and two-branched. The exopodite is four-jointed. The mandible palp of *Aegisthus* is quite rudimentary and unbranched. The antennules, maxillae, first pair of maxillipedes and the five pairs of feet are nearly identical in the two genera.

The long so-called furcal setae in the two genera may really represent the furcal joints, because the long setae in perfect examples of *Aegisthus* terminate in one plumose and two simple setae. These terminal setae appear to be articulated to the long setae just as in normal furcal joints.

#### Genus *Aegisthus* Giesbrecht, 1891.

The body is slender and of moderate length. The forehead is produced into a sharp immovable rostrum. The principal furcal seta is of great length. It is in the form of a slender setiferous spine with a jointed apex that carries a plumose seta. The antennules are rather slender and six or seven-jointed. The first joint has a distinct knob at the distal end of the upper margin. The exopodite of the antennae is small and one-jointed. The mandible has a well developed biting edge and a very rudimentary palp. The maxillae consist of a broad biting part and one digitiform lobe. The first pair of maxillipedes is rather large and five-jointed. The two basal joints are moderately long. The three apical joints are short. The distal end of the upper margin of the second basal joint is furnished with a slender claw. The second pair of maxillipedes is lamelliform and two-jointed. The second joint is very short. The exopodites and endopodites of the first four pairs of feet are three-jointed and of nearly equal length. In some specimens the exopodite and endopodite of the first pair of feet are rather indistinctly three-jointed. The fifth pair of feet is moderately long and slender. It is indistinctly two jointed.

Two species belonging to this genus were represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

#### 1. *Aegisthus aculeatus* Giesbrecht.

*Aegisthus aculeatus* Giesbrecht, 1891, p. 476.

*Aegisthus aculeatus* Giesbrecht, 1893, p. 573, pls. 46 & 49.

*Aegisthus aculeatus* I. C. Thompson, 1903, p. 33.

*Aegisthus aculeatus* Cleve, 1904, p. 185.

*Aegisthus aculeatus* van Breemen, 1908, p. 181, fig. 195.

Three specimens belonging to the above species were obtained from the plankton collected at the following two stations.

Stat. 128 (HENSEN vertical net, 700 metres to surface), 2 specimens. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 1 specimen.

*Aegisthus aculeatus* is much smaller than the next species and the rostrum is not nearly so prominent. The antennules are seven-jointed. The knob on the upper margin of the first joint is comparatively short.

This species has only been recorded from the Atlantic and Pacific Oceans.

## 2. *Aegisthus mucronatus* Giesbrecht.

*Aegisthus mucronatus* Giesbrecht, 1891, p. 476.

*Aegisthus mucronatus* Giesbrecht, 1893, p. 573, pls. 46 & 49.

*Aegisthus longirostris* T. Scott, 1893, p. 104, pl. XI, figs. 31—34.

*Aegisthus mucronatus* I. C. Thompson, 1903, p. 33.

*Aegisthus mucronatus* Cleve, 1904, p. 185.

*Aegisthus mucronatus* Farran, 1905, p. 46.

*Aegisthus mucronatus* Pearson, 1906, p. 36.

*Aegisthus mucronatus* Farran, 1908, p. 91.

*Aegisthus mucronatus* van Breemen, 1908, p. 183, fig. 197.

Twenty specimens of this species were obtained from the plankton collected at the following stations.

Stat. 109. — Stat. 112. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 276 (HENSEN vertical net, 750 metres to surface).

This is a moderately large species with six-jointed antennules. The knob on the distal end of the upper margin of the first joint is very prominent. The rostrum is long and pointed.

*Aegisthus mucronatus* appears to have a wider distribution than the previous species. It has been recorded from the Atlantic Ocean, off the Coast of Africa and off the West Coast of Ireland, and from the Pacific. The form described by my father from the Gulf of Guinea as *Aegisthus longirostris* appears to be identical with *Aegisthus mucronatus* Giesbrecht.

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## 40. Family MONSTRILLIDÆ.

Genus **Monstrilla** Dana, 1848.

The body is elongate and rather cylindrical. The cephalic segment is of considerable size and in some cases exceeds the combined length of the thorax and abdomen. There is no true rostrum. The abdomen is composed of three segments in the female and four in the

male. The joints of the antennules are usually indefinite and vary from two to four in number. The antennae, mandibles and maxillipedes are entirely suppressed. The joints of the basiopodite of the swimming feet are considerably inflated. The exopodites and endopodites of the first four pairs of feet are three-jointed. The fifth pair of feet is rudimentary and one-jointed. The male antennules are both prehensile.

The females of this genus are readily identified by the three-jointed abdomen and by the furcal joints being furnished with five or six setae.

Eight species were obtained from the plankton collected by the 'Siboga' in the Malay Archipelago. Five of the species do not appear to have previously been described.

1. *Monstrilla gracilicauda* Giesbrecht. Plate LVII, figs. 1 and 2.

*Monstrilla gracilicauda* Giesbrecht, 1893, p. 586, pl. 46.

*Monstrilla gracilicauda* T. Scott, 1904, p. 245, pls. XIII & XIV.

*Monstrilla gracilicauda* T. Scott, 1906(a), p. 366.

*Monstrilla gracilicauda* van Breemen, 1908, p. 206, fig. 217.

One female apparently identical with the above species was found in the plankton collected at Station 43, off Pulu Kawassang, Paternoster Islands.

Length 3.5 mm.

The antennules are four-jointed and are equal to half the length of the cephalic segment. The abdomen is composed of three segments. The genital segment is sub-cylindrical in shape and is equal to twice the combined length of the next two segments. It is as long as the united length of the next two segments and furcal joints. The segment is marked by a faint suture traversing the middle. The third abdominal segment of the 'Siboga' specimen is very little shorter than the second segment. The furcal joints are about one and a half times longer than the anal segment. Each joint is furnished with one outer marginal seta and five apical setae. The middle apical seta is much shorter than the others (Plate LVII, fig. 1).

The apex of the fifth pair of feet is rather inflated and is directed at right angles to the body. The apex is furnished with two long setae, and a short one (Plate LVII, fig. 2).

With the exception of the difference in the length of the third segment of the abdomen the 'Siboga' specimen agrees well with the illustrations given by GIESBRECHT.

*Monstrilla gracilicauda* has been recorded from the British Coasts and from the Mediterranean.

2. *Monstrilla longicornis* I. C. Thompson. Plate LVII, figs. 3 and 4.

*Monstrilla longicornis* I. C. Thompson, 1890, p. 119, pl. IV.

*Monstrilla longiremis* Giesbrecht, 1893, p. 586, pl. 46.

*Monstrilla longicornis* I. C. Thompson, 1896, p. 25.

*Monstrilla longicornis* T. Scott, 1902, p. 469, pl. XXV, figs. 3 & 4.

*Monstrilla longicornis* T. Scott, 1904, p. 244, pl. XIII, figs. 1—7.

*Monstrilla longicornis* Pearson, 1906, p. 33.

*Monstrilla longicornis* T. Scott, 1906(a), p. 365.

*Monstrilla longicornis* Farran, 1908, p. 91.

*Monstrilla longicornis* van Breemen, 1908, p. 204, fig. 215,

One female apparently belonging to the above species was obtained from the plankton collected at each of the following two stations.

Stat. 66. — Stat. 121.

Length — 2,8 mm.

The antennules are two-jointed and are equal to two-thirds of the length of the cephalic segment. The abdomen is composed of three segments. The genital segment is sub-quadrangular in shape and is equal to nearly twice the combined length of the next two segments. It is considerably shorter than the united length of the next two segments and furcal joints. The segment is marked by a well defined suture traversing the middle. The third segment is very short and is only equal to about half the length of the second segment. The furcal joints are four times longer than the anal segment. Each joint is furnished with one outer marginal seta and four apical setae. The second inner seta is shorter than the others (Plate LVII, fig. 3).

The fifth pair of feet is sub-cylindrical in shape with a distinct contraction in the middle. Each foot is furnished with one inner marginal seta and two apical setae (Plate LVII, fig. 4).

The long antennules with their rather pointed ends, and the shape of the fifth pair appear to be very characteristic features of this species. The only difference between the 'Siboga' specimens and the illustrations given by GIESBRECHT and by my father, is the absence of a third seta on the apex of the fifth pair of feet.

*Monstrilla longicornis* has been recorded from the British Coasts and from the Mediterranean.

3. *Monstrilla orcula* nov. sp. Plate LVII, figs. 5 and 6.

Female — length 3,8 mm.

Seen from above, the body appears moderately slender. The cephalic segment is greatly contracted in front and is slightly narrowed behind. It is slightly longer than the posterior part of the animal. The frontal margin is concave.

The abdomen is composed of three segments. The genital segment is sub-cylindrical in shape with a distinct constriction at the middle where it is traversed by a well defined suture. Its length is rather less than twice the combined length of the next two segments. It is shorter than the united length of the next two segments and furcal joints. The second and third segments are of about equal length. The furcal joints are nearly equal to twice the length of the anal segment. Each joint is furnished with one marginal seta and five apical setae. The middle apical seta is distinctly shorter than the others (Plate LVII, fig. 5).

The fifth pair of feet is moderately large and is distinctly bi-lobed. The inner lobe is narrower than the outer one and extends beyond the end of it. The apex of the inner lobe is furnished with two setae. The outer lobe is short and stout. The apex is furnished with three setae (Plate LVII, fig. 6).

This species can readily be separated from the other members of the genus by the bi-lobed structure of the fifth pair of feet, and by the inner lobe extending beyond the apex of the outer lobe.

Occurrence. — One female was obtained from the plankton collected at Station 40, off Pulu Kawassang, Paternoster Islands.

4. *Monstrilla inserta* nov. sp. Plate LVII, figs. 7 and 8.

Female — length 3.4 mm.

Seen from above, the body appears moderately slender. The cephalic segment is evenly rounded in the frontal portion and is very slightly contracted at the distal end. It is slightly longer than the posterior part of the animal. The frontal margin is very narrowly rounded and is slightly cleft.

The abdomen is composed of three segments. The genital segment is sub-quadrangular in shape and is traversed by a distinct suture rather in front of the middle. Its length is equal to twice the combined length of the next two segments. It is rather shorter than the united length of the next two segments and furcal joints. The second and third segments are very short and are of nearly equal length. The furcal joints are three times longer than the anal segment. Each joint is furnished with one outer marginal seta and five apical setae (Plate LVII, fig. 7).

The antennules are three-jointed and are equal to one-third of the length of the cephalic segment.

The fifth pair of feet is rather slender and is distinctly bi-lobed. The inner lobe is narrower than the outer lobe and does not extend beyond the end of it. The apex is furnished with one seta. The outer lobe is furnished with three setae (Plate LVII, fig. 8).

This species comes very near *Monstrilla grandis* in general appearance, and in the shape of the fifth pair of feet. The chief difference is in the inner lobe of the fifth pair. GIESBRECHT'S figure shews the inner lobe of the fifth pair of *Monstrilla grandis* to be furnished with two setae, instead of one in the 'Siboga' specimens.

Occurrence. — Seven females were obtained from the plankton collected at the following stations.

Stat. 40, 2 specimens. — Stat. 66, 4 specimens. — Stat. 282, 1 specimen.

5. *Monstrilla cymbula* nov. sp. Plate LVII, figs. 9 and 10.

Female — length 3 mm.

Seen from above, the body appears rather slender. The cephalic segment is considerably contracted in front and is inflated in the middle. It is slightly longer than the posterior part of the animal. The frontal margin is sharply concave.

The abdomen is composed of three segments. The genital segment is sub-cylindrical in shape with a distinct constriction in the middle where it is traversed by a well defined suture. It is one and a half times longer than the combined length of the next two segments. Its length is rather shorter than the united length of the next two segments and furcal joints. The second and third segments are sub-equal in length. The furcal joints are two and a half times longer than the anal segment. Each joint is furnished with two outer marginal setae and four apical setae (Plate LVII, fig. 9).

The antennules are two-jointed and are equal to two-thirds of the length of the cephalic segment.

The fifth pair of feet is short and broad and is distinctly bi-lobed. The inner lobe is

short and moderately wide. It does not extend beyond the apex of the outer lobe. It is furnished with two apical setae. The apex of the outer lobe is directed at almost right angles to the body and is furnished with three setae (Plate LVII, fig. 10).

This species can readily be recognised by the shape and armature of the fifth pair of feet.

Occurrence. — One female was obtained from the plankton collected at Station 99, off North Ubian, Sulu Islands.

6. *Monstrilla helgolandica* Claus. Plate LVIII, figs. 1 and 2.

*Monstrilla helgolandica* Claus, 1863, p. 165, pls. XII & XIII.

*Monstrilla helgolandica* Timm, 1896, p. 376, pls. 5 & 6.

*Monstrilla helgolandica* van Breemen, 1908, p. 207, fig. 218.

Female — length 2,07 mm.

Seen from above, the body appears moderately long and slender. The cephalic segment is contracted in front and is slightly inflated in the middle. It is considerably longer than the posterior part of the animal. The frontal margin is broadly rounded.

The abdomen is composed of three segments. The genital segment is sub-cylindrical in shape. It is contracted in the middle but it is not traversed by a suture. The segment is one and a half times longer than the combined length of the next two segments. It is as long as the united length of the next two segments and furcal joints. The anal segment is slightly shorter than the second segment. The furcal joints are as long as the anal segment. Each joint is furnished with one outer marginal seta and five apical setae. The middle apical seta is much shorter than the others (Plate LVIII, fig. 1).

The antennules are three-jointed and are equal to one-third of the length of the cephalic segment.

The fifth pair of feet is very small and divergent. The apex is directed at right angles to the body and is furnished with two setae (Plate LVIII, fig. 2).

The illustrations given in this report agree very well with the figures by R. TIMM (1896).

Occurrence. — One female was obtained from the plankton collected at Station 99, off North Ubian, Sulu Islands.

*Monstrilla helgolandica* has only previously been recorded from the North Sea, Skager Rack, and English Channel.

7. *Monstrilla longipes* nov. sp. Plate LVIII, figs. 3 and 4.

Female — length 1,85 mm.

Seen from above, the body appears rather short and is moderately robust. The cephalic segment is much inflated just behind the front margin. It is considerably longer than the posterior part of the animal. The frontal margin is wide and broadly rounded. The exoskeleton of the cephalic and first three thoracic segments is marked by fine reticulations that are beset with minute spines.

The abdomen is composed of three segments. The genital segment is sub-quadrangular in outline. It is slightly contracted at the middle where it is traversed by a distinct suture.

The distal ends are provided with small points. The segment is one and two-third times longer than the combined length of the next two segments. Its length is rather shorter than the united length of the next two segments and furcal joints. The second and third segments are sub-equal in length. The distal end of the third segment is decidedly expanded. The furcal joints are three times longer than the anal segment. Each joint is furnished with one outer marginal seta and five apical setae. The middle apical seta is shorter than the others (Plate LVIII, fig. 3).

The antennules are four-jointed and are equal to two-fifths of the length of the *cephalothorax*.

The fifth pair of feet is long and slender and is without apical division. The apex is furnished with two moderately strong setae (Plate LVIII, fig. 4).

This species is readily recognised by the reticulated exoskeleton and by the long slender fifth pair of feet.

**Occurrence.** — One female was found in the plankton collected at Station 142, off Laiwui, coast of Obi Major.

8. *Monstrilla turgida* nov. sp. Plate LVIII, figs. 5 and 6.

Female — length 2 mm.

Seen from above, the body appears rather short and is moderately robust. The cephalic segment is greatly inflated just behind the frontal margin. It is slightly longer than the posterior part of the animal. The frontal margin is broad and boldly rounded.

The abdomen is composed of three segments. The genital segment is sub-quadrangular in shape and is traversed near the middle by a distinct suture. It is one and a half times longer than the combined length of the next two segments. The segment is nearly as long as the united length of the next two segments and furcal joints. The second and third segments are sub-equal in length. The furcal joints are slightly longer than broad and are about one and a half times longer than the anal segment. Each joint is furnished with one outer marginal seta and five apical setae. The apical setae are sub-equal in length (Plate LVIII, fig. 5).

The antennules are four-jointed and are equal to one-third of the length of the cephalic segment.

The fifth pair of feet is moderately long and rather slender. The apex is bi-lobed. The inner lobe is narrower than the outer lobe and extends beyond the apex of it. It is furnished with one seta. The outer lobe is furnished with three setae (Plate LVIII, fig. 6).

This species can easily be separated from the other members of the genus by the very tumid cephalic segment, and by the shape of the fifth pair of feet.

**Occurrence.** — Two females were obtained from the plankton collected at Station 142, off Laiwui, coast of Obi Major.

Genus **Thaumaleus** Kroyer, 1849.

The members of this genus are closely related to *Monstrilla* in general appearance, in the jointing of the antennules, in the entire suppression of the antennae, mandibles, maxillae

and maxillipedes, and in the structure of the five pairs of feet. The abdomen of the female is only two-jointed and each furcal joint is furnished with three setae.

The genus was represented in the 'Siboga' collections by two apparently undescribed species.

1. *Thaumaleus bullatus* nov. sp. Plate LVIII, figs. 7 and 8.

Male — length 1.7 mm.

Seen from above, the body appears elongate and is rather slender. The cephalic segment is considerably inflated at the distal end. It is distinctly shorter than the posterior part of the body. The frontal margin is broad and rounded with a distinct protuberance in the middle.

The abdomen is composed of three segments. The second segment is shorter and the anal segment is longer than the others. The distal end of the anal segment is expanded. The furcal joints are short and broad. Each joint is furnished with four apical setae that are distinctly swollen at the base (Plate LVIII, fig. 7).

The antennules are five-jointed, prehensile, and equal to three-fifths of the length of the cephalic segment.

The fifth pair of feet is rudimentary and without setae (Plate LVIII, fig. 8).

This form does not agree with any of the known males belonging to the genus. It can readily be recognised by the proportional length of the abdominal segments, and by the swollen base of each seta on the furcal joints.

Occurrence. — Thirty specimens were obtained from the plankton collected at Station 142, off Laiwui, Paternoster Islands.

2. *Thaumaleus gigas* nov. sp. Plate LVIII, figs. 9 and 10.

Female — length 8 mm.

Seen from above, the body appears very elongate and is rather slender. The cephalic segment is very long. It is two and one-third times longer than the posterior end of the animal. The segment is contracted in front and is much inflated behind. The frontal margin is narrow and is slightly concave.

The abdomen is composed of two segments. The genital segment is sub-quadrangular in shape. The margins slope inwards from the middle to the distal end. The segment is slightly longer than the anal segment and is traversed by a distinct suture. The anal segment is rather shorter than the genital segment. It is very narrow in front and is much expanded at the posterior end. The furcal joints are nearly as long as the anal segment. Each joint is furnished with one marginal seta and two apical setae (Plate LVIII, fig. 9).

The antennules are comparatively short and four-jointed, and equal to about one-sixth of the length of the cephalic segment.

The fifth pair of feet is moderately broad. The apex is bi-lobed. The inner lobe is rather broad but does not extend beyond the apex of the outer lobe. It is without setae. The outer lobe is furnished with three moderately long setae (Plate LVIII, fig. 10).

This species can readily be separated from the other members of the genus by the

proportional length of the abdominal segments, and by the structure of the fifth pair of feet.

Occurrence. — Three specimens were obtained from the plankton collected at Station 99, off North Ubian, Sulu Islands.

### Tribe ISOKERANDRIA.

#### 41. Family ONCAEIDAE.

#### Genus *Oncaea* Philippi, 1843.

The members of this genus can readily be recognised by their rather pyriform body. The forehead is furnished with a pair of eye-lenses. The abdomen is composed of four segments in the female. The antennules are six-jointed.

The males resemble the females in general appearance, but the abdomen is composed of five segments.

Five species belonging to this genus were represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

#### 1. *Oncaea conifera* Giesbrecht.

- Oncaea conifera* Giesbrecht, 1891, p. 477.  
*Oncaea conifera* Giesbrecht, 1892, p. 591, pls. 2 & 47.  
*Oncaea conifera* I. C. Thompson, 1900, p. 287.  
*Oncaea conifera* Cleve, 1901, p. 8.  
*Oncaea conifera* A. Scott, 1902, p. 418.  
*Oncaea conifera* Giesbrecht, 1903, p. 41.  
*Oncaea conifera* Thompson & Scott, 1903, p. 285.  
*Oncaea conifera* Cleve, 1903, p. 365.  
*Oncaea conifera* Cleve, 1904, p. 193.  
*Oncaea conifera* Farran, 1905, p. 47.  
*Oncaea conifera* Esterly, 1905, p. 216, fig. 55.  
*Oncaea conifera* Wolfenden, 1905 (a), p. 1029.  
*Oncaea conifera* Pearson, 1906, p. 25.  
*Oncaea conifera* Farran, 1908, p. 92.  
*Oncaea conifera* van Breemen, 1908, p. 189, fig. 202.

This species appeared to be rather scarce in the area investigated by the 'Siboga'. It was only noted at the following three stations.

Stat. 47<sup>b</sup>, 11 specimens. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 24 specimens.

*Oncaea conifera* can readily be recognised by the evenly contracted and sloping sides of the genital segment of the female, by the second abdominal segment being distinctly longer than the third segment, and by the furcal joints being as long as the anal segment.

This species appears to have a wide distribution in all parts of the great oceans. It has previously been recorded from the Malay Archipelago.

2. *Oncaca media* Giesbrecht.

- Oncaca media* Giesbrecht, 1891, p. 477.  
*Oncaca media* Giesbrecht, 1893, p. 591, pls. 2 & 47.  
*Oncaca media* Cleve, 1901, p. 8.  
*Oncaca media* A. Scott, 1902, p. 419.  
*Oncaca media* Thompson & Scott, 1903, p. 284.  
*Oncaca media* Cleve, 1903, p. 366.  
*Oncaca media* Cleve, 1904, p. 193.  
*Oncaca media* Wolfenden, 1905(a), p. 1029.  
*Oncaca media* Pearson, 1906, p. 35.  
*Oncaca media* van Breemen, 1908, p. 187, fig. 200.

This *Oncaca* appeared to be very scarce in the area investigated by The 'Siboga'. It was only found in the plankton collected at two stations.

Stat. 148 (HENSEN vertical net, 1000 metres to surface), 3 specimens. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 4 specimens.

*Oncaca media* is closely related to *Oncaca mediterranea* and *Oncaca venusta*, but it can readily be separated by the difference in the proportional length of the last three abdominal segments and furcal joints.

This species is widely distributed in the great oceans.

3. *Oncaca minuta* Giesbrecht.

- Oncaca minuta* Giesbrecht, 1893, p. 591, pl. 57.  
*Oncaca minuta* I. C. Thompson, 1900, p. 287.  
*Oncaca minuta* I. C. Thompson, 1903, p. 34.  
*Oncaca minuta* Thompson & Scott, 1903, p. 284.  
*Oncaca minuta* Esterly, 1905, p. 217, fig. 56.  
*Oncaca minuta* Norman & T. Scott, 1906, p. 197.  
*Oncaca minuta* Farran, 1908, p. 92.  
*Oncaca minuta* van Breemen, 1908, p. 188, fig. 201.

Specimens of this form were found in the plankton from the following five stations.

Stat. 75 (HENSEN vertical net, 11 metres to surface), 1 specimen. — Stat. 93. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 217 (horizontal cylinder), 10 specimens. — Stat. 304.

*Oncaca minuta* is a comparatively small species. It can be recognised by the rather inflated genital segment of the female and by the furcal joints being as long as the anal segment.

This *Oncaca* has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

4. *Oncaca tenuimana* Giesbrecht.

- Oncaca tenuimana* Giesbrecht, 1891, p. 477.  
*Oncaca tenuimana* Giesbrecht, 1893, p. 591, pls. 44 & 47.

This species appeared to be very scarce in the area traversed by the 'Siboga'. It was only present in the plankton collected at two stations.

Stat. 143 (HENSEN vertical net, 1000 metres to surface), 2 specimens. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 2 specimens.

*Oncaea tenuimana* can be recognised by the rather long abdomen and comparatively short furcal joints.

This species is evidently rather limited in its distribution. It does not appear to have been recorded by any other observer since GIESBRECHT described it from specimens found in plankton collected in the Pacific Ocean.

#### 5. *Oncaea venusta* Philippi.

- Oncaea venusta* Philippi, 1843, p. 62, pl. 4.  
*Oncaea venusta* Giesbrecht, 1893, p. 590, pls. 2, 3 & 47.  
*Oncaea venusta* I. C. Thompson, 1900, p. 286.  
*Oncaea venusta* Wheeler, 1900, p. 190, fig. 27.  
*Oncaea venusta* A. Scott, 1902, p. 418.  
*Oncaea venusta* Thompson & Scott, 1903, p. 284.  
*Oncaea venusta* Cleve, 1903, p. 366.  
*Oncaea venusta* Cleve, 1904, p. 194.  
*Oncaea venusta* Wolfenden, 1905 (a), p. 1029.  
*Oncaea venusta* Pearson, 1906, p. 34.  
*Oncaea venusta* Norman & T. Scott, 1906, p. 197.  
*Oncaea venusta* van Breemen, 1908, p. 186, fig. 198.

This proved to be the most common and widely distributed member of the genus in the area investigated by the 'Siboga'. It was present in the plankton collected at the following stations.

Stat. 16. — Stat. 35. — Stat. 36. Stat. 37. — Stat. 40. Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 66. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 89. — Stat. 93. — Stat. 96 (day). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 110. — Stat. 112. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 121. — Stat. 122. — Stat. 125 (day). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133. — Stat. 136. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 144. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 157. — Stat. 165. — Stat. 168. — Stat. 169. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 186. — Stat. 193. — Stat. 194—7. — Stat. 203 (surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 205. — Stat. 210<sup>a</sup>. — Stat. 213. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 220 (surface). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 223. — Stat. 224. — Stat. 229. — Stat. 243 (HENSEN vertical net, 1000 metres to surface). — Stat. 252. — Stat. 271. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304. — Stat. 315.

*Oncaea venusta* can readily be separated from the other members of the genus by the comparatively long furcal joints. The furcal joints are longer than the combined length of the third and fourth abdominal segments.

This species is widely distributed in the warm regions of all the great oceans.

#### Genus *Conaea* Giesbrecht, 1891.

This genus is closely related to *Oncaea*, but it is readily separated by the long end joint of the antennae with its armature of very long and slender curved spines.

One species was represented in the plankton collected by the 'Siboga'.

1. *Conaca gracilis* (Dana).

- Antaria gracilis* Dana, 1852, p. 1229, pl. 86.  
*Conaca rapax* Giesbrecht, 1891, p. 477.  
*Conaca rapax* Giesbrecht, 1893, p. 605, pls. 5 & 48.  
*Oncaea gracilis* T. Scott, 1893, p. 116, pl. XIII, figs. 4—12.  
*Conaca rapax* I. C. Thompson, 1903, p. 34.  
*Conaca rapax* Cleve, 1904, p. 188.  
*Conaca rapax* Farran, 1905, p. 47.  
*Conaca rapax* Pearson, 1906, p. 35.  
*Conaca rapax* Farran, 1908, p. 96.  
*Conaca rapax* van Breemen, 1908, p. 192, fig. 206.

Fifteen specimens of this species were found in the plankton collected at nine stations.

Stat. 118 (HENSEN vertical net, 900 metres to surface), 2 specimens. — Stat. 128 (HENSEN vertical net, 700 metres to surface), 1 specimen. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 2 specimens. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 5 specimens. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), 1 specimen. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 1 specimen. — Stat. 230 (HENSEN vertical net, 2000 metres to surface), 1 specimen. — Stat. 276 (HENSEN vertical net, 750 metres to surface), 1 specimen.

*Conaca gracilis* can readily be recognised by its general appearance, by the long third joint of the antennules, and by the armature of long slender curved spines on the apical joint of the antennae.

GIESBRECHT'S *Conaca rapax* appears to be identical with *Antaria gracilis* Dana.

This species has been recorded from various parts of the Atlantic and Pacific Oceans.

Genus **Lubbockia** Claus, 1863.

The members of this genus are readily recognised by the elongate pyriform body and by the long slender abdomen. The fifth pair of feet is moderately prominent and the terminal spines are usually lamelliform.

Two species were represented in the plankton collected by the 'Siboga'.

1. *Lubbockia aculeata* Giesbrecht.

- Lubbockia aculeata* Giesbrecht, 1891, p. 417.  
*Lubbockia aculeata* Giesbrecht, 1893, p. 606, pl. 48.  
*Lubbockia aculeata* Cleve, 1903, p. 364.

Specimens identical with the above species were obtained from the plankton collected at the following stations.

Stat. 35, 2 specimens. — Stat. 118 (HENSEN vertical net, 900 metres to surface), 3 specimens. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 6 specimens. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 3 specimens. — Stat. 203 (HENSEN vertical net, 1500 metres to surface), 1 specimen.

*Lubbockia aculeata* is closely related to *Lubbockia squillimana*, but the female can be

separated by the presence of a fringe of small spines on the distal end of the first, second and third abdominal segments.

The known distribution of this species appears to be very limited. It has been recorded from the Pacific by GIESBRECHT, and from the Red Sea by CLEVE.

2. *Lubbockia squillimana* Claus.

*Lubbockia squillimana* Claus, 1863, p. 164, pl. XXV, figs. 1—5.

*Lubbockia squillimana* Brady, 1883, p. 118, pls. LIII & LIV.

*Lubbockia squillimana* Giesbrecht, 1893, p. 606, pls. 4 & 48.

*Lubbockia squillimana* T. Scott, 1893, p. 115.

*Lubbockia squillimana* A. Scott, 1902, p. 419.

*Lubbockia squillimana* Thompson & Scott, 1903, p. 285.

*Lubbockia squillimana* Wolfenden, 1905(a), p. 1030.

This species appeared to be very rare in the area investigated by the 'Siboga'. One specimen was obtained from the plankton collected at each of the following four stations.

Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Sta. 315,

*Lubbockia squillimana* can be distinguished by the absence of small spines on the distal end of the first, second and third abdominal segments.

This *Lubbockia* has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

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42. Family CORYCAEIDAE.

Genus *Corycaeus* Dana, 1846.

The members of this genus are readily recognised by their elongate and sub-cylindrical body, by the one or two-jointed abdomen, and by the presence of a pair of comparatively large eye-lenses on the frontal margin of the cephalic segment.

Sixteen species belonging to this genus were represented in the plankton collected by the 'Siboga' during the investigations in the Malay Archipelago.

1. *Corycaeus alatus* Giesbrecht.

*Corycaeus alatus* Giesbrecht, 1891, p. 480.

*Corycaeus alatus* Giesbrecht, 1893, p. 661, pl. 51.

*Corycaeus alatus* I. C. Thompson, 1900, p. 292.

Twenty specimens were found in the plankton collected at the following three stations.

Stat. 66, 8 specimens. — Station 128 (HENSEN vertical net, 700 metres to surface, 6 specimens. — Stat. 217 (horizontal cylinder), 9 specimens.

*Corycaeus alatus* can be distinguished from the other members of the genus by the

slightly inflated genital segment of the female, by the short anal segment, and by the long slender furcal joints. The furcal joints are about four times the length of the anal segment.

This species appears to be rather sparsely distributed. It has been recorded from the Indian and Pacific Oceans.

1. *Corycaeus carinatus* Giesbrecht.

- Corycaeus carinatus* Giesbrecht, 1891, p. 481.  
*Corycaeus carinatus* Giesbrecht, 1893, p. 661, pl. 51.  
*Corycaeus carinatus* I. C. Thompson, 1900, p. 293.  
*Corycaeus carinatus* Wheeler, 1900, p. 192, fig. 30.  
*Corycaeus carinatus* A. Scott, 1902, p. 421.  
*Corycaeus carinatus* Thompson & Scott, 1903, p. 285.  
*Corycaeus carinatus* Wolfenden, (1905( $\alpha$ )), p. 1029.  
*Corycaeus carinatus* Esterly, 1905, p. 226, fig. 62.

One specimen identical with the above species was obtained from the plankton collected with the HENSEN vertical net at Station 203, 1500 metres to the surface.

*Corycaeus carinatus* is closely related to *Corycaeus rostratus*. The abdomen of the female consists of a single segment, but it is distinctly more inflated than in *Corycaeus rostratus* and the furcal joints are moderately long, and slender. The length of the furcal joints is equal to half the length of the abdomen. The furcal joints of *Corycaeus rostratus* are equal to one-fourth of the length of the abdomen.

This *Corycaeus* has been recorded from the Atlantic, Indian, and Pacific Oceans.

3. *Corycaeus concinnus* Dana.

- Corycaeus concinnus* Dana, 1847, pp. 150—154.  
*Corycaeus concinnus* Dana, 1852, p. 1225, pl. 86.  
*Corycaeus concinnus* Giesbrecht, 1893, p. 661, pl. 51.  
*Corycaeus concinnus* A. Scott, 1902, p. 421.  
*Corycaeus concinnus* Thompson & Scott, 1903, p. 286.

Twenty-two specimens belonging to the above species were obtained from the plankton collected at the following stations.

- Stat. 50, 3 specimens. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 10 specimens. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 4 specimens. — Stat. 230 (HENSEN vertical net, 2000 metres to surface), 5 specimens.

The female of *Corycaeus concinnus* can be recognised by the long and rather slender abdomen. The abdomen consists of a single segment. The proximal end is distinctly inflated, and the distal end is rather sharply contracted. The furcal joints are moderately slender and are equal to about one-third of the length of the abdomen.

*Corycaeus concinnus* has been recorded from the Indian and Pacific Oceans.

4. *Corycaeus danae* Giesbrecht.

- Corycaeus danae* Giesbrecht, 1891, p. 480.  
*Corycaeus danae* Giesbrecht, 1893, p. 660, pl. 51.

- Corycaeus danae* Giesbrecht, 1895, p. 261.  
*Corycaeus danae* I. C. Thompson, 1900, p. 291.  
*Corycaeus danae* Cleve, 1901, p. 6.  
*Corycaeus danae* A. Scott, 1902, p. 420.  
*Corycaeus danae* Thompson & Scott, 1903, p. 285.  
*Corycaeus danae* Cleve, 1903, p. 360.  
*Corycaeus danae* Cleve, 1904, p. 188.  
*Corycaeus danae* Wolfenden, 1905 (a), p. 1026.

This *Corycaeus* proved to be moderately common in the area investigated by the 'Siboga'. It was present in the plankton collected at the following thirty-two stations.

Stat. 16. — Stat. 36. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 96 (day). Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 138. — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 165. — Stat. 189<sup>a</sup>. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 225. — Stat. 230 (HENSEN vertical net, 2000 metres to surface). — Stat. 243 (HENSEN vertical net, 1000 metres to surface). — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 304. — Stat. 315.

The abdomen of the female of this species is composed of two segments. The genital segment is narrowly ovate in outline. The furcal joints are two and a half times the length of the anal segment.

*Corycaeus danae* has been recorded from the Indian and Pacific Oceans.

##### 5. *Corycaeus elongatus* Claus.

- Corycaeus elongatus* Claus, 1863, p. 157, pl. XXIV, figs. 3 & 4.  
*Corycaeus elongatus* Giesbrecht, 1893, p. 659, pls. 49 & 51.  
*Corycaeus elongatus* I. C. Thompson, 1900, p. 292.  
*Corycaeus elongatus* Wheeler, 1900, p. 192, fig. 29.  
*Corycaeus elongatus* Thompson & Scott, 1903, p. 285.  
*Corycaeus elongatus* Cleve, 1903, p. 360.

One specimen was found in the plankton collected at the following four stations.

Stat. 50. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 185 HENSEN vertical net, 1536 metres to surface). — Stat. 271.

The abdomen of the female of this *Corycaeus* is composed of one segment. The segment is much contracted in front, considerably inflated in the middle, and then slopes evenly to the rather narrow distal end. The furcal joints are moderately long and slender, and are equal to fully half the length of the abdomen.

*Corycaeus elongatus* has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

##### 6. *Corycaeus flaccus* Giesbrecht.

- Corycaeus flaccus* Giesbrecht, 1891, p. 480.  
*Corycaeus flaccus* Giesbrecht, 1893, p. 659, pl. 51.

*Corycaeus flaccus* Thompson & Scott, 1903, p. 285.

*Corycaeus flaccus* Cleve, 1903, p. 361.

Fourteen specimens of the above species were obtained from the plankton collected with the HENSEN vertical net at the following three stations.

Stat. 128 (700 metres to surface), 6 specimens. — Stat. 203 (1500 metres to surface), 3 specimens. — Stat. 276 (750 metres to surface), 5 specimens.

*Corycaeus flaccus* resembles *Corycaeus alatus* in general appearance. The abdomen is composed of two segments. The genital segment is considerably inflated and the distal end of the dorsal surface is produced in the middle line into a short blunt tooth-like process. The furcal joints are moderately long and slender, and are about two and a half times longer than the anal segment. The proximal end of the joints is swollen.

This species has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

#### 7. *Corycaeus furcifer* Claus.

*Corycaeus furcifer* Claus, 1863, p. 157, pl. XXIV, figs. 7—12.

*Corycaeus furcifer* Giesbrecht, 1893, p. 660, pls. 49 & 51.

*Corycaeus furcifer* I. C. Thompson, 1900, p. 291.

*Corycaeus furcifer* Cleve, 1901, p. 6.

*Corycaeus furcifer* A. Scott, 1902, p. 421.

*Corycaeus furcifer* Thompson & Scott, 1903, p. 285.

*Corycaeus furcifer* Cleve, 1904, p. 188.

This species appeared to be moderately frequent and fairly well distributed in the area investigated by the 'Siboga'. It was found in the plankton collected at the following stations.

Stat. 50. — Stat. 98. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 129. — Stat. 133. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 144. — Stat. 157. — Stat. 165. — Stats. 194—7. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 214. — Stat. 217. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 223. — Stat. 224. — Stat. 225. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282.

The abdomen of the female of *Corycaeus furcifer* is composed of two segments. The furcal joints are long and slender, and are nearly twice as long as the abdomen.

This *Corycaeus* has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

#### 8. *Corycaeus gibbulus* Giesbrecht.

*Corycaeus gibbulus* Giesbrecht, 1891, p. 481.

*Corycaeus gibbulus* Giesbrecht, 1893, p. 660, pl. 51.

*Corycaeus gibbulus* I. C. Thompson, 1900, p. 293.

*Corycaeus gibbulus* Cleve, 1901, p. 6.

*Corycaeus gibbulus* A. Scott, 1902, p. 420.

*Corycaeus gibbulus* Thompson & Scott, 1903, p. 286.

*Corycaeus gibbulus* Cleve, 1903, p. 361.

*Corycaeus gibbulus* Wolfenden, 1905 (*a*), p. 1028.

*Corycaeus gibbulus* although not common, appeared to be well distributed in the area investigated by the 'Siboga'. It was present in the plankton collected at the following stations.

Stat. 35. — Stat. 36. — Stat. 50. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 96 (day). — Stat. 96 (night). — Stat. 99. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 142. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 184. — Stat. 186. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 213. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 225. — Stat. 229. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 304. — Stat. 315.

The abdomen is composed of two segments. Seen from above, the second segment appears moderately large and funnel-shaped, with the wide end in front. The furcal joints are moderately short and stout. The joints are rather shorter than the anal segment.

This *Corycaeus* has been recorded from various parts of the Indian Ocean, and also from the Pacific.

#### 9. *Corycaeus gracilicaudatus* Giesbrecht.

- Corycaeus gracilicaudatus* Giesbrecht, 1891, p. 481.  
*Corycaeus gracilicaudatus* Giesbrecht, 1893, p. 661, pl. 51.  
*Corycaeus gracilicaudatus* Cleve, 1901, p. 6.  
*Corycaeus gracilicaudatus* A. Scott, 1902, p. 421.  
*Corycaeus gracilicaudatus* Thompson & Scott, 1903, p. 286.  
*Corycaeus gracilicaudatus* Cleve, 1903, p. 361.  
*Corycaeus gracilicaudatus* Wolfenden, 1905 (a), p. 1029.

This species appeared to be rather scarce in the area investigated by the 'Siboga'. It was only observed in the plankton collected at three stations.

Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 304.

The abdomen of the female is moderately short and rather slender. It is composed of two segments. The genital segment is somewhat inflated in the middle. The second segment is narrow and cylindrical. The furcal joints are comparatively long and slender, and are slightly longer than the anal segment.

*Corycaeus gracilicaudatus* has been recorded from various parts of the Indian Ocean and from the Pacific.

#### 10. *Corycaeus longistylis* Dana.

- Corycaeus longistylis* Dana, 1849, pp. 8—61.  
*Corycaeus longistylis* Dana, 1852, p. 1212, pl. 85.  
*Corycaeus longistylis* Giesbrecht, 1893, p. 661, pl. 51.  
*Corycaeus longistylis* I. C. Thompson, 1900, p. 293.  
*Corycaeus longistylis* Cleve, 1901, p. 6.  
*Corycaeus longistylis* Thompson & Scott, 1903, p. 286.  
*Corycaeus longistylis* Wolfenden, 1905 (a), p. 1026.

Specimens belonging to this species were found in the plankton collected at the following stations.

Stat. 36. — Stat. 66. — Stat. 71. — Stat. 101. — Stat. 112. — Stat. 121. — Stat. 125 (night). — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 271. — Stat. 276 (HENSEN vertical net, 750 metres to surface).

\* *Corycaeus longistylis* resembles *Corycaeus furcifer* in general appearance. It can easily be distinguished from that species, however, by the abdomen being composed of a single segment, and by the rather shorter furcal joints.

This *Corycaeus* has been recorded from the Indian and Pacific Oceans.

#### 11. *Corycaeus lubbocki* Giesbrecht.

*Corycaeus lubbocki* Giesbrecht, 1891, p. 481.  
*Corycaeus lubbocki* Giesbrecht, 1893, p. 660, pl. 51.  
*Corycaeus lubbocki* A. Scott, 1902, p. 421.  
*Corycaeus lubbocki* Thompson & Scott, 1903, p. 285.  
*Corycaeus lubbocki* Cleve, 1903, p. 361.

*Corycaeus lubbocki* appeared to be rather scarce in the Malay Archipelago. It was only observed in the plankton collected at the following five stations.

Stat. 71. — Stat. 96 (night). — Stat. 213. — Stat. 271. — Stat. 315.

This is a moderately slender form, with the abdomen composed of two segments. The genital segment is elongate ovate in shape. The second segment is short, narrow and cylindrical. The furcal joints are rather long and slender, and slightly divergent. The joints are about three times the length of the anal segment.

*Corycaeus lubbocki* has been recorded from the Indian and Pacific Oceans, and from the Red Sea.

#### 12. *Corycaeus obtusus* Dana.

*Corycaeus obtusus* Dana, 1849, pp. 8—61.  
*Corycaeus obtusus* Dana, 1852, p. 1214, pl. 85.  
*Corycaeus obtusus* Brady, 1883, p. 116, pl. XLVI.  
*Corycaeus obtusus* Giesbrecht, 1893, p. 659, pls. 3 & 51.  
*Corycaeus obtusus* T. Scott, 1893, p. 112.  
*Corycaeus obtusus* Giesbrecht, 1895, p. 261.  
*Corycaeus obtusus* Cleve, 1901, p. 6.  
*Corycaeus obtusus* A. Scott, 1902, p. 421.  
*Corycaeus obtusus* Thompson & Scott, 1903, p. 286.  
*Corycaeus obtusus* Cleve, 1903, p. 361.  
*Corycaeus obtusus* Wolfenden, 1905(a), p. 1026.

This species proved to be moderately common and generally distributed in the area investigated by the 'Siboga', as shewn by the following records of its occurrence.

Stat. 16. — Stat. 35. — Stat. 36. — Stat. 47<sup>b</sup>. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 93. — Stat. 99. — Stat. 121. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 148 (HENSEN vertical net, 1000 metres to surface) — Stat. 149. — Stat. 165. — Stat. 174. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204. — Stat. 205. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 229. — Stat. 243 (HENSEN vertical net, 1000 metres to surface). — Stat. 245. — Stat. 271. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 304. — Stat. 315.

*Corycaeus obtusus* is a rather small and moderately robust species. The abdomen of the female is composed of two segments. The second segment is comparatively short and wide. The furcal joints are slightly divergent and are rather longer than the anal segment.

This *Corycaeus* has been recorded from various parts of the Indian Ocean and from the Pacific.

### 13. *Corycaeus robustus* Giesbrecht.

*Corycaeus robustus* Giesbrecht, 1891, p. 480.

*Corycaeus robustus* Giesbrecht, 1893, p. 660, pls. 2 & 51.

*Corycaeus robustus* Cleve, 1901, p. 6.

*Corycaeus robustus* Thompson & Scott, 1903, p. 286.

*Corycaeus robustus* Cleve, 1903, p. 361.

*Corycaeus robustus* Cleve, 1904, p. 188.

Specimens belonging to this species were obtained from the plankton collected at the following stations in the area investigated by the 'Siboga'.

Stat. 96 (day). — Stat. 98. — Stat. 99. — Stat. 112. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 142. — Stat. 169. — Stats. 194—7. — Stat. 203 (surface). — Stat. 210<sup>a</sup>. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 223. — Stat. 224. — Stat. 225. — Stat. 282. — Stat. 304.

*Corycaeus robustus* is a moderately large and stout form. The abdomen of the female is composed of two segments. The genital segment is large and oval in shape. A distinct tubercle is present on the dorso-lateral margins. The anal segment is short and wide. The furcal joints are stout and are slightly divergent. Each joint is about one and a half times longer than the anal segment.

This *Corycaeus* has been recorded from the Indian and Pacific Oceans.

### 14. *Corycaeus speciosus* Dana.

*Corycaeus speciosus* Dana, 1849, pp. 8—61.

*Corycaeus speciosus* Dana, 1852—55, p. 1220, pl. 86.

*Corycaeus speciosus* Brady, 1883, p. 115, pl. XLVI.

*Corycaeus speciosus* Giesbrecht, 1893, p. 660, pl. 51.

*Corycaeus speciosus* T. Scott, 1893, p. 112.

*Corycaeus speciosus* I. C. Thompson, 1900, p. 292.

*Corycaeus speciosus* A. Scott, 1902, p. 420.

*Corycaeus speciosus* Thompson & Scott, 1903, p. 285.

- Corycaeus speciosus* Cleve, 1903, p. 362.  
*Corycaeus speciosus* Cleve, 1904, p. 189.  
*Corycaeus speciosus* Wolfenden, 1905(a), p. 1026.  
*Corycaeus speciosus* Pearson, 1906, p. 34.  
*Corycaeus speciosus* van Breemen, 1908, p. 199, fig. 212.

This distinct species proved to be widely distributed in the area investigated by the 'Siboga'. It was present in the plankton collected at the following stations.

- Stat. 36. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 71. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 89. — Stat. 93. — Stat. 96 (day). — Stat. 98. — Stat. 112. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 121. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 133. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 165. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 223. — Stat. 230 (HENSEN vertical net, 2000 metres to surface). — Stat. 245. — Stat. 271. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304.

The moderately long and divergent furcal joints of the female of this species readily distinguish it from any of the other members of the genus.

*Corycaeus speciosus* has been recorded from various parts of the Atlantic, Indian and Pacific Oceans.

#### 15. *Corycaeus tenuis* Giesbrecht.

- Corycaeus tenuis* Giesbrecht, 1891, p. 481.  
*Corycaeus tenuis* Giesbrecht, 1893, p. 660, pl. 51.  
*Corycaeus tenuis* Thompson & Scott, 1903, p. 286.

Specimens belonging to the above species were found in the plankton collected at the following seven stations.

- Stat. 47<sup>b</sup>. — Stat. 142. — Stat. 143 (HENSEN vertical net, 1000 metres to surface). — Stat. 165. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 271. — Stat. 315.

*Corycaeus tenuis* is a comparatively slender form and resembles *Corycaeus lubbocki* in general appearance. The abdomen of the female is composed of two segments. The anal segment is narrow and cylindrical in shape. The furcal joints are slender and are nearly twice as long as the anal segment.

This *Corycaeus* has been recorded from the Indian and Pacific Oceans.

#### 16. *Corycaeus venustus* Dana.

- Corycaeus venustus* Dana, 1849, pp. 8—61.  
*Corycaeus venustus* Dana, 1852, p. 1222, pl. 86.  
*Corycaeus venustus* Brady, 1883, p. 115, pl. LIV.  
*Corycaeus venustus* Giesbrecht, 1893, p. 674, pls. 4 & 51.  
*Corycaeus venustus* T. Scott, 1893, p. 111.

- Corycaeus venustus* I. C. Thompson, 1900, p. 290.  
*Corycaeus venustus* A. Scott, 1902, p. 420.  
*Corycaeus venustus* I. C. Thompson, 1903, p. 35.  
*Corycaeus venustus* Thompson & Scott, 1903, p. 285.  
*Corycaeus venustus* Cleve, 1903, p. 362.  
*Corycaeus venustus* Wolfenden, 1905 (a), p. 1026.  
*Corycaeus venustus* Esterly, 1905, p. 225, fig. 61.  
*Corycaeus venustus* Pearson, 1906, p. 34.  
*Corycaeus venustus* van Breemen, 1908, p. 200, fig. 213.

This species although widely distributed in the area appeared to be rather rare. It was found in the plankton collected at the following fifteen stations.

Stat. 47<sup>b</sup>. — Stat. 50. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 93. — Stat. 101. — Stat. 118 (HENSEN vertical net, 700 metres to surface). — Stat. 125. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 205. — Stat. 213. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 229.

*Corycaeus venustus* resembles *Corycaeus tenuis* in general appearance, except that it is more robust. The abdomen is composed of two segments. The furcal joints are slightly longer than the anal segment.

This species appears to be widely distributed in the Atlantic, Indian and Pacific Oceans. It has also been recorded from the Mediterranean.

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#### 43. Family SAPPHIRINIDAE.

Genus *Sapphirina* J. V. Thompson, 1829.

The members of this genus are easily recognised by the semi-transparent, ovate or sub-ovate depressed body, by the comparatively short lamelliform furcal joints, and by the presence of a pair of eye-lenses on the frontal margin of the cephalic segment.

Fifteen species belonging to this genus were represented in the plankton collected during the investigations of the 'Siboga', in the Malay Archipelago. One of the species does not appear to have previously been described.

##### 1. *Sapphirina angusta* Dana.

- Sapphirina angusta* Dana, 1849, p. 41.  
*Sapphirina angusta* Dana, 1852, p. 1240, pl. 87.  
*Sapphirina angusta* Giesbrecht, 1893, p. 619, pls. 52, 53 & 54.  
*Sapphirina angusta* Giesbrecht, 1895, p. 261.  
*Sapphirina angusta* Cleve, 1903, p. 368.  
*Sapphirina angusta* Cleve, 1904, p. 196.  
*Sapphirina angusta* Esterly, 1905, p. 221, fig. 58.

One specimen of the above species was found in the plankton collected at each of the following nine stations.



Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 110. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 144. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 282.

The furcal joints of this species are nearly three times longer than broad. The distal end of the inner margin terminates in a moderately strong tooth.

*Sapphirina angusta* has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

### 2. *Sapphirina auronitens* Claus.

*Sapphirina auronitens* Claus, 1863, p. 153.

*Sapphirina auronitens* Giesbrecht, 1893, p. 619, pls. 4, 52 & 54.

*Sapphirina auronitens* Steuer, 1898, p. 4.

*Sapphirina auronitens* Cleve, 1901, p. 8.

*Sapphirina auronitens* A. Scott, 1902, p. 419.

*Sapphirina auronitens* Thompson & Scott, 1903, p. 287.

Specimens of this species were obtained from the plankton collected at the following stations in the area traversed by the 'Siboga'.

Stat. 93. — Stat. 98. — Stat. 117<sup>a</sup>. — Stat. 172. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 193. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 215<sup>a</sup>.

*Sapphirina auronitens* is a moderately wide species with broadly oval furcal joints. Each joint is one and a half times longer than broad. The apex is rather pointed.

This species has been recorded from the Mediterranean and Red Sea, and from various parts of the Indian Ocean.

### 3. *Sapphirina bicuspidata* Giesbrecht.

*Sapphirina bicuspidata* Giesbrecht, 1891, p. 479.

*Sapphirina bicuspidata* Giesbrecht, 1893, p. 620, pls. 52 & 54.

*Sapphirina bicuspidata* Steuer, 1898, p. 5.

*Sapphirina bicuspidata* Thompson & Scott, 1903, p. 287.

This species was represented in the plankton collected at the following stations in the Malay Archipelago.

Stat. 16. — Stat. 165. — Stat. 172. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 186. — Stat. 204. — Stat. 217 (horizontal cylinder). — Stat. 220 (surface). — Stat. 225. — Stat. 271. — Stat. 315.

*Sapphirina bicuspidata* is a rather broadly oval species with wide furcal joints. The joints are about one and two-third times longer than broad.

This *Sapphirina* has been recorded from the Indian and Pacific Oceans, from the Mediterranean, and from the Red Sea.

### 4. *Sapphirina darwini* Haeckel.

*Sapphirina darwini* Haeckel, 1864, p. 105, pls. 2 & 3.

*Sapphirina darwini* Giesbrecht, 1893, p. 619, pls. 52 & 54.

This characteristic species appeared to be very limited in its distribution in the area investigated. It was present in the plankton collected at the following six stations.

Stat. 125 (night). — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 189<sup>a</sup>. — Stats. 194—7. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 282.

The furcal joints are moderately broad. The apex is rather truncate. The distal end of the inner margin terminates in a small tooth.

This species has apparently only been recorded from the Mediterranean, and from the Pacific Ocean.

5. *Sapphirina gastrica* Giesbrecht.

*Sapphirina gastrica* Giesbrecht, 1891, p. 478.

*Sapphirina gastrica* Giesbrecht, 1893, p. 620, pls. 52—54.

*Sapphirina gastrica* I. C. Thompson, 1900, p. 288.

*Sapphirina gastrica* Thompson & Scott, 1903, p. 286.

Specimens belonging to this species were found in the plankton collected at the following stations in the area traversed by the 'Siboga'.

Stat. 16. — Stat. 106. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 136. — Stat. 144. — Stat. 169. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 104. — Stat. 224. — Stat. 225. — Stat. 276 (HENSEN vertical net, 750 metres to surface).

The furcal joints are elongate ovate in shape and are about twice as long as broad. The distal end of the inner margin of each joint terminates in a small tooth.

*Sapphirina gastrica* has been recorded from the Indian and Pacific Oceans.

6. *Sapphirina intestinata* Giesbrecht.

*Sapphirina intestinata* Giesbrecht, 1891, p. 478.

*Sapphirina intestinata* Giesbrecht, 1893, p. 619, pls. 52 & 54.

*Sapphirina intestinata* Thompson & Scott, 1903, p. 287.

*Sapphirina intestinata* Wolfenden, 1905 (a), p. 1029.

This *Sapphirina* was present in the plankton collected at the following ten stations.

Stat. 129. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1000 metres to surface). — Stat. 165. — Stat. 172. — Stat. 184. — Stat. 185. — Stat. 252. — Stat. 282.

*Sapphirina intestinata* is a rather small and moderately broad species. The furcal joints are somewhat elongate ovate in shape and are fully twice as long as broad. The middle of the outer margin is distinctly expanded. The apex is rather narrow and truncate. The inner margin terminates in a small tooth.

This species has been recorded from the Indian and Pacific Oceans.

7. *Sapphirina metallina* Dana.

*Sapphirina metallina* Dana, 1849, pp. 8—61.

*Sapphirina metallina* Dana, 1852, p. 1242, pl. 87.

- Sapphirina metallina* Brady, 1883, p. 128, pl. L.  
*Sapphirina metallina* Giesbrecht, 1893, p. 620, pl. 54.  
*Sapphirina metallina* T. Scott, 1893, p. 125, pl. XII.  
*Sapphirina metallina* Steuer, 1898, p. 5.  
*Sapphirina metallina* Cleve, 1901, p. 9.  
*Sapphirina metallina* Thompson & Scott, 1903, p. 287.  
*Sapphirina metallina* Wolfenden, 1905 (a), p. 1029.

Specimens of this very characteristic species were found in the plankton collected at the following stations.

- Stat. 66. — Stat. 99. — Stat. 121. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 142. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282.

The furcal joints are narrowly quadrangular in shape and are about twice as long as broad. Two of the apical setae are leaf-like in structure.

*Sapphirina metallina* has been recorded from the Atlantic, Indian and Pacific Oceans.

#### 8. *Sapphirina maculosa* Giesbrecht.

- Sapphirina maculosa* Giesbrecht, 1893, p. 619, pls. 52 & 54.  
*Sapphirina maculosa* A. Scott, 1902, p. 419.

One specimen belonging to this species was found in the plankton collected at each of the following five stations.

- Stat. 36. — Stat. 37. — Stat. 47<sup>b</sup>. — Stat. 66. — Stat. 225.

The furcal joints are elongate ovate in shape and are about twice as long as broad. The apex is narrowly rounded. The inner margin terminates in a small tooth.

*Sapphirina maculosa* has been recorded from the Mediterranean and Red Sea, and from the Atlantic Ocean.

#### 9. *Sapphirina nigromaculata* Claus.

- Sapphirina nigromaculata* Claus, 1863, p. 152, pl. VIII.  
*Sapphirina nigromaculata* Giesbrecht, 1893, p. 619, pls. 52 & 54.  
*Sapphirina nigromaculata* Steuer, 1898, p. 5.  
*Sapphirina nigromaculata* I. C. Thompson, 1900, p. 288.  
*Sapphirina nigromaculata* Cleve, 1901, p. 9.  
*Sapphirina nigromaculata* A. Scott, 1902, p. 419.  
*Sapphirina nigromaculata* Thompson & Scott, 1903, p. 287.  
*Sapphirina nigromaculata* Cleve, 1903, p. 368.  
*Sapphirina nigromaculata* Cleve, 1904, p. 196.  
*Sapphirina nigromaculata* Wolfenden, 1905 (a), p. 1029.  
*Sapphirina nigromaculata* van Breemen, 1908, p. 196, fig. 209.

This species appeared to be fairly well distributed in the area investigated by the 'Siboga'. It was present at twenty stations as shewn.

Stat. 16. — Stat. 40. — Stat. 47<sup>b</sup>. — Stat. 96 (night). — Stat. 96 (day). — Stat. 101. — Stat. 106. — Stat. 129. — Stat. 138. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 146. — Stat. 148 (HENSEN vertical net, 1000 metres to surface). — Stat. 168. — Stat. 169. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 217 (horizontal cylinder). — Stat. 220 (surface). — Stat. 223. — Stat. 271.

*Sapphirina nigromaculata* is a moderately broad species. The furcal joints are elongate ovate in shape and are fully twice as long as broad. The apex of each joint is rather narrowly rounded. The inner margin terminates in a small tooth.

This species has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean, and Red Sea.

#### 10. *Sapphirina opalina* Dana.

- Sapphirina opalina* Dana, 1849, pp. 8—61.  
*Sapphirina opalina* Dana, 1852—55, p. 1254, pl. 88.  
*Sapphirina opalina* Brady, 1883, p. 126, pl. XLIX.  
*Sapphirina opalina* Giesbrecht, 1893, p. 620, pls. 52 & 54.  
*Sapphirina opalina* T. Scott, 1893, p. 123.  
*Sapphirina opalina* Steuer, 1898, p. 6.  
*Sapphirina opalina* Cleve, 1904, p. 196.  
*Sapphirina opalina* Wolfenden, 1905(a), p. 1029.

This species appeared to be moderately frequent and fairly well distributed in the Malay Archipelago. It was found in the plankton collected at the following stations.

Stat. 36, 32 specimens. — Stat. 37, 4 specimens. — Stat. 93. — Stat. 96 (night). — Stat. 98, 9 specimens. — Stat. 106, 6 specimens. — Stat. 117<sup>a</sup>, 21 specimens. — Stat. 118 (HENSEN vertical net, 900 metres to surface), 1 specimen. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 3 specimens. — Stat. 144, 17 specimens. — Stat. 148 (HENSEN vertical net, 1000 metres to surface), 8 specimens. — Stat. 165, 6 specimens. — Stat. 169. — Stat. 172, 13 specimens. — Stat. 177<sup>a</sup>. — Stat. 185, 5 specimens. — Stat. 189<sup>a</sup>. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204, 5 specimens. — Stat. 205. — Stat. 220 (surface), 4 specimens. — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 315, 7 specimens.

*Sapphirina opalina* is a rather broad species with short and very wide furcal joints. Each joint is about as broad as long. The tooth-like projection of the inner margin extends beyond the apex of the joint.

This species has been recorded from Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

#### 11. *Sapphirina ovatolanceolata* Dana.

- Sapphirina ovatolanceolata* Dana, 1849, pp. 8—61.  
*Sapphirina ovatolanceolata* Dana, 1852, p. 1251, pl. 87.  
*Sapphirina ovatolanceolata* Giesbrecht, 1893, p. 618, pls. 1, 52 & 54.  
*Sapphirina ovatolanceolata* Steuer, 1898, p. 6.  
*Sapphirina ovatolanceolata* Thompson & Scott, 1903, p. 286.  
*Sapphirina ovatolanceolata* Cleve, 1903, p. 368.  
*Sapphirina ovatolanceolata* Wolfenden, 1905(a), p. 1029.

This species was generally distributed in the Malay Archipelago. It was obtained from the plankton collected at the following stations.

Stat. 50. — Stat. 93. — Stat. 96 (night). — Stat. 101. — Stat. 106. — Stat. 117<sup>a</sup>. — Stat. 121. — Stat. 125. — Stat. 133. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 177<sup>a</sup>. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 204. — Stat. 213. — Stat. 215<sup>a</sup>. — Stat. 217, (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 223. — Stat. 225. — Stat. 252. — Stat. 282.

This is a rather narrow species. The furcal joints are elongate ovate in shape and are fully twice as long as broad. The apex of each joint is narrowly rounded. The inner margin terminates in a small tooth.

*Sapphirina ovatolanceolata* has been recorded from the Atlantic and Indian Oceans, and from the Mediterranean.

### 12. *Sapphirina scarlata* Giesbrecht.

*Sapphirina scarlata* Giesbrecht, 1891, p. 478.  
*Sapphirina scarlata* Giesbrecht, 1893, p. 620, pls. 25 & 54.  
*Sapphirina scarlata* Cleve, 1903, p. 368.  
*Sapphirina scarlata* Cleve, 1904, p. 197.  
*Sapphirina scarlata* Esterly, 1905, p. 222, fig. 59.

Four specimens belonging to this species were obtained from the plankton collected at the three following stations.

Stat. 215<sup>a</sup>, 2 specimens. — Stat. 220 (surface), 1 specimen, — Stat. 229, 1 specimen.

The male and female of this *Sapphirina* are moderately wide forms. The furcal joints are narrowly oval in shape. Each joint is rather less than twice as long as broad. The apex of the joints is broadly rounded. The distal end of the inner margin is produced into a well defined tooth.

*Sapphirina scarlata* has been recorded from the Indian and Pacific Oceans, and from the Mediterranean.

### 13. *Sapphirina sinuicauda* Brady.

*Sapphirina sinuicauda* Brady, 1883, p. 129, pl. XLIX.  
*Sapphirina sinuicauda* Giesbrecht, 1893, p. 620, pls. 52 & 53.  
*Sapphirina sinuicauda* T. Scott, 1903, p. 125.  
*Sapphirina sinuicauda* Steuer, 1898, p. 6.  
*Sapphirina sinuicauda* Thompson & Scott, 1903, p. 287.  
*Sapphirina sinuicauda* Cleve, 1904, p. 197.

Specimens identical with the above species were found in the plankton collected at the following stations.

Stat. 16, 1 specimen. — Stat. 66, 4 specimens. — Stat. 118 (HENSEN vertical net, 900 metres to surface), 1 specimen. — Stat. 136, 1 specimen. — Stat. 138, 1 specimen. — Stat. 184,

1 specimen. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), 2 specimens. — Stat. 193, 1 specimen. — Stats. 194—7. — Stat. 276 (HENSEN vertical net, 750 metres to surface), 1 specimen.

The female of this species is moderately broad. The furcal joints are oval in shape and are nearly twice as long as broad. Each joint terminates in a sharp pointed apex which and readily distinguishes the species from any of the other known members of the genus.

*Sapphirina sinuicauda* has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

14. *Sapphirina stellata* Giesbrecht.

*Sapphirina stellata* Giesbrecht, 1891, p. 478.

*Sapphirina stellata* Giesbrecht, 1893, p. 620, pls. 52 & 54.

*Sapphirina stellata* I. C. Thompson, 1900, p. 288.

*Sapphirina stellata* Cleve, 1903, p. 368.

This proved to be the most common and widely distributed member of the genus. It was represented at the following stations in the area traversed by the 'Siboga'.

Stat. 81. — Stat. 89, 5 specimens. — Stat. 93, 2 specimens. — Stat. 96 (night). — Stat. 98, 5 specimens. — Stat. 99, 1 specimen. — Stat. 101. — Stat. 106. — Stat. 117<sup>a</sup>, 4 specimens. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface), 2 specimens. — Stat. 144, 2 specimens. — Stat. 165, 3 specimens. — Stat. 172, 1 specimen. — Stat. 184, 2 specimens. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), 36 specimens. — Stat. 189<sup>a</sup>, 2 specimens. — Stat. 193, 1 specimen. — Stats. 194—7, 6 specimens. — Stat. 204, 2 specimens. — Stat. 213, 6 specimens. — Stat. 215<sup>a</sup>, 6 specimens. — Stat. 217 (horizontal cylinder), 23 specimens. — Stat. 220 (HENSEN vertical net, 200 metres to surface), 3 specimens. — Stat. 220 (surface), 6 specimens. — Stat. 222, 1 specimen. — Stat. 224, 12 specimens. — Stat. 225, 57 specimens. — Stat. 282, 1 specimen. — Stat. 304.

The female is moderately broad. The furcal joints are elongate ovate in shape and are about twice as long as broad. The apex of each joint is rather narrowly rounded. The distal end of the inner margin is produced into a distinct tooth.

*Sapphirina stellata* has been recorded from the Atlantic, Indian and Pacific Oceans.

15. *Sapphirina longifurca* nov. sp. Plate LXIX, figs. 15—20.

Female — length 5.5 mm.

Seen from above, the body appears moderately elongate and narrow. Its length, including the furcal joints, is three and a half times longer than broad. The abdomen is distinctly narrower than the thorax. The furcal joints are comparatively long and narrow. Each joint is three times longer than broad. The outer margin of the joints is nearly straight. The inner margin is considerably inflated at the proximal end. The distal end of the outer margin is notched. The inner margin terminates in a small tooth. The outer margin is entirely without setae. The joints are furnished with a single seta placed at the apex (Plate LXIX, fig. 15).

The antennules are short and five-jointed. The second joint is considerably longer than any of the others. The fourth joint is short (Plate LXIX, Fig. 16).

The antennae, mandibles, maxillae and maxillipedes are of the usual *Sapphirina* type.  
Male unknown.

The female of this species is readily separated from any of the other members of the genus by the long narrow furcal joints, and by the outer margin of the joints being nearly straight and without setae.

Occurrence. — One specimen was obtained from the plankton collected at Station 136, off Ternate Island, Molucca Passage.

#### Genus *Copilia* Dana, 1849.

The males of this genus resemble the males of *Sapphirina* in general appearance, but they can readily be separated by their very elongate and narrow furcal joints. The females are easily recognised by the large and somewhat quadrangular cephalic segment, by the moderately long anal segment, and by the long slender furcal joints.

Three species were represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

##### 1. *Copilia mirabilis* Dana.

- Copilia mirabilis* Dana, 1852, p. 1232, pl. 86.  
*Copilia mirabilis* Brady, 1883, p. 117, pl. LIII, figs. 1—11.  
*Copilia mirabilis* Giesbrecht, 1893, p. 647, pl. 50.  
*Copilia mirabilis* T. Scott, 1893, p. 113.  
*Copilia mirabilis* I. C. Thompson, 1900, p. 283.  
*Copilia mirabilis* Cleve, 1901, p. 6.  
*Copilia mirabilis* A. Scott, 1902, p. 420.  
*Copilia mirabilis* Thompson & Scott, 1903, p. 286.  
*Copilia mirabilis* Cleve, 1903, p. 360.

This species proved to be comparatively common and widely distributed in the area traversed by the 'Siboga'. It was present in the plankton collected at the following stations.

Stat. 16. — Stat. 36. — Stat. 47'. — Stat. 66. — Stat. 75 (HENSEN vertical net, 11 metres to surface). — Stat. 81. — Stat. 89. — Stat. 93. — Stat. 96 (day). — Stat. 96 (night). — Stat. 98. — Stat. 99. — Stat. 101. — Stat. 106. — Stat. 110. — Stat. 117<sup>a</sup>, 430 specimens. — Stat. 118 (HENSEN vertical net, 900 metres to surface). — Stat. 121. — Stat. 124. — Stat. 125. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 129. — Stat. 133. — Stat. 136. — Stat. 141 (HENSEN vertical net, 1500 metres to surface). — Stat. 144. — Stat. 146. — Stat. 157. — Stat. 165. — Stat. 169. — Stat. 172. — Stat. 177<sup>a</sup>. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 189<sup>a</sup>. — Stats. 194—7. — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 204. — Stat. 213. — Stat. 214. — Stat. 215<sup>a</sup>. — Stat. 216. — Stat. 217 (horizontal cylinder). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 220 (surface). — Stat. 223. — Stat. 224. — Stat. 225. — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 304.

The female of this species can readily be recognised by the comparatively long and narrow anal segment, and by the furcal joints being about two and a half times longer than the anal segment.

*Copilia mirabilis* appears to be widely distributed in the warm regions of all the great oceans.

2. *Copilia quadrata* Dana.

*Copilia quadrata* Dana, 1849, pp. 8—61.

*Copilia quadrata* Dana, 1852, p. 1232, pl. 86.

*Copilia quadrata* Giesbrecht, 1893, p. 647, pls. 2 & 50.

*Copilia quadrata* T. Scott, 1893, p. 113.

*Copilia quadrata* I. C. Thompson, 1900, p. 289.

This species although widely distributed in the Malay Archipelago, proved to be much scarcer than *Copilia mirabilis*. It was present in the plankton collected at the following stations.

Stat. 36. — Stat. 37. — Stat. 66. — Stat. 89. — Stat. 93. — Stat. 98. — Stat. 117<sup>a</sup>. — Stat. 128 (HENSEN vertical net, 700 metres to surface). — Stat. 129. — Stat. 136. — Stat. 144. — Stat. 146. — Stat. 157. — Stat. 165. — Stat. 169. — Stat. 172. — Stat. 184. — Stat. 185 (HENSEN vertical net, 1536 metres to surface). — Stat. 203 (HENSEN vertical net, 1500 metres to surface). — Stat. 220 (HENSEN vertical net, 200 metres to surface). — Stat. 220 (surface). — Stat. 230. — Stat. 252. — Stat. 276 (HENSEN vertical net, 750 metres to surface). — Stat. 282. — Stat. 315.

The cephalic segment of the female is very wide. It is nearly quadrangular in outline. The furcal joints are four times longer than the anal segment.

*Copilia quadrata* has been recorded from the Atlantic, Indian and Pacific Oceans, and from the Mediterranean.

3. *Copilia vitrea* (Haeckel).

*Hyalophyllum vitreum* Haeckel, 1864, p. 63, pl. 1.

*Copilia vitrea* Giesbrecht, 1893, p. 647, pls. 2 & 50.

One female apparently identical with the above species was found in the plankton collected with the HENSEN vertical net at Station 220, from a depth of 200 metres to the surface.

The cephalic segment is rather irregular in shape. It is moderately narrow in front and is somewhat expanded behind. The furcal joints are five times longer than the anal segment.

This *Copilia* has been recorded from the Atlantic and Pacific Oceans, and from the Mediterranean.

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44. Family LICHOMOLGIDAE.

Genus **Pachysoma** Claus, 1863.

The members of this genus can be recognised by the broad pyriform body with its distinctly pointed forehead, by the pointed fourth thoracic segment, and by the short abdomen. The antennules are seven to eight-jointed. The exopodites and endopodites of the four pairs of swimming feet are three-jointed.

One species was represented in the plankton collected by the 'Siboga'.

1. *Pachysoma punctatum* Claus.

*Pachysoma punctata* Claus, 1863, p. 163, pl. XXV.

*Pachysoma punctatum* Brady, 1883, p. 121.

*Pachysoma punctatum* Giesbrecht, 1893, p. 612, pls. 4 & 48.

*Pachysoma punctatum* T. Scott, 1893, p. 119, pl. XIII, figs. 18—24.

Specimens identical with the above species were found in the plankton collected at the following four stations.

Stat. 142, 1 specimen. — Stat. 143 (HENSEN vertical net, 1000 metres to surface), 3 specimens. — Stat. 144, 1 specimen. — Stat. 185 (HENSEN vertical net, 1536 metres to surface), 1 specimen.

*Pachysoma punctatum* can readily be separated from *Pachysoma tuberosum* Giesbrecht, by the second and third abdominal segments being of nearly equal length. The second segment of the abdomen of *Pachysoma tuberosum* is distinctly shorter than the third segment.

This species has hitherto only been known from the Atlantic Ocean, and from the Mediterranean.

Genus **Hermannella** Canu, 1891.

The members of this genus can be recognised by the stylet-shaped form of the mandible and of the first pair of maxillipedes, and by the exopodites and endopodites of the first four pairs of feet being three-jointed.

The three-jointed exopodite and endopodite of the fourth pair of feet is the principal character that distinguishes this genus from *Lichomolgus* and *Pseudanthessius*.

One species, apparently undescribed, was represented in the plankton collected by the 'Siboga' in the Malay Archipelago.

1. *Hermannella concinna* nov. sp. Plate LXVIII, figs. 1—10.

Female — length 2.9 mm.

Seen from above, the body appears nearly circular in outline. The frontal margin is broadly rounded. The fifth thoracic segment is comparatively large and is sub-quadrangular in shape, with the anterior and posterior ends considerably contracted.

The abdomen is composed of four segments. The combined length of the abdomen and furcal joints is contained nearly twice in the total length of the *cephalothorax*, from the frontal margin to the distal end of the fifth thoracic segment. The genital segment is rather large and is moderately expanded in the middle. It is as long as the combined length of the second and third segments added to half of the length of the anal segment. The second and fourth segments are sub-equal in length. The third segment is much smaller than the others. The furcal joints are cylindrical and of moderate length. The joints are slightly longer than the anal segment and are furnished with one outer marginal seta, and four apical setae (Plate LXVIII, fig. 1).

The antennules are slender and seven-jointed. The second and fourth joints are long.

The fourth joint is as long as the combined length of the last three joints (Plate LXVIII, fig. 2).

The antennae are short and three-jointed. The apex of the third joint is armed with three moderately strong claws and four short setae (Plate LXVIII, fig. 3).

The mandible consists of two long slender stylets. The upper stylet has a serrated outer margin. The upper margin of the inner stylet is fringed with short hairs. The mandible is also furnished with two digitiform processes (Plate LXVIII, fig. 4A).

The maxillae are lamelliform and attached to the base of the mandibles. The apex is excavated in the middle. The upper part is rounded and bears two short hairs. The lower portion is toothed and is armed with one moderately strong seta, and two very small setae (Plate LXVIII, fig. 4B).

The second joint of the first pair of maxillipedes has a stylet-shaped termination which is armed with strong and slightly curved spines on the upper margin. The basal joint is moderately large (Plate LXVIII, fig. 5).

The second pair of maxillipedes is small and two-jointed. The second joint is elongate and terminates in a narrow apex carrying two small spines (Plate LXVIII, fig. 6).

The exopodites and endopodites of the first four pairs of feet are three-jointed.

The fifth pair of feet is elongate ovate in shape. The upper margin is arched. The distal end is furnished with four setae. The lower margin is nearly straight. The middle of the upper margin and the distal end of the lower margin, is fringed with fine short spines (Plate LXVIII, fig. 9).

Male — length 2.45 mm.

The male resembles the female in general appearance, but the abdomen is composed of five segments. The second pair of maxillipedes is furnished with a very powerful curved claw. The claw is longer than the second joint (Plate LXVIII, fig. 7).

This species can readily be recognised by the very rounded form of the *cephalothorax*, by the shape of the fifth pair of feet, and by the proportional length of the abdominal segments and furcal joints.

Occurrence. — Two females and eight males were obtained from the plankton collected with the HENSEN vertical net at Station 230, from a depth of 2000 metres to the surface.

#### Genus *Lichomolgus* Thorell, 1859.

The mandibles and first pair of maxillipedes of the members of this genus are stylet-shaped. The endopodite of the fourth pair of feet is composed of two very unequal joints and is considerably shorter than the exopodite.

The two-jointed endopodite of the fourth pair of feet is the most important character by which the members of this genus can be recognised.

Five species were represented in the material collected during the traverse of the 'Siboga'. Two of the species do not appear to have previously been described.

##### 1. *Lichomolgus buddhensis* Thompson & Scott.

*Lichomolgus buddhensis* Thompson & Scott, 1903, p. 279, pl. XV, figs. 18—24.

Specimens identical with the above species were found in the washings from dredged invertebrata collected at the following two stations.

Stat. 164, 2 specimens. — Stat. 226, midway between the Lucipara and Schildpad Islands, nineteen specimens.

*Lichomolgus buddhensis* can readily be recognised by the very short abdomen and furcal joints, and by the comparatively large fifth pair of feet.

This species has hitherto only been known from the pearl banks around Ceylon.

2. *Lichomolgus elegans* Thompson & Scott.

*Lichomolgus elegans* Thompson & Scott, 1903, p. 280, pl. XVI, figs. 8—13.

One specimen belonging to this species was found in the washings from dredged invertebrata collected at Station 226, midway between Lucipara and Schildpad Islands, from a depth of 1595 metres.

*Lichomolgus elegans* is easily identified by its rather narrow and elongate form, by the comparatively long cylindrical genital segment, and by the shape of the fifth pair of feet.

This species has hitherto only been known from Ceylon.

3. *Lichomolgus gigas* Thompson & Scott.

*Lichomolgus gigas* Thompson & Scott, 1903, p. 280, pl. XVI, figs. 21—26.

One male identical with the above species was found in the washings from dredged invertebrata collected at Station 226, midway between the Lucipara and Schildpad Islands.

This is a large species. It can readily be separated from the other members of the genus by the large size of the animal, by the proportional length of the joints of the antennules, by the moderately long cylindrical furcal joints, and by the rather large fifth pair of feet.

*Lichomolgus gigas* has hitherto only been known from Ceylon.

4. *Lichomolgus anomalus* nov. sp. Plate LXVII, figs. 6—17.

Female — length .67 mm.

Seen from above, the body appears short and very broadly oval. The fourth segment is short and the distal ends are evenly rounded. The fifth thoracic segment is rather short and is somewhat funnel-shaped. The distal end is considerably expanded.

The abdomen is short and is composed of four segments. The combined length of the abdomen and furcal joints is contained fully three times in the total length of the *cephalothorax*, from the frontal margin to the distal end of the fifth thoracic segment. The genital segment is comparatively large and is slightly inflated. It is traversed by an incomplete suture near the posterior end of the dorsal surface. The segment is slightly longer than the combined length of the next three abdominal segments and furcal joints. The second, third and fourth segments are short and sub-equal in length. The furcal joints are very short. The joints are

furnished with one outer marginal seta, four apical setae, and one inner marginal seta (Plate LXVII, fig. 6).

The antennules are moderately long and seven-jointed. The second joint is longer than any of the others. The third and seventh joints are of nearly equal length (Plate LXVII, fig. 7).

The antennae are comparatively short and four-jointed. The fourth joint is furnished at the apex with one stout claw and three short setae (Plate LXVII, fig. 8).

The mandible has a stylet-shaped apex. The outer portion of the apical region is somewhat quadrangular in shape. The outer margin is furnished with a strong triangular tooth-like process. The inner margin is fringed with fine short hairs. The upper surface has a simple hyaline edge (Plate LXVII, fig. 9A).

The maxillae are rather narrow and the apex is furnished with three setae (Plate LXVII, fig. 9B).

The apical portion of the first pair of maxillipedes is stylet-shaped. The middle portion of the upper margin is fringed with fine spines. The inner margin is furnished near the base with a short stout spine (Plate LXVII, fig. 10).

The second pair of maxillipedes is prehensile and three-jointed. The third joint is short and narrow. The apex is furnished with two moderately stout spines (Plate LXVII, fig. 11).

The exopodites and endopodites of the first three pairs of feet are three-jointed. The exopodite of the fourth pair of feet is three-jointed. The endopodite is two-jointed.

The fifth pair of feet is comparatively large. The distal end is rather narrow and is furnished with one moderately long seta (Plate LXVII, fig. 16).

Male — length .67 mm.

The male resembles the female in general appearance, but the abdomen is composed of five segments and the genital segment is very large and inflated. The second pair of maxillipedes is well developed and is prehensile. The terminal claw is long and slightly curved (Plate LXVII, fig. 12). The endopodite of the first pair of feet is apparently to some extent prehensile. The second joint is curved, and there is an indication of a hinge between the second and third joints (Plate LXVII, fig. 14). The fifth pair of feet is smaller than in the female.

This species can readily be recognised by its small size and rounded body, by the very short furcal joints, and by the shape of the fifth pair of feet. The structure of the endopodite of the first pair of feet of the male is quite distinct from what is usually found in the males of this genus.

Occurrence. — Seven females and two males were found in the washings from dredged invertebrata collected at Station 226, midway between the Lucipara and Schildpad Islands, from a depth of 1595 metres.

5. *Lichomolgus gracilipes* nov. sp. Plate LXVIII, figs. 11—20.

Female — length 1.53 mm.

Seen from above, the body appears broadly oval in outline. The cephalic segment is greatly inflated near the middle. The frontal margin is boldly rounded. The fourth thoracic

segment is produced posteriorly and the distal ends are narrowly rounded. The fifth segment is of moderate size and is broadly funnel-shaped. The distal part is greatly expanded.

The abdomen is composed of four segments. The combined length of the abdomen and furcal joints is contained two and a half times in the total length of the *cephalothorax*, from the frontal margin to the distal end of the fifth thoracic segment. The genital segment is large and is considerably swollen in the middle. It is distinctly longer than the combined length of the next three segments and furcal joints. The second, third and fourth segments are short and are of nearly equal length. The furcal joints are about as long as broad and are slightly shorter than the anal segment. The joints are furnished with one outer marginal seta and four apical setae (Plate LXVIII, fig. 11).

The antennules are slender and seven-jointed. The fourth and fifth joints are of nearly equal length (Plate LXVIII, fig. 12).

The antennae are four-jointed. The apex of the fourth joint is furnished with two short curved claws and three setae. The outer claw is much stouter than the inner claw (Plate LXVIII, fig. 13).

The apex of the mandible is stylet-shaped. The intermediate region is broadly triangular in shape and is distinctly cleft. The margins are fringed with short spines (Plate LXVIII, fig. 14A).

The maxillae are elongate and narrow. They are furnished with one marginal seta and three apical setae.

The apex of the first pair of maxillipedes is stylet-shaped. The upper margin is pectinate. A moderately long setiferous spine is attached to near the base of the inner margin. The basal joint is short and broad (Plate LXVIII, fig. 15).

The second pair of maxillipedes is three-jointed. The last joint is very small. It is furnished with one small curved spine and three short setae (Plate LXVIII, fig. 16).

The exopodites and endopodites of the first three pairs of feet are three-jointed. The exopodite of the fourth pair of feet is three-jointed. The endopodite is two-jointed.

The fifth pair of feet is moderately long and narrow. Each foot is fully three times longer than broad and is furnished with two apical setae (Plate LXVIII, fig. 19).

Male — length 1.1 mm.

The male resembles the female in general appearance, but the abdomen is composed of five segments. The genital segment is large and is greatly inflated. The second pair of maxillipedes is strongly prehensile. The terminal claw is long and curved (Plate LXVIII, fig. 17). The fifth pair of feet is comparatively small.

The females of this species can readily be identified by their shape, by the elongate and slender fifth pair of feet, and by the short sub-equal second, third and fourth segments of the abdomen.

Twenty-one females and three males were found attached to a Nudibranch collected at Station 301, Pepela Bay, East Coast of Rotti Island. The label in the tube was marked 'On Nudibranch, Fig. 273'.

Genus **Paralichomolgus** Thompson and Scott, 1903.

This genus is closely related to *Lichomolgus*, but the distal ends of the first three thoracic segments are produced posteriorly and terminate in distinct points. The exopodite and endopodite of the fourth pair of feet are of nearly equal length. The endopodite is composed of two sub-equal joints.

One species was represented in the material collected by the 'Siboga' in the Malay Archipelago.

1. *Paralichomolgus curticaudatus* Thompson & Scott.

*Paralichomolgus curticaudatus* Thompson & Scott, 1903, p. 281, pl. XVI, figs. 1—7.

Two females belonging to this species were found in the washings from dredged invertebrata collected at Station 226, midway between the Lucipara and the Schildpad Islands, from a depth of 1595 metres.

The female is easily recognised by its large body, and very short abdomen and furcal joints. The distal ends of the first, second and third thoracic segments are produced posteriorly, and terminate in blunt points.

*Paralichomolgus curticaudatus* has only previously been recorded from Ceylon.

Genus **Pseudanthessius** Claus, 1889.

The mandibles and first pair of maxillipedes of the members of this genus are stylet-shaped. The endopodite of the fourth pair of feet is shorter than the exopodite and is composed of a single joint.

The comparatively short one-jointed endopodite of the fourth pair of feet is the principal character that separates the members of this genus, from the other genera belonging to the Lichomolgidae.

Four species of *Pseudanthessius* were represented in the material collected by the 'Siboga' during the investigations in the Malay Archipelago. None of the four species appear to have previously been met with.

1. *Pseudanthessius weberi* nov. sp. Plate LXVII, figs. 18—24.

Female — length 1,16 mm.

Seen from above, the body appears short and broadly oval. The frontal margin is rather narrowly rounded. The distal ends of the fourth thoracic segment are slightly produced and are narrowly rounded. The fifth thoracic segment is of moderate length and is slightly expanded at the distal end.

The abdomen is composed of four segments. The combined length of the abdomen and furcal joints is contained one and two-third times in the total length of the *cephalothorax*, from the frontal margin to the distal end of the fifth thoracic segment. The genital segment is rather long and is slightly expanded in the middle. The segment is as long as the combined

length of the next three segments added to one-third of the length of the furcal joints. The second and third segments are of nearly equal length. The anal segment is one and one-third times the length of the second segment. The furcal joints are rather long and moderately slender, and are twice as long as the anal segment. The joints are furnished with one outer marginal seta placed near the distal end, and four apical setae (Plate LXVII, fig. 18).

The antennules are comparatively stout and seven-jointed. The second joint is considerably longer than the others. The third and seventh joints are short (Plate LXVII, fig. 19).

The antennae are four-jointed. The apex of the fourth joint is furnished with three slender curved claws and three setae. The inner claw is stouter than the other two (Plate LXVII, fig. 20).

The apex of the mandible is stylet-shaped and is furnished with a simple lamella (Plate LXVII, fig. 21A).

The maxillae are very short. The apex is furnished with four setae.

The apex of the first pair of maxillipedes is in the form of a long slender stylet. The upper margin is fringed with fine spines (Plate LXVII, fig. 22).

The second pair of maxillipedes is prehensile. The basal joint is moderately large and broad. The second and third joints are very narrow. The distal end of the third joint is furnished with two short spines (Plate LXVII, fig. 23).

The exopodites and endopodites of the first three pairs of feet are three-jointed. The exopodite of the fourth pair of feet is three-jointed. The endopodite is one-jointed and is furnished with two apical spines (Plate LXVII, fig. 24).

The fifth pair of feet is very small. The apex of each foot is provided with one spine and one seta.

Male unknown.

This species can readily be identified by the short body and comparatively long and slender abdomen, and by the elongate furcal joints.

Occurrence. — One specimen was found in the washings from dredged invertebrata collected at Station 226, midway between the Lucipara and the Schildpad Islands, from a depth of 1595 metres.

2. *Pseudanthessius pectinatus* nov. sp. Plate LXVIII, figs. 21—27.

Female — length 1,35 mm.

Seen from above, the body appears elongate and rather narrow. The frontal margin is narrowly rounded. It is almost angular in outline. The fourth segment is produced posteriorly and the distal ends are narrowly rounded. The fifth segment is considerably expanded at the distal end.

The abdomen is composed of four segments. The combined length of the abdomen and furcal joints is contained one and three-fourth times in the total length of the *cephalothorax*, from the frontal margin to the distal end of the fifth thoracic segment. The genital segment is comparatively long and is equal to the combined length of the next three segments. The

proximal end of the segment is expanded, and the distal end is slightly contracted. The second segment is one and a half times the length of the third segment. The anal segment is distinctly longer than the third segment. The furcal joints are rather short and ovate in shape. The joints are as long as the second abdominal segment. They are furnished with two outer marginal setae and three apical setae (Plate LXVIII, fig. 21).

The antennules are moderately long and seven-jointed. The second joint is longer, and the third joint shorter, than any of the others (Plate LXVIII, fig. 22).

The antennae are slender and four-jointed. The apex of the fourth joint is furnished with three long slender spines and four setae. The two inner spines are stouter than the outside spine and are fringed on the exterior margin with short hairs (Plate LXVIII, fig. 23).

The apex of the mandible is stylet-shaped. The basal portion is very broad and its upper margin is coarsely dentate (Plate LXVIII, fig. 24A).

The maxillae are rather stout. They are furnished with two marginal setae and two apical setae.

The apex of the first pair of maxillipedes is produced into a short stout blunt stylet which terminates in a stout spine. The upper margin is armed with six moderately stout teeth. The inner margin of the apical joint is furnished near the base with a strong and finely toothed spine (Plate LXVIII, fig. 25).

The second pair of maxillipedes is three-jointed. The upper margin of the second joint is furnished with two very stout spines. The outer margin of the proximal spine is armed with eleven moderately long and slender spinules. The distal spine has a fringe of short hairs on the inner margin. The third joint is short. It terminates in one long moderately stout and curved claw and two short spines (Plate LXVIII, fig. 26).

The exopodites and endopodites of the first three pairs of feet are three-jointed. The exopodite of the fourth pair of feet is three-jointed. The endopodite is one-jointed.

Male unknown.

This species bears a close resemblance to *Pseudanthessius propinquus* T. Scott (1893), but the female is easily separated by the quite different armature of the second pair of maxillipedes. The proximal spine on the second joint in *Pseudanthessius propinquus* has no fringe of long spinules and there is no long apical claw on the third joint.

Occurrence. — One specimen was obtained from the surface plankton collected at Station 35.

### 3. *Pseudanthessius parvus* nov. sp. Plate LXIX, figs. 1—7.

Female — length .9 mm.

Seen from above, the body appears elongate and narrowly ovate. The frontal margin is narrowly rounded. It is almost angular in outline. The fourth thoracic segment is very little produced and the distal ends are rounded. The fifth thoracic segment is of moderate size with the distal end considerably expanded.

The abdomen is composed of four segments. The combined length of the abdomen and

furcal joints is contained nearly twice in the total length of the *cephalothorax*, from the frontal margin to the distal end of the fifth thoracic segment. The genital segment is moderately long and is considerably inflated at the proximal end. It is equal to the combined length of the next three segments added to half the length of the furcal joints. The second and fourth segments are sub-equal in length. The third segment is equal to two-thirds of the length of the second segment. The furcal joints are slightly longer than the anal segment. The joints are furnished with two outer marginal setae and three apical setae (Plate LXIX, fig. 1).

The antennules are rather long and seven-jointed. The joints are all of moderate length, except the first and third, which are shorter than the others. (Plate LXIX, fig. 2).

The antennae are short, stout and four-jointed. The apex of the fourth joint is furnished with two stout curved claws and four setae (Plate LXIX, fig. 3).

The apex of the mandible is stylet-shaped. The basal portion is of moderate size, but it is deeply constricted in the middle. The upper margin is finely serrate (Plate LXIX, fig. 4).

The maxillae are short and broad. They are furnished with one marginal and three apical setae.

The apex of the first pair of maxillipedes is stylet-shaped. The upper margin is coarsely serrate (Plate LXIX, fig. 5).

The second pair of maxillipedes is small and two-jointed. The second joint terminates in one very stout claw. The upper surface is provided with two short spines (Plate LXIX, fig. 6).

The exopodites and endopodites of the first three pairs of feet are three-jointed. The exopodite of the fourth pair of feet is three-jointed. The endopodite is one-jointed. The outer margin is sharply constricted in the middle. The apex is furnished with two moderately long spathulate spines (Plate LXIX, fig. 7).

The fifth pair of feet is slender and of moderate length. The apex of each foot bears two short spines.

Male unknown.

This species is readily recognised by the elongate body, by the moderately long and inflated genital segment, and by the proportional length of the joints of the antennules.

Occurrence. — Two specimens were obtained from the plankton collected during the night at Station 142, when the 'Siboga' was anchored off Lawui, on the Coast of Obi Major.

4. *Pseudanthessius obscurus* nov. sp. Plate LXIX, figs. 8—14.

Female — length 1.15 mm.

Seen from above, the body appears elongate and narrowly ovate. The frontal margin is narrowly rounded. It is almost angular in outline. The fourth thoracic segment is short and is very slightly produced posteriorly. The distal ends are rounded. The fifth thoracic segment is broadly triangular in shape with the distal end moderately expanded.

The abdomen is slender and is composed of four segments. The combined length of the abdomen and furcal joints is contained one and two-third times in the total length of the *cephalothorax*, from the frontal margin to the distal end of the fifth thoracic segment. The

genital segment is long and is only slightly inflated. It is as long as the combined length of the next three segments added to half of the length of the furcal joints. The second segment is distinctly longer than the third segment. The third and fourth segments are of nearly equal length. The furcal joints are moderately long and slender, and are nearly as long as the second abdominal segment. The joints are furnished with one outer marginal seta, and four apical setae (Plate LXIX, fig. 8).

The antennules are short, stout and seven-jointed. The third joint is shorter than any of the others (Plate LXIX, fig. 9).

The antennae are long and four-jointed. The apex of the fourth joint is furnished with three moderately long and slender curved claws, and three setae (Plate LXIX, fig. 10).

The mandible is moderately broad and lamelliform with a pointed apex. The lower margin is fringed with short spines (Plate LXIX, fig. 11).

The first pair of maxillipedes is two-jointed. The distal end of the inner margin is furnished with a long, straight, pectinate spine. The apex bears two curved teeth. The proximal end of the inner margin is also furnished with a long, straight, pectinate spine (Plate LXIX, fig. 12).

The two pectinate spines are distinctly articulated to the joint and are not simply an extension of it, as in the other members of the genus.

The second pair of maxillipedes is two-jointed. The joints are short and broad. The apex of the second joint is furnished with a stout curved claw which is armed near the base of the upper margin with a short spine (Plate LXIX, fig. 13).

The exopodites and endopodites of the first three pairs of feet are three-jointed. The exopodite of the fourth pair of feet is three-jointed. The endopodite is one-jointed. The proximal end of the outer margin has a distinct tooth and the apex is furnished with two spines (Plate LXIX, fig. 14).

The fifth pair of feet is very rudimentary and is represented by two spines attached to the expanded portion of the fifth thoracic segment (Plate LXIX, fig. 8).

Male unknown.

This species differs from the typical members of the genus *Pseudanthessius* in the very short antennules, in the shape of the mandible, and in the rudimentary condition of the fifth pair of feet.

Occurrence. — Four specimens were obtained from the plankton collected during the night at Station 142, when the 'Siboga' was anchored off Laiwui, on the Coast of Obi Major.

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#### 45. Family CLAUSIIDAE.

Genus **Hersiliodes** Canu, 1888.

The members of this genus can readily be separated from the Lichomolgidae by the comparatively large lamelliform fifth pair of feet, and by the structure of the mouth organs. The mandible has the cutting edge composed of two or three short stout serrate spines. It is

not styliform. The first pair of maxillipedes is non-styilet-shaped and is moderately well developed. The first joint is furnished with a digitiform process carrying spines. The second joint terminates in a broad serrated tooth. The exopodites and endopodites of the four pairs of swimming feet are three-jointed. The abdomen of both sexes is composed of five segments.

The non-styilet-shape of the mandible and of the first pair of maxillipedes, along with the large lamelliform fifth pair of feet, are the principal characters that separate the members of the family from the Lichomolgidae.

One species belonging to CANU's genus *Hersiliodes* was represented in the material collected by the 'Siboga' during the investigations carried out in the Malay Archipelago.

1. *Hersiliodes leggii* Thompson & Scott.

*Hersiliodes leggii* Thompson & Scott, 1903, p. 283, pl. XVII, figs. 12—21.

One male identical with the above species was found in the washings from dredged invertebrata collected at Station 273, off Pulu Jedan, East Coast of Aru Islands, from a depth of 13 metres.

This species is readily recognised by the short broad fifth pair of feet being armed along the margins with a dense fringe of short spinules.

*Hersiliodes leggii* has hitherto only been known from the Gulf of Manaar, Ceylon.

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## LIST OF STATIONS

SHEWING NUMBERS AND SPECIES OF COPEPODA TAKEN.

STATION 16, March 15 & 16, 1899. Lat. 6° 59'.0 S., Long. 115° 24'.7 E. Bay of Kankamaraan, S. Coast of Kangeang. HENSEN Vertical net with electric light; 10 metres to surface.

<p>Acartia erythraea.                      Acrocalanus gibber.                      Acrocalanus gracilis.                      Acrocalanus longicornis.                      Calanopia elliptica.                      Calanopia thompsoni n. sp.                      Calocalanus pavo.                      Candacia bradyi.                      Candacia simplex.                      Canthocalanus pauper.                      Centropages furcatus.                      Centropages orsinii.                      Clausocalanus arcuicornis.                      Clausocalanus furcatus.                      Copilia mirabilis.                      Corycaeus danae.                      Corycaeus obtusus.                      Eucalanus crassus.                      Eucalanus pileatus.                      Euchaeta concinna.                      Euchaeta marina.                      Labidocera acuta.                      Labidocera bataviae n. sp.</p>	<p>Labidocera detruncata.                      Labidocera madurae n. sp.                      Labidocera minuta.                      Lucicutia flavicornis.                      Mecynocera clausi.                      Metacalanus aurivillii.                      Microsetella rosea.                      Oithona plumifera.                      Oncaea venusta.                      Paracalanus parvus.                      Pontellopsis krameri.                      Pseudodiaptomus aurivillii.                      Pseudodiaptomus clevei n. sp.                      Sapphirina bicuspidata.                      Sapphirina gastrica.                      Sapphirina nigromaculata.                      Sapphirina sinuicauda.                      Scolecithricella marginata.                      Temora discaudata.                      Temora turbinata.                      Tortanus gracilis.                      Tortanus murrayi n. sp.                      Undinula vulgaris.</p>
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*46 Species.*

STATION 19, March 19 & 21, 1899. Lat. 8° 44'.5 S., Long. 116° 2'.5 E. Bay of Labuan Tring, West Coast, Lombok. Surface.

<p>Acrocalanus gibber.                      Candacia pachydaetyla.                      Clausocalanus arcuicornis.                      Eucalanus monachus.                      Eucalanus pileatus.                      Euchaeta concinna.                      Euchaeta marina.                      Ilyopsyllus affinis.                      Labidocera acuta.                      Mecynocera clausi.</p>	<p>Macrosetella gracilis.                      Megacalanus gracilis.                      Metacalanus aurivillii.                      Pontella securifer.                      Pontellina plumata.                      Scolecithrix danae.                      Temora discaudata.                      Undinula darwini.                      Undinula vulgaris.</p>
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*19 Species.*

STATION 35, March 28, 1899. Lat. 8° 0'.3 S., Long. 116° 59'.0 E. Bali Sea. Surface.

Acartia erythraea.	Lubbockia aculeata.
Acrocalanus gibber.	Lucicutia flavicornis.
Acrocalanus longicornis.	Macrosetella gracilis.
Calanopia elliptica.	Mecynocera clausi.
Calanopia minor.	Megacalanus gracilis.
Calocalanus plumulosus.	Metacalanus aurivillii.
Candacia discaudata n. sp.	Microsetella rosea.
Candacia simplex.	Oithona plumifera.
Candacia truncata.	Oncaea venusta.
Clausocalanus arcuicornis.	Paracalanus aculeatus.
Centropages furcatus.	Paracalanus parvus.
Corycaeus gibbulus.	Pontella princeps.
Corycaeus obtusus.	Pontella securifer.
Eucalanus monachus.	Pontellina plumata.
Eucalanus pileatus.	Pontellopsis armata.
Eucalanus subcrassus.	Pontellopsis krameri.
Euchaeta concinna,	Pontellopsis perspicax.
Euchaeta marina.	Pseudanthessius pectinatus n. sp.
Euterpina acutifrons.	Rhincalanus cornutus.
Harpacticus clausi n. sp.	Rhynchothalestris rufocincta.
Harpacticus cristatus n. sp.	Temora discaudata.
Harpacticus glaber.	Temora turbinata.
Ilyopsyllus affinis.	Temoropia mayumbaensis.
Labidocera acuta.	Undinula darwini.
Labidocera kroyeri.	Undinula vulgaris.
Labidocera minuta.	

51 Species.

STATION 36, March 29, 1899. Lat. 7° 38'.0 S., Long. 117° 31'.0 E. Bali Sea. Surface.

Acartia negligens.	Eucalanus pileatus.
Acrocalanus gibber.	Euchaeta concinna.
Acrocalanus gracilis.	Euchaeta marina.
Acrocalanus longicornis.	Euchaeta wolfendeni n. sp.
Calanopia elliptica.	Labidocera acuta.
Calanopia minor.	Macrosetella gracilis.
Calanus minor.	Mecynocera clausi.
Candacia aethiopica.	Metacalanus aurivillii.
Candacia discaudata n. sp.	Oithona plumifera.
Candacia pachydactyla.	Oncaea venusta.
Candacia simplex.	Paracalanus parvus.
Clausocalanus arcuicornis.	Pontella securifer.
Copilia mirabilis.	Rhincalanus cornutus.
Copilia quadrata.	Scolecithrix danae.
Corycaeus danae.	Sapphirina maculosa.
Corycaeus gibbulus.	Sapphirina opalina.
Corycaeus longistylis.	Temora discaudata.
Corycaeus obtusus.	Temora turbinata.
Corycaeus speciosus.	Undinula darwini.
Eucalanus monachus.	Undinula vulgaris.
Eucalanus mucronatus.	

41 Species.

STATION 37, March 30 & 31, 1899. Lat. 7° 36'.0 S., Long. 117° 28'.7 E. Sailus Ketjil, Paternoster-Islands. Close to reef. Surface.

Acrocalanus gibber.	Candacia catula.
Calanopia elliptica.	Candacia pachydactyla.

*Candacia truncata.*  
*Canthocalanus pauper.*  
*Centropages furcatus.*  
*Centropages gracilis.*  
*Copilia mirabilis.*  
*Copilia quadrata.*  
*Eucalanus crassus.*  
*Eucalanus monachus.*  
*Eucalanus mucronatus.*  
*Eucalanus pileatus.*  
*Euchaeta concinna.*  
*Euchaeta marina.*  
*Euchaeta wolfendeni n. sp.*  
*Labidocera acuta.*  
*Labidocera kroyeri.*  
*Labidocera minuta.*  
*Lucicutia flavicornis.*  
*Macrosetella gracilis.*  
*Mecynocera clausi.*  
*Megacalanus robustior.*

*Metacalanus aurivillii.*  
*Oithona plumifera.*  
*Oncaea venusta.*  
*Paracalanus aculeatus.*  
*Paracalanus parvus.*  
*Pleuromamma abdominalis.*  
*Pleuromamma gracilis.*  
*Pontella securifer.*  
*Pontellina plumata.*  
*Pontellopsis macronyx n. sp.*  
*Rhincalanus cornutus.*  
*Sapphirina maculosa.*  
*Sapphirina opalina.*  
*Scolecithrix danae.*  
*Temora discaudata.*  
*Temora turbinata.*  
*Undinula caroli.*  
*Undinula darwini.*  
*Undinula vulgaris.*

43 Species.

STATION 40, April 2, 1899. Lat.  $7^{\circ} 27'.0$  S., Long.  $117^{\circ} 49'.0$  E. Anchorage off Pulu Kawassang. Pater-noster-Islands. Surface, night.

*Acartia erythraea.*  
*Acartia negligens.*  
*Acrocalanus gracilis.*  
*Acrocalanus longicornis.*  
*Ameira sibogae, n. sp.*  
*Calocalanus pavo.*  
*Candacia pachydactyla.*  
*Centropages orsinii.*  
*Clausocalanus furcatus.*  
*Cletodes latipes n. sp.*  
*Corycaeus speciosus.*  
*Euchaeta concinna.*  
*Euchaeta marina.*  
*Labidocera acuta.*  
*Macrosetella gracilis.*  
*Mecynocera clausi.*  
*Megacalanus gracilis.*  
*Megacalanus robustior.*  
*Metacalanus aurivillii.*  
*Monstrilla gracilicauda.*  
*Monstrilla inserta n. sp.*

*Monstrilla orcula n. sp.*  
*Oithona plumifera.*  
*Oncaea venusta.*  
*Paracalanus aculeatus.*  
*Paracalanus parvus.*  
*Phyllopodopsyllus longicaudatus n. sp.*  
*Pleuromamma abdominalis.*  
*Pleuromamma gracilis.*  
*Pontellina plumata.*  
*Pseudothalestris sarsi n. sp.*  
*Rhincalanus cornutus.*  
*Rhynchothalestris rufocincta.*  
*Sapphirina nigromaculata.*  
*Scolecithricella marginata.*  
*Scolecithrix danae.*  
*Temora discaudata.*  
*Temora turbinata.*  
*Tydemanella typica n. sp.*  
*Undinula darwini.*  
*Undinula vulgaris.*

41 Species.

STATION 47', April 12, 1899. Lat.  $8^{\circ} 20'.5$  S., Long.  $118^{\circ} 42'.0$  E. Flores Sea. Surface.

*Acartia erythraea.*  
*Acartia negligens.*  
*Acrocalanus gibber.*  
*Acrocalanus longicornis.*  
*Calanopia elliptica.*  
*Calanopia minor.*  
*Calanus minor.*  
*Calocalanus pavo.*

*Calocalanus plumulosus.*  
*Candacia bradyi.*  
*Candacia discaudata n. sp.*  
*Candacia catula.*  
*Candacia curta.*  
*Canthocalanus pauper.*  
*Centropages furcatus.*  
*Centropages orsinii.*

Clausocalanus arcuicornis.  
 Copilia mirabilis.  
 Corycaeus danae.  
 Corycaeus obtusus.  
 Corycaeus speciosus.  
 Corycaeus tenuis.  
 Corycaeus venustus.  
 Eucalanus monachus.  
 Eucalanus mucronatus.  
 Eucalanus pileatus.  
 Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta marina.  
 Labidocera minuta.  
 Lucicutia flavicornis.  
 Macrosetella gracilis.

Mecynocera clausi.  
 Metacalanus aurivillii.  
 Oithona plumifera.  
 Oithona rigida.  
 Oncaea conifera.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Pontellina plumata.  
 Sapphirina maculosa.  
 Sapphirina nigromaculata.  
 Scolecithricella marginata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Temora turbinata.  
 Undinula vulgaris.

48 Species.

STATION 50, April 16—18, 1899. Lat.  $8^{\circ} 30'.0$  S., Long.  $119^{\circ} 52'.0$  E. Bay of Badjo. West Coast of Flores, Surface.

Acrocalanus longicornis.  
 Calocalanus pavo.  
 Candacia pachydactyla.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Corycaeus concinnus.  
 Corycaeus elongatus.  
 Corycaeus furcifer.  
 Corycaeus gibbulus.  
 Corycaeus venustus.  
 Euchaeta marina.  
 Labidocera acuta.

Macrosetella gracilis.  
 Oithona rigida.  
 Oncaea venusta.  
 Paracalanus parvus.  
 Pontellina plumata.  
 Rhincalanus cornutus.  
 Sapphirina ovatolanceolata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Temora turbinata.  
 Tortanus gracilis.  
 Undinula vulgaris.

24 Species.

STATION 66, May 7 & 8, 1899. Lat.  $6^{\circ} 32'.5$  S., Long.  $120^{\circ} 27'.3$  E. Bank between Islands of Bahuluwang and Tambolungan, South of Saleyer. Surface.

Calanopia elliptica.  
 Calanopia minor.  
 Candacia catula.  
 Candacia discaudata n. sp.  
 Candacia pachydactyla.  
 Candacia simplex.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Centropages elongatus.  
 Centropages furcatus.  
 Centropages gracilis.  
 Centropages orsinii.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Corycaeus alatus.  
 Corycaeus danae.  
 Corycaeus longistylis.  
 Eucalanus crassus.  
 Eucalanus monachus.  
 Eucalanus mucronatus.

Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Gaidius similis.  
 Heterorhabdus spinifrons.  
 Labidocera acuta.  
 Labidocera bataviae n. sp.  
 Labidocera laevidentata.  
 Labidocera minuta.  
 Lucicutia flavicornis.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Megacalanus gracilis.  
 Metacalanus aurivillii.  
 Monstrilla inserta n. sp.  
 Monstrilla longicornis.  
 Oncaea venusta.  
 Paracalanus aculeatus.

Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pontella denticauda n. sp.  
 Pontella fera.  
 Pontella princeps.  
 Pontella securifer.  
 Pontellina plumata.  
 Rhincalanus cornutus.  
 Sapphirina maculosa.

Sapphirina metallina.  
 Sapphirina sinuicauda.  
 Scolecithricella marginata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Tortanus gracilis.  
 Undinula darwini.  
 Undinula vulgaris.

57 Species.

STATION 71, May 10, 1899. Lat.  $5^{\circ}9'.0$  S., Long.  $119^{\circ}23'.5$  E. Makassar and Surroundings. Surface.

Acartia erythraea.  
 Acartia negligens.  
 Acrocalanus longicornis.  
 Calanopia elliptica.  
 Calanopia minor.  
 Candacia discaudata n. sp.  
 Candacia pachydactyla.  
 Candacia simplex.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Centropages orsinii.  
 Clausocalanus furcatus.  
 Corycaeus danae.  
 Corycaeus gibbulus.  
 Corycaeus longistylis.  
 Corycaeus lubbocki.  
 Corycaeus obtusus.  
 Corycaeus speciosus.  
 Euchaeta marina.

Euchirella galeata.  
 Labidocera acuta.  
 Labidocera bataviae n. sp.  
 Labidocera laevidentata.  
 Labidocera minuta.  
 Oithona plumifera.  
 Oithona rigida.  
 Oncaea venusta.  
 Paracalanus parvus.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pontella fera.  
 Pontellina plumata.  
 Pontellopsis krameri.  
 Pseudodiaptomus aurivillii.  
 Temora discaudata.  
 Temora turbinata.  
 Tortanus gracilis.  
 Undinula vulgaris.

38 Species.

STATION 75, June 8, 1899. Lat.  $4^{\circ}57'.4$  S., Long.  $119^{\circ}2'.8$  E. Makassar Strait. HENSEN Vertical Net, 11 metres to surface; electric light in net.

Acrocalanus gracilis.  
 Acrocalanus longicornis.  
 Calanopia elliptica.  
 Calocalanus pavo.  
 Calocalanus plumulosus.  
 Candacia catula.  
 Candacia pachydactyla.  
 Clausocalanus arcuicornis.  
 Copilia mirabilis.  
 Corycaeus danae.  
 Corycaeus gibbulus.  
 Corycaeus obtusus.  
 Corycaeus speciosus.  
 Corycaeus venustus.  
 Eucalanus crassus.  
 Eucalanus monachus.  
 Eucalanus mucronatus.  
 Eucalanus subtenuis.  
 Labidocera acuta.

Lucicutia flavicornis.  
 Macrosetella gracilis.  
 Megacalanus gracilis.  
 Metacalanus aurivillii.  
 Oithona plumifera.  
 Oncaea media.  
 Oncaea venusta.  
 Paracalanus parvus.  
 Pleuromamma gracilis.  
 Pontella fera.  
 Pontellina plumata.  
 Scolecithricella marginata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Temora turbinata.  
 Undinula caroli.  
 Undinula darwini.  
 Undinula vulgaris.

37 Species.

STATION 81, June 14, 1899. Lat.  $2^{\circ} 12'.0$  S., Long.  $117^{\circ} 24'.6$  E. Pulu Sebangkatang, Borneo Bank.  
 HENSEN Vertical Net, 10 metres to surface; electric light in net. Strong current (about 2 miles).

Acrocalanus longicornis.	Labidocera acuta.
Calanopia elliptica.	Labidocera bataviae n. sp.
Calanopia minor.	Labidocera kroyeri.
Calanus minor.	Labidocera minuta.
Candacia aethiopia.	Lucicutia flavicornis.
Candacia curta.	Macrosetella gracilis.
Candacia discaudata n. sp.	Oithona plumifera.
Candacia pachydactyla.	Oncaea venusta.
Canthocalanus pauper.	Paracalanus aculeatus.
Centropages calaninus.	Paracalanus parvus.
Centropages furcatus.	Pleuromamma gracilis.
Centropages gracilis.	Pontella denticauda n. sp.
Clausocalanus furcatus.	Pontella fera.
Clytemnestra rostrata.	Pontellina plumata.
Copilia mirabilis.	Rhincalanus cornutus.
Corycaeus danae.	Sapphirina stellata.
Corycaeus speciosus.	Scolecithrix danae.
Eucalanus subcrassus.	Temora discaudata.
Euchaeta concinna.	Undinula darwini.
Euchaeta marina.	Undinula vulgaris.
Euchaeta wolfendeni n. sp.	

41 Species.

STATION 89, June 21, 1899. Lat.  $1^{\circ} 7'.0$  N., Long.  $118^{\circ} 44'.6$  E. Pulu Kaniungan Ketjil. Surface.

Ætideus armatus.	Euchaeta concinna.
Acrocalanus longicornis.	Euchaeta marina.
Candacia curta.	Ilyopsyllus affinis.
Candacia discaudata n. sp.	Labidocera acuta.
Centropages furcatus.	Megacalanus gracilis.
Copilia mirabilis.	Oncaea venusta.
Copilia quadrata.	Pontellopsis armata.
Corycaeus speciosus.	Sapphirina stellata.
Eucalanus crassus.	Temora discaudata.
Eucalanus mucronatus.	Undinula vulgaris.
Eucalanus subcrassus.	

21 Species.

STATION 93, June 24 & 25, 1899. Lat.  $4^{\circ} 59'.0$  N. Long.  $119^{\circ} 49'.0$  E. Pulu Sanguisiapo, Tawi-Tawi-Islands Sulu Archipelago. Surface, night.

Acartia spinicauda.	Corycaeus obtusus.
Acrocalanus gibber.	Corycaeus speciosus.
Acrocalanus gracilis.	Corycaeus venustus.
Acrocalanus longicornis.	Eucalanus crassus.
Candacia aethiopia.	Eucalanus monachus.
Candacia discaudata n. sp.	Eucalanus mucronatus.
Candacia simplex.	Eucalanus pileatus.
Candacia truncata.	Eucalanus subcrassus.
Canthocalanus pauper.	Eucalanus subtenuis.
Centropages calaninus.	Euchaeta marina.
Centropages furcatus.	Labidocera acuta.
Centropages gracilis.	Macrosetella gracilis.
Clausocalanus arcuicornis.	Metacalanus aurivillii.
Copilia mirabilis.	Oncaea minuta.
Copilia quadrata.	Oncaea venusta.

Pontella denticauda n. sp.  
 Pontella fera.  
 Pontella forficula n. sp.  
 Pontellina plumata.  
 Sapphirina auronitens.  
 Sapphirina opalina.  
 Sapphirina ovatolanceolata.

Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula caroli.  
 Undinula darwini.  
 Undinula vulgaris.

43 Species.

STATION 96, June 27, 1899. Lat.  $5^{\circ}48'.0$  N., Long.  $119^{\circ}44'.0$  E. South East side of Pearl Bank, Sulu Archipelago. Surface, day.

Acartia negligens.  
 Acrocalanus longicornis.  
 Calanopia elliptica.  
 Calanopia minor.  
 Calocalanus pavo.  
 Candacia aethiopica.  
 Candacia catula.  
 Candacia simplex.  
 Canthocalanus pauper.  
 Centropages calaninus.  
 Centropages elongatus.  
 Centropages furcatus.  
 Centropages gracilis.  
 Centropages orsinii.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Copilia mirabilis.  
 Corycaeus danae.  
 Corycaeus gibbulus.  
 Corycaeus robustus.

Corycaeus speciosus.  
 Eucalanus pileatus.  
 Eucalanus subcrassus.  
 Euchaeta marina.  
 Labidocera acuta.  
 Mecynocera clausi.  
 Metacalanus aurivillii.  
 Neopontella typica n. sp.  
 Oithona plumifera.  
 Oncaea venusta.  
 Paracalanus parvus.  
 Pontellina plumata.  
 Sapphirina angusta.  
 Sapphirina nigromaculata.  
 Scaphocalanus magnus.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula darwini.  
 Undinula vulgaris.

39 Species.

STATION 96, June 27, 1899. Lat.  $5^{\circ}48'.0$  N., Long.  $119^{\circ}44'.0$  S. South East side of Pearl Bank, Sulu Archipelago. Surface, night.

Acartia erythraea.  
 Acrocalanus longicornis.  
 Calanus minor.  
 Calocalanus pavo.  
 Candacia aethiopica.  
 Candacia catula.  
 Candacia pachydactyla.  
 Candacia truncata.  
 Centropages calaninus.  
 Centropages elongatus.  
 Centropages furcatus.  
 Centropages gracilis.  
 Centropages orsinii.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Copilia mirabilis.  
 Corycaeus danae.  
 Corycaeus gibbulus.  
 Corycaeus lubbocki.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.

Euchaeta marina.  
 Labidocera acuta.  
 Labidocera detruncata.  
 Labidocera minuta.  
 Lucicutia flavicornis.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Metacalanus aurivillii.  
 Paracalanus parvus.  
 Pleuromamma gracilis.  
 Pontellina plumata.  
 Pontellopsis strenua.  
 Sapphirina angusta.  
 Sapphirina nigromaculata.  
 Sapphirina opalina.  
 Sapphirina ovatolanceolata.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula darwini.  
 Undinula vulgaris.

42 Species.

STATION 98, June 28, 1899. Lat.  $6^{\circ}9'.0$  N., Long.  $120^{\circ}21'.0$  S. Sulu Sea. Surface.

Acrocalanus gibber.	Eucalanus subtentus.
Acrocalanus gracilis.	Euchaeta concinna.
Acrocalanus longicornis.	Euchaeta marina.
Acrocalanus monachus.	Euchaeta wolfendeni n. sp.
Calanopia elliptica.	Labidocera acuta.
Candacia aethiopica.	Labidocera bataviae n. sp.
Candacia bradyi.	Labidocera detruncata.
Candacia catula.	Labidocera kroyeri.
Candacia curta.	Lucicutia flavicornis.
Candacia discaudata n. sp.	Macrosetella gracilis.
Candacia pachydaetyla.	Mecynocera clausi.
Candacia simplex.	Megacalanus gracilis.
Candacia truncata.	Metacalanus aurivillii.
Canthocalanus pauper.	Oncaea venusta.
Centropages furcatus.	Pontella denticauda n. sp.
Centropages gracilis.	Pontella securifer.
Clausocalanus arcuicornis.	Pontellina plumata.
Clausocalanus furcatus.	Pontellopsis armata.
Copilia mirabilis.	Pontellopsis regalis.
Copilia quadrata.	Rhincalanus cornutus.
Corycaeus danae.	Sapphirina angusta.
Corycaeus furcifer.	Sapphirina auronitens.
Corycaeus gibbulus.	Sapphirina opalina.
Corycaeus robustus.	Sapphirina stellata.
Corycaeus speciosus.	Scolecithrix danae.
Eucalanus crassus.	Temora discaudata.
Eucalanus monachus.	Undinula caroli.
Eucalanus mucronatus.	Undinula darwini.
Eucalanus subcrassus.	Undinula vulgaris.

58 Species.

STATION 99, June 28—30, 1899. Lat.  $6^{\circ}7'.5$  N., Long.  $120^{\circ}26'.0$  E. Anchorage off North Ubian, Sulu Archipelago. Surface.

Acartia erythraea.	Eucalanus crassus.
Acartia spinicauda.	Eucalanus monachus.
Acrocalanus gracilis.	Eucalanus mucronatus.
Acrocalanus longicornis.	Eucalanus pileatus.
Acrocalanus monachus.	Eucalanus subcrassus.
Calanopia elliptica.	Euchaeta marina.
Calanopia minor.	Labidocera acuta.
Calocalanus pavo.	Labidocera kroyeri.
Candacia bradyi.	Macrosetella gracilis.
Candacia catula.	Megacalanus gracilis.
Candacia discaudata n. sp.	Metacalanus aurivillii.
Candacia simplex.	Microsetella norvegica.
Candacia truncata.	Monstrilla cymbula n. sp.
Canthocalanus pauper.	Monstrilla helgolandica.
Centropages furcatus.	Oithona plumifera.
Clausocalanus furcatus.	Oncaea venusta.
Copilia mirabilis.	Paracalanus parvus.
Corycaeus danae.	Pontella denticauda n. sp.
Corycaeus gibbulus.	Rhincalanus cornutus.
Corycaeus obtusus.	Sapphirina metallina.
Corycaeus robustus.	Sapphirina stellata.

Temora discaudata.  
Thaumaleus gigas n. sp.

Undinula darwini.  
Undinula vulgaris.

46 *Species.*

STATION 101, June 30, 1899. Lat.  $6^{\circ}15'.0$  N., Long.  $120^{\circ}21'.0$  E. Sulu Sea. Surface.

Acartia erythraea.  
Acrocalanus gracilis.  
Calocalanus pavo.  
Candacia catula.  
Candacia simplex.  
Candacia truncata.  
Canthocalanus pauper.  
Centropages furcatus.  
Copilia mirabilis.  
Corycaeus longistylis.  
Corycaeus venustus.  
Eucalanus monachus.

Eucalanus mucronatus.  
Eucalanus subcrassus.  
Labidocera acuta.  
Mecynocera clausi.  
Oncaea venusta.  
Paracalanus aculeatus.  
Paracalanus parvus.  
Sapphirina nigromaculata.  
Sapphirina ovatolanceolata.  
Sapphirina stellata.  
Temora discaudata.  
Undinula vulgaris.

24 *Species.*

STATION 106, July 4, 1899. Lat.  $6^{\circ}4'.0$  N., Long.  $121^{\circ}25'.0$  E. Anchorage off Kapul Island, Sulu Archipelago. Surface.

Acartia erythraea.  
Candacia simplex.  
Candacia truncata.  
Canthocalanus pauper.  
Centropages furcatus.  
Copilia mirabilis.  
Eucalanus crassus.  
Eucalanus mucronatus.  
Eucalanus pileatus.  
Eucalanus subcrassus.  
Euchaeta concinna.  
Euchaeta marina.  
Labidocera acuta.

Labidocera minuta.  
Mecynocera clausi.  
Metacalanus aurivillii.  
Paracalanus parvus.  
Pleuromamma abdominalis.  
Rhincalanus cornutus.  
Sapphirina nigromaculata.  
Sapphirina gastrica.  
Sapphirina opalina.  
Sapphirina ovatolanceolata.  
Sapphirina stellata.  
Undinula darwini.  
Undinula vulgaris.

26 *Species.*

STATION 109, July 5 & 6, 1899. Lat.  $6^{\circ}7'.0$  N. Long.  $121^{\circ}44'$  E. Anchorage off Tongkil Island, Sulu Archipelago. Surface, night.

Acartia erythraea.  
Acrocalanus gracilis.  
Aegisthus mucronatus.  
Calanopia elliptica.  
Calanopia minor.  
Calanopia herdmani n. sp.  
Candacia truncata.  
Canthocalanus pauper.  
Centropages furcatus.  
Centropages orsinii.  
Eucalanus crassus.  
Eucalanus subcrassus.  
Euchaeta marina.

Labidocera acuta.  
Labidocera kroyeri.  
Labidocera minuta.  
Mecynocera clausi.  
Metacalanus aurivillii.  
Paracalanus parvus.  
Pontella denticauda n. sp.  
Pontella fera.  
Pontellopsis krameri.  
Pontellopsis macronyx n. sp.  
Scolecithrix danae.  
Temora discaudata.  
Undinula vulgaris.

26 *Species.*

STATION 110, July 6, 1899. Lat.  $4^{\circ}34'.0$  N. Long.  $122^{\circ}0'.0$  E. Celebes Sea. Surface, night.

Acartia negligens.  
Acartia spinicauda.  
Acrocalanus longicornis.  
Calocalanus pavo.

Candacia aethiopica.  
Candacia bispinosa.  
Candacia pachydactyla.  
Candacia simplex.

Candacia truncata.  
 Canthocalanus pauper.  
 Centropages orsinii.  
 Clausocalanus furcatus.  
 Copilia mirabilis.  
 Eucalanus monachus.  
 Eucalanus mucronatus.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Labidocera detruncata.  
 Labidocera kroyeri.  
 Labidocera minuta.  
 Lucicutia flavicornis.  
 Macrosetella gracilis.

Megacalanus gracilis.  
 Megacalanus robustior.  
 Oithona plumifera.  
 Oncaea venusta.  
 Pleuromamma abdominalis.  
 Pontella denticauda n. sp.  
 Pontella fera.  
 Pontella securifer.  
 Pontellina plumata.  
 Pontellopsis krameri.  
 Sapphirina angusta.  
 Temora discaudata.  
 Undinula darwini.  
 Undinula vulgaris.

37 Species.

STATION 111, July 7, 1899. Lat.  $3^{\circ}19'.0$  N. Long.  $112^{\circ}2'.0$  E. Celebes Sea, Surface.

Acrocalanus longicornis.  
 Euchaeta marina.

Labidocera detruncata.

3 Species.

STATION 112, July 7, 1899. Lat.  $3^{\circ}1'.0$  N. Long.  $122^{\circ}2'.0$  E. Celebes Sea. Horizontal Cylinder towed over a distance of 7 miles.

Acrocalanus gibber.  
 Acrocalanus longicornis.  
 Aegisthus mucronatus.  
 Candacia longimana.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Corycaeus longistylis.  
 Corycaeus robustus.  
 Corycaeus speciosus.  
 Eucalanus subcrassus.

Euchaeta marina.  
 Euchirella hessei.  
 Labidocera acuta.  
 Macrosetella gracilis.  
 Oncaea venusta.  
 Paracalanus parvus.  
 Pleuromamma abdominalis.  
 Pontellina plumata.  
 Rhincalanus cornutus.  
 Temora discaudata.  
 Undinula darwini.  
 Undinula vulgaris.

24 Species.

STATION 117<sup>a</sup>, July 12, 1899. Lat.  $1^{\circ}15'.0$  N. Long.  $123^{\circ}37'.0$  E. North Coast of Celebes. Surface, night.

Acartia erythraea.  
 Acrocalanus gracilis.  
 Calanopia elliptica.  
 Calanopia minor.  
 Calanopia herdmani n. sp.  
 Candacia aethiopica.  
 Candacia bradyi.  
 Candacia curta.  
 Candacia discaudata n. sp.  
 Candacia simplex.  
 Candacia truncata.  
 Centropages furcatus.  
 Centropages orsinii.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Eucalanus monachus.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.

Euchaeta concinna.  
 Euchaeta grandiremis.  
 Euchaeta marina.  
 Euchaeta media.  
 Euchaeta wolfendeni n. sp.  
 Euchirella hessei.  
 Euchirella pulchra.  
 Euchirella venusta.  
 Labidocera acuta.  
 Labidocera kroyeri.  
 Lucicutia flavicornis.  
 Megacalanus gracilis.  
 Megacalanus robustior.  
 Metacalanus aurivillii.  
 Paracalanus parvus.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pleuromamma xiphias.

Pontella alata n. sp.  
 Pontella danae.  
 Pontella princeps.  
 Pontella securifer.  
 Pontellina plumata.  
 Pontellopsis armata.  
 Pontellopsis regalis.  
 Pontellopsis strenua.  
 Rhincalanus cornutus.  
 Sapphirina auronitens.

Sapphirina opalina.  
 Sapphirina ovatlanceolata.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undeuchaeta plumosa.  
 Undeuchaeta major.  
 Undinula darwini.  
 Undinula vulgaris.

55 Species.

STATION 118, July 13, 1899. Lat.  $1^{\circ} 38'.0$  N. Long.  $124^{\circ} 28'.2$  E. Celebes Sea. HENSEN Vertical Net, from 900 metres to surface.

Acartia erythraea.  
 Acrocalanus gibber.  
 Acrocalanus gracilis.  
 Acrocalanus longicornis.  
 Aegisthus mucronatus.  
 Ætideus armatus.  
 Ætideus bradyi n. sp.  
 Ætideus giesbrechti.  
 Ætideoopsis rostrata.  
 Augaptilus filigerus.  
 Augaptilus palumboi.  
 Calanopia minor.  
 Calanus minor.  
 Calocalanus pavo.  
 Candacia aethiopica.  
 Candacia curta.  
 Candacia discaudata.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Centropages gracilis.  
 Centropages orsinii.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Conaea gracilis.  
 Copilia mirabilis.  
 Corycaeus danae.  
 Corycaeus elongatus.  
 Corycaeus furcifer.  
 Corycaeus speciosus.  
 Corycaeus venustus.  
 Eucalanus crassus.  
 Eucalanus mucronatus.  
 Eucalanus subtenuis.  
 Euchaeta marina.  
 Euchirella curticauda.  
 Euchirella galeata.  
 Euchirella hessei.  
 Euchirella messinensis.  
 Euchirella pulchra.  
 Euchirella venusta.  
 Gaetanus armiger.

Gaetanus caudani.  
 Gaetanus kruppii.  
 Gaetanus miles.  
 Haloptilus longicornis.  
 Haloptilus ornatus.  
 Lophothrix frontalis.  
 Lubbockia aculeata.  
 Lubbockia squillimana.  
 Lucicutia flavicornis.  
 Lucicutia philyra n. sp.  
 Macrosetella gracilis.  
 Megacalanus gracilis.  
 Metacalanus aurivillii.  
 Metridia boeckii.  
 Metridia brevicauda.  
 Metridia princeps.  
 Metridia venusta.  
 Mormonilla phasma.  
 Oithona plumifera.  
 Oncaea venusta.  
 Oxycalanus semispinus n. sp.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Phaenna spinifera.  
 Phyllopus bidentatus.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pleuromamma xiphias.  
 Pontellina plumata.  
 Rhincalanus cornutus.  
 Rhincalanus gigas.  
 Sapphirina gastrica.  
 Sapphirina opalina.  
 Sapphirina sinuicauda.  
 Scaphocalanus magnus.  
 Scolecithricella auropecten.  
 Scolecithricella ctenopus.  
 Scolecithricella marginata.  
 Scolecithricella tenuipes.  
 Scolecithrix danae.  
 Scottocalanus persecans.

Scottocalanus securifer.  
 Scottocalanus setosus n. sp.  
 Temora discaudata.  
 Tortanus murrayi n. sp.

Undeuchaeta plumosa.  
 Undinula darwini.  
 Undinula vulgaris.  
 Xanthocalanus agilis. 90 *Species.*

STATION 121, July 14—16, 1899. Lat.  $1^{\circ}33'.0$  N. Long.  $124^{\circ}47'.5$  E. Menado Anchorage. Surface.

Acartia erythraea.  
 Acrocalanus longicornis.  
 Calocalanus pavo.  
 Calocalanus plumulosus.  
 Candacia catula.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Copilia mirabilis.  
 Corycaeus longistylis.  
 Corycaeus obtusus.  
 Corycaeus speciosus.  
 Eucalanus mucronatus.

Eucalanus pileatus.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Monstrilla longicornis.  
 Oithona plumifera.  
 Oncaea venusta.  
 Paracalanus parvus.  
 Pontellina plumata.  
 Sapphirina metallina.  
 Sapphirina ovatolanceolata.  
 Temora discaudata.  
 Undinula vulgaris. 28 *Species.*

STATION 122, July 17, 1899. Lat.  $1^{\circ}58'.5$  N. Long.  $125^{\circ}0'.5$  E. Near Biaru Island. Surface.

Candacia discaudata n. sp.  
 Centropages orsinii.  
 Labidocera acuta.  
 Oncaea venusta.

Pontellina plumata.  
 Temora discaudata.  
 Undinula vulgaris.

7 *Species.*

STATION 124, July 18, 1899. Lat.  $2^{\circ}27'.0$  N. Long.  $125^{\circ}35'.0$  E. Celebes Sea. Surface.

Calanus minor.  
 Candacia bradyi.  
 Candacia curta.  
 Candacia pachydactyla.  
 Copilia mirabilis.  
 Eucalanus crassus.  
 Eucalanus mucronatus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Labidocera acuta.

Macrosetella gracilis.  
 Pontella denticauda n. sp.  
 Pontellina plumata.  
 Pontellopsis armata.  
 Pontellopsis krameri.  
 Pontellopsis regalis.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula caroli.  
 Undinula darwini.  
 Undinula vulgaris.

23 *Species.*

STATION 125, July 18 & 19, 1899. Lat.  $2^{\circ}38'.0$  N., Long.  $125^{\circ}26'.5$  E. Anchorage off Sawan, Siau Island. Surface, day.

Acartia negligens.  
 Acrocalanus longicornis.  
 Calanopia elliptica.  
 Calanus minor.  
 Candacia catula.  
 Candacia curta.  
 Centropages furcatus.  
 Copilia mirabilis.  
 Corycaeus venustus.  
 Eucalanus crassus.  
 Eucalanus mucronatus.

Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Megacalanus gracilis.  
 Metacalanus aurivillii.  
 Oithona plumifera.  
 Oncaea venusta.  
 Paracalanus parvus.  
 Phaenna spinifera.

Rhincalanus cornutus.  
Sapphirina ovatolanceolata.  
Scolecithrix danae.

Temora discaudata.  
Undinula darwini.  
Undinula vulgaris. *28 Species.*

STATION 125, July 18 & 19, 1899. Lat.  $2^{\circ} 38'.0$  N., Long.  $125^{\circ} 26.5$  E. Anchorage off Sawan, Siau Island. Surface, night.

Candacia bradyi.  
Candacia truncata.  
Canthocalanus pauper.  
Corycaeus longistylis.  
Eucalanus crassus.  
Eucalanus subcrassus.

Eucalanus subtenuis.  
Labidocera acuta.  
Megacalanus gracilis.  
Rhincalanus gigas.  
Sapphirina darwini.  
Undinula vulgaris. *12 Species.*

STATION 128, July 22, 1899. Lat.  $4^{\circ} 27'.0$  N., Long.  $125^{\circ} 25'.7$  E. Celebes Sea. HENSEN Vertical Net, from 700 metres to surface.

Acartia negligens.  
Acrocalanus longicornis.  
Acrocalanus monachus.  
Aegisthus aculeatus.  
Aegisthus mucronatus.  
Ætideus armatus.  
Ætideus bradyi n. sp.  
Ætideus giesbrechti.  
Augaptilus palumboi.  
Augaptilus validus n. sp.  
Calanopia elliptica.  
Calanopia minor.  
Calanus minor.  
Candacia aethiopica.  
Candacia bispinosa.  
Candacia longimana.  
Candacia pachydactyla.  
Candacia truncata.  
Canthocalanus pauper.  
Centropages elongatus.  
Centropages furcatus.  
Chiridius poppei.  
Chirundina streetsi.  
Clausocalanus arcuicornis.  
Clausocalanus furcatus.  
Conaea gracilis.  
Copilia mirabilis.  
Copilia quadrata.  
Corycaeus alatus.  
Corycaeus danae.  
Corycaeus elongatus.  
Corycaeus flaccus.  
Corycaeus furcifer.  
Corycaeus gibbulus.  
Corycaeus longistylis.  
Corycaeus robustus.  
Corycaeus speciosus.  
Eucalanus mucronatus.  
Euchaeta concinna.

Euchaeta hebes.  
Euchaeta marina.  
Euchaeta wolfendeni n. sp.  
Euchirella amoena.  
Euchirella curticauda.  
Euchirella hessei.  
Gaetanus caudani.  
Gaetanus miles.  
Haloptilus longicornis.  
Haloptilus ornatus.  
Haloptilus spiniceps.  
Heterorhabdus clausi.  
Heterorhabdus longicornis.  
Heterorhabdus papilliger.  
Labidocera minuta.  
Lophothrix frontalis.  
Lubbockia squillimana.  
Lucicutia flavicornis.  
Lucicutia pera n. sp.  
Macrosetella gracilis.  
Megacalanus gracilis.  
Megacalanus robustior.  
Metacalanus aurivillii.  
Metridia princeps.  
Metridia venusta.  
Oithona plumifera.  
Oncaea venusta.  
Paracalanus aculeatus.  
Paracalanus parvus.  
Phyllopus bidentatus.  
Phyllopus helgae.  
Phyllopus impar.  
Pleuromamma abdominalis.  
Pleuromamma gracilis.  
Pleuromamma xiphias.  
Pontella denticauda n. sp.  
Pontellina plumata.  
Rhincalanus cornutus.  
Rhincalanus gigas.

Scaphocalanus magnus.  
Scolecithricella longifurca.  
Scolecithricella marginata.  
Scolecithrix danae.  
Scottocalanus farrani n. sp.

Scottocalanus persecans.  
Scottocalanus securifrons.  
Undeuchaeta plumosa.  
Undinula darwini.

87 Species.

STATION 129, July 22 & 23, 1899. Lat.  $4^{\circ}37'.0$  N., Long.  $125^{\circ}26'.5$  E. Anchorage off Kawio- and Kamboling Islands, Karkaralong-group. Surface.

Candacia bipinnata.  
Candacia simplex.  
Copilia mirabilis.  
Copilia quadrata.  
Corycaeus furcifer.  
Eucalanus mucronatus.  
Eucalanus subcrassus.  
Eucalanus subtenuis.

Euchaeta marina.  
Haloptilus longicornis.  
Megacalanus gracilis.  
Pontellina plumata.  
Sapphirina intestinata.  
Sapphirina nigromaculata.  
Undinula darwini.

15 Species.

STATION 133, July 25—27, 1899. Lat.  $3^{\circ}59'.0$  N., Long.  $126^{\circ}42'.0$  E. Anchorage off Lirung, Salibabu Island. Surface.

Acartia negligens.  
Calocalanus pavo.  
Candacia aethiopica.  
Candacia bispinosa.  
Candacia pachydactyla.  
Candacia truncata.  
Canthocalanus pauper.  
Centropages orsinii.  
Copilia mirabilis.  
Corycaeus furcifer.  
Corycaeus longistylis.  
Corycaeus speciosus.  
Eucalanus mucronatus.

Eucalanus subcrassus.  
Euchaeta marina.  
Euchirella messinensis.  
Megacalanus gracilis.  
Oithona plumifera.  
Oncaea venusta.  
Paracalanus parvus.  
Pontellina plumata.  
Pseudodiaptomus aurivillii.  
Rhincalanus cornutus.  
Sapphirina ovatolanceolata.  
Scolecithrix danae.  
Undinula darwini.

26 Species.

STATION 136, July 29, 1899. Lat.  $0^{\circ}48'.0$  N., Long.  $127^{\circ}26'.0$  E. Ternate Anchorage. Surface.

Acartia erythraea.  
Calanopia elliptica.  
Calanus minor.  
Candacia bradyi.  
Candacia discaudata n. sp.  
Candacia pachydactyla.  
Candacia simplex.  
Candacia truncata.  
Canthocalanus pauper.  
Centropages furcatus.  
Copilia mirabilis.  
Copilia quadrata.  
Eucalanus monachus.  
Eucalanus mucronatus.  
Eucalanus subcrassus.  
Eucalanus subtenuis.  
Euchaeta concinna.  
Euchaeta marina.  
Euchaeta wolfendeni n. sp.  
Labidocera acuta.  
Labidocera minuta.

Metacalanus aurivillii.  
Oithona plumifera.  
Oncaea venusta.  
Paracalanus aculeatus.  
Paracalanus parvus.  
Pontellina plumata.  
Rhincalanus cornutus.  
Sapphirina angusta.  
Sapphirina gastrica.  
Sapphirina intestinata.  
Sapphirina longifurca n. sp.  
Sapphirina opalina.  
Sapphirina ovatolanceolata.  
Sapphirina sinuicauda.  
Sapphirina stellata.  
Scolecithrix danae.  
Temora discaudata.  
Undinula caroli.  
Undinula darwini.  
Undinula vulgaris.

41 Species.

STATION 138, August 3, 1899. Lat.  $0^{\circ}6'.0$  N., Long.  $127^{\circ}6'.0$  E. Anchorage on the East-Coast of Kajoa Island. Surface, night.

*Acartia negligens.*  
*Acrocalanus gibber.*  
*Acrocalanus gracilis.*  
*Acrocalanus longicornis.*  
*Aegisthus mucronatus.*  
*Calanopia elliptica.*  
*Calanopia minor.*  
*Calocalanus pavo.*  
*Candacia aethiopica.*  
*Candacia bradyi.*  
*Candacia catula.*  
*Candacia curta.*  
*Candacia pachydactyla.*  
*Centropages gracilis.*  
*Clausocalanus furcatus.*  
*Corycaeus danae.*  
*Corycaeus speciosus.*  
*Eucalanus crassus.*  
*Eucalanus monachus.*  
*Eucalanus mucronatus.*  
*Eucalanus pileatus.*  
*Eucalanus subcrassus.*  
*Eucalanus subtenuis.*  
*Euchaeta concinna.*

*Euchaeta marina.*  
*Euchaeta wolfendeni* n. sp.  
*Labidocera acuta.*  
*Labidocera minuta.*  
*Macrosetella gracilis.*  
*Megacalanus robustior.*  
*Metacalanus aurivillii.*  
*Oithona plumifera.*  
*Oncaea venusta.*  
*Paracalanus parvus.*  
*Pontella princeps.*  
*Pontellina plumata.*  
*Pontellopsis armata.*  
*Pontellopsis pexa* n. sp.  
*Pontellopsis villosa.*  
*Rhincalanus cornutus.*  
*Sapphirina nigromaculata.*  
*Sapphirina sinuicauda.*  
*Scaphocalanus magnus.*  
*Scolecithrix danae.*  
*Temora discaudata.*  
*Undinula caroli.*  
*Undinula darwini.*  
*Undinula vulgaris.*

48 Species.

STATION 141, August 5, 1899. Lat.  $1^{\circ}0'.4$  S., Long.  $127^{\circ}25'.3$  E. Molucca Passage. HENSEN Vertical Net, from 1500 metres to surface.

*Acartia erythraea.*  
*Acartia negligens.*  
*Acrocalanus gibber.*  
*Acrocalanus gracilis.*  
*Acrocalanus longicornis.*  
*Aegisthus mucronatus.*  
*Ætideus armatus.*  
*Ætideus bradyi* n. sp.  
*Ætideus giesbrechti.*  
*Ætideoopsis rostrata.*  
*Arietellus setosus.*  
*Arietellus simplex.*  
*Augaptilus bullifer.*  
*Augaptilus filigerus.*  
*Augaptilus hecticus.*  
*Augaptilus palumboi.*  
*Augaptilus validus*, n. sp.  
*Bradyidius armatus.*  
*Calanopia elliptica.*  
*Calanopia minor.*  
*Calanopia herdmani* n. sp.  
*Calanus minor.*  
*Calocalanus pavo.*  
*Candacia aethiopica.*  
*Candacia bradyi.*

*Candacia curta.*  
*Candacia discaudata* n. sp.  
*Candacia pachydactyla.*  
*Candacia simplex.*  
*Candacia tenuimana.*  
*Candacia truncata.*  
*Canthocalanus pauper.*  
*Centropages furcatus.*  
*Chiridius gracilis.*  
*Chiridius obtusifrons.*  
*Chiridius poppei.*  
*Chirundina streetsi.*  
*Clausocalanus arcuicornis.*  
*Clausocalanus furcatus.*  
*Conaca gracilis.*  
*Copilia mirabilis.*  
*Corycaeus concinnus.*  
*Corycaeus furcifer.*  
*Corycaeus obtusus.*  
*Corycaeus speciosus.*  
*Corycaeus venustus.*  
*Disseta palumboi.*  
*Eucalanus crassus.*  
*Eucalanus dentatus* n. sp.  
*Eucalanus monachus.*

- Eucalanus mucronatus.  
 Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta acuta.  
 Euchaeta concinna.  
 Euchaeta longicornis.  
 Euchaeta marina.  
 Euchaeta tenuis.  
 Euchaeta wolfendeni n. sp.  
 Euchirella curticauda.  
 Euchirella galeata.  
 Euchirella hessei.  
 Euchirella messinensis.  
 Euchirella pulchra.  
 Euchirella venusta.  
 Gaetanus hamatus n. sp.  
 Gaetanus kruppii.  
 Gaetanus miles.  
 Gaetanus minor.  
 Gaidius similis.  
 Haloptilus longicornis.  
 Haloptilus plumosus.  
 Heterorhabdus longicornis.  
 Heterorhabdus spinifrons.  
 Labidocera acuta.  
 Labidocera madurae n. sp.  
 Labidocera minuta.  
 Lophothrix frontalis.  
 Lubbockia aculeata.  
 Lucicutia clausi.  
 Lucicutia flavicornis.  
 Mecynocera clausi.  
 Megacalanus gracilis.  
 Megacalanus robustior.  
 Metacalanus aurivillii.  
 Metridia boeckii.  
 Metridia brevicauda.  
 Metridia princeps.  
 Metridia venusta.  
 Oithona plumifera.  
 Oncaea conifera.  
 Oncaea venusta.  
 Oxycalanus semispinus n. sp.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Paraugaptilus similis n. sp.  
 Phyllopus bidentatus.  
 Phyllopus impar.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pleuromamma xiphias.  
 Paraeuchaeta californica.  
 Paraeuchaeta tonsa.  
 Rhincalanus cornutus.  
 Rhincalanus gigas.  
 Sapphirina angusta.  
 Sapphirina intestinata.  
 Sapphirina metallina.  
 Sapphirina nigromaculata.  
 Sapphirina opalina.  
 Sapphirina ovatolanceolata.  
 Sapphirina stellata.  
 Scaphocalanus magnus.  
 Scaphocalanus major.  
 Scolecithricella bradyi.  
 Scolecithricella abyssalis.  
 Scolecithricella longicornis.  
 Scolecithricella obtusifrons.  
 Scolecithricella profunda.  
 Scolecithricella tenuipes.  
 Scolecithrix danae.  
 Scottocalanus farrani n. sp.  
 Scottocalanus securifrons.  
 Scottocalanus setosus.  
 Temora discaudata.  
 Temora turbinata.  
 Undeuchaeta plumosa.  
 Undeuchaeta intermedia n. sp.  
 Undeuchaeta major.  
 Undinula vulgaris.  
 Xanthocalanus agilis.

131 Species.

STATION 142, August 5—7, 1899. Lat.  $0^{\circ} 24'.0$  S., Long.  $127^{\circ} 36'.0$  E. Anchorage off Laiwui, Coast of Obi Major. HENSEN Vertical Net, 10 metres to surface, with electric light in net.

- Acartia erythraea.  
 Acartia negligens.  
 Acartia spinicauda.  
 Acrocalanus gibber.  
 Acrocalanus gracilis.  
 Acrocalanus longicornis.  
 Calanopia elliptica.  
 Calanopia minor.  
 Calanopia herdmani n. sp.  
 Calanopia thompsoni n. sp.  
 Candacia bradyi.  
 Candacia discaudata n. sp.  
 Candacia pachydactyla.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Centropages orsinii.  
 Chiridius gracilis.  
 Chiridius poppei.  
 Chirundina streetsi.

*Clausocalanus arcuicornis*.  
*Clausocalanus furcatus*.  
*Clytemnestra rostrata*.  
*Corycaeus danae*.  
*Corycaeus gibbulus*.  
*Corycaeus gracilicaudatus*.  
*Corycaeus obtusus*.  
*Corycaeus robustus*.  
*Corycaeus speciosus*.  
*Corycaeus tenuis*.  
*Eucalanus crassus*.  
*Eucalanus mucronatus*.  
*Eucalanus subtenuis*.  
*Euchaeta marina*.  
*Euchaeta wolfendeni*, n. sp.  
*Euchirella galeata*.  
*Euchirella hessei*.  
*Euchirella pulchra*.  
*Euterpina acutifrons*.  
*Gaidius similis*.  
*Labidocera acuta*.  
*Labidocera kroyeri*.  
*Labidocera minuta*.  
*Metacalanus aurivillii*.  
*Metridia venusta*.  
*Monstrilla longipes* n. sp.  
*Monstrilla turgida* n. sp.

*Neopontella typica* n. sp.  
*Oithona plumifera*.  
*Oithona pygmaea*.  
*Oithona minuta*.  
*Oncaea venusta*.  
*Pachysoma punctatum*.  
*Paracalanus aculeatus*.  
*Paracalanus parvus*.  
*Parapeltidium johnstoni* n. sp.  
*Paraugaptilus similis* n. sp.  
*Phyllothalestris mysis*.  
*Pleuromamma abdominalis*.  
*Pseudanthessius obscurus* n. sp.  
*Pseudanthessius parvus* n. sp.  
*Rhincalanus gigas*.  
*Sapphirina metallina*.  
*Scolecithricella abyssalis*.  
*Scolecithricella bradyi*.  
*Scolecithricella marginata*.  
*Scolecithrix danae*.  
*Temora discaudata*.  
*Temora turbinata*.  
*Thaumaleus bullatus* n. sp.  
*Tortanus gracilis*.  
*Undeuchaeta plumosa*.  
*Undeuchaeta intermedia* n. sp.  
*Undinula vulgaris*.

74 Species.

STATION 143, August 7, 1899. Lat.  $1^{\circ}4'5$  S., Long.  $127^{\circ}52'6$  E. Halmahera Sea. HENSEN Vertical Net, from 1000 metres to surface.

*Acartia erythraea*.  
*Acrocalanus gibber*.  
*Acrocalanus gracilis*.  
*Acrocalanus longicornis*.  
*Aegisthus mucronatus*.  
*Ætideus armatus*.  
*Ætideus bradyi* n. sp.  
*Ætideus giesbrechti*.  
*Ætideoopsis rostrata*.  
*Augaptilus filigerus*.  
*Augaptilus palumboi*.  
*Augaptilus placitus* n. sp.  
*Bathypontia spinifera* n. sp.  
*Calanopia elliptica*.  
*Calanopia minor*.  
*Calanopia herdmani* n. sp.  
*Calanus minor*.  
*Candacia bradyi*.  
*Candacia catula*.  
*Candacia curta*.  
*Candacia pachydactyla*.  
*Candacia simplex*.  
*Candacia truncata*.  
*Canthocalanus pauper*.

*Centropages furcatus*.  
*Clausocalanus arcuicornis*.  
*Clausocalanus furcatus*.  
*Chiridius gracilis*.  
*Chirundina streetsi*.  
*Conaea gracilis*.  
*Cornucalanus simplex*.  
*Corycaeus danae*.  
*Corycaeus gracilicaudatus*.  
*Corycaeus longistylis*.  
*Corycaeus obtusus*.  
*Corycaeus speciosus*.  
*Corycaeus tenuis*.  
*Eucalanus crassus*.  
*Eucalanus mucronatus*.  
*Euchaeta concinna*.  
*Euchaeta marina*.  
*Euchaeta tenuis*.  
*Euchirella galeata*.  
*Euchirella messinensis*.  
*Euchirella pulchra*.  
*Euchirella venusta*.  
*Gactanus caudani*.  
*Gactanus kruppii*.

Gaetanus miles.  
 Heteramalla dubia.  
 Heterorhabdus longicornis.  
 Heterorhabdus spinifrons.  
 Labidocera minuta.  
 Lubbockia aculeata.  
 Lubbockia squillimana.  
 Lucicutia clausi.  
 Lucicutia flavicornis.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Megacalanus gracilis.  
 Metacalanus aurivillii.  
 Metridia brevicauda.  
 Metridia venusta.  
 Mormonilla phasma.  
 Neopontella typica n. sp.  
 Oithona plumifera.  
 Oncaea conifera.  
 Oncaea minuta.  
 Oncaea tenuimana.  
 Oncaea venusta.  
 Oxycalanus semispinus n. sp.  
 Pachysoma punctatum.  
 Paracalanus aculeatus.

Paracalanus parvus.  
 Paraeuchaeta californica.  
 Paraugaptilus similis n. sp.  
 Phaenna spinifera.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pleuromamma xiphias.  
 Phyllopus impar.  
 Pontellopsis armata.  
 Rhincalanus cornutus.  
 Rhincalanus gigas.  
 Scaphocalanus magnus.  
 Scaphocalanus major.  
 Scolecithricella abyssalis.  
 Scolecithricella bradyi.  
 Scolecithricella longicornis.  
 Scolecithricella marginata.  
 Scolecithrix danae.  
 Scottocalanus farrani n. sp.  
 Scottocalanus securifrons.  
 Scottocalanus setosus n. sp.  
 Temoropia mayumbaensis.  
 Undeuchaeta plumosa.  
 Undinula vulgaris.

97 Species.

STATION 144, August 7—9, 1899. Lat.  $0^{\circ} 58'.0$  S., Long.  $128^{\circ} 21'.0$  E. Anchorage North of Salomakiëe (Damar) Island.

Acartia erythraea.  
 Acrocalanus longicornis.  
 Aegisthus mucronatus.  
 Calanopia elliptica.  
 Calanus minor.  
 Candacia bradyi.  
 Candacia curta.  
 Candacia discaudata.  
 Candacia pachydactyla.  
 Candacia simplex.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Corycaeus furcifer.  
 Eucalanus crassus.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Labidocera acuta.  
 Labidocera kroyeri.

Labidocera minuta.  
 Mecynocera clausi.  
 Oncaea venusta.  
 Pachysoma punctatum.  
 Paracalanus parvus.  
 Phaenna spinifera.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pontella fera.  
 Pontellina plumata.  
 Pontellopsis armata.  
 Pontellopsis krameri.  
 Pontellopsis regalis.  
 Rhincalanus cornutus.  
 Sapphirina angusta.  
 Sapphirina gastrica.  
 Sapphirina opalina.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Temora turbinata.  
 Undinula darwini.  
 Undinula vulgaris.

46 Species.

STATION 146, August 9, 1899. Lat.  $0^{\circ} 36'.0$  S., Long.  $128^{\circ} 32'.7$  E.  $2\frac{1}{2}$  miles north of Eastern Widi Group. Surface.

Calocalanus pavo.

Candacia aethiopica.

Candacia catula.  
 Candacia curta.  
 Candacia pachydactyla.  
 Centropages furcatus.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Corycaeus danae.  
 Eucalanus crassus.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.

Euchaeta concinna.  
 Labidocera acuta.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Oithona plumifera.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Rhincalanus cornutus.  
 Sapphirina nigromaculata.  
 Undinula darwini. 22 Species.

STATION 148, August 10, 1899. Lat.  $0^{\circ} 17'.6$  S., Long.  $129^{\circ} 14'.5$  E. Halmahera Sea. HENSEN Vertical Net, from 1000 metres to surface.

Acartia erythraea.  
 Acartia negligens.  
 Acrocalanus gracilis.  
 Acrocalanus longicornis.  
 Aegisthus aculeatus.  
 Aegisthus mucronatus.  
 Aetideopsis rostrata.  
 Amalophora typica.  
 Augaptilus filigerus.  
 Augaptilus palumboi.  
 Augaptilus placitus n. sp.  
 Arietellus aculeatus.  
 Bradycalanus typicus n. sp.  
 Calanopia elliptica.  
 Calanopia minor.  
 Calanus minor.  
 Calocalanus pavo.  
 Calocalanus plumulosus.  
 Candacia aethiopica.  
 Candacia catula.  
 Candacia curta.  
 Candacia discaudata n. sp.  
 Candacia pachydactyla.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Chiridella macrodactyla.  
 Chiridius gracilis.  
 Chiridius poppei.  
 Chirundina streetsi.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Conaea gracilis.  
 Corycaeus concinnus.  
 Corycaeus danae.  
 Corycaeus gibbulus.  
 Corycaeus longistylis.  
 Corycaeus obtusus.  
 Corycaeus speciosus.  
 Eucalanus crassus.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.

Euchaeta acuta.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Euchaeta tenuis.  
 Euchirella galeata.  
 Euchirella maxima.  
 Euchirella pulchra.  
 Euchirella venusta.  
 Gaetanus miles.  
 Gaidius notacanthus.  
 Haloptilus longicornis.  
 Heterorhabdus clausi.  
 Heterorhabdus longicornis.  
 Heterorhabdus spinifrons.  
 Labidocera acuta.  
 Lophothrix frontalis.  
 Lucicutia flavicornis.  
 Macandrewella joanae n. sp.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Megacalanus gracilis.  
 Megacalanus princeps.  
 Metacalanus aurivillii.  
 Metridia boeckii.  
 Metridia princeps.  
 Metridia venusta.  
 Oithona plumifera.  
 Oncaea media.  
 Oncaea tenuimana.  
 Oncaea venusta.  
 Onchocalanus cristatus.  
 Oxycalanus semispinus n. sp.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Paraeuchaeta californica.  
 Paraeuchaeta sibogae n. sp.  
 Paraugaptilus similis n. sp.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pleuromamma xiphias.  
 Pontellina plumata.

Rhincalanus cornutus.  
 Sapphirina nigromaculata.  
 Sapphirina opalina.  
 Scaphocalanus elongatus n. sp.  
 Scolecithricella auropecten.  
 Scolecithricella curticauda n. sp.  
 Scolecithricella gracilis.  
 Scolecithricella longicornis.  
 Scolecithricella obtusifrons.  
 Scolecithricella tydemani n. sp.  
 Scolecithricella valida.  
 Scolecithrix danae.  
 Scottocalanus farrani n. sp.

Scottocalanus helenae.  
 Scottocalanus longispinus n. sp.  
 Scottocalanus persecans.  
 Scottocalanus securifrons.  
 Scottocalanus setosus n. sp.  
 Temora discaudata.  
 Temora turbinata.  
 Temoropia mayumbaensis.  
 Undeuchaeta plumosa.  
 Undeuchaeta major.  
 Undinula caroli.  
 Undinula darwini.  
 Undinula vulgaris. *108 Species.*

STATION 149, August 10 & 11, 1899. Lat.  $0^{\circ}5'.0$  S., Long.  $129^{\circ}24'.0$  E. Fau Anchorage, West Coast of Gebé Island. Surface.

Acartia erythraea.  
 Calanopia elliptica.  
 Canthocalanus pauper.  
 Corycaeus obtusus.

Euchaeta marina.  
 Scolecithrix danae.  
 Undinula darwini.  
 Undinula vulgaris. *8 Species.*

STATION 157, August 15 & 16, 1899. Lat.  $0^{\circ}32'.9$  S., Long.  $130^{\circ}14'.6$  E.  $4\frac{1}{2}$  Cables N.N.W. of the North point of Great Fam Island (Jef-Fam-besar). Surface, night.

Calanus minor.  
 Candacia curta.  
 Candacia discaudata n. sp.  
 Candacia pachydactyla.  
 Candacia truncata.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Corycaeus furcifer.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.

Labidocera acuta.  
 Megacalanus gracilis.  
 Oithona plumifera.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Pontella denticauda n. sp.  
 Pontellina plumata.  
 Pontellopsis armata.  
 Pontellopsis regalis.  
 Rhincalanus cornutus.  
 Scolecithrix danae.  
 Undinula darwini.  
 Undinula vulgaris. *27 Species.*

STATION 164, August 20, 1899. Lat.  $1^{\circ}42'.5$  S., Long.  $130^{\circ}47'.5$  E. near New Guinea. Washings from dredged material depth 32 metres.

Alteuthella pellucida n. sp.  
 Canuella curticaudata.  
 Eupelte oblivia n. sp.  
 Lichomolgus buddhensis.

Longipedia coronata.  
 Rhynchothalestris rufocincta.  
 Sunaristes paguri. *7 Species.*

STATION 165, August 20—22, 1899. Lat.  $2^{\circ}8'.0$  S., Long.  $130^{\circ}50'.7$  E. Anchorage on North East Side of Daram Island (False Pisangs), East Coast of Misool. Surface.

Acartia erythraea.  
 Acartia negligens.  
 Acrocalanus longicornis.  
 Calanoides brevicornis.  
 Calanopia elliptica.  
 Calanus minor.  
 Candacia curta.

Candacia pachydactyla.  
 Candacia simplex.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Corycaeus danae.

Corycaeus furcifer.  
 Corycaeus obtusus.  
 Corycaeus speciosus.  
 Corycaeus tenuis.  
 Eucalanus crassus.  
 Eucalanus monachus.  
 Eucalanus mucronatus.  
 Eucalanus pileatus.  
 Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Labidocera acuta.  
 Labidocera kroyeri.  
 Oithona plumifera.

Oithona rigida.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Rhincalanus cornutus.  
 Rhincalanus gigas.  
 Sapphirina bicuspidata.  
 Sapphirina intestinata.  
 Sapphirina opalina.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Temora turbinata.  
 Undinula caroli.  
 Undinula darwini.  
 Undinula vulgaris.

46 Species.

STATION 168, August 22 & 23, 1899. Lat.  $2^{\circ}38'.0$  S., Long.  $131^{\circ}33'$  E. Anchorage North of Sabuda Island. Surface.

Acartia erythraea.  
 Acartia negligens.  
 Acrocalanus longicornis.  
 Calanoides brevicornis.  
 Calanopia minor.  
 Calanus minor.  
 Candacia discaudata.  
 Candacia pachydactyla.  
 Canthocalanus pauper.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Eucalanus monachus.  
 Eucalanus mucronatus.  
 Eucalanus pileatus.  
 Eucalanus subcrassus.  
 Euchaeta concinna.

Lophothrix frontalis.  
 Macrosetella gracilis.  
 Oithona plumifera.  
 Oithona rigida.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Rhincalanus cornutus.  
 Rhincalanus gigas.  
 Sapphirina nigromaculata.  
 Scaphocalanus magnus.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula darwini.  
 Undinula vulgaris.

31 Species.

STATION 169, August 23—25, 1899. Lat.  $3^{\circ}0'.0$  S., Long.  $132^{\circ}0'.2$  E. Anchorage off Atjatuning, West Coast of New Guinea. Surface.

Acartia erythraea.  
 Acartia spinicauda.  
 Acrocalanus longicornis.  
 Calanoides brevicornis.  
 Candacia bradyi.  
 Candacia curta.  
 Candacia pachydactyla.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Corycaeus robustus.  
 Eucalanus crassus.  
 Eucalanus monachus.  
 Eucalanus mucronatus.

Eucalanus pileatus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.  
 Labidocera acuta.  
 Labidocera minuta.  
 Oithona plumifera.  
 Oncaea venusta.  
 Paracalanus parvus.  
 Rhincalanus cornutus.  
 Sapphirina gastrica.  
 Sapphirina nigromaculata.  
 Sapphirina opalina.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula darwini.  
 Undinula vulgaris.

32 Species.

STATION 172, August 26—28, 1899. Lat.  $3^{\circ} 54'.0$  S., Long.  $130^{\circ} 50'.0$  E. Grisser; Anchorage between this Island and Ceram Laut. Surface.

Calanoides brevicornis.	Euchaeta wolfendeni n. sp.
Candacia bradyi.	Labidocera acuta.
Candacia discaudata n. sp.	Phaenna spinifera.
Candacia pachydactyla.	Pontellina plumata.
Candacia simplex.	Rhincalanus cornutus.
Candacia truncata.	Rhincalanus gigas.
Canthocalanus pauper.	Sapphirina auronitens.
Copilia mirabilis.	Sapphirina bicuspidata.
Copilia quadrata.	Sapphirina intestinata.
Eucalanus crassus.	Sapphirina opalina.
Eucalanus dentatus n. sp.	Sapphirina stellata.
Eucalanus mucronatus.	Scolecithrix danae.
Eucalanus subcrassus.	Temora discaudata.
Eucalanus subtenuis.	Undinula darwini.
Euchaeta concinna.	Undinula vulgaris.

30 Species.

STATION 174, August 28 & 29, 1899. Lat.  $3^{\circ} 27'.0$  S., Long.  $130^{\circ} 39'.0$  E. Waru Bay, North Coast of Ceram. Surface.

Acartia erythraea.	Corycaeus obtusus.
Acartia negligens.	Labidocera acuta.
Acartia spinicauda.	Labidocera minuta.
Calanopia elliptica.	Oithona rigida.
Candacia bradyi.	Pontellopsis armata.
Candacia discaudata n. sp.	Pseudodiaptomus aurivillii.
Candacia simplex.	Rhincalanus cornutus.
Centropages furcatus.	Rhincalanus gigas.
Clausocalanus arcuicornis.	Scolecithrix danae.
Clytemnestra rostrata.	Undinula vulgaris.

20 Species.

STATION 177<sup>1</sup>, September 1, 1899. Lat.  $2^{\circ} 30'.0$  S., Long.  $129^{\circ} 28'.0$  E. Ceram Sea. Surface.

Acartia erythraea.	Megacalanus gracilis.
Candacia simplex.	Paracalanus parvus.
Candacia truncata.	Pleuromamma abdominalis.
Chirundina streetsi.	Pontellina plumata.
Copilia mirabilis.	Rhincalanus cornutus.
Eucalanus mucronatus	Sapphirina opalina.
Eucalanus subcrassus.	Sapphirina ovatolanceolata.
Euchaeta concinna.	Scolecithrix danae.
Euchirella hessei.	Undinula darwini.
Labidocera acuta.	Undinula vulgaris.

20 Species.

STATION 184, September 11 & 12, 1899. Lat.  $3^{\circ} 20'.0$  S., Long.  $127^{\circ} 33'.0$  E. Anchorage off Kampong Kelang, South Coast of Manipa Island. Night.

Acrocalanus gibber.	Candacia truncata.
Acrocalanus longicornis.	Canthocalanus pauper.
Calanopia elliptica.	Centropages furcatus.
Calanopia minor.	Clausocalanus furcatus.
Calanus minor.	Copilia mirabilis.
Calocalanus plumulosus.	Copilia quadrata.
Candacia bradyi.	Corycaeus gibbulus.
Candacia curta.	Corycaeus obtusus.
Candacia pachydactyla.	Corycaeus speciosus.

*Eucalanus crassus.*  
*Eucalanus dentatus* n. sp.  
*Eucalanus mucronatus.*  
*Eucalanus subcrassus.*  
*Eucalanus subtenuis.*  
*Euchaeta concinna.*  
*Euchaeta marina.*  
*Euchaeta wolfendeni* n. sp.  
*Labidocera acuta.*  
*Lophothrix frontalis.*  
*Lucicutia clausi.*  
*Lucicutia flavicornis.*  
*Mecynocera clausi.*  
*Metacalanus aurivillii.*  
*Oithona plumifera.*  
*Oncaea venusta.*  
*Paracalanus aculeatus.*  
*Paracalanus parvus.*

*Pleuromamma xiphias.*  
*Pontellopsis armata.*  
*Rhincalanus cornutus.*  
*Sapphirina bicuspidata.*  
*Sapphirina intestinata.*  
*Sapphirina nigromaculata.*  
*Sapphirina sinuicauda.*  
*Sapphirina stellata.*  
*Scottocalanus farrani* n. sp.  
*Scottocalanus securifrons.*  
*Scottocalanus setosus* n. sp.  
*Scolecithrix danae.*  
*Temora discaudata.*  
*Temora turbinata.*  
*Temoropia mayumbaensis.*  
*Undinula darwini.*  
*Undinula vulgaris.*

53 Species.

STATION 185, September 12, 1899. Lat. 3° 20'.0 S., Long. 127° 22'.9 E. Manipa Strait. HENSEN Vertical Net, from 1536 metres to surface.

*Acartia erythraea.*  
*Acartia negligens.*  
*Acrocalanus longicornis.*  
*Ætideus bradyi* n. sp.  
*Ætideus giesbrechti.*  
*Augaptilus longicaudatus.*  
*Brachycalanus gigas* n. sp.  
*Calanoides brevicornis.*  
*Calanopia elliptica.*  
*Candacia bradyi.*  
*Candacia catula.*  
*Candacia curta.*  
*Candacia simplex.*  
*Canthocalanus pauper.*  
*Centropages furcatus.*  
*Chiridius poppei.*  
*Chirundina streetsi.*  
*Clausocalanus arcuicornis.*  
*Clausocalanus furcatus.*  
*Conaea gracilis.*  
*Copilia mirabilis.*  
*Copilia quadrata.*  
*Corycaeus elongatus.*  
*Corycaeus obtusus.*  
*Corycaeus speciosus.*  
*Corycaeus venustus.*  
*Eucalanus mucronatus.*  
*Eucalanus subcrassus.*  
*Enchaeta concinna.*  
*Euchaeta marina.*  
*Euchaeta media.*  
*Euchaeta tenuis.*  
*Euchirella curticauda.*

*Euchirella dentata* n. sp.  
*Euchirella dubia* n. sp.  
*Euchirella granulata* n. sp.  
*Euchirella hessei.*  
*Euchirella messinensis.*  
*Euchirella pulchra.*  
*Euchirella venusta.*  
*Gaetanus miles.*  
*Haloptilus spiniceps.*  
*Heterorhabdus spinifrons.*  
*Lophothrix frontalis.*  
*Lucicutia flavicornis.*  
*Lucicutia grandis.*  
*Megacalanus princeps.*  
*Megacalanus robustior.*  
*Metridia brevicauda.*  
*Metridia princeps.*  
*Oithona plumifera.*  
*Oncaea venusta.*  
*Onchocalanus cristatus.*  
*Onchocalanus hirtipes.*  
*Oxycalanus semispinus* n. sp.  
*Pachysoma punctatum.*  
*Paracalanus aculeatus.*  
*Paracalanus parvus.*  
*Paracuchaeta californica.*  
*Paracuchaeta weberi* n. sp.  
*Paraugaptilus similis* n. sp.  
*Phaenna spinifera.*  
*Phyllopus bidentatus.*  
*Pleuromamma abdominalis.*  
*Pleuromamma gracilis.*  
*Pleuromamma xiphias.*

Pontellina plumata.  
Rhincalanus cornutus.  
Rhincalanus gigas.  
Sapphirina angusta.  
Sapphirina auronitens.  
Sapphirina bicuspidata.  
Sapphirina darwini.  
Sapphirina gastrica.  
Sapphirina intestinata.  
Sapphirina metallina.  
Sapphirina nigromaculata.  
Sapphirina opalina.  
Sapphirina ovatolanceolata.  
Sapphirina sinuicauda.  
Sapphirina stellata.

Scaphocalanus magnus.  
Scolecithricella abyssalis.  
Scolecithricella marginata.  
Scolecithricella obtusifrons.  
Scolecithrix danae.  
Scottocalanus farrani n. sp.  
Scottocalanus securifrons.  
Scottocalanus setosus n. sp.  
Temora discaudata.  
Temora turbinata.  
Temoropia mayumbaensis.  
Tortanus barbatus.  
Tortanus murrayi n. sp.  
Undinula darwini.  
Undinula vulgaris.

96 Species.

STATION 186, September 12, 1899. Lat.  $3^{\circ} 10'.5$  S., Long.  $127^{\circ} 20.5'$  E. Manipa Strait. Surface.

Calanus minor.  
Candacia truncata.  
Canthocalanus pauper.  
Corycaeus gibbulus.  
Eucalanus mucronatus.  
Euchaeta concinna.  
Oncaea venusta.  
Paracalanus aculeatus.

Pontellina plumata.  
Pontellopsis armata.  
Sapphirina bicuspidata.  
Scolecithrix danae.  
Temora discaudata.  
Undinula caroli.  
Undinula darwini.

15 Species.

STATION 189<sup>a</sup>, September 12, 1899. Lat.  $2^{\circ} 22'.0$  S., Long.  $126^{\circ} 46'.0$  E. Ceram Sea. Surface, evening.

Candacia bradyi.  
Candacia discaudata n. sp.  
Candacia curta.  
Candacia pachydactyla.  
Candacia simplex.  
Candacia truncata.  
Canthocalanus pauper.  
Copilia mirabilis.  
Corycaeus danae.  
Eucalanus crassus.  
Eucalanus mucronatus.  
Eucalanus subcrassus.  
Eucalanus subtenuis.  
Euchaete concinna.  
Euchaeta marina.  
Euchaeta wolfendeni n. sp.  
Labidocera acuta.  
Labidocera kroyeri.

Labidocera minuta.  
Megacalanus gracilis.  
Megacalanus robustior.  
Pleuromamma abdominalis.  
Pleuromamma gracilis.  
Pleuromamma xiphias.  
Pontellina plumata.  
Pontellopsis armata.  
Rhincalanus cornutus.  
Sapphirina darwini.  
Sapphirina opalina.  
Sapphirina stellata.  
Scolecithrix danae.  
Temora discaudata.  
Undeuchaeta plumosa.  
Undinula darwini.  
Undinula vulgaris.

35 Species.

STATION 193, September 13 & 14, 1899. Lat.  $2^{\circ} 4'.7$  S., Long.  $126^{\circ} 4'.5$  E. Sanana Bay, East Coast of Sulu Besi. Surface.

Candacia pachydactyla.  
Eucalanus subcrassus.  
Oncaea venusta.  
Pontellopsis armata.  
Sapphirina auronitens.

Sapphirina sinuicauda.  
Sapphirina stellata.  
Scolecithrix danae.  
Temora discaudata.  
Undinula darwini.

10 Species.

STATIONS 194—7, September 15, 1899. Between Lat.  $1^{\circ}45'.3$  &  $1^{\circ}55'.0$  S. and Long  $126^{\circ}39'.0$  &  $127^{\circ}8'.3$  E. Banda Sea. Surface.

Calanus minor.	Labidocera madurae n. sp.
Candacia bradyi.	Megacalanus gracilis.
Candacia catula.	Oncaea venusta.
Candacia curta.	Paracalanus aculeatus.
Candacia pachydactyla.	Pleuromamma abdominalis.
Candacia simplex.	Pontella denticauda n. sp.
Canthocalanus pauper.	Pontellina plumata.
Copilia mirabilis.	Pontellopsis armata.
Corycaeus furcifer.	Pontellopsis krameri.
Corycaeus robustus.	Sapphirina darwini.
Eucalanus crassus.	Sapphirina sinuicauda.
Eucalanus mucronatus.	Sapphirina stellata.
Eucalanus subcrassus.	Scolecithrix danae.
Euchaeta marina.	Temora discaudata.
Labidocera acuta.	Undinula vulgaris.

30 Species.

STATION 203, September 19, 1899. Lat.  $3^{\circ}32'.5$  S., Long.  $124^{\circ}15'.5$  E. Banda Sea. Surface.

Candacia pachydactyla.	Mecynocera clausi.
Candacia truncata.	Oithona plumifera.
Clausocalanus furcatus.	Oncaea venusta.
Corycaeus robustus.	Pontella fera.
Corycaeus speciosus.	Pontella securifer.
Eucalanus mucronatus.	Pontellina plumata.
Eucalanus subcrassus.	Pontellopsis armata.
Eucalanus subtenuis.	Scolecithrix danae.
Euchaeta marina.	Temora discaudata.
Labidocera acuta.	Undinula darwini.
Labidocera detruncata.	Undinula vulgaris.
Labidocera madurae n. sp.	

23 Species.

STATION 203, September 19, 1899. Lat.  $3^{\circ}32'.5$  S., Long.  $124^{\circ}15'.5$  E. Banda Sea. HENSEN Vertical Net, from 1500 metres to surface.

Acartia danae.	Chirundina streetsi.
Acartia erythraea.	Clausocalanus arcuicornis.
Acartia negligens.	Clausocalanus furcatus.
Acartia spinicauda.	Conaea gracilis.
Acrocalanus gracilis.	Copilia mirabilis.
Acrocalanus longicornis.	Copilia quadrata.
Aegisthus mucronatus.	Corycaeus carinatus.
Ætideus armatus.	Corycaeus danae.
Ætideus bradyi n. sp.	Corycaeus flaccus.
Ætideus giesbrechti.	Corycaeus furcifer.
Arietellus setosus.	Corycaeus gibbulus.
Augaptilus longicaudatus.	Corycaeus obtusus.
Augaptilus palumboi.	Corycaeus speciosus.
Calanopia minor.	Corycaeus tenuis.
Calocalanus pavo.	Corycaeus venustus.
Candacia bipinnata.	Eucalanus mucronatus.
Candacia pachydactyla.	Eucalanus subcrassus.
Candacia truncata.	Eucalanus subtenuis.
Canthocalanus pauper.	Euchaeta acuta.
Centropages furcatus.	Euchaeta marina.
Centropages gracilis.	Euchaeta tenuis.

Euchirella galeata.  
 Euchirella hessei.  
 Euchirella messinensis.  
 Euchirella pulchra.  
 Euchirella venusta.  
 Gaidiopsis crassirostris n. sp.  
 Gaidius similis.  
 Haloptilus longicornis.  
 Haloptilus spiniceps.  
 Heterorhabdus longicornis.  
 Heterorhabdus spinifrons.  
 Labidocera madurae n. sp.  
 Lophothrix frontalis.  
 Lubbockia aculeata.  
 Lucicutia clausi.  
 Lucicutia flavicornis.  
 Mecynocera clausi.  
 Megacalanus gracilis.  
 Metacalanus aurivillii.  
 Metridia boeckii.  
 Metridia brevicauda.  
 Metridia princeps.  
 Metridia venusta.  
 Monacilla dubia n. sp.  
 Mormonilla phasma.  
 Oithona plumifera.  
 Oncaea media.  
 Oncaea venusta.

Oxycalanus semispinus n. sp.  
 Paracalanus aculeatus.  
 Paraugaptilus similis n. sp.  
 Phyllopus bidentatus.  
 Phyllopus giesbrechti n. sp.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pleuromamma xiphias.  
 Pontella cerami n. sp.  
 Rhincalanus cornutus.  
 Rhincalanus gigas.  
 Sapphirina auronitens.  
 Sapphirina darwini.  
 Sapphirina opalina.  
 Scaphocalanus magnus.  
 Scolecithricella abyssalis.  
 Scolecithricella bradyi.  
 Scolecithricella marginata.  
 Scolecithrix danae.  
 Scottocalanus securifrons.  
 Scottocalanus thomasi n. sp.  
 Temora discaudata.  
 Temoropia mayumbaensis.  
 Undeuchaeta plumosa.  
 Undinula darwini.  
 Undinula vulgaris.  
 Xanthocalanus agilis.

97 Species.

STATION 204, September 20, 1899. Lat.  $4^{\circ}20'.0$  S., Long.  $122^{\circ}58'.0$  E. Between Islands of Wowoni and Buton, North Entrance of Buton Strait. Surface.

Acrocalanus longicornis.  
 Calanus minor.  
 Candacia pachydactyla.  
 Candacia simplex.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Clausocalanus furcatus.  
 Copilia mirabilis.  
 Corycaeus danae.  
 Corycaeus obtusus.  
 Eucalanus crassus.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta marina.  
 Labidocera acuta.

Labidocera minuta.  
 Megacalanus gracilis.  
 Paracalanus parvus.  
 Pleuromamma gracilis.  
 Pontellopsis krameri.  
 Rhincalanus cornutus.  
 Rhincalanus gigas.  
 Sapphirina bicuspidata.  
 Sapphirina gastrica.  
 Sapphirina opalina.  
 Sapphirina ovatolanceolata.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Temora turbinata.  
 Undinula darwini.  
 Undinula vulgaris.

34 Species.

STATION 205, September 20, 1899. Lat.  $4^{\circ}57'.4$  S., Long.  $122^{\circ}43'.0$  E. Lohio Bay, Buton Strait. Night.

Acartia erythraea.  
 Acartia negligens.  
 Acrocalanus longicornis.  
 Calanopia elliptica.  
 Calanopia minor.

Calanopia thompsoni n. sp.  
 Candacia discaudata n. sp.  
 Candacia pachydactyla.  
 Candacia simplex.  
 Canthocalanus pauper.

Centropages furcatus.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Corycaeus obtusus.  
 Corycaeus venustus.  
 Eucalanus monachus.  
 Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta marina.  
 Labidocera acuta.  
 Labidocera minuta.  
 Lucicutia flavicornis.  
 Mecynocera clausi.

Metacalanus aurivillii.  
 Mormonilla phasma.  
 Oithona plumifera.  
 Oithona rigida.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Pontella fera.  
 Sapphirina opalina.  
 Temora discaudata.  
 Temora turbinata.  
 Undinula darwini.  
 Undinula vulgaris.

36 Species.

STATION 210<sup>a</sup>, September 24, 1899. Lat. 5° 26'.0 S., Long. 121° 18'.0 E. Banda Sea. Surface.

Acartia erythraea.  
 Acrocalanus longicornis.  
 Calanus minor.  
 Candacia pachydactyla.  
 Candacia simplex.  
 Corycaeus robustus.  
 Eucalanus mucronatus.  
 Euchaeta marina.

Oncaea venusta.  
 Pontellina plumata.  
 Pontellopsis krameri.  
 Rhincalanus gigas.  
 Temora discaudata.  
 Undinula caroli.  
 Undinula darwini.  
 Undinula vulgaris.

16 Species.

STATION 213, September 26, 1899. Lat. 6° 4'.7 S., Long. 120° 23'.5 E. Saleyer Anchorage. Surface.

Acartia erythraea.  
 Acartia negligens.  
 Acrocalanus gracilis.  
 Acrocalanus longicornis.  
 Calanopia elliptica.  
 Calanopia minor.  
 Calanopia thompsoni n. sp.  
 Calocalanus pavo.  
 Candacia curta.  
 Candacia pachydactyla.  
 Candacia simplex.  
 Centropages furcatus.  
 Centropages orsinii.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Clytemnestra rostrata.  
 Copilia mirabilis.  
 Corycaeus danae.  
 Corycaeus furcifer.  
 Corycaeus gibbulus.  
 Corycaeus lubbocki.  
 Corycaeus obtusus.  
 Corycaeus speciosus.  
 Corycaeus venustus.  
 Eucalanus mucronatus.  
 Euchaeta marina.  
 Euterpina acutifrons.  
 Ilyopsyllus affinis.  
 Labidocera acuta.  
 Labidocera kroyeri.

Labidocera madurae n. sp.  
 Labidocera minuta.  
 Lucicutia flavicornis.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Metacalanus aurivillii.  
 Oithona plumifera.  
 Oithona rigida.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Peltidium intermedium n. sp.  
 Pontella denticauda n. sp.  
 Pontella fera.  
 Pontellina plumata.  
 Pontellopsis armata.  
 Pontellopsis macronyx n. sp.  
 Pontellopsis regalis.  
 Pseudodiaptomus aurivillii.  
 Rhincalanus cornutus.  
 Sapphirina ovatolanceolata.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Tortanus brevipes n. sp.  
 Tortanus gracilis.  
 Tortanus murrayi n. sp.  
 Undinula darwini.  
 Undinula vulgaris.

59 Species.

STATION 214, October 27, 1899. Lat.  $6^{\circ}30'.0$  S., Long.  $121^{\circ}55'.0$  E. Banda Sea. Surface.

Acrocalanus longicornis.	Eucalanus subtenuis.
Candacia pachydactyla.	Labidocera acuta.
Canthocalanus pauper.	Oithona plumifera.
Centropages furcatus.	Scolecithrix danae.
Copilia mirabilis.	Temora discaudata.
Corycaeus furcifer.	Undinula darwini.

12 Species.

STATION 215<sup>a</sup>, October 29, 1899. Lat.  $6^{\circ}48'.9$  S., Long.  $122^{\circ}9'.0$  E. West 1000 M. distant from North point of Kabia Island reef. Surface.

Acrocalanus gibber.	Eucalanus subtenuis.
Acrocalanus longicornis.	Euchaeta marina.
Aegisthus mucronatus.	Gaetanus armiger.
Calanopia elliptica.	Labidocera acuta.
Calocalanus pavo.	Paracalanus aculeatus.
Candacia bradyi.	Pontella fera.
Candacia catula.	Pontellina plumata.
Candacia pachydactyla.	Pontellopsis armata.
Candacia simplex.	Sapphirina auronitens.
Canthocalanus pauper.	Sapphirina ovatolanceolata.
Clausocalanus arcuicornis.	Sapphirina scarlata.
Clausocalanus furcatus.	Sapphirina stellata.
Copilia mirabilis.	Scolecithrix danae.
Corycaeus danae.	Temora discaudata.
Corycaeus robustus.	Undeuchaeta intermedia.
Corycaeus speciosus.	Undinula darwini.
Eucalanus monachus.	Undinula vulgaris.
Eucalanus mucronatus.	

35 Species.

STATION 216, October 30, 1899. Lat.  $6^{\circ}49'.0$  S., Long.  $122^{\circ}43'.0$  E. Banda Sea. Fowler closing net from 975—415 metres depth.

Acrocalanus longicornis.	Oncaea venusta.
Aegisthus mucronatus.	Paracalanus aculeatus.
Calanopia elliptica.	Phyllopus bidentatus.
Candacia pachydactyla.	Pleuromamma abdominalis.
Copilia mirabilis.	Pleuromamma gracilis.
Corycaeus furcifer.	Pleuromamma xiphias.
Corycaeus gibbulus.	Pontellopsis armata.
Corycaeus obtusus.	Rhincalanus cornutus.
Corycaeus speciosus.	Scolecithrix danae.
Eucalanus crassus.	Scottocalanus securifrons.
Eucalanus mucronatus.	Temora discaudata.
Heterorhabdus papilliger.	Undeuchaeta plumosa.
Labidocera minuta.	Undinula darwini.
Macrosetella gracilis.	Undinula vulgaris.

28 Species.

STATION 217, October 31, 1899. Lat.  $6^{\circ}40'.6$  S., Long.  $123^{\circ}14'.7$  E. Banda Sea. Surface.

Corycaeus furcifer.	Pontellina plumata.
Euchaeta marina.	Pontellopsis armata.
Euchaeta wolfendeni n. sp.	Sapphirina nigromaculata.
Metridia princeps.	

7 Species.

STATION 217, October 31, 1899. Lat.  $6^{\circ}40'.6$  S., Long.  $123^{\circ}14'.7$  E. Banda Sea. Horizontal Cylinder.

Acartia danae.	Acrocalanus gibber.
Acartia negligens.	Acrocalanus gracilis.

Acrocalanus longicornis.  
 Acrocalanus monachus.  
 Calanopia minor.  
 Calanus minor.  
 Calocalanus pavo.  
 Calocalanus plumulosus.  
 Candacia catula.  
 Candacia pachydactyla.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Centropages gracilis.  
 Calusocalanus arcuicornis.  
 Calusocalanus furcatus.  
 Copilia mirabilis.  
 Corycaeus alatus.  
 Corycaeus danae.  
 Corycaeus furcifer.  
 Corycaeus gibbulus.  
 Corycaeus obtusus.  
 Corycaeus robustus.  
 Corycaeus speciosus.  
 Corycaeus venustus.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.

Eucalanus subtenuis.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Heterorhabdus spinifrons.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Metacalanus aurivillii.  
 Microsetella norvegica.  
 Microsetella rosea.  
 Oithona plumifera.  
 Oncaea minuta.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Paracalanus parvus.  
 Pontellina plumata.  
 Pontellopsis armata.  
 Sapphirina bicuspidata.  
 Sapphirina ovatolanceolata.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula caroli.  
 Undinula darwini.  
 Undinula vulgaris.

53 Species.

STATION 220, November 1—3, 1899. Lat. 5° 58'.0 S., Long. 124° 0'.0 E. Anchorage off Pasir Pandjang West Coast of Binongka. Surface.

Acrocalanus longicornis.  
 Candacia catula.  
 Candacia pachydactyla.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Eucalanus mucronatus.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Lucicutia flavicornis.  
 Megacalanus gracilis.  
 Oncaea venusta.  
 Paracalanus aculeatus.

Pontellina plumata.  
 Rhincalanus cornutus.  
 Sapphirina bicuspidata.  
 Sapphirina nigromaculata.  
 Sapphirina opalina.  
 Sapphirina scarlata.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula caroli.  
 Undinula darwini.  
 Undinula vulgaris.

24 Species.

STATION 220, November 1—3, 1899. Lat. 5° 58'.0 S., Long. 124° 0'.0 E. HENSEN Vertical Net, from 200 metres to surface. Banda Sea.

Acrocalanus longicornis.  
 Ætideus bradyi n. sp.  
 Ætideus giesbrechti.  
 Calocalanus pavo.  
 Candacia catula.  
 Candacia pachydactyla.  
 Candacia truncata.  
 Centropages furcatus.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Copilia mirabilis.  
 Copilia quadrata.

Copilia vitrea.  
 Corycaeus danae.  
 Corycaeus furcifer.  
 Corycaeus gibbulus.  
 Corycaeus obtusus.  
 Corycaeus speciosus.  
 Corycaeus venustus.  
 Eucalanus crassus.  
 Eucalanus mucronatus.  
 Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.

Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Haloptilus longicornis.  
 Haloptilus spiniceps.  
 Heterorhabdus spinifrons.  
 Labidocera acuta.  
 Lucicutia flavicornis.  
 Mecynocera clausi.  
 Megacalanus gracilis.  
 Metacalanus aurivillii.  
 Oithona plumifera.  
 Oncaea venusta.

Paracalanus aculeatus.  
 Pleuromamma xiphias.  
 Rhincalanus cornutus.  
 Sapphirina metallina.  
 Sapphirina ovatolanceolata.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Temora turbinata.  
 Temoropia mayumbaensis.  
 Undinula darwini.  
 Undinula vulgaris.

48 Species.

STATION 222, November 5, 1899. Lat.  $6^{\circ} 10'.0$  S., Long.  $125^{\circ} 35'.5$  E. Banda Sea. Surface.

Pontellopsis armata.

Sapphirina stellata.

2 Species.

STATION 223, November 6, 1899. Lat.  $5^{\circ} 44'.7$  S., Long.  $126^{\circ} 27'.3$  E. Banda Sea. Surface.

Acrocalanus longicornis.  
 Calanopia elliptica.  
 Candacia bradyi.  
 Candacia pachydactyla.  
 Clausocalanus arcuicornis.  
 Copilia mirabilis.  
 Corycaeus furcifer.  
 Corycaeus robustus.  
 Corycaeus speciosus.  
 Eucalanus mucronatus.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.

Labidocera acuta.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Pontellina plumata.  
 Pontellopsis armata.  
 Rhincalanus cornutus.  
 Sapphirina nigromaculata.  
 Sapphirina ovatolanceolata.  
 Scolecithrix danae.  
 Temora discaudata.  
 Undinula darwini.  
 Undinula vulgaris.

24 Species.

STATION 224, November 7, 1899. Lat.  $5^{\circ} 34'.0$  S., Long.  $127^{\circ} 4'.0$  E. Banda Sea. Surface.

Acrocalanus gracilis.  
 Calocalanus pavo.  
 Candacia pachydactyla.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Copilia mirabilis.  
 Corycaeus furcifer.  
 Corycaeus robustus.  
 Eucalanus mucronatus.

Euchaeta wolfendeni n. sp.  
 Labidocera acuta.  
 Oncaea venusta.  
 Pontellina plumata.  
 Pontellopsis armata.  
 Sapphirina gastrica.  
 Sapphirina stellata.  
 Scolecithrix danae.  
 Undinula darwini.  
 Undinula vulgaris.

21 Species.

STATION 225, November 8, 1899. Lat.  $5^{\circ} 28'.0$  S., Long.  $127^{\circ} 20'.4$  E. Banda Sea. Surface.

Acartia spinicauda.  
 Acrocalanus gracilis.  
 Calanoides brevicornis.  
 Candacia bradyi.  
 Candacia catula.  
 Candacia pachydactyla.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Clausocalanus arcuicornis.  
 Copilia mirabilis.  
 Corycaeus danae.

Corycaeus furcifer.  
 Corycaeus gibbulus.  
 Corycaeus robustus.  
 Eucalanus mucronatus.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Labidocera acuta.  
 Pleuromamma gracilis.  
 Sapphirina bicuspidata.  
 Sapphirina gastrica.  
 Sapphirina maculosa.

Sapphirina ovatolanceolata.  
Sapphirina stellata.  
Scolecithrix danae.  
Temora discaudata.

Temora turbinata.  
Undinula darwini.  
Undinula vulgaris.

29 Species.

STATION 226, November 11 & 12, 1899. Lat.  $5^{\circ}26'.7$  S., Long.  $127^{\circ}36'.5$  E. Washings from dredged material depth 1595 metres. Mid channel between the Lucipara and Schildpad Islands.

Alteuthella pygmaea n. sp.  
Alteuthella spinicauda n. sp.  
Amphiascus ceylonicus.  
Eupeltidium glabrum n. sp.  
Laophonte cornuta.  
Laophonte hirsuta.  
Lichomolgus anomalus n. sp.

Lichomolgus buddhensis.  
Lichomolgus elegans.  
Lichomolgus gigas.  
Paralichomolgus curticaudatus.  
Peltidium falcatum n. sp.  
Pseudanthessius weberi n. sp.

13 Species.

STATION 229, November 14 1899. Lat.  $4^{\circ}23'.0$  S., Long.  $128^{\circ}45'.5$  E. Banda Sea. Surface.

Acartia spinicauda.  
Acrocalanus gracilis.  
Acrocalanus longicornis.  
Calanopia elliptica.  
Calocalanus pavo.  
Candacia truncata.  
Canthocalanus pauper.  
Corycaeus gibbulus.  
Corycaeus obtusus.  
Corycaeus venustus.  
Eucalanus subcrassus.  
Euchaeta marina.  
Euchaeta wolfendeni n. sp.  
Labidocera acuta.

Labidocera minuta.  
Oncaea venusta.  
Paracalanus aculeatus.  
Paracalanus parvus.  
Pontella securifer.  
Pontellina plumata.  
Pontellopsis armata.  
Sapphirina scarlata.  
Scolecithrix danae.  
Temora discaudata.  
Temora turbinata.  
Undinula darwini.  
Undinula vulgaris.

27 Species.

STATION 230, November 14, 1899. Lat.  $3^{\circ}58'.0$  S., Long.  $128^{\circ}20'.0$  E. HENSEN Vertical Net, from 2000 metres to surface.

Acartia erythraea.  
Acrocalanus longicornis.  
Calanoides brevicornis.  
Chirundina streetsi.  
Clausocalanus arcuicornis.  
Clausocalanus furcatus.  
Conaea gracilis.  
Copilia mirabilis.  
Copilia quadrata.  
Corycaeus concinnus.  
Corycaeus danae.  
Corycaeus speciosus.  
Disseta palumboi.  
Disseta scopularis.  
Eucalanus mucronatus.  
Euchaeta concinna.  
Euchaeta marina.  
Euchaeta media.  
Euchaeta tenuis.  
Euchirella curticauda.  
Euchirella galeata.

Euchirella hessei.  
Gaetanus caudani.  
Gaetanus miles.  
Hermannella concinna n. sp.  
Lophothrix frontalis.  
Lucicutia bicornuta.  
Lucicutia clausi.  
Lucicutia flavicornis.  
Lucicutia longiserrata.  
Lucicutia maxima.  
Mesorhabdus truncatus n. sp.  
Metridia macrura.  
Oithona plumifera.  
Oithona rigida.  
Oxycalanus semispinus n. sp.  
Paracalanus aculeatus.  
Paracalanus parvus.  
Paraeuchaeta barbata.  
Paraeuchaeta bisinuata.  
Paraeuchaeta californica.  
Paraeuchaeta gracilicauda n. sp.

*Paraeuchaeta propinqua*.  
*Paraeuchaeta sarsi*.  
*Paraeuchaeta sibogae* n. sp.  
*Paraeuchaeta tonsa*.  
*Paraeuchaeta tuberculata* n. sp.  
*Paraeuchaeta weberi* n. sp.  
*Pleuromamma abdominalis*.  
*Pleuromamma gracilis*.  
*Rhincalanus cornutus*.  
*Rhincalanus gigas*.  
*Scolecithricella abyssalis*.

*Scolecithricella valida*.  
*Scottocalanus farrani* n. sp.  
*Scottocalanus setosus* n. sp.  
*Temora discaudata*.  
*Temora turbinata*.  
*Undeuchaeta major*.  
*Undeuchaeta plumosa*.  
*Undinula vulgaris*.  
*Valdiviella brevicornis*.  
*Valdiviella gigas*.

63 Species.

STATION 243, December 2, 1899. Lat.  $4^{\circ} 30.2$  S., Long.  $129^{\circ} 25'.0$  E. Banda Sea. HENSEN Vertical Net, from 1000 metres to surface.

*Acrocalanus gracilis*.  
*Acrocalanus longicornis*.  
*Calocalanus pavo*.  
*Chiridius poppei*.  
*Chirundina streetsi*.  
*Clausocalanus arcuicornis*.  
*Corycaeus danae*.  
*Corycaeus obtusus*.  
*Disseta palumboi*.  
*Eucalanus mucronatus*.  
*Euchaeta concinna*.  
*Euchaeta marina*.  
*Euchaeta tenuis*.  
*Euchirella galeata*.  
*Euchirella messinensis*.  
*Euchirella pulchra*.  
*Euchirella venusta*.  
*Gaetanus kruppii*.  
*Heterorhabdus longicornis*.  
*Heterorhabdus spinifrons*.  
*Lophothrix frontalis*.  
*Lucicutia flavicornis*.  
*Megacalanus gracilis*.  
*Megacalanus princeps*.  
*Oithona plumifera*.  
*Oncaea venusta*.  
*Metridia princeps*.

*Paracalanus aculeatus*.  
*Paracalanus parvus*.  
*Paraeuchaeta barbata*.  
*Paraeuchaeta bisinuata*.  
*Paraeuchaeta californica*.  
*Paraeuchaeta sibogae* n. sp.  
*Paraeuchaeta tonsa*.  
*Paraeuchaeta tuberculata* n. sp.  
*Paraeuchaeta weberi* n. sp.  
*Pleuromamma gracilis*.  
*Pleuromamma xiphias*.  
*Rhincalanus cornutus*.  
*Rhincalanus gigas*.  
*Scaphocalanus major*.  
*Scolecithricella abyssalis*.  
*Scolecithricella bradyi*.  
*Scolecithricella marginata*.  
*Scolecithrix danae*.  
*Scottocalanus farrani* n. sp.  
*Scottocalanus securifrons*.  
*Scottocalanus setosus* n. sp.  
*Temoropia mayumbaensis*.  
*Undeuchaeta plumosa*.  
*Undeuchaeta intermedia* n. sp.  
*Undinula darwini*.  
*Undinula vulgaris*.

53 Species.

STATION 245, December 3, 1899. Lat.  $4^{\circ} 16'.5$  S. Long.  $130^{\circ} 15'.8$  E. Banda Sea. Surface.

*Acartia negligens*.  
*Acrocalanus gracilis*.  
*Calanopia elliptica*.  
*Candacia pachydactyla*.  
*Centropages furcatus*.  
*Corycaeus obtusus*.  
*Corycaeus speciosus*.  
*Eucalanus mucronatus*.  
*Eucalanus subtenuis*.  
*Euchaeta concinna*.  
*Euchaeta marina*.  
*Euchaeta wolfendeni* n. sp.

*Gaidius similis*.  
*Labidocera acuta*.  
*Megacalanus gracilis*.  
*Megacalanus robustus*.  
*Pleuromamma abdominalis*.  
*Pleuromamma gracilis*.  
*Pontellina plumata*.  
*Pontellopsis armata*.  
*Pontellopsis macronyx* n. sp.  
*Scolecithrix danae*.  
*Temora discaudata*.  
*Temora turbinata*.

Undeuchaeta plumosa.  
Undinula darwini.

Undinula vulgaris.

27 Species.

STATION 252, December 8 & 9, 1899. Lat.  $5^{\circ}40'.7$  S., Long.  $132^{\circ}7'.0$  E. West Side of Taam Island. Night.

Acartia erythraea.  
Acartia negligens.  
Candacia discaudata n. sp.  
Candacia pachydactyla.  
Candacia simplex.  
Candacia truncata.  
Canthocalanus pauper.  
Copilia mirabilis.  
Copilia quadrata.  
Eucalanus crassus.  
Eucalanus mucronatus.  
Eucalanus subcrassus.  
Euchaeta concinna.  
Euchaeta marina.  
Euchaeta tenuis.  
Euchirella hessei.  
Gaidius similis.  
Haloptilus longicornis.

Labidocera acuta.  
Lucicutia flavicornis.  
Mecynocera clausi.  
Megacalanus gracilis.  
Metacalanus aurivillii.  
Oithona plumifera.  
Oncaea venusta.  
Paracalanus aculeatus.  
Paraeuchaeta bisinuata.  
Paraeuchaeta californica.  
Phaenna spinifera.  
Sapphirina intestinata.  
Sapphirina metallina.  
Sapphirina opalina.  
Sapphirina ovatolanceolata.  
Scolecithrix danae.  
Temora discaudata.  
Undinula vulgaris.

36 Species.

STATION 271, December 21, 1899. Lat.  $5^{\circ}46'.7$  S., Long.  $134^{\circ}0'.0$  E. Arafura Sea. Horizontal Cylinder towed for three hours at a speed of 7 knots.

Acrocalanus longicornis.  
Calanopia elliptica.  
Calanopia minor.  
Calocalanus pavo.  
Calocalanus plumulosus.  
Candacia pachydactyla.  
Canthocalanus pauper.  
Clausocalanus furcatus.  
Corycaeus elongatus.  
Corycaeus longistylis.  
Corycaeus lubbocki.  
Corycaeus obtusus.  
Corycaeus speciosus.  
Corycaeus tenuis.

Eucalanus mucronatus.  
Euchaeta marina.  
Microsetella norvegica.  
Microsetella rosea.  
Oithona plumifera.  
Oncena venusta.  
Paracalanus parvus.  
Pontellina plumata.  
Sapphirina bicuspidata.  
Sapphirina nigromaculata.  
Sapphirina sinuicauda.  
Scolecithrix danae.  
Temora discaudata.  
Undinula vulgaris.

28 Species.

STATION 273, December 23—26, 1899. Lat.  $5^{\circ}24'.0$  S., Long.  $134^{\circ}43'.0$  E. Washings from dredged material, depth 13 metres. Anchorage off Pulu Jedan. East West of Aru Islands (Pearl Banks).

Amphiascus ceylonicus.  
Amphiascus havelocki.  
Amphiascus hirsutus.  
Canuella curticaudata.  
Ceylonia armata.  
Cletodes linearis = (Orthopsyllus linearis).  
Eudactylopus latipes.  
Hersiliodes leggii.  
Idomene laticaudata.

Laophonte cornuta.  
Laophonte hirsuta.  
Longipedia scotti.  
Longipedia weberi n. sp.  
Peltidium exiguum n. sp.  
Peltidium minutum n. sp.  
Porcellidium brevicaudatum.  
Rhynchothalestris rufocincta.  
Rhynchothalestris similis n. sp.

18 Species.

STATION 276, January 9, 1900. Lat. 6°47'.5 S., Long. 128°40'.5 E. Banda Sea. HENSEN Vertical Net, from 750 metres to surface.

<i>Acartia erythraea</i> .	<i>Heterorhabdus clausi</i> .
<i>Acartia negligens</i> .	<i>Heterorhabdus longicornis</i> .
<i>Aegisthus mucronatus</i> .	<i>Heterorhabdus papilliger</i> .
<i>Ætideus armatus</i> .	<i>Heterorhabdus spinifrons</i> .
<i>Ætideus bradyi</i> n. sp.	<i>Labidocera acuta</i> .
<i>Ætideus giesbrechti</i> .	<i>Lophothrix frontalis</i> .
<i>Augaptilus bullifer</i> .	<i>Lucicutia flavicornis</i> .
<i>Augaptilus filigerus</i> .	<i>Lucicutia pera</i> n. sp.
<i>Augaptilus hecticus</i> .	<i>Mecynocera clausi</i> .
<i>Augaptilus longicaudatus</i> .	<i>Megacalanus gracilis</i> .
<i>Augaptilus validus</i> n. sp.	<i>Megacalanus robustior</i> .
<i>Bradyidius armatus</i> .	<i>Metacalanus aurivillii</i> .
<i>Calanoides brevicornis</i> .	<i>Metridia boeckii</i> .
<i>Calanopia elliptica</i> .	<i>Metridia brevicauda</i> .
<i>Calocalanus pavo</i> .	<i>Metridia venusta</i> .
<i>Candacia bipinnata</i> .	<i>Oithona plumifera</i> .
<i>Candacia catula</i> .	<i>Oncaea venusta</i> .
<i>Candacia pachydactyla</i> .	<i>Oxycalanus semispinus</i> n. sp.
<i>Candacia truncata</i> .	<i>Paracalanus aculeatus</i> .
<i>Canthocalanus pauper</i> .	<i>Paraeuchaeta bisinuata</i> .
<i>Centropages gracilis</i> .	<i>Paraeuchaeta californica</i> .
<i>Chiridius poppei</i> .	<i>Paraeuchaeta dentata</i> n. sp.
<i>Chirundina streetsi</i> .	<i>Paraeuchaeta gracilicauda</i> n. sp.
<i>Clausocalanus arcuicornis</i> .	<i>Paraeuchaeta tonsa</i> .
<i>Clausocalanus furcatus</i> .	<i>Paraeuchaeta tuberculata</i> n. sp.
<i>Conaea gracilis</i> .	<i>Paraeuchaeta spinifera</i> .
<i>Copilia mirabilis</i> .	<i>Paraeuchaeta weberi</i> n. sp.
<i>Copilia quadrata</i> .	<i>Phaenna spinifera</i> .
<i>Corycaeus danae</i> .	<i>Phyllopus bidentatus</i> .
<i>Corycaeus flaccus</i> .	<i>Phyllopus giesbrechti</i> n. sp.
<i>Corycaeus furcifer</i> .	<i>Pleuromamma abdominalis</i> .
<i>Corycaeus gibbulus</i> .	<i>Pleuromamma gracilis</i> .
<i>Corycaeus longistylis</i> .	<i>Pleuromamma xiphias</i> .
<i>Corycaeus obtusus</i> .	<i>Pontellina plumata</i> .
<i>Corycaeus speciosus</i> .	<i>Rhincalanus cornutus</i> .
<i>Eucalanus mucronatus</i> .	<i>Rhincalanus gigas</i> .
<i>Euchaeta marina</i> .	<i>Sapphirina gastrica</i> .
<i>Euchaeta wolfendeni</i> n. sp.	<i>Sapphirina metallina</i> .
<i>Euchirella curticauda</i> .	<i>Sapphirina opalina</i> .
<i>Euchirella galeata</i> .	<i>Sapphirina sinuicauda</i> .
<i>Euchirella hessei</i> .	<i>Scaphocalanus magnus</i> .
<i>Euchirella maxima</i> .	<i>Scolecithricella abyssalis</i> .
<i>Euchirella messinensis</i> .	<i>Scolecithricella bradyi</i> .
<i>Euchirella pulchra</i> .	<i>Scolecithrix danae</i> .
<i>Euchirella venusta</i> .	<i>Scottocalanus farrani</i> n. sp.
<i>Gaetanus caudani</i> .	<i>Scottocalanus securifrons</i> .
<i>Gaetanus hamatus</i> n. sp.	<i>Scottocalanus setosus</i> n. sp.
<i>Gaetanus kruppii</i> .	<i>Temora discaudata</i> .
<i>Gaetanus latifrons</i> .	<i>Temora turbinata</i> .
<i>Gaetanus miles</i> .	<i>Undeuchaeta plumosa</i> .
<i>Gaetanus minor</i> .	<i>Undinula darwini</i> .
<i>Haloptilus longicornis</i> .	<i>Undinula vulgaris</i> .

107 Species.

STATION 282, January, 15—17, 1900. Lat.  $8^{\circ}25'.2$  S., Long.  $127^{\circ}18'.4$  E. Anchorage between Nusa Besi and the N.E. point of Timor. Surface.

Acartia erythraea.	Euchaeta wolfendeni n. sp.
Acartia negligens.	Labidocera acuta.
Calanopia elliptica.	Labidocera bataviae n. sp.
Calanopia minor.	Labidocera detruncata.
Calanus minor.	Labidocera madurae n. sp.
Calanus tenuicornis.	Lucicutia flavicornis.
Calocalanus pavo.	Mecynocera clausi.
Calocalanus plumulosus.	Megacalanus gracilis.
Candacia bipinnata.	Metacalanus aurivillii.
Candacia catula.	Monstrilla inserta n. sp.
Candacia curta.	Oithona plumifera.
Candacia pachydactyla.	Oncaea venusta.
Candacia truncata.	Pontella denticauda n. sp.
Canthocalanus pauper.	Pontella fera.
Centropages calaninus.	Pontella securifer.
Centropages furcatus.	Pontellina plumata.
Centropages gracilis.	Rhincalanus cornutus.
Centropages orsinii.	Rhincalanus gigas.
Clausocalanus arcuicornis.	Sapphirina angusta.
Clausocalanus furcatus.	Sapphirina darwini.
Copilia mirabilis.	Sapphirina intestinata.
Copilia quadrata.	Sapphirina metallina.
Corycaeus furcifer.	Sapphirina opalina.
Corycaeus robustus.	Sapphirina ovatolanceolata.
Corycaeus speciosus.	Sapphirina stellata.
Eucalanus crassus.	Scolecithrix danae.
Eucalanus mucronatus.	Temora discaudata.
Eucalanus pileatus.	Undinula darwini.
Euchaeta concinna.	Undinula vulgaris.
Euchaeta marina.	

59 Species.

STATION 301, January 30, 1900. Lat.  $10^{\circ}38'$  S., Long.  $123^{\circ}25'.2$  E. Pepela Bay, East Coast of Rotti Island. Lichomolgus gracilipes n. sp. (on Nudibranch).

STATION 304, February 6—8, 1900. Lat.  $8^{\circ}35'.5$  S., Long.  $123^{\circ}31'.0$  E. Horizontal Cylinder towed over a distance of 36 miles. Savu Sea.

Acartia negligens.	Corycaeus obtusus.
Calanopia elliptica.	Corycaeus robustus.
Calanopia minor.	Corycaeus speciosus.
Calanus minor.	Eucalanus mucronatus.
Calocalanus pavo.	Euchaeta marina.
Calocalanus plumulosus.	Euterpina acutifrons.
Candacia catula.	Heterorhabdus spinifrons.
Candacia pachydactyla.	Labidocera acuta.
Candacia truncata.	Lucicutia flavicornis.
Centropages calaninus.	Macrosetella gracilis.
Centropages furcatus.	Mecynocera clausi.
Centropages orsinii.	Metacalanus aurivillii.
Clytemnestra rostrata.	Microsetella norvegica.
Copilia mirabilis.	Microsetella rosea.
Corycaeus danae.	Oncaea minuta.
Corycaeus gibbulus.	Oncaea venusta.
Corycaeus gracilicaudatus.	Paracalanus aculeatus.

Paracalanus parvus.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pleuromamma xiphias.  
 Sapphirina stellata.

Scolecithrix danae.  
 Temora discaudata.  
 Undinula darwini.  
 Undinula vulgaris.

43 Species.

STATION 315, February 17 & 18, 1900. Lat. 7° 28'.2 S., Long. 117° 28'.7 E. Anchorage East of Sailus Besar, Paternoster Islands. Night.

Acartia erythraea.  
 Acartia spinicauda.  
 Acrocalanus gibber.  
 Acrocalanus gracilis.  
 Acrocalanus longicornis.  
 Calanopia elliptica.  
 Calanopia minor.  
 Candacia bipinnata.  
 Candacia bradyi.  
 Candacia catula.  
 Candacia curta.  
 Candacia discaudata n. sp.  
 Candacia pachydactyla.  
 Candacia simplex.  
 Candacia truncata.  
 Canthocalanus pauper.  
 Centropages furcatus.  
 Clausocalanus arcuicornis.  
 Clausocalanus furcatus.  
 Conaea gracilis.  
 Copilia mirabilis.  
 Copilia quadrata.  
 Corycaeus danae.  
 Corycaeus elongatus.  
 Corycaeus gibbulus.  
 Corycaeus lubbocki.  
 Corycaeus obtusus.  
 Corycaeus tenuis.  
 Eucalanus crassus.  
 Eucalanus monachus.  
 Eucalanus mucronatus.  
 Eucalanus pileatus.

Eucalanus subcrassus.  
 Eucalanus subtenuis.  
 Euchaeta concinna.  
 Euchaeta marina.  
 Euchaeta wolfendeni n. sp.  
 Euchirella venusta.  
 Haloptilus spiniceps.  
 Heterorhabdus spinifrons.  
 Labidocera acuta.  
 Labidocera detruncata.  
 Labidocera kroyeri.  
 Labidocera madurae n. sp.  
 Labidocera minuta.  
 Lubbockia squillimana.  
 Lucicutia flavicornis.  
 Macrosetella gracilis.  
 Mecynocera clausi.  
 Metacalanus aurivillii.  
 Oithona plumifera.  
 Oncaea venusta.  
 Paracalanus aculeatus.  
 Pleuromamma abdominalis.  
 Pleuromamma gracilis.  
 Pontella securifer.  
 Pontellina plumata.  
 Rhincalanus cornutus.  
 Sapphirina bicuspidata.  
 Sapphirina opalina.  
 Scolecithrix danae.  
 Temora discaudata.  
 Temora turbinata.  
 Undinula vulgaris.

64 Species.

# SYSTEMATIC LIST

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*Erratum.* — Page 213, for Porcellidiidae read Porcellidiidae.

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<i>persecans</i> ( <i>Scolecithrix</i> ) . . . . .	111	propinquus (Pseudanthessius) . . . . .	269	Scolecithrix . . . . .	87
persecans (Scottocalanus) . . . . .	105	Pseudaetideus . . . . .	41	<i>Scolecithrix</i> . . . . .	86, 88—105
perspicax ( <i>Monops</i> ) . . . . .	171	Pseudanthessius . . . . .	267	scopularis (Disseta) . . . . .	134
perspicax ( <i>Pontella</i> ) . . . . .	171	<i>Pseudocalanus</i> . . . . .	37 & 39	scopularis ( <i>Heterorhabdus</i> ) . . . . .	134
perspicax ( <i>Pontellina</i> ) . . . . .	171	Pseudodiaptomus . . . . .	116	scopularis ( <i>Leuckartia</i> ) . . . . .	134
perspicax (Pontellopsis) . . . . .	171	Pseudothalestris . . . . .	217	scotti (Longipedia) . . . . .	196
pexa (Pontellopsis) . . . . .	173	pulchra ( <i>Euchaeta</i> ) . . . . .	56	<i>scotti</i> ( <i>Scolecithrix</i> ) . . . . .	86
Phaenna . . . . .	79	<i>pulchra</i> ( <i>Euchaeta</i> ) . . . . .	62	Scottocalanus . . . . .	103
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Phyllopus . . . . .	147	<i>punctata</i> (Pachysoma) . . . . .	262	securifer (Pontella) . . . . .	160
Phyllothalestris . . . . .	214	punctatum (Pachysoma) . . . . .	262	securifer ( <i>Pontellina</i> ) . . . . .	160
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placitus (Augaptilus) . . . . .	137	pygmaeus (Paracalanus) . . . . .	28	securifrons (Scottocalanus) . . . . .	104
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plumata ( <i>Pontella</i> ) . . . . .	175	regalis ( <i>Monops</i> ) . . . . .	171	serricaudatus (Pseudodiap- tomus) . . . . .	117
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plumifera (Oithona) . . . . .	194	regalis ( <i>Pontellina</i> ) . . . . .	171	setosus (Arietellus) . . . . .	142
plumosa (Undeuchaeta) . . . . .	62	regalis (Pontellopsis) . . . . .	171	<i>setosus</i> (Arietellus) . . . . .	143
plumosa ( <i>Undina</i> ) . . . . .	62	<i>Reticulina</i> . . . . .	202	setosus (Scottocalanus) . . . . .	108
plumosus (Haloptilus) . . . . .	141	Rhincalanus . . . . .	23	sibogae (Ameira) . . . . .	222
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	page		page		page
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simplex ( <i>Candacia</i> ) . . . . .	154	tenuicornis ( <i>Calanus</i> ) . . . . .	8	typica ( <i>Tydemanella</i> ) . . . . .	216
simplex ( <i>Cornucalanus</i> ) . . . . .	83	tenuimana ( <i>Candace</i> ) . . . . .	155	typicus ( <i>Bradycalanus</i> ) . . . . .	14
similis ( <i>Euchaeta hessei</i> var.) . . . . .	51	tenuimana ( <i>Candacia</i> ) . . . . .	155	typicus ( <i>Xanthocalanus</i> ) . . . . .	85
similis ( <i>Gaidius</i> ) . . . . .	51	tenuimana ( <i>Oncaea</i> ) . . . . .	242	Undeuchaeta . . . . .	60
<i>similis</i> ( <i>Labidocera kroyeri</i> var.) . . . . .	166	tenuipes ( <i>Scolecithricella</i> ) . . . . .	92	<i>Undina</i> . . . . .	16, 56, 62, 88 & 111
similis ( <i>Paraugaptilus</i> ) . . . . .	144	tenuipes ( <i>Scolecithrix</i> ) . . . . .	92	<i>Undinopsis</i> . . . . .	39
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spiniceps ( <i>Haloptilus</i> ) . . . . .	141	<i>tenuispinus</i> ( <i>Chiridius</i> ) . . . . .	51	valida ( <i>Scolecithricella</i> ) . . . . .	92
spiniceps ( <i>Hemicalanus</i> ) . . . . .	141	<i>Thalestris</i> . . . . .	214 & 215	valida ( <i>Scolecithrix</i> ) . . . . .	92
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spinifera ( <i>Euchaeta</i> ) . . . . .	75	thompsoni ( <i>Calanopia</i> ) . . . . .	178	venusta ( <i>Euchirella</i> ) . . . . .	57
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spinifrons ( <i>Heterochaeta</i> ) . . . . .	130	tonsa ( <i>Paraeuchaeta</i> ) . . . . .	72	venustus ( <i>Corycaeus</i> ) . . . . .	252
spinifrons ( <i>Heterorhabdus</i> ) . . . . .	130	Tortanus . . . . .	189	villosa ( <i>Pontellopsis</i> ) . . . . .	172
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squamatus ( <i>Augaptilus</i> ) . . . . .	138	truncata ( <i>Candace</i> ) . . . . .	155	violaceus ( <i>Centropages</i> ) . . . . .	115
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stellata ( <i>Sapphirina</i> ) . . . . .	259	truncata ( <i>Candacia</i> ) . . . . .	155	<i>vitreum</i> ( <i>Hyalophyllum</i> ) . . . . .	261
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strenua ( <i>Pontella</i> ) . . . . .	172	<i>tuberculata</i> ( <i>Candacia</i> ) . . . . .	156	vulgaris ( <i>Calanus</i> ) . . . . .	16
<i>strenua</i> ( <i>Pontella</i> ) . . . . .	171	<i>tuberculata</i> ( <i>Paraeuchaeta</i> ) . . . . .	76	vulgaris ( <i>Undina</i> ) . . . . .	16
strenua ( <i>Pontellina</i> ) . . . . .	172	tuberosum ( <i>Pachysoma</i> ) . . . . .	262	vulgaris ( <i>Undinula</i> ) . . . . .	16
strenua ( <i>Pontellopsis</i> ) . . . . .	172	<i>tumida</i> ( <i>Scolecithrix</i> ) . . . . .	89	weberi ( <i>Longipedia</i> ) . . . . .	196
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Temoropia . . . . .	119	tydemani ( <i>Scolecithricella</i> ) . . . . .	93	xiphias ( <i>Pleuromamma</i> ) . . . . .	124
		typica ( <i>Amalophora</i> ) . . . . .	85	xiphias ( <i>Pleuromma</i> ) . . . . .	124

PLATES

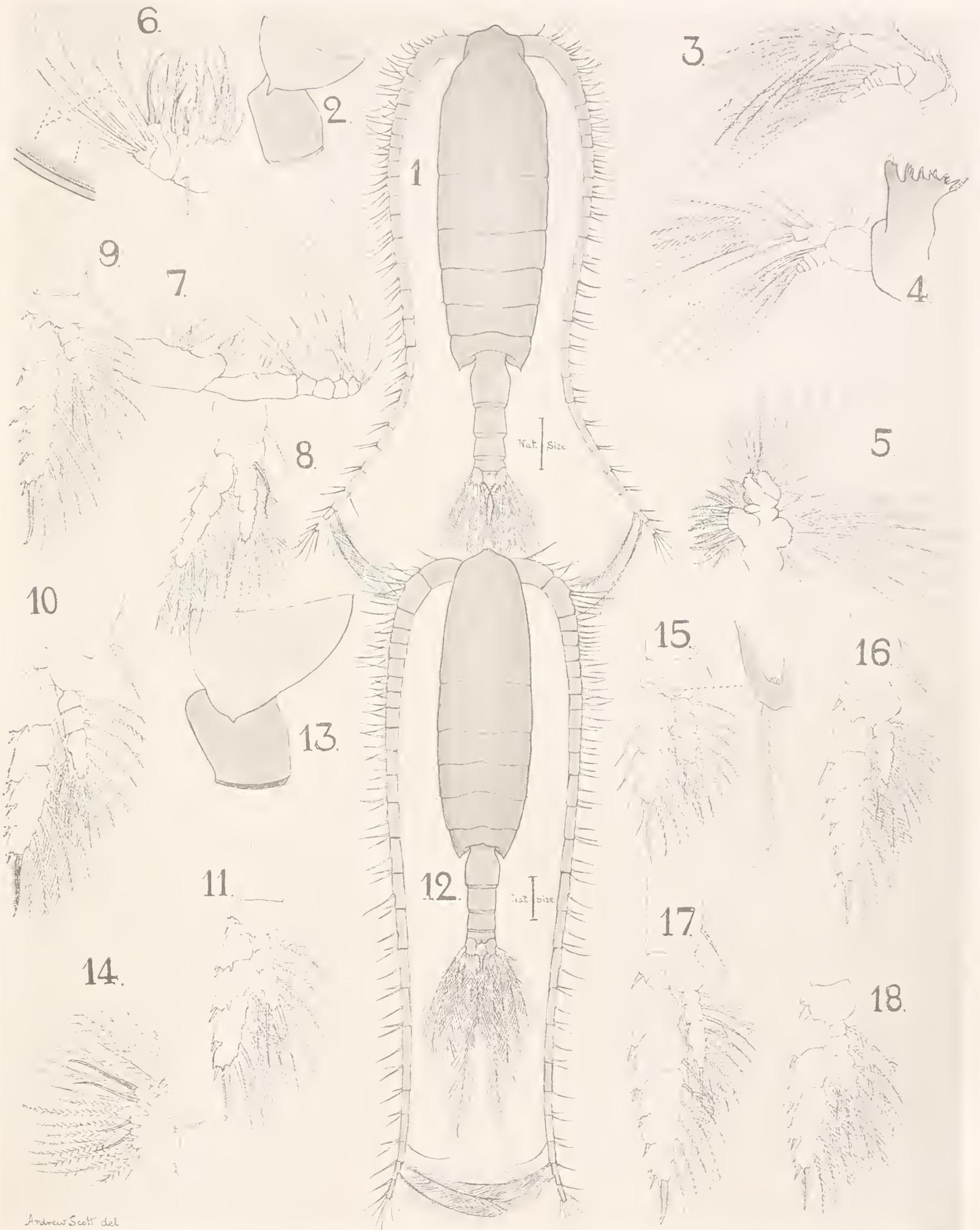
## PLATE I.

Figs. 1—11. *Bradycalanus typicus* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 9$ .
- Fig. 2. Female, last thoracic and first abdominal segments, left side.  $\times 18$ .
- Fig. 3. Female, antenna.  $\times 26$ .
- Fig. 4. Female, mandible and palp.  $\times 26$ .
- Fig. 5. Female, maxilla.  $\times 26$ .
- Fig. 6. Female, first maxilliped.  $\times 19$ , part of a terminal spine.  $\times 70$ .
- Fig. 7. Female, second maxilliped.  $\times 19$ .
- Fig. 8. Female, first foot.  $\times 22,5$ .
- Fig. 9. Female, second foot.  $\times 22,5$ .
- Fig. 10. Female, fourth foot.  $\times 22,5$ .
- Fig. 11. Female, fifth foot.  $\times 22,5$ .

Figs. 12—18. *Megacalanus princeps* Wolfenden.

- Fig. 12. Female, dorsal view.  $\times 9,5$ .
- Fig. 13. Female, last thoracic and first abdominal segments, left side.  $\times 33$ .
- Fig. 14. Female, first maxilliped.  $\times 19$ .
- Fig. 15. Female, first foot.  $\times 22,5$ .
- Fig. 16. Female, second foot.  $\times 22,5$ .
- Fig. 17. Female, third foot.  $\times 22,5$ .
- Fig. 18. Female, fifth foot.  $\times 22,5$ .



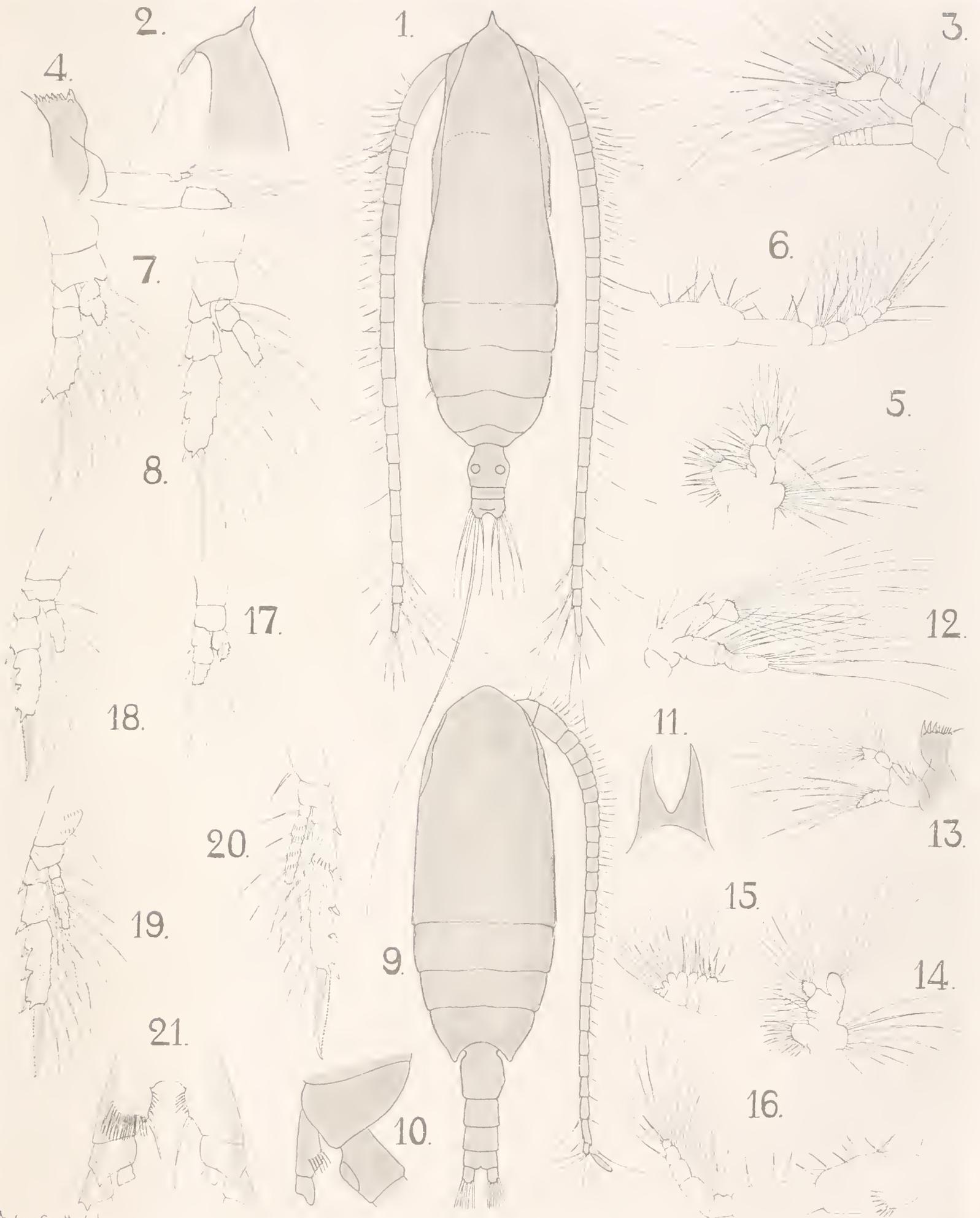
## PLATE II.

Figs. 1—8. *Eucalanus dentatus* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 45$ .
- Fig. 2. Female, head, lateral view.  $\times 60$ .
- Fig. 3. Female, antenna.  $\times 90$ .
- Fig. 4. Female, mandible and palp.  $\times 90$ .
- Fig. 5. Female, maxilla.  $\times 70$ .
- Fig. 6. Female, second maxilliped.  $\times 90$ .
- Fig. 7. Female, first foot.  $\times 111$ .
- Fig. 8. Female, fourth foot.  $\times 97$ .

Figs. 9—21. *Oxycalanus semispinus* nov. sp.

- Fig. 9. Female, dorsal view.  $\times 45$ .
- Fig. 10. Female, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 11. Female, rostrum.  $\times 195$ .
- Fig. 12. Female, antenna.  $\times 60$ .
- Fig. 13. Female, mandible and palp.  $\times 60$ .
- Fig. 14. Female, maxilla.  $\times 60$ .
- Fig. 15. Female, first maxilliped.  $\times 60$ .
- Fig. 16. Female, second maxilliped.  $\times 90$ .
- Fig. 17. Female, first foot.  $\times 60$ .
- Fig. 18. Female, second foot.  $\times 60$ .
- Fig. 19. Female, third foot.  $\times 60$ .
- Fig. 20. Female, fourth foot (right side).  $\times 60$ .
- Fig. 21. Female, fourth pair of feet, basal portion.  $\times 90$ .



Andrew Scott, del.



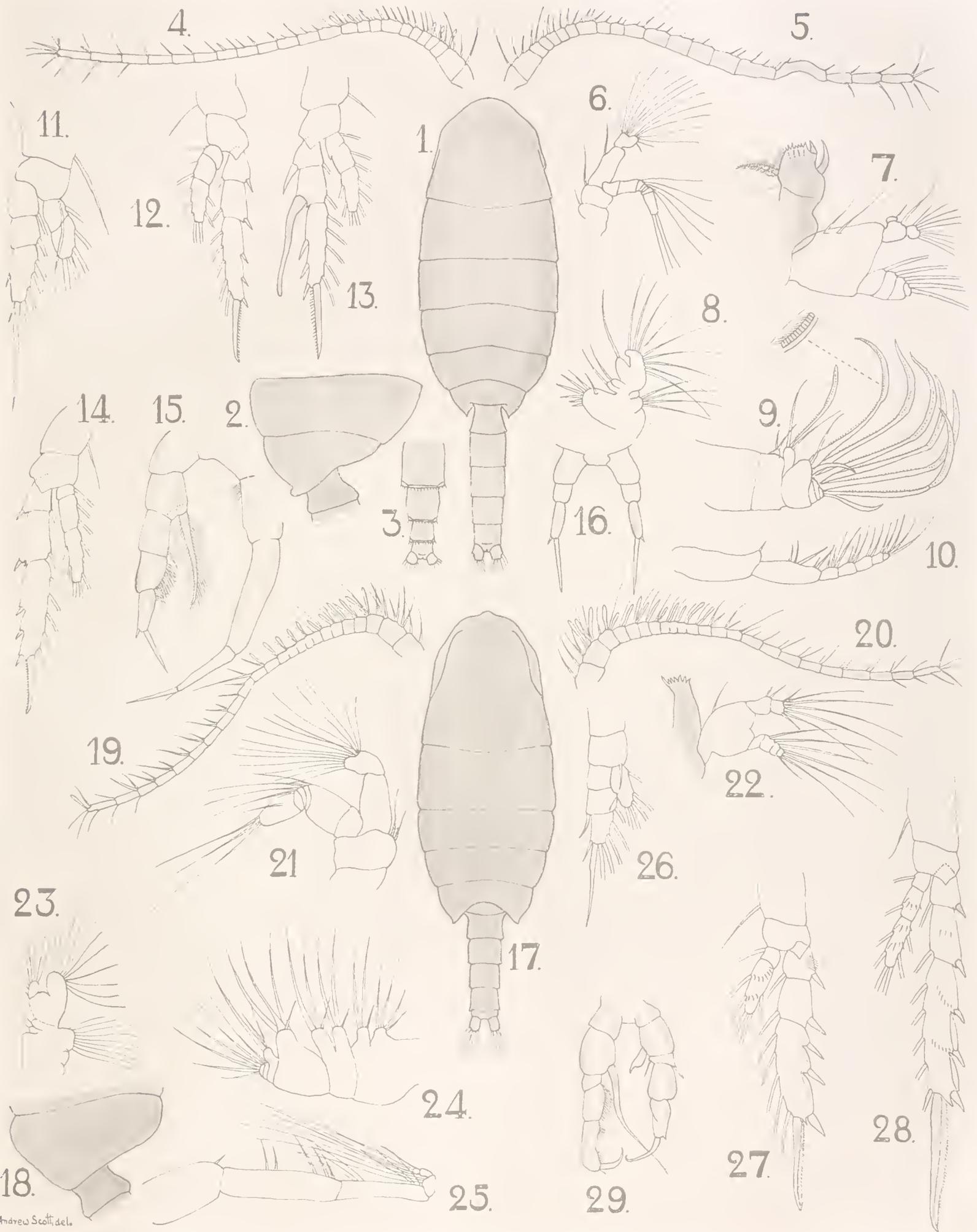
## PLATE III.

Figs. 1—16. *Bathypontia spinifera* nov. sp.

- Fig. 1. Male, dorsal view.  $\times 36$ .
- Fig. 2. Male, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 3. Female, abdomen, dorsal view.  $\times 36$ .
- Fig. 4. Female, antennule.  $\times 36$ .
- Fig. 5. Male, right antennule.  $\times 36$ .
- Fig. 6. Female, antenna.  $\times 36$ .
- Fig. 7. Female, mandible and palp.  $\times 90$ .
- Fig. 8. Female, maxilla.  $\times 60$ .
- Fig. 9. Female, first maxilliped.  $\times 60$ .
- Fig. 10. Female, second maxilliped.  $\times 60$ .
- Fig. 11. Female, first foot.  $\times 90$ .
- Fig. 12. Female, second foot.  $\times 60$ .
- Fig. 13. Male, second foot.  $\times 60$ .
- Fig. 14. Female, fourth foot.  $\times 60$ .
- Fig. 15. Male, fifth feet.  $\times 90$ .
- Fig. 16. Female, fifth feet.  $\times 90$ .

Figs. 17—29. *Monacilla dubia* nov. spec.

- Fig. 17. Male, dorsal view.  $\times 45$ .
- Fig. 18. Male, last thoracic and first abdominal segments.  $\times 90$ .
- Fig. 19. Male, right antennule.  $\times 45$ .
- Fig. 20. Male, left antennule.  $\times 45$ .
- Fig. 21. Male, antenna.  $\times 90$ .
- Fig. 22. Male, mandible and palp.  $\times 90$ .
- Fig. 23. Male, maxilla.  $\times 90$ .
- Fig. 24. Male, first maxilliped.  $\times 156$ .
- Fig. 25. Male, second maxilliped.  $\times 90$ .
- Fig. 26. Male, first foot.  $\times 90$ .
- Fig. 27. Male, second foot.  $\times 90$ .
- Fig. 28. Male, fourth foot.  $\times 90$ .
- Fig. 29. Male, fifth feet.  $\times 90$ .



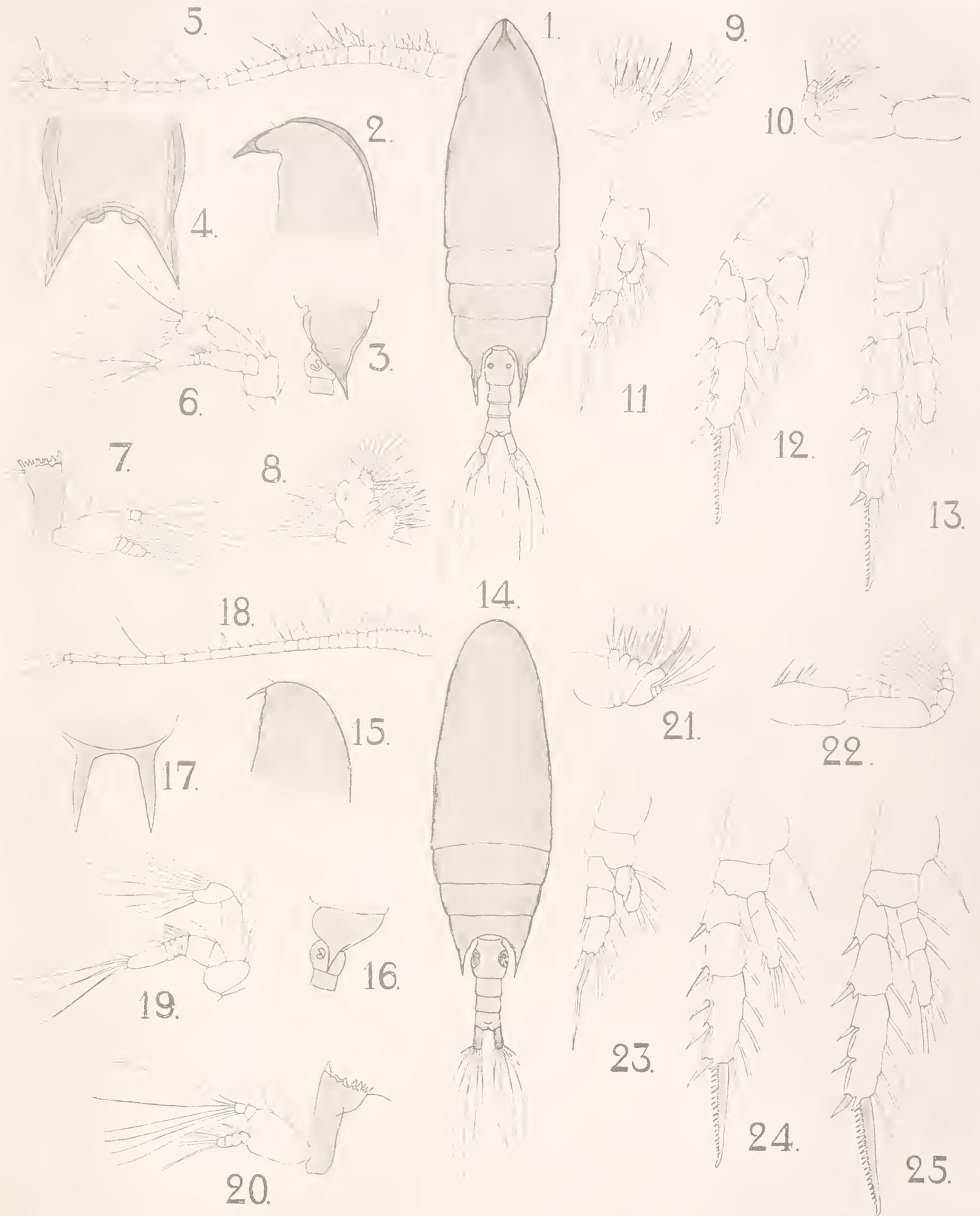
## PLATE IV.

Figs. 1—13. *Etideus giesbrechti* Cleve.

- Fig. 1. Female, dorsal view.  $\times 45$ .
- Fig. 2. Female, head, lateral view.  $\times 45$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 45$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 45$ .
- Fig. 6. Female, antenna  $\times 90$ .
- Fig. 7. Female, mandible and palp.  $\times 90$ .
- Fig. 8. Female, maxilla.  $\times 90$ .
- Fig. 9. Female, first maxilliped.  $\times 90$ .
- Fig. 10. Female, second maxilliped.  $\times 90$ .
- Fig. 11. Female, first foot.  $\times 120$ .
- Fig. 12. Female, second foot.  $\times 120$ .
- Fig. 13. Female, fourth foot.  $\times 120$ .

Figs. 14—25. *Etideus armatus* (Boeck).

- Fig. 14. Female, dorsal view.  $\times 45$ .
- Fig. 15. Female, head, lateral view.  $\times 45$ .
- Fig. 16. Female, last thoracic and first abdominal segments.  $\times 45$ .
- Fig. 17. Female, rostrum.  $\times 181$ .
- Fig. 18. Female, antennule.  $\times 45$ .
- Fig. 19. Female, antenna.  $\times 90$ .
- Fig. 20. Female, mandible and palp.  $\times 90$ .
- Fig. 21. Female, first maxilliped.  $\times 90$ .
- Fig. 22. Female, second maxilliped.  $\times 90$ .
- Fig. 23. Female, first foot.  $\times 120$ .
- Fig. 24. Female, second foot.  $\times 120$ .
- Fig. 25. Female, third foot.  $\times 120$ .



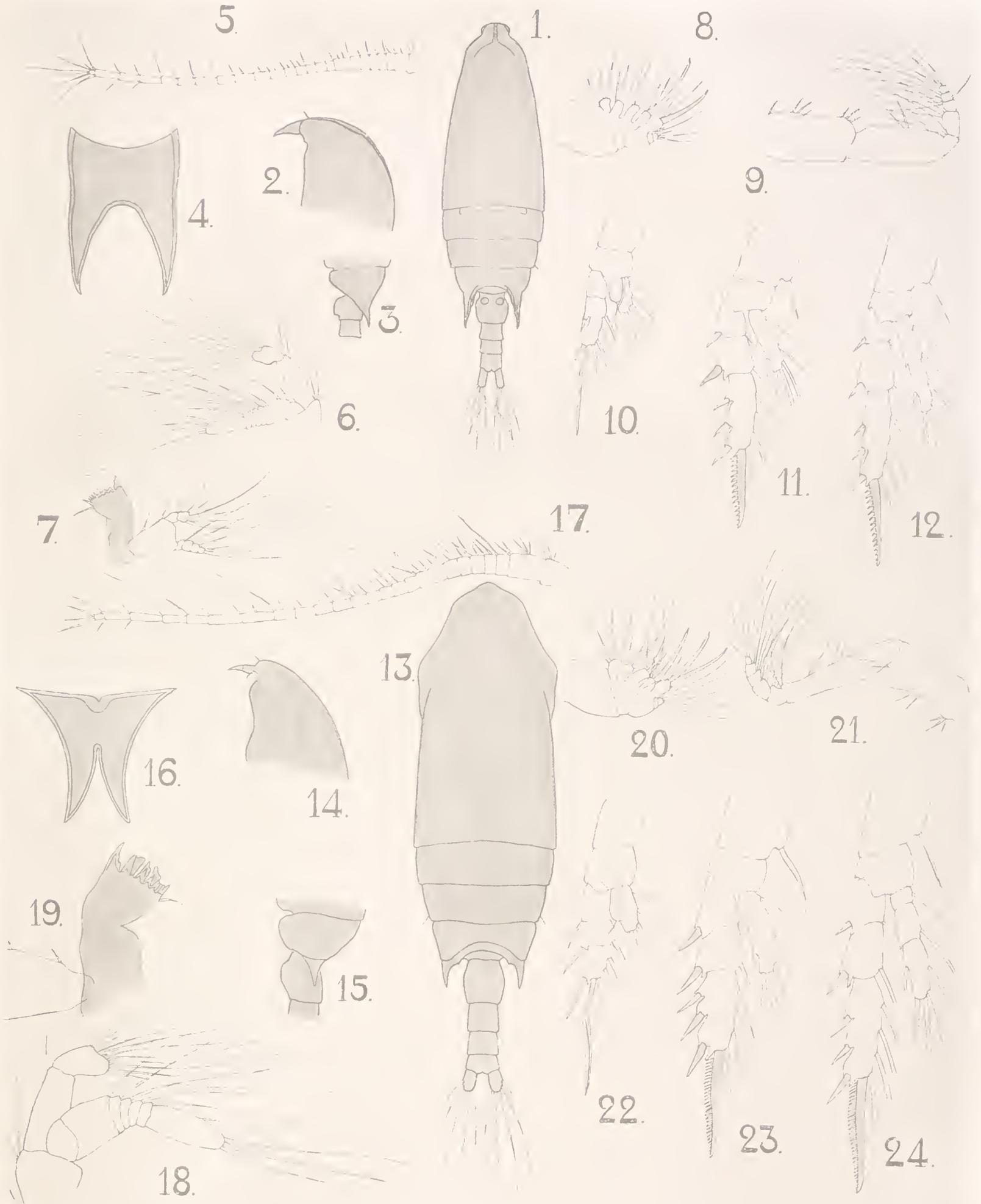
## PLATE V.

Figs. 1—12. *Etideus bradyi* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 45$ .
- Fig. 2. Female, head, lateral view.  $\times 45$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 45$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 45$ .
- Fig. 6. Female, antenna.  $\times 90$ .
- Fig. 7. Female, mandible and palp.  $\times 90$ .
- Fig. 8. Female, first maxilliped.  $\times 120$ .
- Fig. 9. Female, second maxilliped.  $\times 120$ .
- Fig. 10. Female, first foot.  $\times 120$ .
- Fig. 11. Female, second foot.  $\times 120$ .
- Fig. 12. Female, fourth foot.  $\times 120$ .

Figs. 13—24. *Etideopsis rostrata* G. O. Sars.

- Fig. 13. Female, dorsal view.  $\times 36$ .
- Fig. 14. Female, head, lateral view.  $\times 36$ .
- Fig. 15. Female, last thoracic and first abdominal segments.  $\times 36$ .
- Fig. 16. Female, rostrum.  $\times 260$ .
- Fig. 17. Female, antennule.  $\times 36$ .
- Fig. 18. Female, antenna.  $\times 90$ .
- Fig. 19. Female, mandible and palp.  $\times 90$ .
- Fig. 20. Female, first maxilliped.  $\times 60$ .
- Fig. 21. Female, second maxilliped.  $\times 60$ .
- Fig. 22. Female, first foot.  $\times 90$ .
- Fig. 23. Female, second foot.  $\times 90$ .
- Fig. 24. Female, fourth foot.  $\times 90$ .



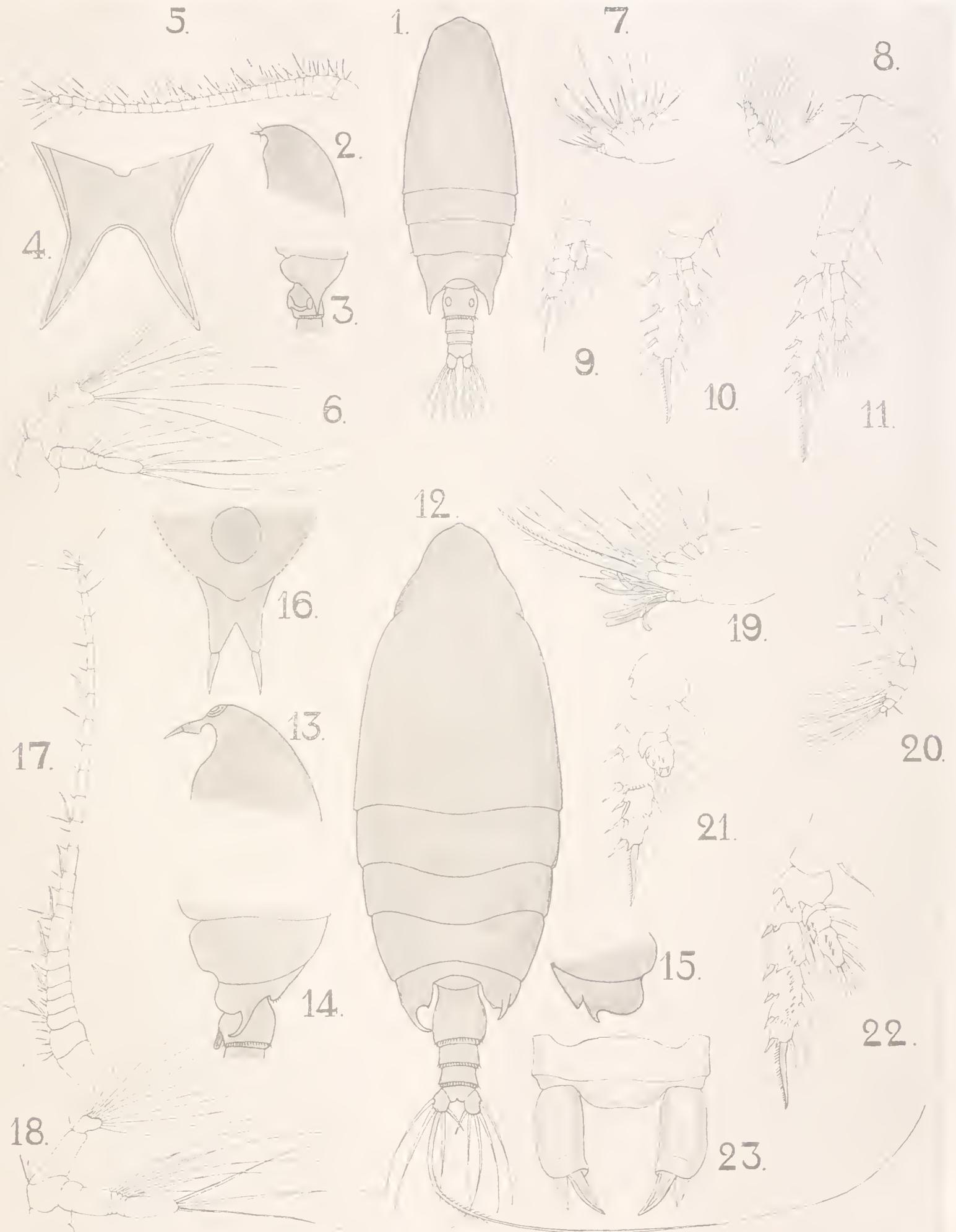
## PLATE VI.

Figs. 1—11. *Bradyidius armatus* (Brady).

- Fig. 1. Female, dorsal view.  $\times 45$ .
- Fig. 2. Female, head lateral view.  $\times 45$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 45$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 45$ .
- Fig. 6. Female, antenna.  $\times 120$ .
- Fig. 7. Female, first maxilliped.  $\times 90$ .
- Fig. 8. Female, second maxilliped.  $\times 90$ .
- Fig. 9. Female, first foot.  $\times 90$ .
- Fig. 10. Female, second foot.  $\times 90$ .
- Fig. 11. Female, fourth foot.  $\times 90$ .

Figs. 12—23. *Macandrewella joanae* nov. sp.

- Fig. 12. Female, dorsal view.  $\times 36$ .
- Fig. 13. Female, head, lateral view.  $\times 36$ .
- Fig. 14. Female, last thoracic and first abdominal segments, left side.  $\times 36$ .
- Fig. 15. Female, last thoracic segment, right side.  $\times 36$ .
- Fig. 16. Female, rostrum.  $\times 90$ .
- Fig. 17. Female, antennule.  $\times 36$ .
- Fig. 18. Female, antenna.  $\times 45$ .
- Fig. 19. Female, first maxilliped.  $\times 90$ .
- Fig. 20. Female, second maxilliped.  $\times 45$ .
- Fig. 21. Female, second foot.  $\times 45$ .
- Fig. 22. Female, fourth foot.  $\times 45$ .
- Fig. 23. Female, fifth feet.  $\times 390$ .



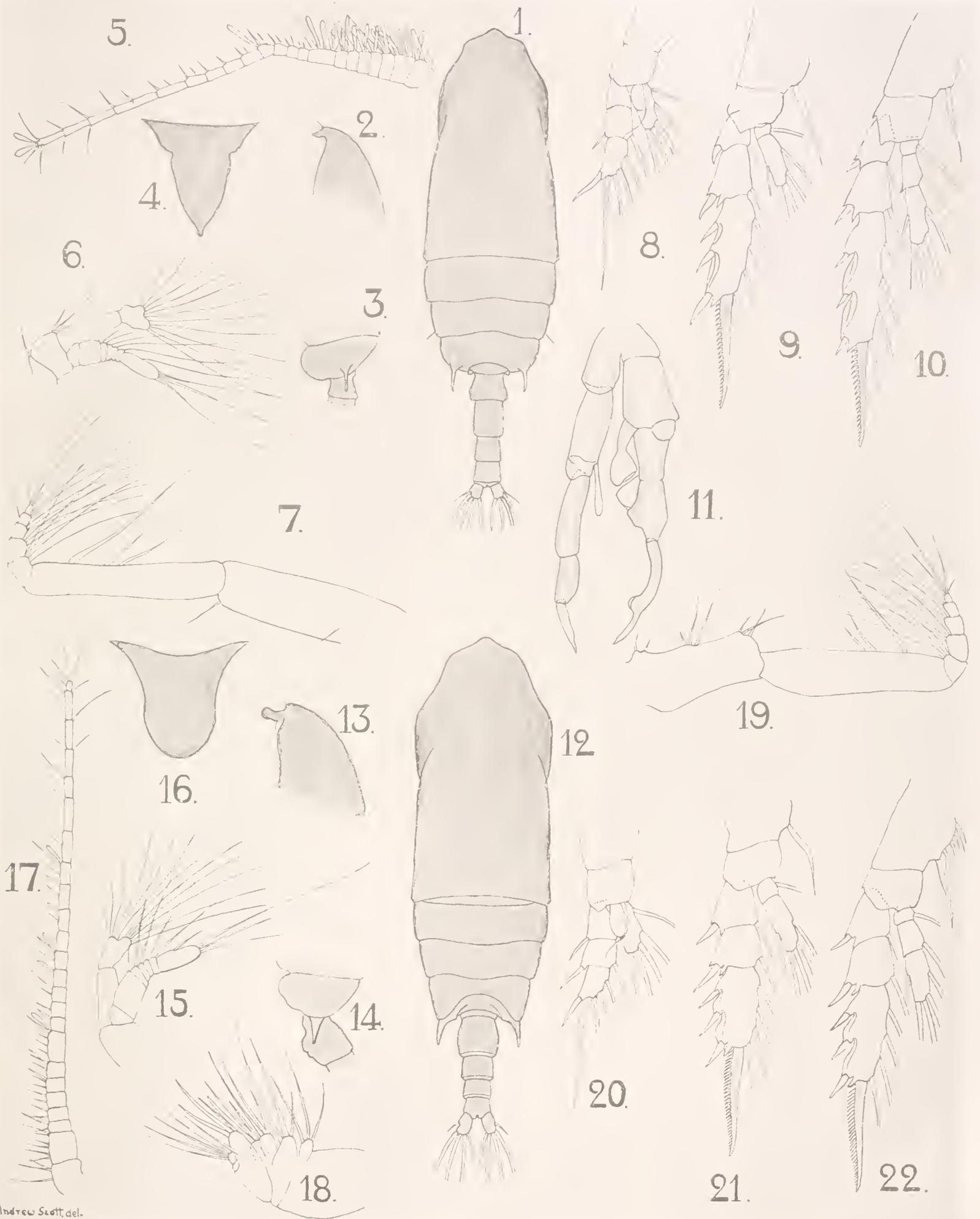
## PLATE VII.

Figs. 1—11. *Gaidius similis* (T. Scott).

- Fig. 1. Male, dorsal view.  $\times 36$ .
- Fig. 2. Male, head, lateral view.  $\times 36$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 36$ .
- Fig. 4. Male, rostrum.  $\times 520$ .
- Fig. 5. Male, antennule.  $\times 36$ .
- Fig. 6. Male, antenna.  $\times 60$ .
- Fig. 7. Male, second maxilliped.  $\times 120$ .
- Fig. 8. Male, first foot.  $\times 90$ .
- Fig. 9. Male, second foot.  $\times 90$ .
- Fig. 10. Male, fourth foot.  $\times 90$ .
- Fig. 11. Male, fifth feet.  $\times 90$ .

Figs. 12—22. *Gaidiopsis crassirostris* nov. sp.

- Fig. 12. Female, dorsal view.  $\times 36$ .
- Fig. 13. Female, head, lateral view.  $\times 36$ .
- Fig. 14. Female, last thoracic and first abdominal segments.  $\times 36$ .
- Fig. 15. Female, rostrum.  $\times 260$ .
- Fig. 16. Female, antennule.  $\times 36$ .
- Fig. 17. Female, antenna.  $\times 60$ .
- Fig. 18. Female, first maxilliped.  $\times 90$ .
- Fig. 19. Female, second maxilliped.  $\times 90$ .
- Fig. 20. Female, first foot.  $\times 90$ .
- Fig. 21. Female, second foot.  $\times 90$ .
- Fig. 22. Female, third foot.  $\times 90$ .



## PLATE VIII.

Figs. 1—8. *Gaetanus miles* Giesbrecht.

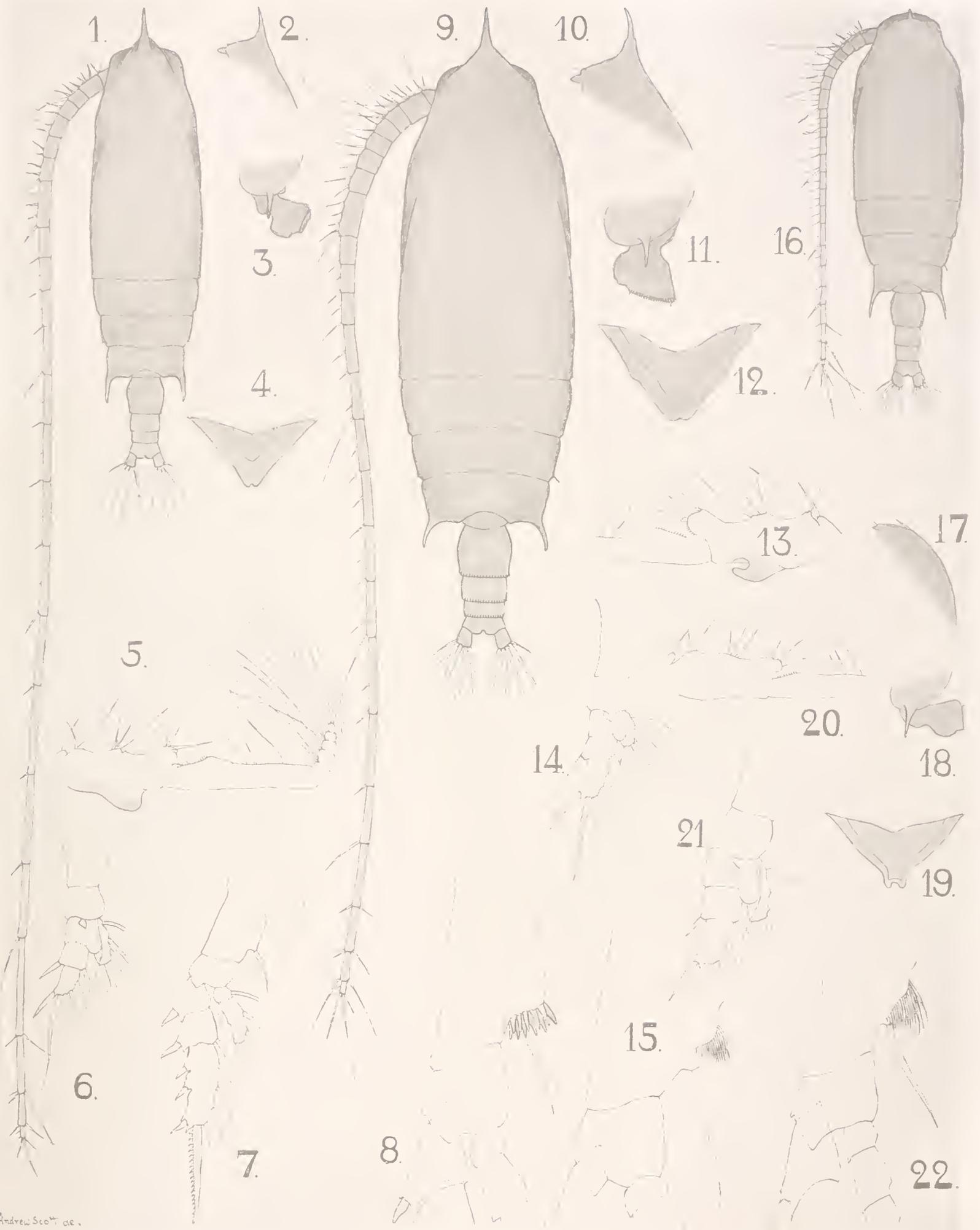
- Fig. 1. Female, dorsal view.  $\times 23,5$ .
- Fig. 2. Female, head, lateral view.  $\times 23,5$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 4. Female, rostrum.  $\times 260$ .
- Fig. 5. Female, second maxilliped.  $\times 60$ .
- Fig. 6. Female, first foot.  $\times 60$ .
- Fig. 7. Female, second foot.  $\times 60$ .
- Fig. 8. Female, fourth foot, basal portion only.  $\times 120$ .

Figs. 9—15. *Gaetanus caudani* Canu.

- Fig. 9. Female, dorsal view.  $\times 23,5$ .
- Fig. 10. Female, head, lateral view.  $\times 23,5$ .
- Fig. 11. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 12. Female, rostrum.  $\times 260$ .
- Fig. 13. Female, second maxilliped, basal portion only.  $\times 45$ .
- Fig. 14. Female, first foot.  $\times 45$ .
- Fig. 15. Female, fourth foot, basal portion only.  $\times 90$ .

Figs. 16—22. *Gaetanus armiger* Giesbrecht.

- Fig. 16. Female, dorsal view.  $\times 23,5$ .
- Fig. 17. Female, head, lateral view.  $\times 23,5$ .
- Fig. 18. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 19. Female, rostrum.  $\times 520$ .
- Fig. 20. Female, second maxilliped, basal portion only.  $\times 60$ .
- Fig. 21. Female, first foot.  $\times 90$ .
- Fig. 22. Female, fourth foot, basal portion only.  $\times 120$ .



## PLATE IX.

Figs. 1—8. *Gaetanus minor* Farran.

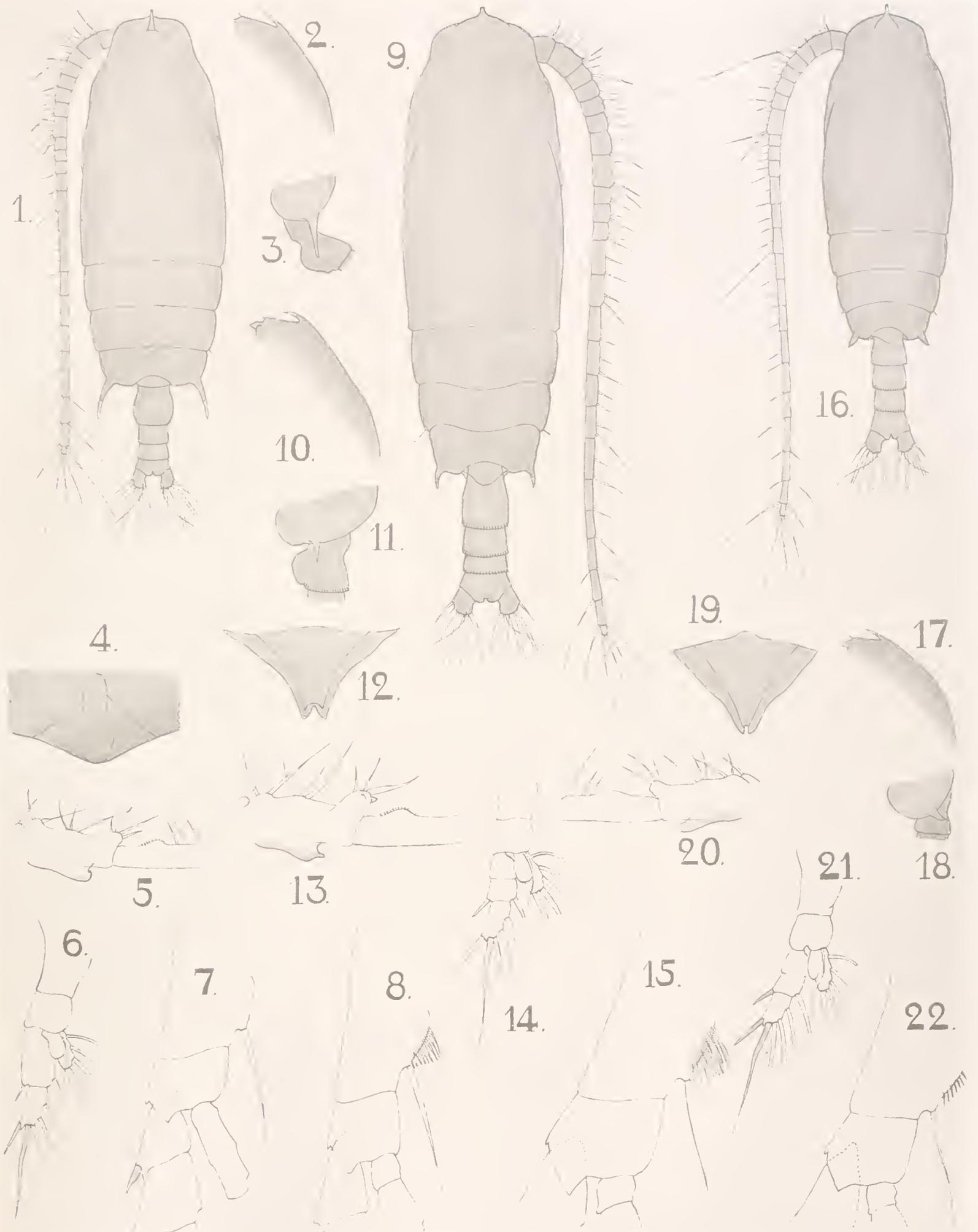
- Fig. 1. Female, dorsal view.  $\times 45$ .
- Fig. 2. Female, head, lateral view.  $\times 45$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 45$ .
- Fig. 4. Female, rostrum.  $\times 781$ .
- Fig. 5. Female, second maxilliped, basal portion only.  $\times 90$ .
- Fig. 6. Female, first foot.  $\times 120$ .
- Fig. 7. Female, second foot, basal portion only.  $\times 181$ .
- Fig. 8. Female, fourth foot, basal portion only.  $\times 181$ .

Figs. 9—15. *Gaetanus kruppii* Giesbrecht.

- Fig. 9. Female, dorsal view.  $\times 23,5$ .
- Fig. 10. Female, head, lateral view.  $\times 23,5$ .
- Fig. 11. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 12. Female, rostrum.  $\times 260$ .
- Fig. 13. Female, second maxilliped, basal portion only.  $\times 45$ .
- Fig. 14. Female, first foot.  $\times 45$ .
- Fig. 15. Female, fourth foot, basal portion only.  $\times 90$ .

Figs. 16—22. *Gaetanus hamatus* nov. sp.

- Fig. 16. Female, dorsal view.  $\times 23,5$ .
- Fig. 17. Female, head, lateral view.  $\times 23,5$ .
- Fig. 18. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 19. Female, rostrum.  $\times 90$ .
- Fig. 20. Female, second maxilliped, basal portion only.  $\times 45$ .
- Fig. 21. Female, first foot.  $\times 60$ .
- Fig. 22. Female, fourth foot, basal portion only.  $\times 90$ .



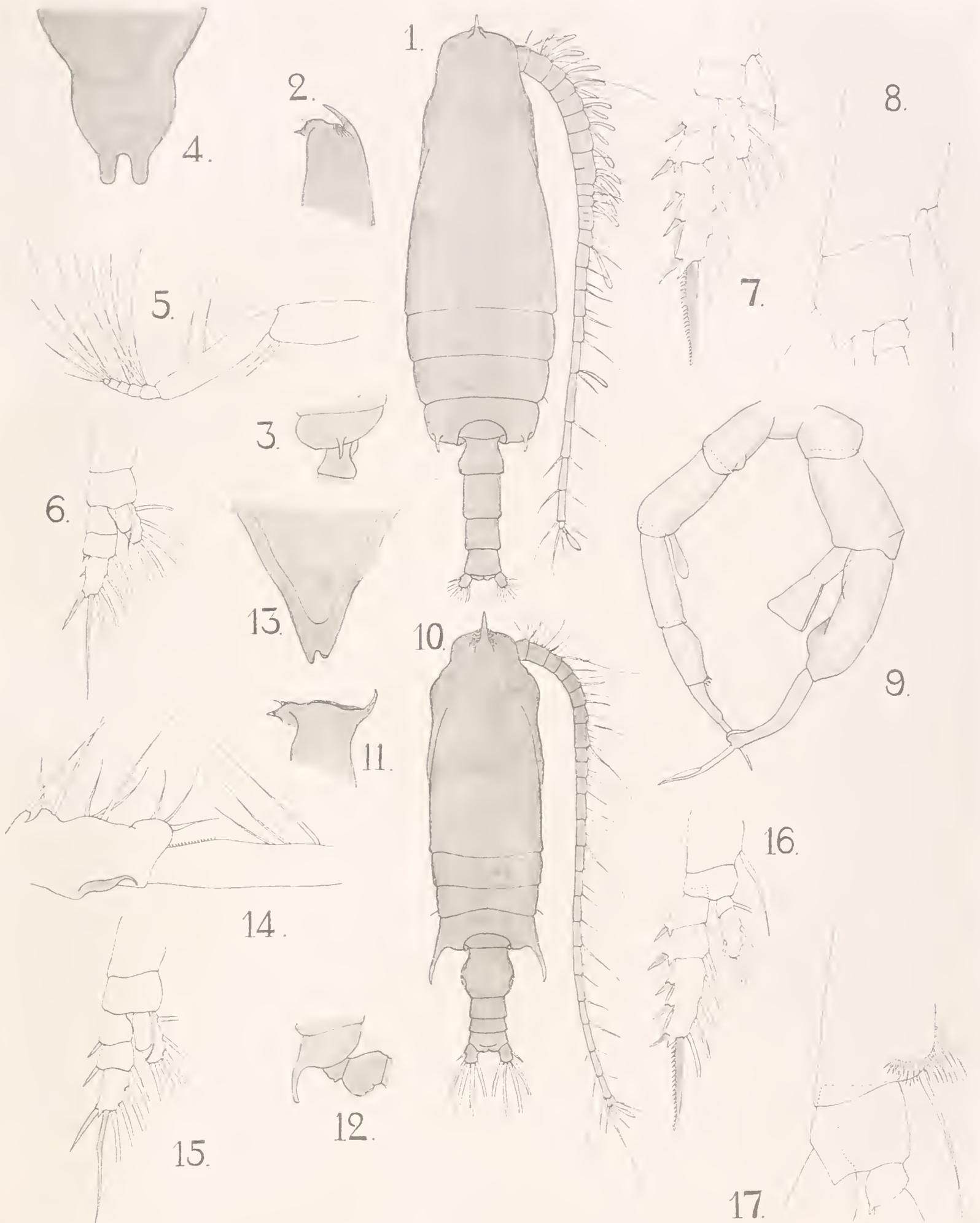
## PLATE X.

Figs. 1—9. *Gaetanus kruppii* Giesbrecht.

- Fig. 1. Male, dorsal view.  $\times 22,5$ .
- Fig. 2. Male, head, lateral view.  $\times 22,5$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 22,5$ .
- Fig. 4. Male, rostrum.  $\times 390$ .
- Fig. 5. Male, second maxilliped.  $\times 36$ .
- Fig. 6. Male, first foot.  $\times 45$ .
- Fig. 7. Male, second foot.  $\times 45$ .
- Fig. 8. Male, fourth foot, basal portion only.  $\times 90$ .
- Fig. 9. Male, fifth feet.  $\times 60$ .

Figs. 10—17. *Gaetanus latifrons* G. O. Sars.

- Fig. 10. Female, dorsal view.  $\times 18$ .
- Fig. 11. Female, head, lateral view.  $\times 18$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 18$ .
- Fig. 13. Female, rostrum<sup>\*</sup>.  $\times 520$ .
- Fig. 14. Female, second maxilliped, basal portion only.  $\times 60$ .
- Fig. 15. Female, first foot.  $\times 60$ .
- Fig. 16. Female, second foot.  $\times 45$ .
- Fig. 17. Female, fourth foot, basal portion only.  $\times 90$ .



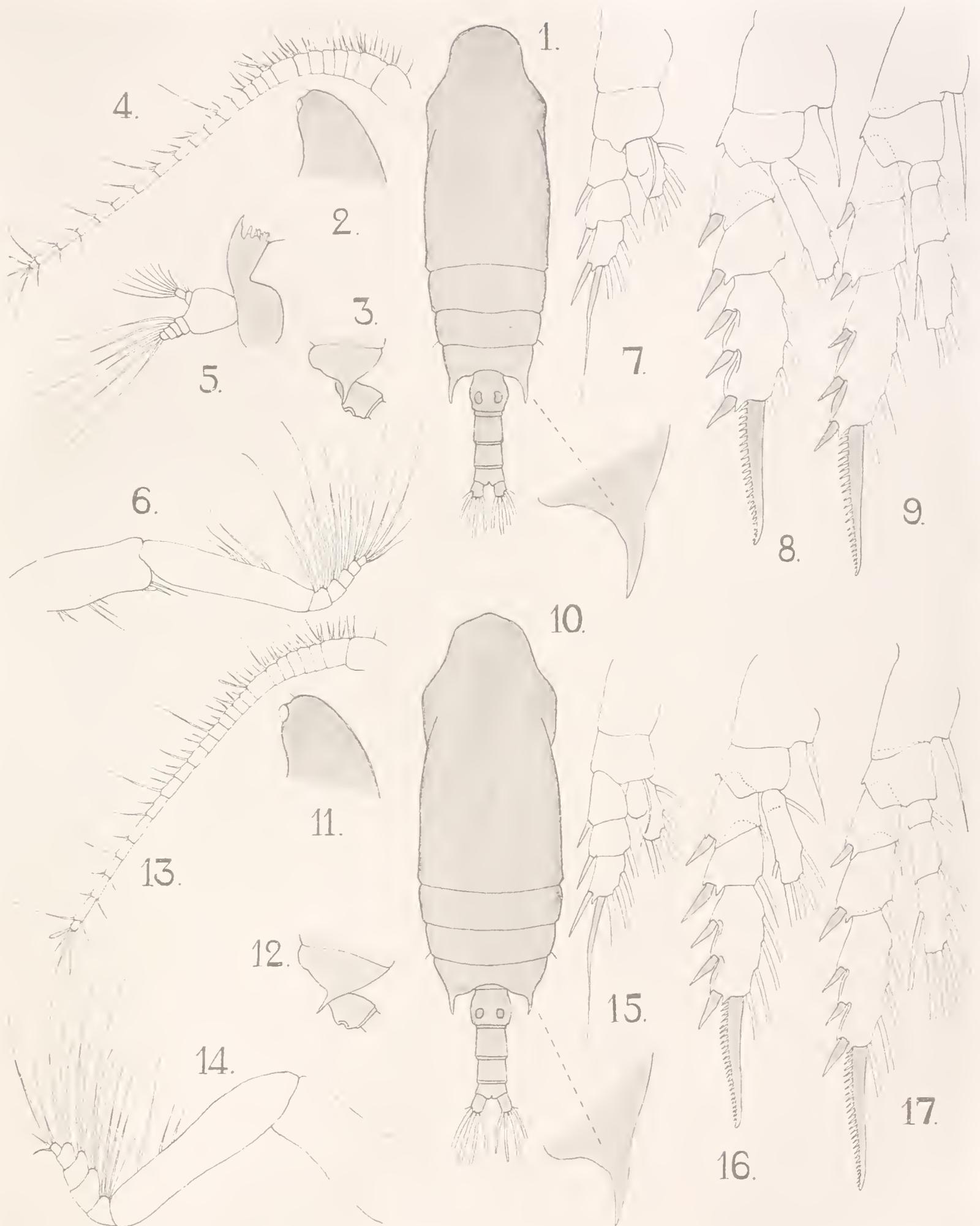
## PLATE XI.

Figs. 1—9. *Chiridius ? gracilis* Farran.

- Fig. 1. Female, dorsal view.  $\times 45$ .
- Fig. 2. Female, head, lateral view.  $\times 45$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 45$ .
- Fig. 4. Female, antennule.  $\times 60$ .
- Fig. 5. Female, mandible and palp.  $\times 90$ .
- Fig. 6. Female, second maxilliped.  $\times 120$ .
- Fig. 7. Female, first foot.  $\times 181$ .
- Fig. 8. Female, second foot.  $\times 181$ .
- Fig. 9. Female, fourth foot.  $\times 181$ .

Figs. 10—17. *Chiridius poppei* Giesbrecht.

- Fig. 10. Female, dorsal view.  $\times 60$ .
- Fig. 11. Female, head, lateral view.  $\times 60$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 13. Female, antennule.  $\times 60$ .
- Fig. 14. Female, second maxilliped.  $\times 181$ .
- Fig. 15. Female, first foot.  $\times 181$ .
- Fig. 16. Female, second foot.  $\times 181$ .
- Fig. 17. Female, fourth foot.  $\times 181$ .



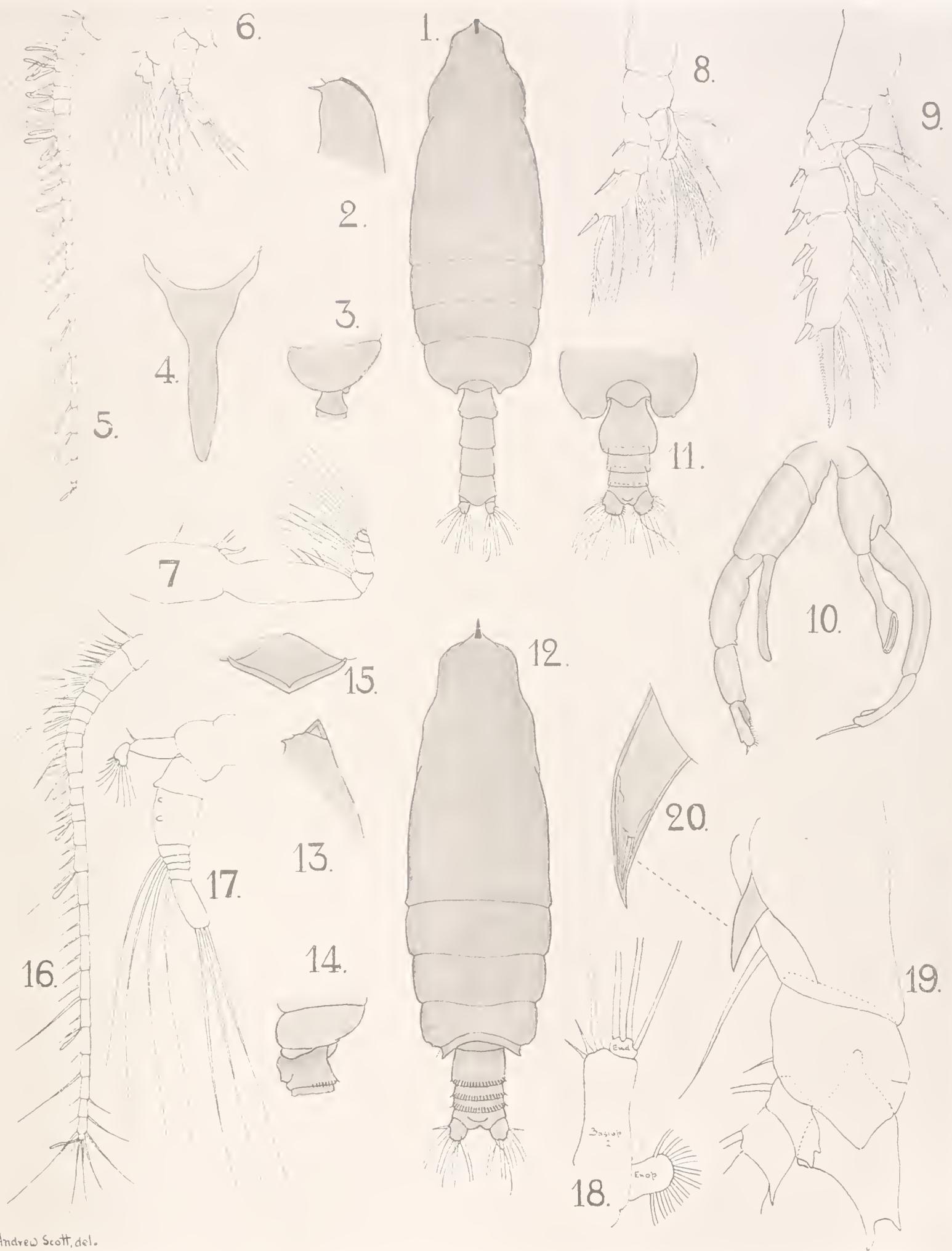
## PLATE XII.

Figs. 1—11. *Chirundina streetsi* Giesbrecht.

- Fig. 1. Male, dorsal view.  $\times 24,5$ .
- Fig. 2. Male, head, lateral view.  $\times 24,5$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 24,5$ .
- Fig. 4. Male, rostrum.  $\times 390$ .
- Fig. 5. Male, antennule.  $\times 24,5$ .
- Fig. 6. Male, antenna.  $\times 36$ .
- Fig. 7. Male, second maxilliped.  $\times 60$ .
- Fig. 8. Male, first foot.  $\times 60$ .
- Fig. 9. Male, second foot.  $\times 60$ .
- Fig. 10. Male, fifth feet.  $\times 45$ .
- Fig. 11. Female, last thoracic segment and abdomen, dorsal view.  $\times 24,5$ .

Figs. 12—20. *Euchirella maxima* Wolfenden.

- Fig. 12. Female, dorsal view.  $\times 16$ .
- Fig. 13. Female, head, lateral view.  $\times 16$ .
- Fig. 14. Female, last thoracic and first abdominal segments.  $\times 16$ .
- Fig. 15. Female, rostrum.  $\times 190$ .
- Fig. 16. Female, antennule.  $\times 16$ .
- Fig. 17. Female, antenna.  $\times 31,5$ .
- Fig. 18. Female, maxilla, endopodite and exopodite.  $\times 90$ .
- Fig. 19. Female, fourth foot, basal portion only.  $\times 90$ .
- Fig. 20. Female, spine on first basipodite of the fourth foot.  $\times 181$ .



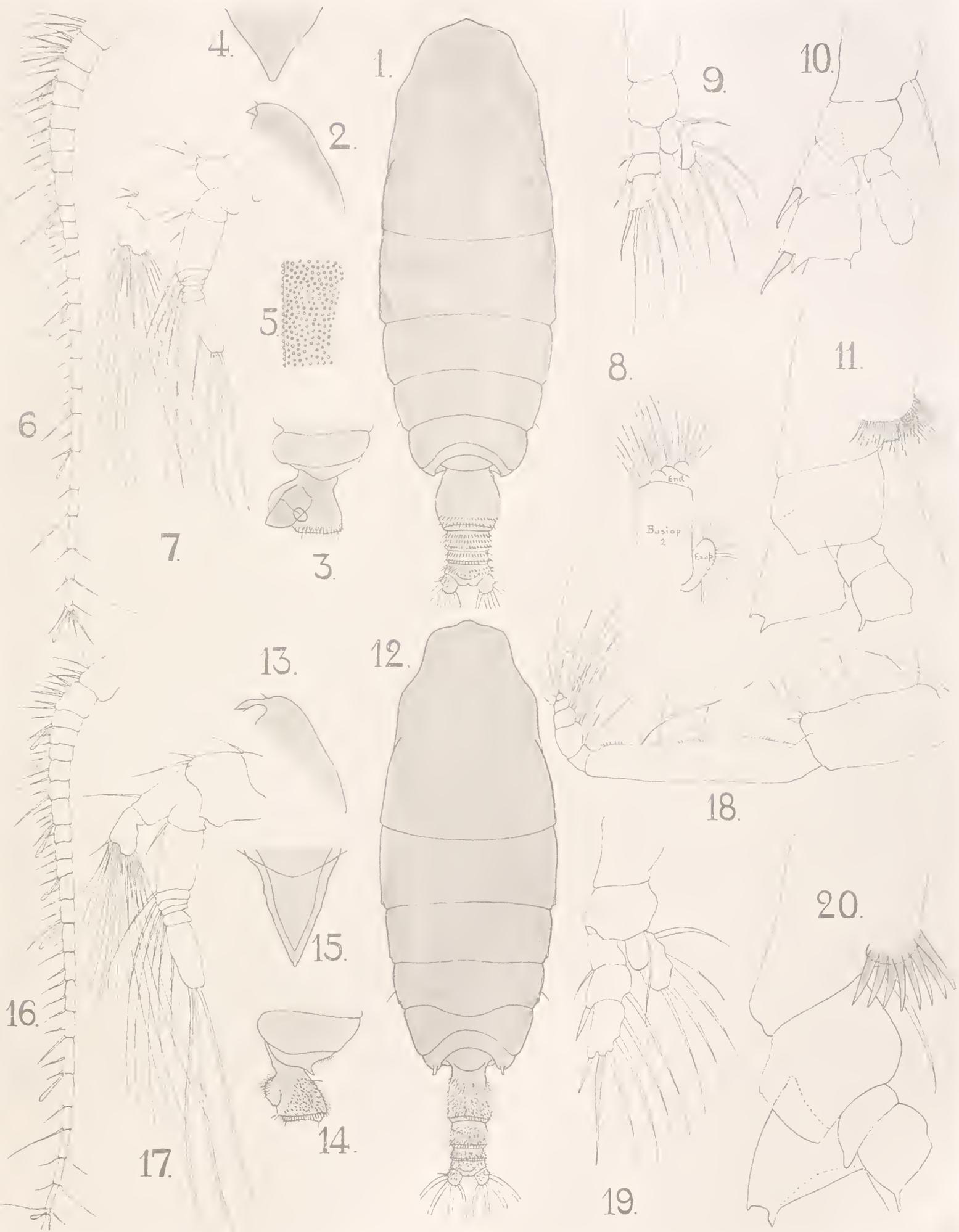
## PLATE XIII.

Figs. 1—12. *Euchirella granulata* nov. sp.

- Fig. 1. Female, dorsal view. × 23.
- Fig. 2. Female, head, lateral view. × 23.
- Fig. 3. Female, last thoracic and first abdominal segments. × 23.
- Fig. 4. Female, rostrum. × 390.
- Fig. 5. Female, portion of the integument highly magnified.
- Fig. 6. Female, antennule. × 23.
- Fig. 7. Female, antenna. × 45.
- Fig. 8. Female, maxilla, endopodite and exopodite. × 90.
- Fig. 9. Female, second maxilliped. × 22,5.
- Fig. 10. Female, first foot. × 45.
- Fig. 11. Female, second foot, basal portion only. × 60.
- Fig. 12. Female, fourth foot, basal portion only. × 60.

Figs. 13—21. *Euchirella dentata* nov. sp.

- Fig. 13. Female, dorsal view. × 19.
- Fig. 14. Female, head, lateral view. × 19.
- Fig. 15. Female, last thoracic and first abdominal segments. × 19.
- Fig. 16. Female, rostrum. × 120.
- Fig. 17. Female, antennule. × 19.
- Fig. 18. Female, antenna. × 45.
- Fig. 19. Female, second maxilliped. × 45.
- Fig. 20. Female, first foot. × 45.
- Fig. 21. Female, fourth foot, basal portion only. × 90.



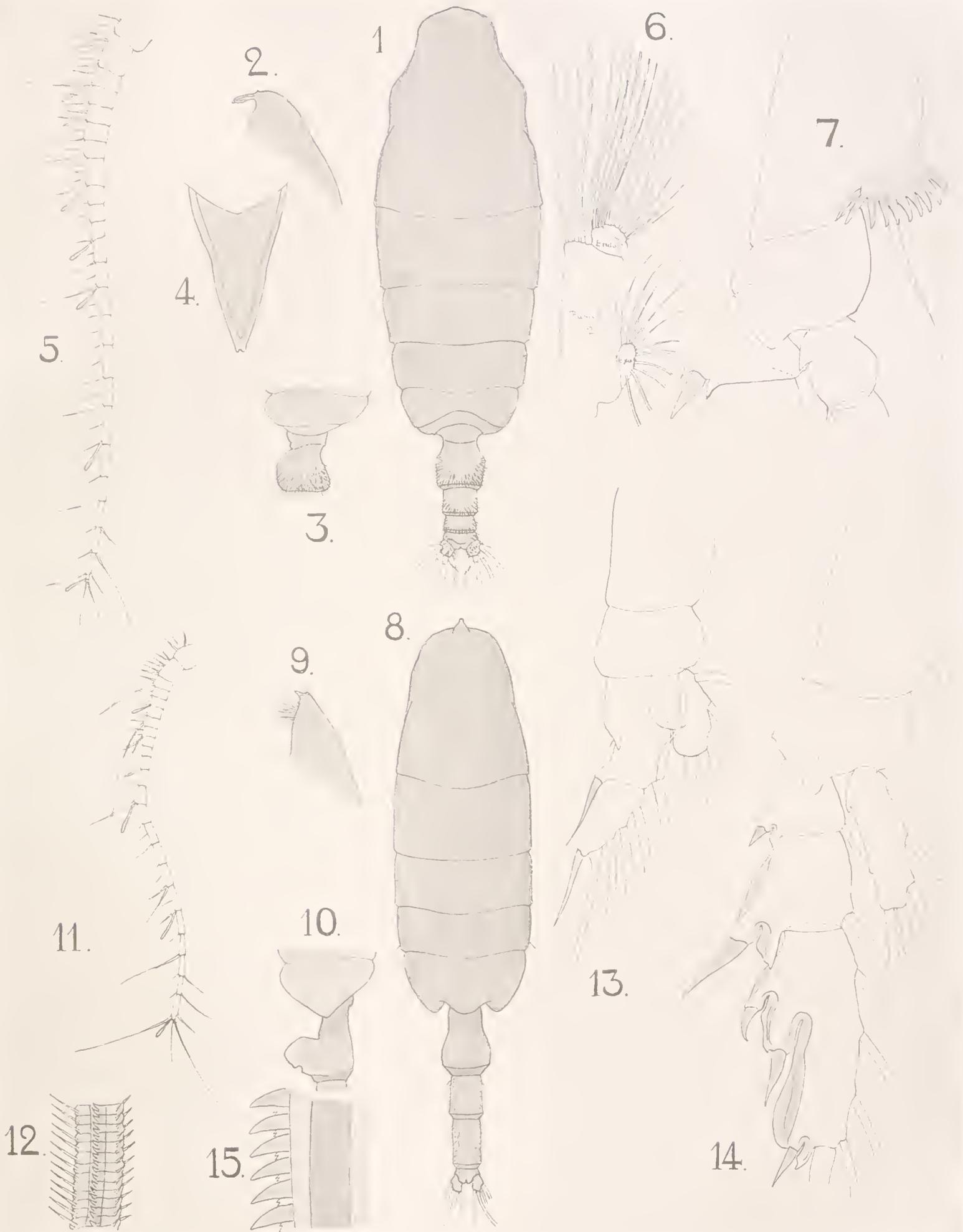
## PLATE XIV.

Figs. 1—7. *Euchirella dubia* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 17$ .
- Fig. 2. Female, head, lateral view.  $\times 17$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 17$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 17$ .
- Fig. 6. Female, maxilla, endopodite and exopodite.  $\times 90$ .
- Fig. 7. Female, fourth foot, basal portion only.  $\times 90$ .

Figs. 8—15. *Paraeuchaeta tonsa* (Giesbrecht).

- Fig. 8. Female, dorsal view.  $\times 17$ .
- Fig. 9. Female, head, lateral view.  $\times 17$ .
- Fig. 10. Female, last thoracic and first abdominal segments.  $\times 17$ .
- Fig. 11. Female, antennule.  $\times 17$ .
- Fig. 12. Female, second maxilliped, part of one of the distal hairs.  $\times 78$ .
- Fig. 13. Female, first foot.  $\times 90$ .
- Fig. 14. Female, second foot.  $\times 90$ .
- Fig. 15. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .



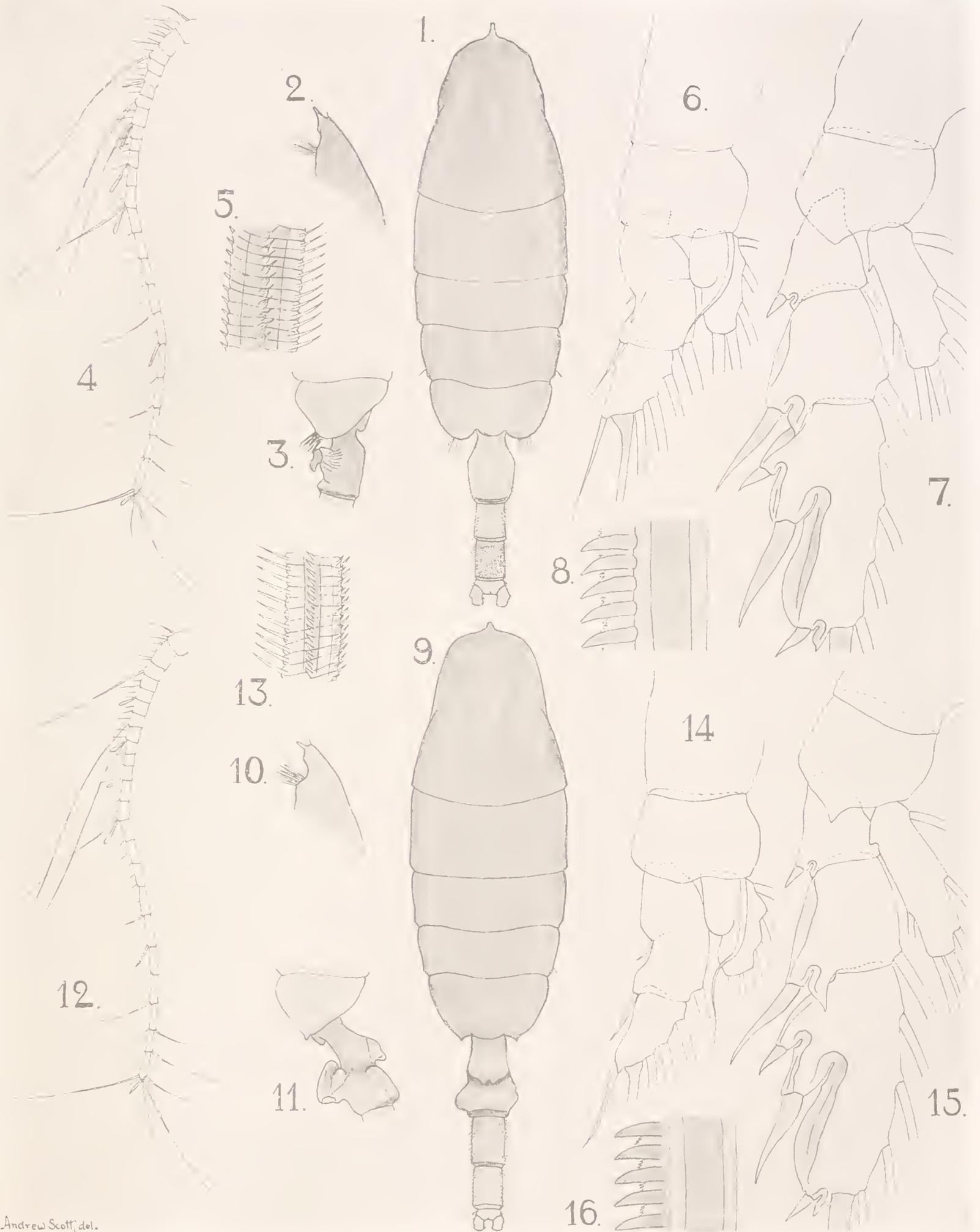
## PLATE XV.

Figs. 1—8. *Paraeuchaeta californica* (Esterly).

- Fig. 1. Female, dorsal view.  $\times 18$ .
- Fig. 2. Female, head, lateral view.  $\times 18$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 18$ .
- Fig. 4. Female, antennule.  $\times 18$ .
- Fig. 5. Female, second maxilliped, part of one of the distal hairs.  $\times 781$ .
- Fig. 6. Female, first foot.  $\times 90$ .
- Fig. 7. Female, second foot.  $\times 90$ .
- Fig. 8. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .

Figs. 9—16. *Paraeuchaeta weberi* nov. sp.

- Fig. 9. Female, dorsal view.  $\times 14$ .
- Fig. 10. Female, head, lateral view.  $\times 14$ .
- Fig. 11. Female, last thoracic and first abdominal segments.  $\times 14$ .
- Fig. 12. Female, antennule.  $\times 14$ .
- Fig. 13. Female, second maxilliped, part of one of the distal hairs.  $\times 781$ .
- Fig. 14. Female, first foot.  $\times 90$ .
- Fig. 15. Female, second foot.  $\times 90$ .
- Fig. 16. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .



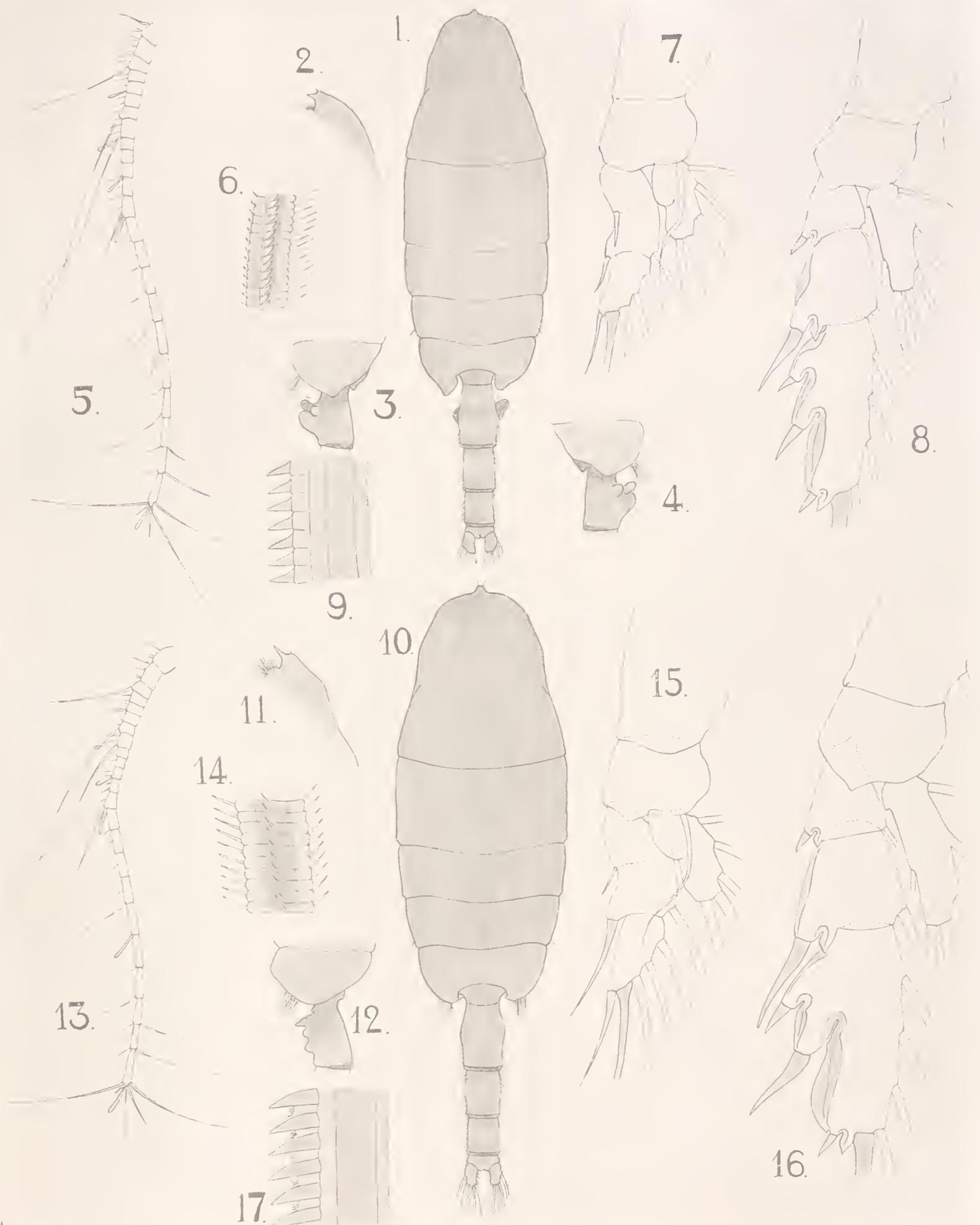
## PLATE XVI.

Figs. 1—9. *Paracuchaeta sibogae* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 23,5$ .
- Fig. 2. Female, head, lateral view.  $\times 23,5$ .
- Fig. 3. Female, last thoracic and first abdominal segments, left.  $\times 23,5$ .
- Fig. 4. Female, last thoracic and first abdominal segments, right.  $\times 23,5$ .
- Fig. 5. Female, antennule.  $\times 23,5$ .
- Fig. 6. Female, second maxilliped, part of one of the distal hairs.  $\times 781$ .
- Fig. 7. Female, first foot.  $\times 90$ .
- Fig. 8. Female, second foot.  $\times 90$ .
- Fig. 9. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .

Figs. 10—17. *Paraeuchaeta bisinuata* (G. O. Sars).

- Fig. 10. Female, dorsal view.  $\times 23,5$ .
- Fig. 11. Female, head, lateral view.  $\times 23,5$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 13. Female, antennule.  $\times 23,5$ .
- Fig. 14. Female, second maxilliped, part of one of the distal hairs.  $\times 781$ .
- Fig. 15. Female, first foot.  $\times 90$ .
- Fig. 16. Female, second foot.  $\times 90$ .
- Fig. 17. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .



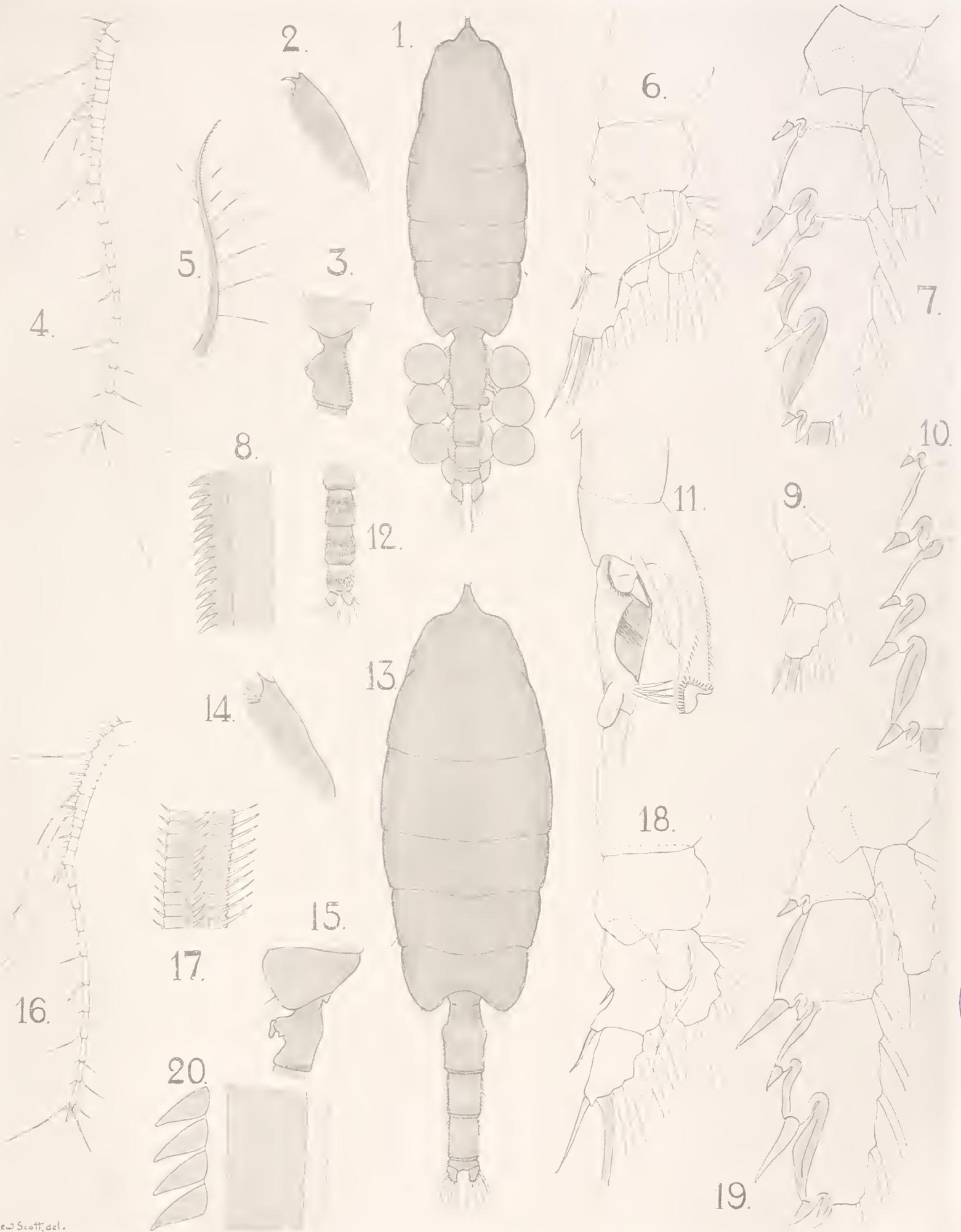
## PLATE XVII.

Figs. 1—12. *Euchaeta wolfendani* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 36$ .
- Fig. 2. Female, head, lateral view.  $\times 36$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 36$ .
- Fig. 4. Female, antennule.  $\times 36$ .
- Fig. 5. Female, second maxilliped, one of the distal hairs.  $\times 781$ .
- Fig. 6. Female, first foot.  $\times 195$ .
- Fig. 7. Female, second foot.  $\times 195$ .
- Fig. 8. Female, part of terminal spine, exopodite of third foot.  $\times 781$ .
- Fig. 9. Male, first foot, exopodite.  $\times 195$ .
- Fig. 10. Male, second foot, part of exopodite.  $\times 195$ .
- Fig. 11. Male, fifth foot, part of left branch.  $\times 195$ .
- Fig. 12. Male, abdomen.  $\times 36$ .

Figs. 13—20. *Paraeuchaeta propinqua* (Esterly).

- Fig. 13. Female, dorsal view.  $\times 13,45$ .
- Fig. 14. Female, head, lateral view.  $\times 13,45$ .
- Fig. 15. Female, last thoracic and first abdominal segments.  $\times 13,45$ .
- Fig. 16. Female, antennule.  $\times 13,45$ .
- Fig. 17. Female, second maxilliped, part of one of the distal hairs.  $\times 781$ .
- Fig. 18. Female, first foot.  $\times 60$ .
- Fig. 19. Female, second foot.  $\times 60$ .
- Fig. 20. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .



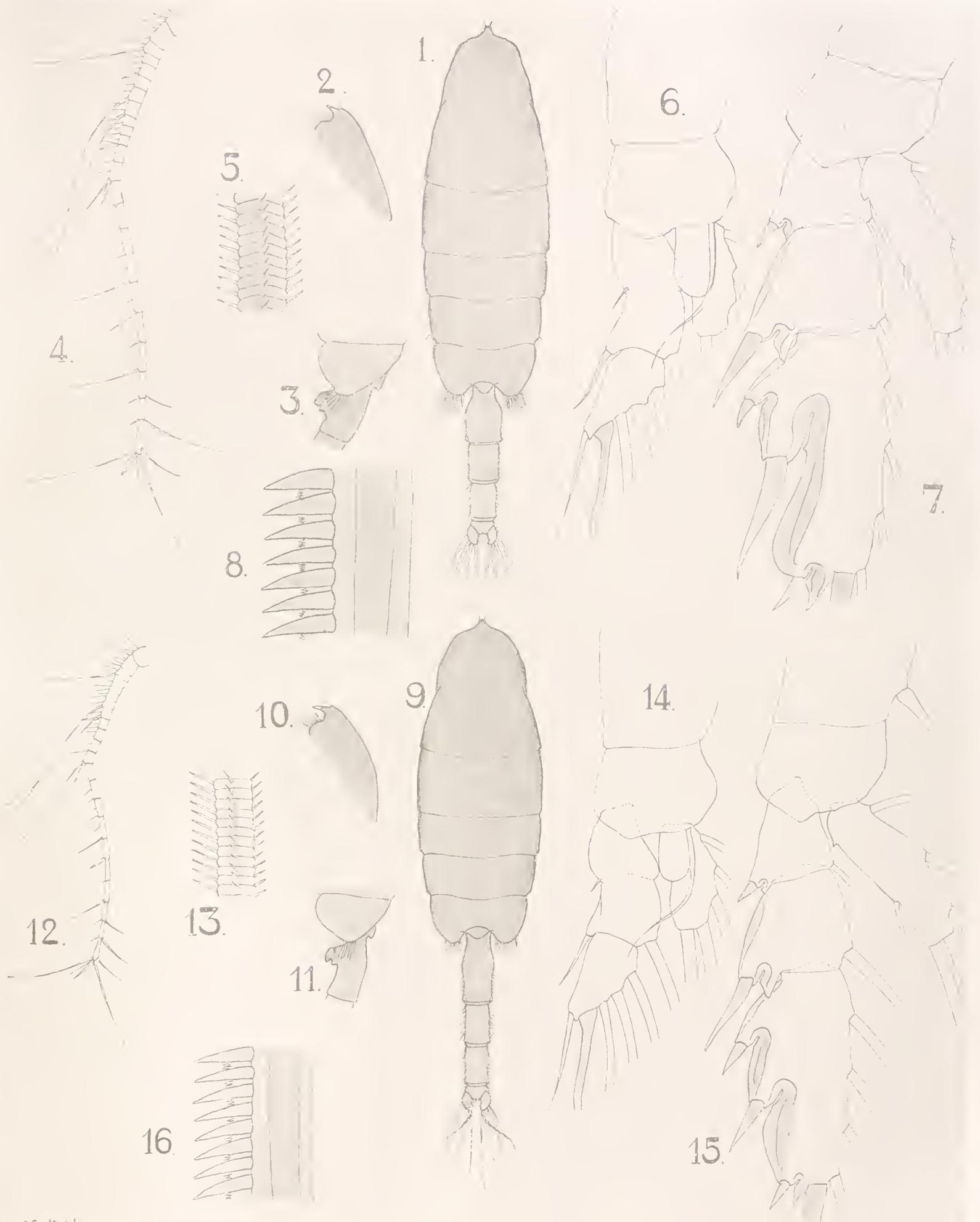
## PLATE XVIII.

Figs. 1—8. *Paraeuchaeta barbata* (Brady).

- Fig. 1. Female, dorsal view.  $\times 15,7$ .
- Fig. 2. Female, head, lateral view.  $\times 15,7$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 15,7$ .
- Fig. 4. Female, antennule.  $\times 15,7$ .
- Fig. 5. Female, second maxilliped, part of one of the distal hairs.  $\times 781$ .
- Fig. 6. Female, first foot.  $\times 90$ .
- Fig. 7. Female, second foot.  $\times 90$ .
- Fig. 8. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .

Figs. 9—16. *Paraeuchaeta gracilicauda* nov. sp.

- Fig. 9. Female, dorsal view.  $\times 15,7$ .
- Fig. 10. Female, head, lateral view.  $15,7$ .
- Fig. 11. Female, last thoracic and first abdominal segments.  $\times 15,7$ .
- Fig. 12. Female, antennule.  $\times 15,7$ .
- Fig. 13. Female, second maxilliped, part of one of the distal hairs.  $\times 781$ .
- Fig. 14. Female, first foot.  $\times 90$ .
- Fig. 15. Female, second foot.  $\times 90$ .
- Fig. 16. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .



## PLATE XIX.

### Figs. 1—8. *Euchaeta tenuis* Esterly.

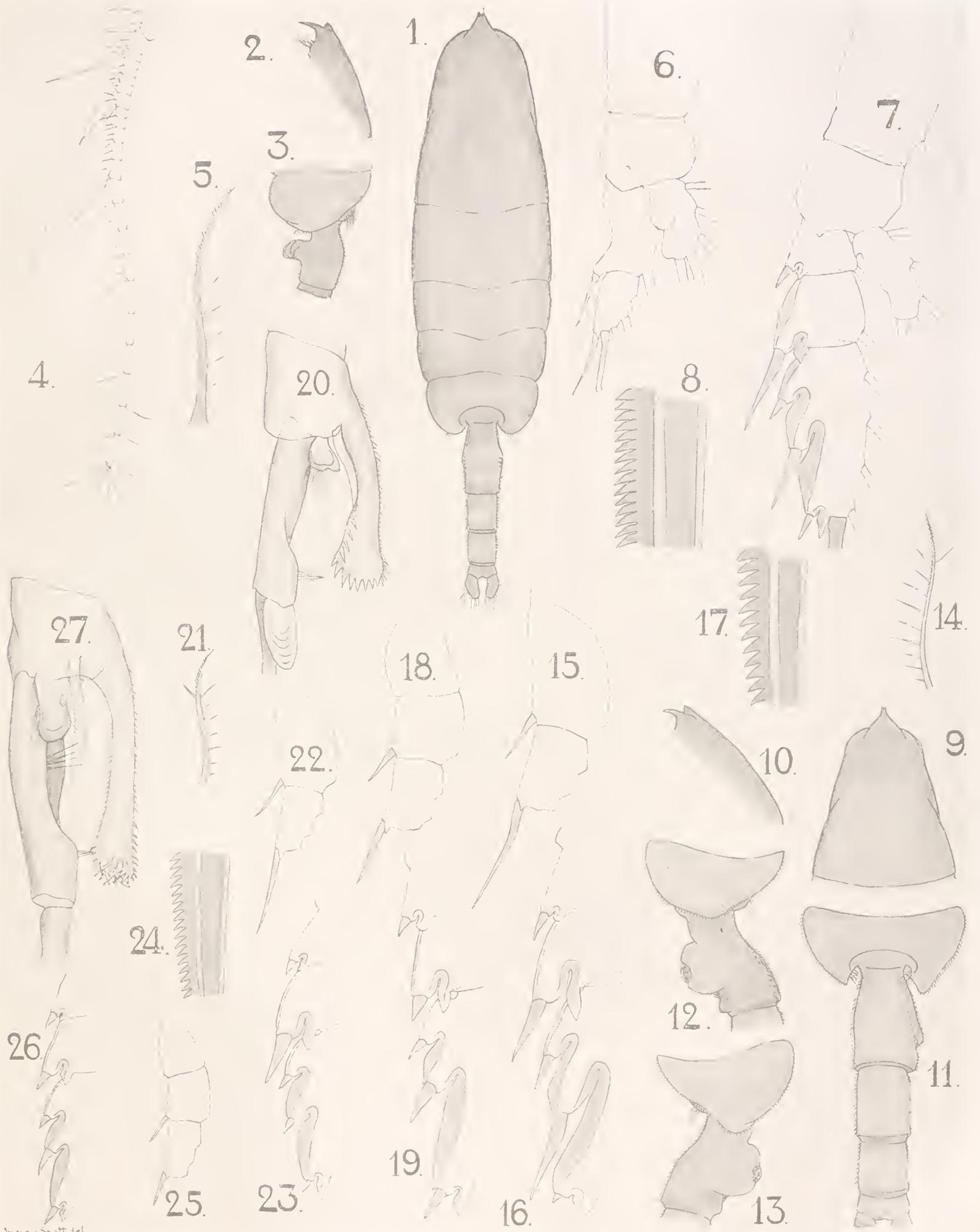
- Fig. 1. Female, dorsal view.  $\times 19$ .
- Fig. 2. Female, head, lateral view.  $\times 19$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 19$ .
- Fig. 4. Female, antennule.  $\times 19$ .
- Fig. 5. Female, second maxilliped, one of the distal hairs.  $\times 90$ .
- Fig. 6. Female, first foot.  $\times 90$ .
- Fig. 7. Female, second foot.  $\times 90$ .
- Fig. 8. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .

### Figs. 9—20. *Euchaeta marina* (Prestandrea).

- Fig. 9. Female, head, dorsal view.  $\times 31$ .
- Fig. 10. Female, head, lateral view.  $\times 31$ .
- Fig. 11. Female, last thoracic segment and abdomen, dorsal view.  $\times 31$ .
- Fig. 12. Female, last thoracic and first abdominal segments, left side.  $\times 31$ .
- Fig. 13. Female, last thoracic and first abdominal segments, right side.  $\times 31$ .
- Fig. 14. Female, second maxilliped, end hair.  $\times 90$ .
- Fig. 15. Female, first foot, exopodite only.  $\times 195$ .
- Fig. 16. Female, second foot, outer margin of exopodite.  $\times 135$ .
- Fig. 17. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .
- Fig. 18. Male, first foot, exopodite only.  $\times 195$ .
- Fig. 19. Male, second foot, outer margin of exopodite.  $\times 135$ .
- Fig. 20. Male, fifth foot, part of left branch.  $\times 135$ .

### Figs. 21—27. *Euchaeta concinna* Dana.

- Fig. 21. Female, second maxilliped, end hair.  $\times 90$ .
- Fig. 22. Female, first foot, exopodite only.  $\times 195$ .
- Fig. 23. Female, second foot, outer margin of exopodite.  $\times 135$ .
- Fig. 24. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .
- Fig. 25. Male, first foot, exopodite only.  $\times 195$ .
- Fig. 26. Male, second foot, outer margin of exopodite.  $\times 135$ .
- Fig. 27. Male, fifth foot, part of left branch.  $\times 260$ .



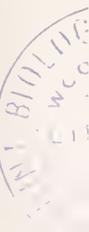
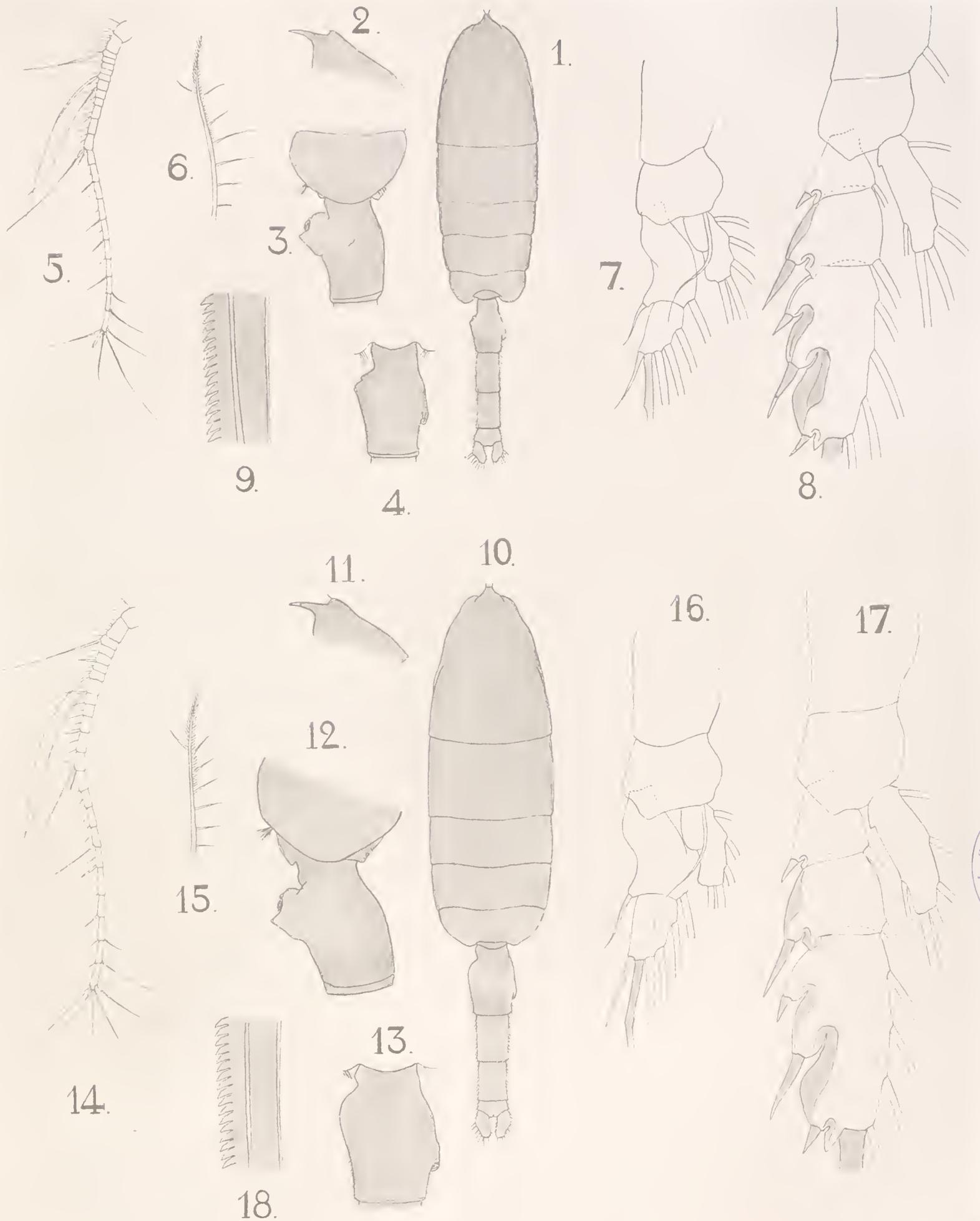
## PLATE XX.

Figs. 1—9. *Euchaeta acuta* Giesbrecht.

- Fig. 1. Female, dorsal view.  $\times 23,5$ .
- Fig. 2. Female, head, lateral view.  $\times 90$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 46$ .
- Fig. 4. Female, genital segment, dorsal view.  $\times 46$ .
- Fig. 5. Female, antennule.  $\times 31$ .
- Fig. 6. Female, second maxilliped, end hair.  $\times 90$ .
- Fig. 7. Female, first foot.  $\times 120$ .
- Fig. 8. Female, second foot.  $\times 120$ .
- Fig. 9. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .

Figs. 10—18. *Euchaeta media* Giesbrecht.

- Fig. 10. Female, dorsal view.  $\times 31$ .
- Fig. 11. Female, head, lateral view.  $\times 90$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 13. Female, genital segment, dorsal view.  $\times 60$ .
- Fig. 14. Female, antennule.  $\times 31$ .
- Fig. 15. Female, second maxilliped, end hair.  $\times 90$ .
- Fig. 16. Female, first foot.  $\times 135$ .
- Fig. 17. Female, second foot.  $\times 135$ .
- Fig. 18. Female, part of terminal spine, exopodite of third foot.  $\times 390$ .



## PLATE XXI.

Figs. 1—8. *Paraeuchaeta tuberculata* nov. sp.

- Fig. 1. Male, head, dorsal view.  $\times 34$ .
- Fig. 2. Male, head, lateral view.  $\times 34$ .
- Fig. 3. Male, last thoracic and first abdominal segments, dorsal view.  $\times 34$ .
- Fig. 4. Male, last thoracic and first abdominal segments, lateral view.  $\times 34$ .
- Fig. 5. Male, first foot, exopodite only.  $\times 135$ .
- Fig. 6. Male, second foot, outer margin of exopodite.  $\times 60$ .
- Fig. 7. Male, part of terminal spine, exopodite of third foot.  $\times 380$ .
- Fig. 8. Male, fifth foot, part of left branch.  $\times 90$ .

Figs. 9—15. *Paraeuchaeta sarsi* Farran.

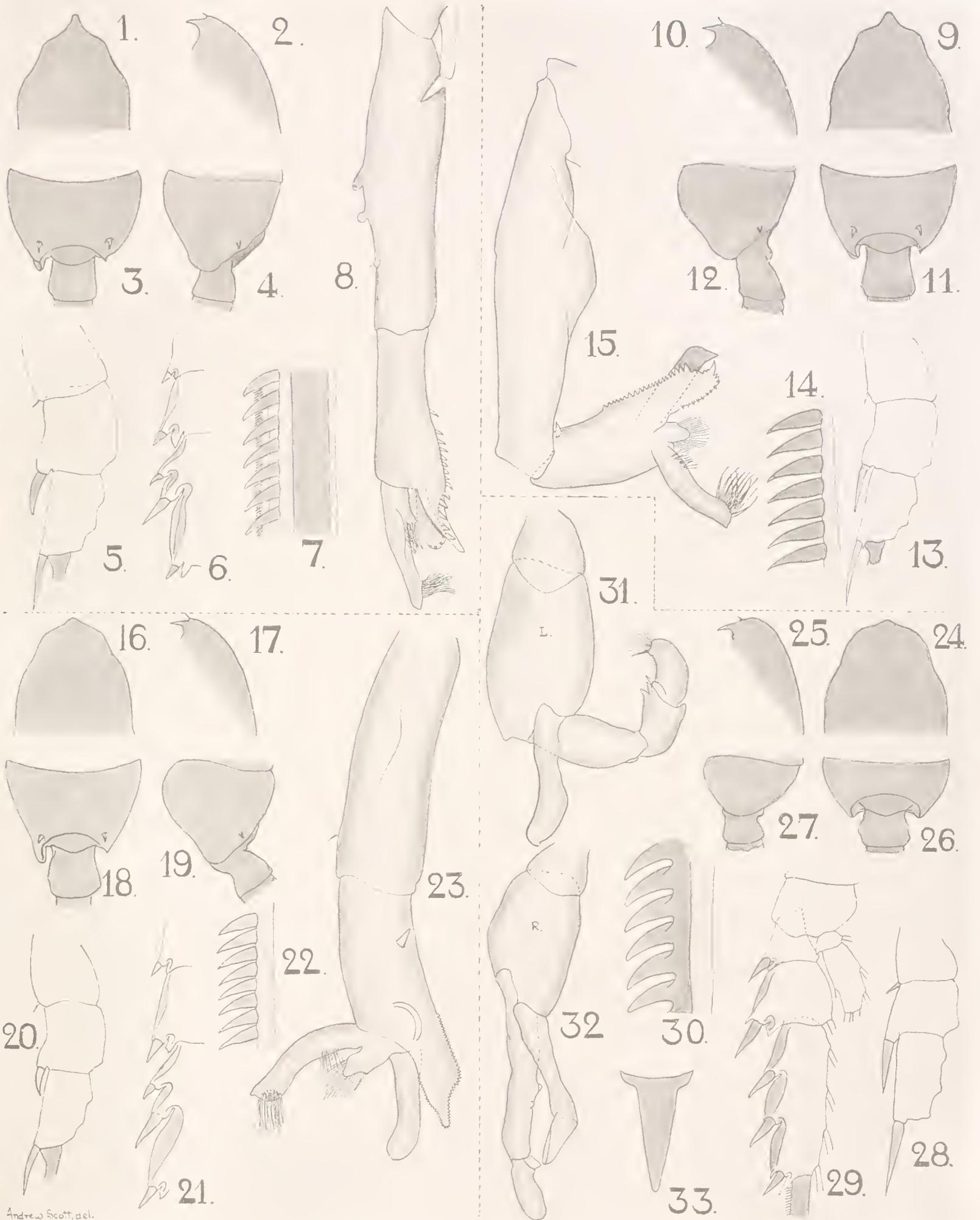
- Fig. 9. Male, head, dorsal view.  $\times 26$ .
- Fig. 10. Male, head, lateral view.  $\times 26$ .
- Fig. 11. Male, last thoracic and first abdominal segments, dorsal view.  $\times 26$ .
- Fig. 12. Male, last thoracic and first abdominal segments, lateral view.  $\times 26$ .
- Fig. 13. Male, first foot, exopodite only.  $\times 90$ .
- Fig. 14. Male, part of terminal spine, exopodite of third foot.  $\times 380$ .
- Fig. 15. Male, fifth foot, part of left branch.  $\times 90$ .

Figs. 16—23. *Paraeuchaeta dentata* nov. sp.

- Fig. 16. Male, head, dorsal view.  $\times 26$ .
- Fig. 17. Male, head lateral view.  $\times 26$ .
- Fig. 18. Male, last thoracic and first abdominal segments, dorsal view.  $\times 26$ .
- Fig. 19. Male, last thoracic and first abdominal segments, lateral view.  $\times 26$ .
- Fig. 20. Male, first foot, exopodite only.  $\times 90$ .
- Fig. 21. Male, second foot, outer margin of exopodite.  $\times 60$ .
- Fig. 22. Male, part of terminal spine, exopodite of third foot.  $\times 380$ .
- Fig. 23. Male, fifth foot, part of left branch.  $\times 90$ .

Figs. 24—33. *Gaidius notacanthus* G. O. Sars.

- Fig. 24. Male, head, dorsal view.  $\times 26$ .
- Fig. 25. Male, head, lateral view.  $\times 26$ .
- Fig. 26. Male, last thoracic and first abdominal segments, dorsal view.  $\times 26$ .
- Fig. 27. Male, last thoracic and first abdominal segments, lateral view.  $\times 26$ .
- Fig. 28. Male, first foot, exopodite only.  $\times 90$ .
- Fig. 29. Male, second foot.  $\times 60$ .
- Fig. 30. Male, part of terminal spine, exopodite of third foot.  $\times 380$ .
- Fig. 31. Male, fifth foot, left branch.  $\times 45$ .
- Fig. 32. Male, fifth foot, right branch.  $\times 45$ .
- Fig. 33. Male, rostrum.  $\times 181$ .



Andrew Scott, del.

## PLATE XXII.

### Figs. 1—8. *Undeuchaeta plumosa* (Lubbock).

- Fig. 1. Male, head, dorsal view.  $\times 45$ .
- Fig. 2. Male, head, lateral view.  $\times 45$ .
- Fig. 3. Male, last thoracic and first abdominal segments, dorsal view.  $\times 45$ .
- Fig. 4. Male, last thoracic and first abdominal segments, lateral view.  $\times 45$ .
- Fig. 5. Male, first foot, exopodite only.  $\times 181$ .
- Fig. 6. Male, second foot, outer margin of exopodite.  $\times 135$ .
- Fig. 7. Male, part of terminal spine, exopodite of third foot.  $\times 390$ .
- Fig. 8. Male, fifth pair of feet.  $\times 60$ .

### Figs. 9—16. *Paraeuchaeta spinifera* (Esterly).

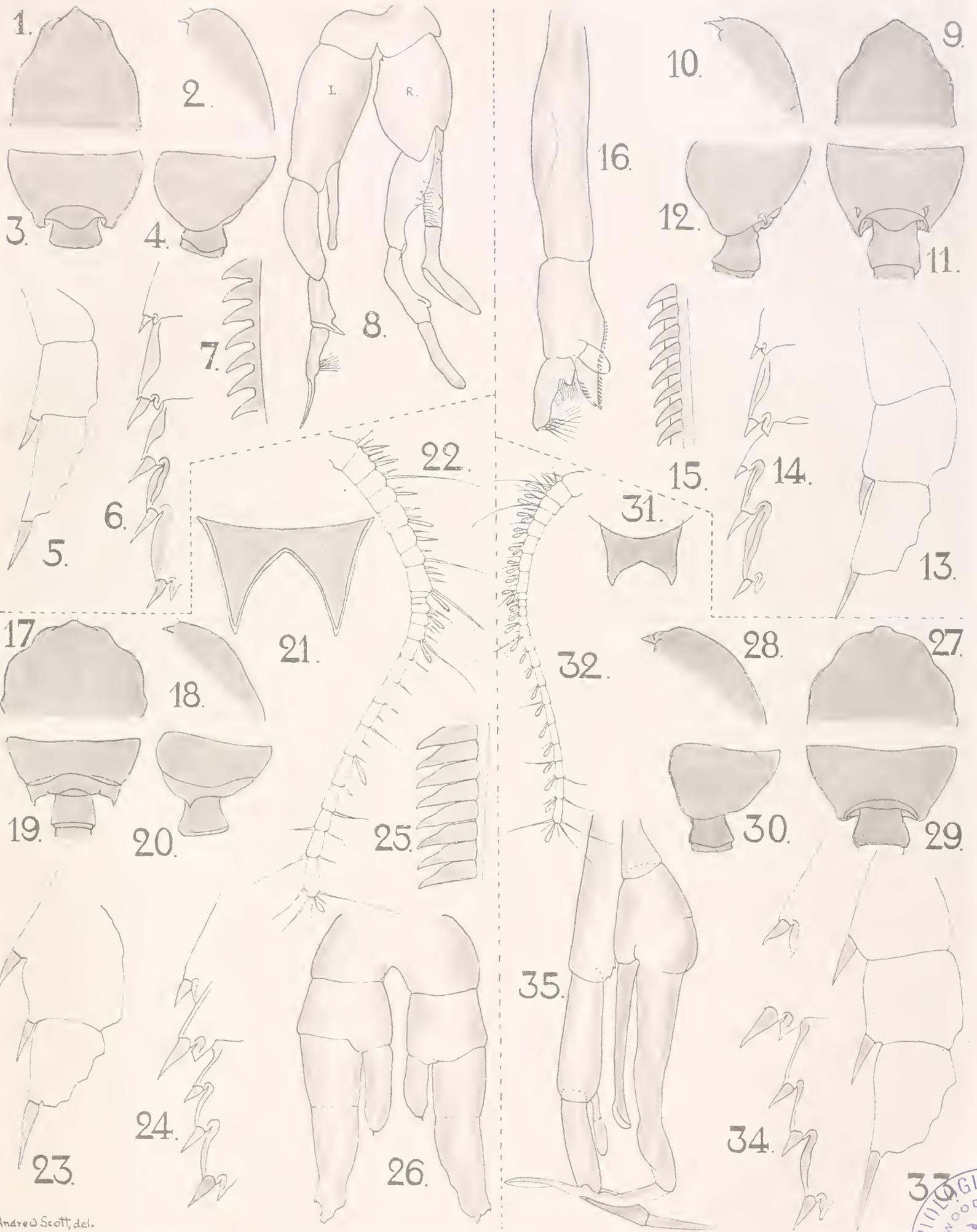
- Fig. 9. Male, head, dorsal view.  $\times 36$ .
- Fig. 10. Male, head, lateral view.  $\times 36$ .
- Fig. 11. Male, last thoracic and first abdominal segments, dorsal view.  $\times 36$ .
- Fig. 12. Male, last thoracic and first abdominal segments, lateral view.  $\times 36$ .
- Fig. 13. Male, first foot, exopodite only.  $\times 181$ .
- Fig. 14. Male, second foot, outer margin of exopodite.  $\times 90$ .
- Fig. 15. Male, part of terminal spine, exopodite of third foot.  $\times 390$ .
- Fig. 16. Male, fifth foot, part of left branch.  $\times 60$ .

### Figs. 17—26. *Valdiviella gigas* (Brady).

- Fig. 17. Male, head, dorsal view.  $\times 19$ .
- Fig. 18. Male, head, lateral view.  $\times 19$ .
- Fig. 19. Male, last thoracic and first abdominal segments, dorsal view.  $\times 19$ .
- Fig. 20. Male, last thoracic and first abdominal segments, lateral view.  $\times 19$ .
- Fig. 21. Male, rostrum.  $\times 181$ .
- Fig. 22. Male, antennule.  $\times 23,5$ .
- Fig. 23. Male, first foot, exopodite only.  $\times 90$ .
- Fig. 24. Male, second foot, outer margin of exopodite.  $\times 60$ .
- Fig. 25. Male, part of terminal spine, exopodite of third foot.  $\times 390$ .
- Fig. 26. Male, fifth feet.  $\times 60$ .

### Figs. 27—35. *Valdiviella brevicornis* G. O. Sars.

- Fig. 27. Male, head, dorsal view.  $\times 31$ .
- Fig. 28. Male, head, lateral view.  $\times 31$ .
- Fig. 29. Male, last thoracic and first abdominal segments, dorsal view.  $\times 31$ .
- Fig. 30. Male, last thoracic and first abdominal segments, lateral view.  $\times 31$ .
- Fig. 31. Male, rostrum.  $\times 181$ .
- Fig. 32. Male, antennule.  $\times 23,5$ .
- Fig. 33. Male, first foot, exopodite only.  $\times 181$ .
- Fig. 34. Male, second foot, outer margin of exopodite.  $\times 120$ .
- Fig. 35. Male, fifth feet.  $\times 60$ .



Andreo Scott, del.



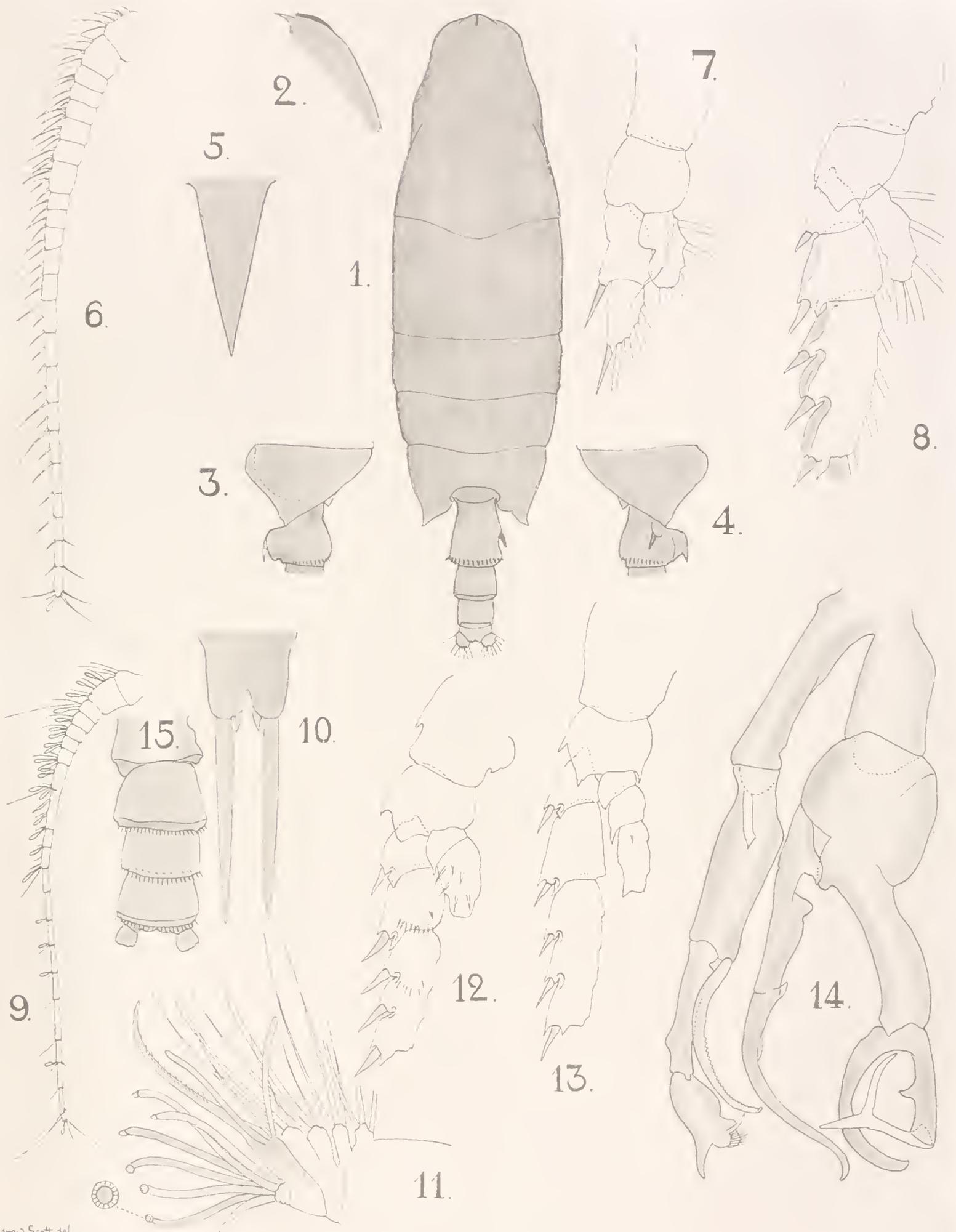
## PLATE XXIII.

Figs. 1—8. *Undeuchaeta intermedia* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 31$ .
- Fig. 2. Female, head, lateral view.  $\times 31$ .
- Fig. 3. Female, last thoracic and first abdominal segments, left side.  $\times 31$ .
- Fig. 4. Female, last thoracic and first abdominal segments, right side.  $\times 31$ .
- Fig. 5. Female, rostrum.  $\times 390$ .
- Fig. 6. Female, antennule.  $\times 31$ .
- Fig. 7. Female, first foot.  $\times 90$ .
- Fig. 8. Female, second foot.  $\times 90$ .

Figs. 9—15. *Macandrewella joanae* nov. sp.

- Fig. 9. Male, antennule.  $\times 31$ .
- Fig. 10. Male, rostrum.  $\times 390$ .
- Fig. 11. Male, first maxilliped.  $\times 181$ .
- Fig. 12. Male, second foot.  $\times 90$ .
- Fig. 13. Male, fourth foot.  $\times 90$ .
- Fig. 14. Male, fifth feet.  $\times 90$ .
- Fig. 15. Male, abdomen, dorsal view.  $\times 60$ .



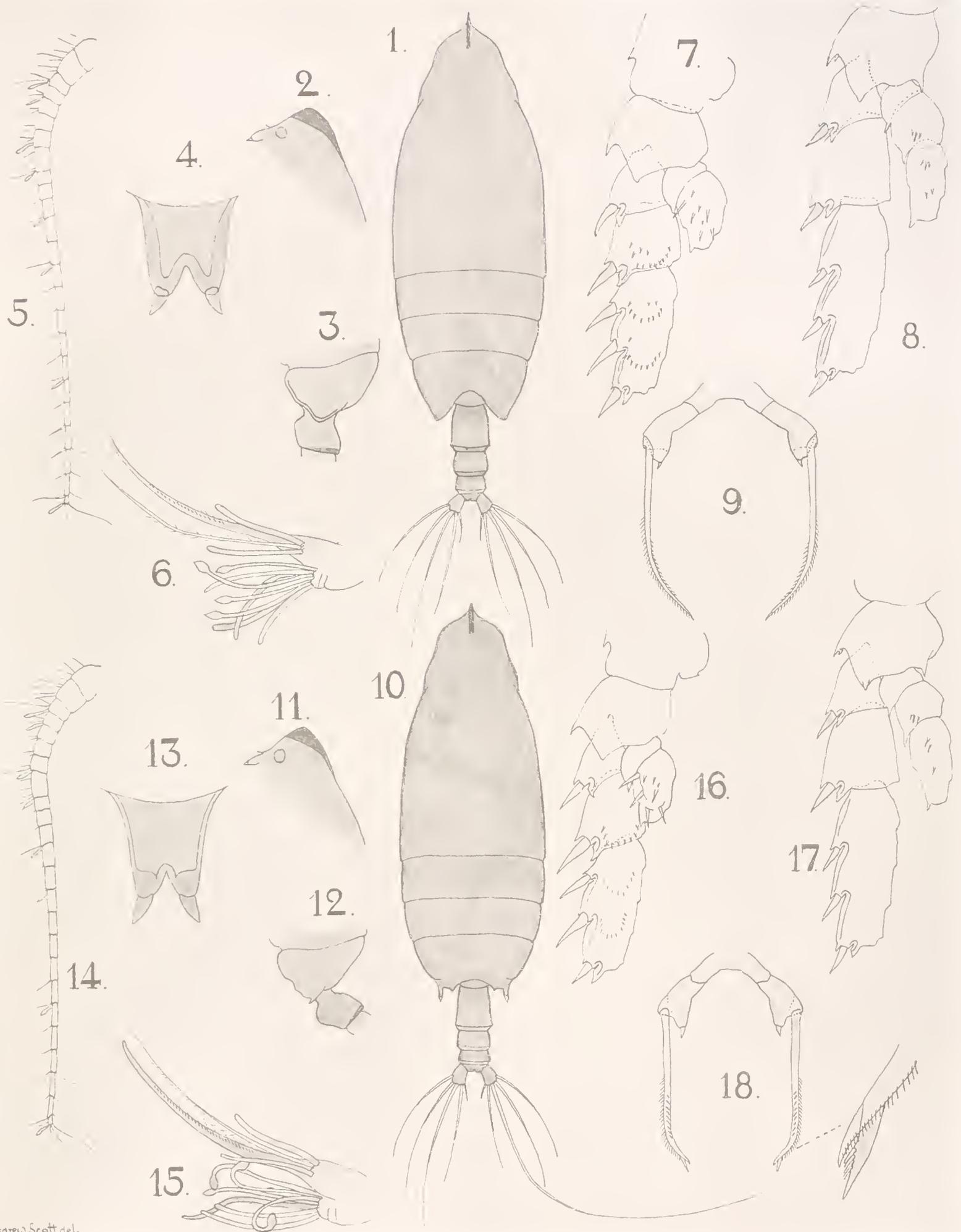
## PLATE XXIV.

Figs. 1—9. *Scottocalanus farrani* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 31$ .
- Fig. 2. Female, head, lateral view.  $\times 31$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 31$ .
- Fig. 4. Female, rostrum.  $\times 90$ .
- Fig. 5. Female, antennule.  $\times 31$ .
- Fig. 6. Female, first maxilliped, distal portion.  $\times 156$ .
- Fig. 7. Female, second foot.  $\times 90$ .
- Fig. 8. Female, fourth foot.  $\times 90$ .
- Fig. 9. Female, fifth feet.  $\times 90$ .

Figs. 10—18. *Scottocalanus setosus* nov. sp.

- Fig. 10. Female, dorsal view.  $\times 31$ .
- Fig. 11. Female, head, lateral view.  $\times 31$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 31$ .
- Fig. 13. Female, rostrum.  $\times 181$ .
- Fig. 14. Female, antennule.  $\times 31$ .
- Fig. 15. Female, first maxilliped, distal portion.  $\times 156$ .
- Fig. 16. Female, second foot.  $\times 90$ .
- Fig. 17. Female, fourth foot.  $\times 90$ .
- Fig. 18. Female, fifth feet.  $\times 90$ .



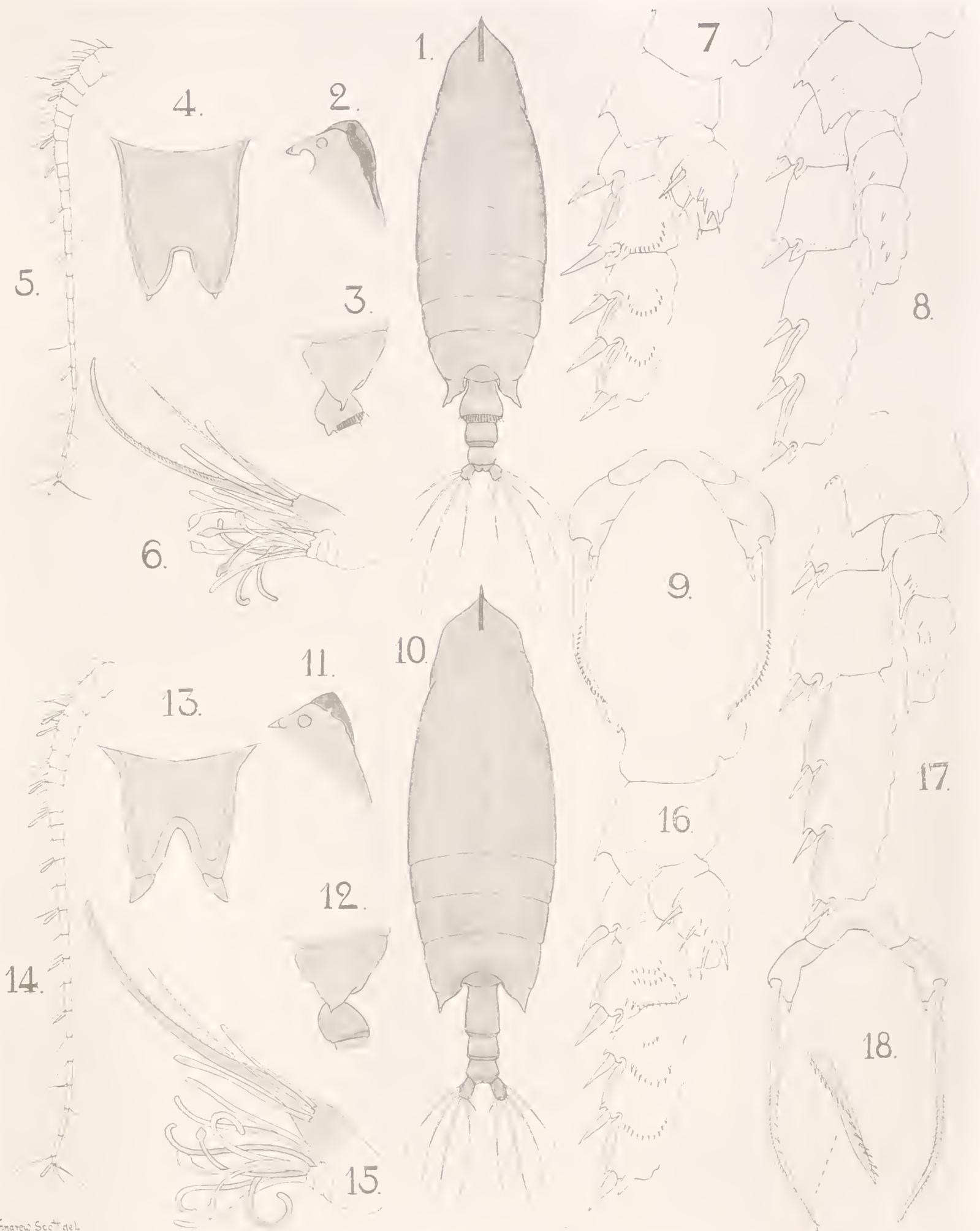
## PLATE XXV.

Figs. 1—9. *Scottocalanus securifrons* (T. Scott).

- Fig. 1. Female, dorsal view.  $\times 23,5$ .
- Fig. 2. Female, head, lateral view.  $\times 23,5$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 4. Female, rostrum.  $\times 135$ .
- Fig. 5. Female, antennule.  $\times 23,5$ .
- Fig. 6. Female, first maxilliped, distal portion.  $\times 156$ .
- Fig. 7. Female, second foot.  $\times 90$ .
- Fig. 8. Female, fourth foot.  $\times 90$ .
- Fig. 9. Female, fifth feet.  $\times 90$ .

Figs. 10—18. *Scottocalanus longispinus* nov. sp.

- Fig. 10. Female, dorsal view.  $\times 23,5$ .
- Fig. 11. Female, head lateral view.  $\times 23,5$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 13. Female, rostrum.  $\times 181$ .
- Fig. 14. Female, antennule.  $\times 23,5$ .
- Fig. 15. Female, first maxilliped, distal portion.  $\times 156$ .
- Fig. 16. Female, second foot.  $\times 90$ .
- Fig. 17. Female, fourth foot.  $\times 90$ .
- Fig. 18. Female, fifth feet.  $\times 90$ .



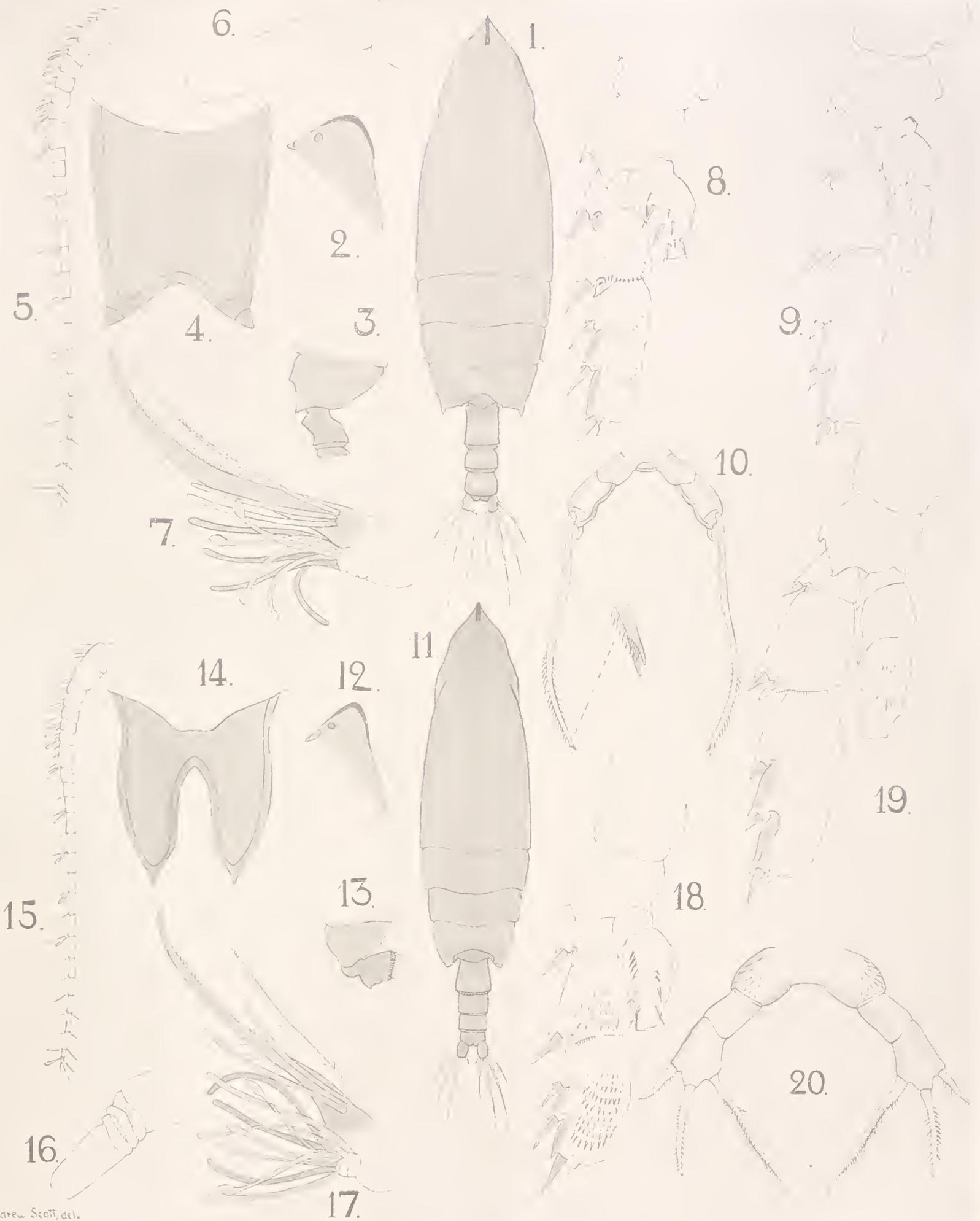
## PLATE XXVI.

Figs. 1—10. *Scottocalanus thomasi* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 19$ .
- Fig. 2. Female, head, lateral view.  $\times 19$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 19$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 19$ .
- Fig. 6. Female, antenna, distal part of exopodite.  $\times 90$ .
- Fig. 7. Female, first maxilliped, distal portion.  $\times 156$ .
- Fig. 8. Female, second foot.  $\times 60$ .
- Fig. 9. Female, fourth foot.  $\times 60$ .
- Fig. 10. Female, fifth feet.  $\times 60$ .

Figs. 11—20. *Lophothrix frontalis* Giesbrecht.

- Fig. 11. Female, dorsal view.  $\times 13,5$ .
- Fig. 12. Female, head, lateral view.  $\times 13,5$ .
- Fig. 13. Female, last thoracic and first abdominal segments.  $\times 13,5$ .
- Fig. 14. Female, rostrum.  $\times 135$ .
- Fig. 15. Female, antennule.  $\times 13,5$ .
- Fig. 16. Female, antenna, distal part of exopodite.  $\times 90$ .
- Fig. 17. Female, first maxilliped, distal portion.  $\times 90$ .
- Fig. 18. Female, second foot.  $\times 60$ .
- Fig. 19. Female, fourth foot.  $\times 60$ .
- Fig. 20. Female, fifth feet.  $\times 130$ .



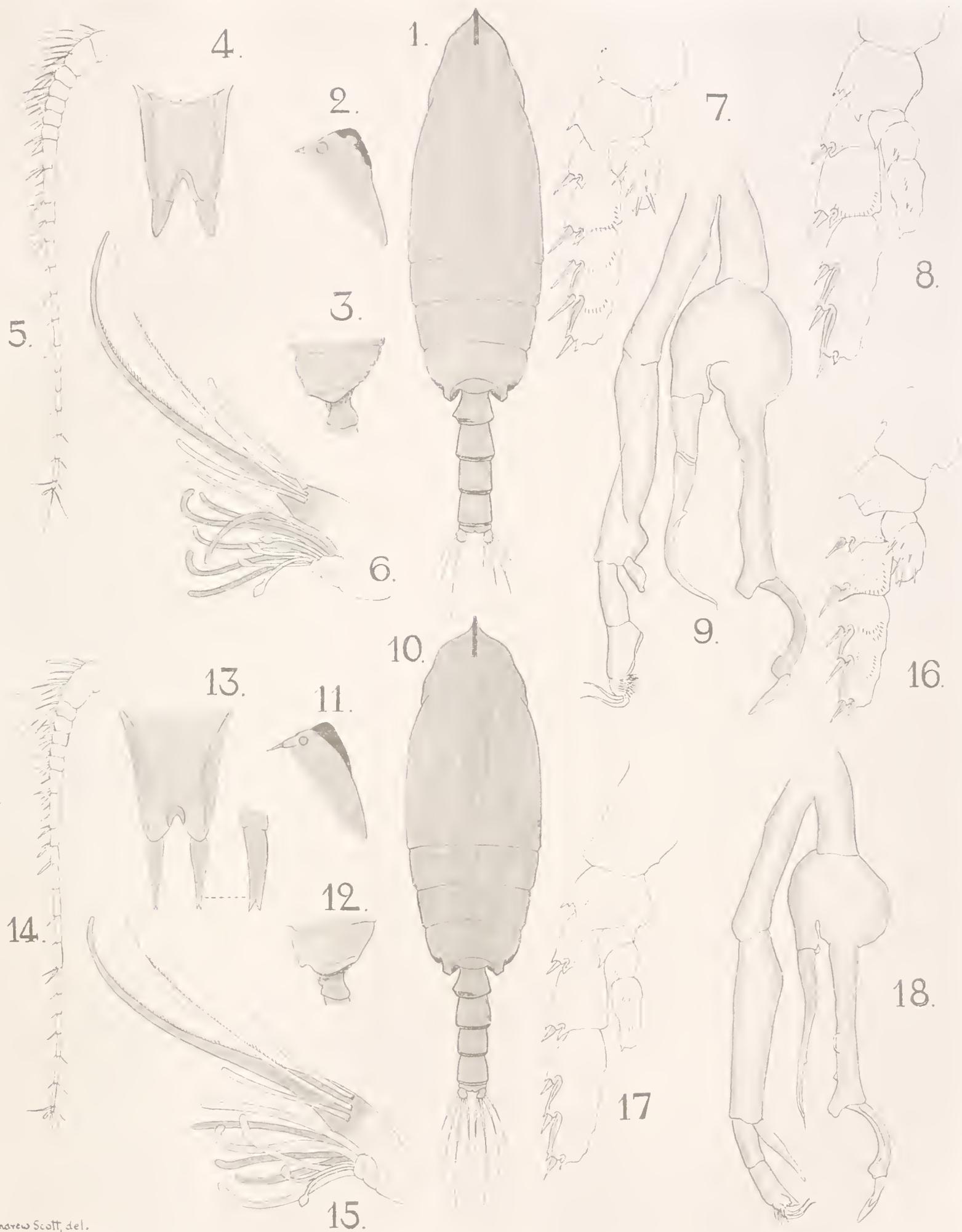
## PLATE XXVII.

Figs. 1—9. *Scottocalanus helenae* (Lubbock).

- Fig. 1. Male, dorsal view.  $\times 23,5$ .
- Fig. 2. Male, head, lateral view.  $\times 23,5$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 4. Male, rostrum.  $\times 181$ .
- Fig. 5. Male, antennule.  $\times 23,5$ .
- Fig. 6. Male, first maxilliped, distal portion.  $\times 181$ .
- Fig. 7. Male, second foot.  $\times 60$ .
- Fig. 8. Male, fourth foot.  $\times 60$ .
- Fig. 9. Male, fifth feet.  $\times 60$ .

Figs. 10—18. *Scottocalanus persecans* (Giesbrecht).

- Fig. 10. Male, dorsal view.  $\times 23,5$ .
- Fig. 11. Male, head, lateral view.  $\times 23,5$ .
- Fig. 12. Male, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 13. Male, rostrum.  $\times 181$ .
- Fig. 14. Male, antennule.  $\times 23,5$ .
- Fig. 15. Male, first maxilliped, distal portion  $\times 181$ .
- Fig. 16. Male, second foot.  $\times 60$ .
- Fig. 17. Male, fourth foot.  $\times 60$ .
- Fig. 18. Male, fifth feet.  $\times 60$ .



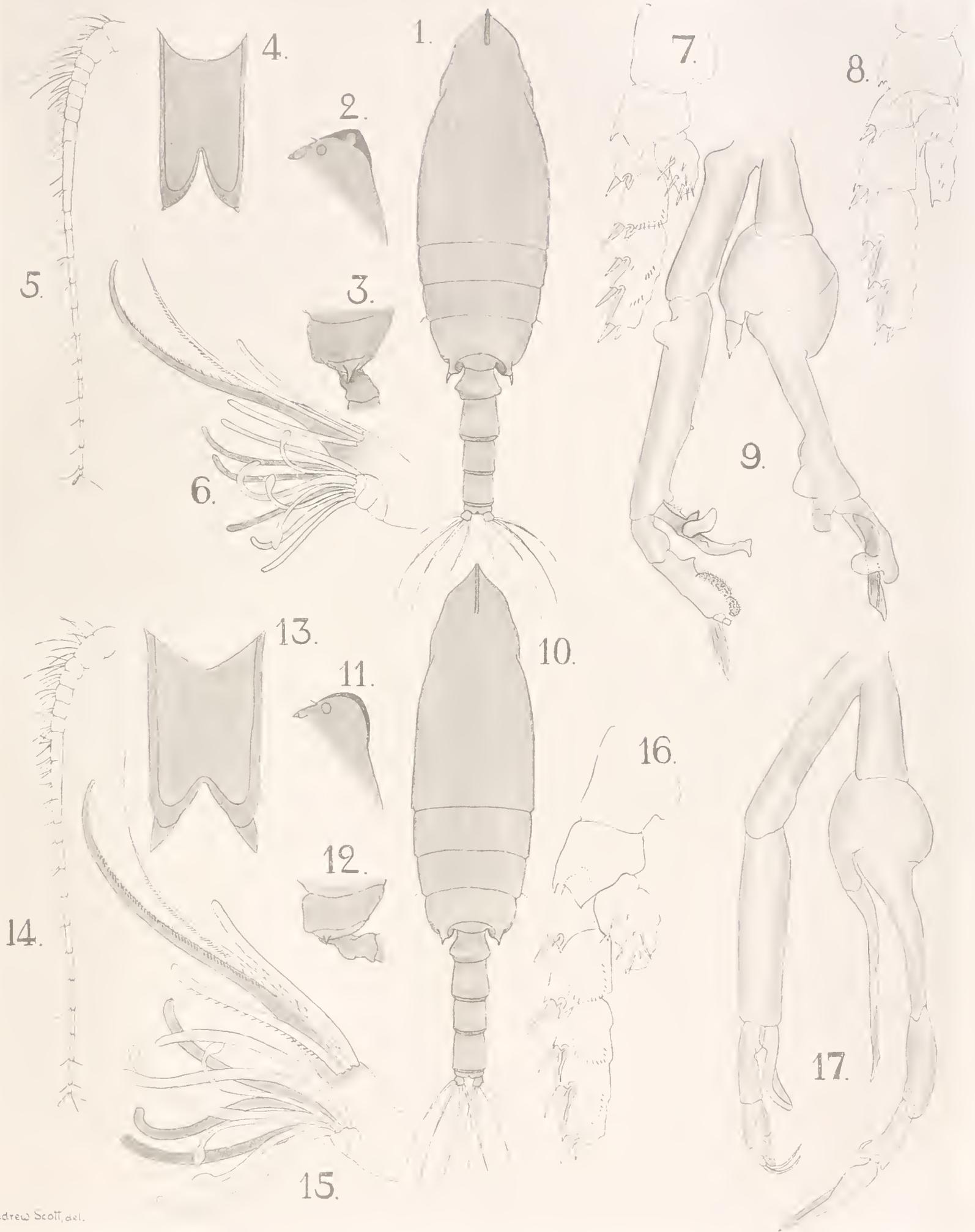
## PLATE XXVIII.

Figs. 1—9. *Scottocalanus securifrons* (T. Scott.).

- Fig. 1. Male, dorsal view.  $\times 23,5$ .
- Fig. 2. Male, head, lateral view.  $\times 23,5$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 4. Male, rostrum.  $\times 181$ .
- Fig. 5. Male, antennule.  $\times 23,5$ .
- Fig. 6. Male, first maxilliped, distal portion.  $\times 181$ .
- Fig. 7. Male, second foot.  $\times 60$ .
- Fig. 8. Male, fourth foot.  $\times 60$ .
- Fig. 9. Male, fifth feet.  $\times 90$ .

Figs. 10—17. *Scottocalanus thomasi* nov. sp.

- Fig. 10. Male, dorsal view.  $\times 19$ .
- Fig. 11. Male, head, lateral view.  $\times 19$ .
- Fig. 12. Male, last thoracic and first abdominal segments.  $\times 19$ .
- Fig. 13. Male, rostrum.  $\times 181$ .
- Fig. 14. Male, antennule.  $\times 19$ .
- Fig. 15. Male, first maxilliped, distal portion.  $\times 181$ .
- Fig. 16. Male, second foot.  $\times 60$ .
- Fig. 17. Male, fifth feet.  $\times 90$ .



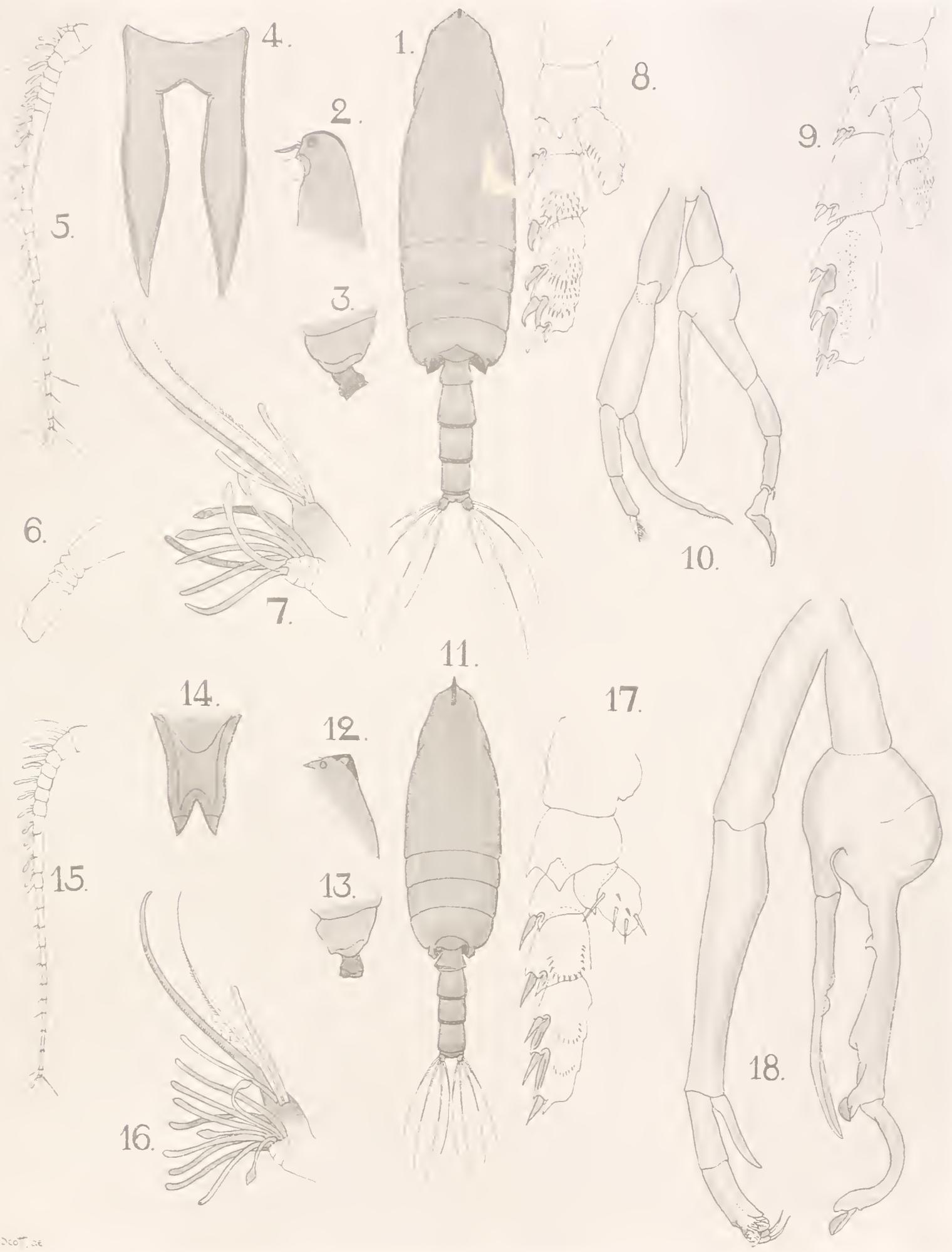
## PLATE XXIX.

Figs. 1—10. *Lophothrix frontalis* Giesbrecht.

- Fig. 1. Male, dorsal view.  $\times 19$ .
- Fig. 2. Male, head, lateral view.  $\times 19$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 19$ .
- Fig. 4. Male, rostrum.  $\times 181$ .
- Fig. 5. Male, antennule.  $\times 19$ .
- Fig. 6. Male, antenna, distal part of exopodite.  $\times 90$ .
- Fig. 7. Male, first maxilliped, distal portion.  $\times 181$ .
- Fig. 8. Male, second foot.  $\times 60$ .
- Fig. 9. Male, fourth foot.  $\times 60$ .
- Fig. 10. Male, fifth feet.  $\times 60$ .

Figs. 11—18. *Scottocalanus farrani* nov. sp.

- Fig. 11. Male, dorsal view.  $\times 23,5$ .
- Fig. 12. Male, head, lateral view.  $\times 23,5$ .
- Fig. 13. Male, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 14. Male, rostrum.  $\times 181$ .
- Fig. 15. Male, antennule.  $\times 23,5$ .
- Fig. 16. Male, first maxilliped, distal portion.  $\times 181$ .
- Fig. 17. Male, second foot.  $\times 90$ .
- Fig. 18. Male, fifth feet.  $\times 90$ .



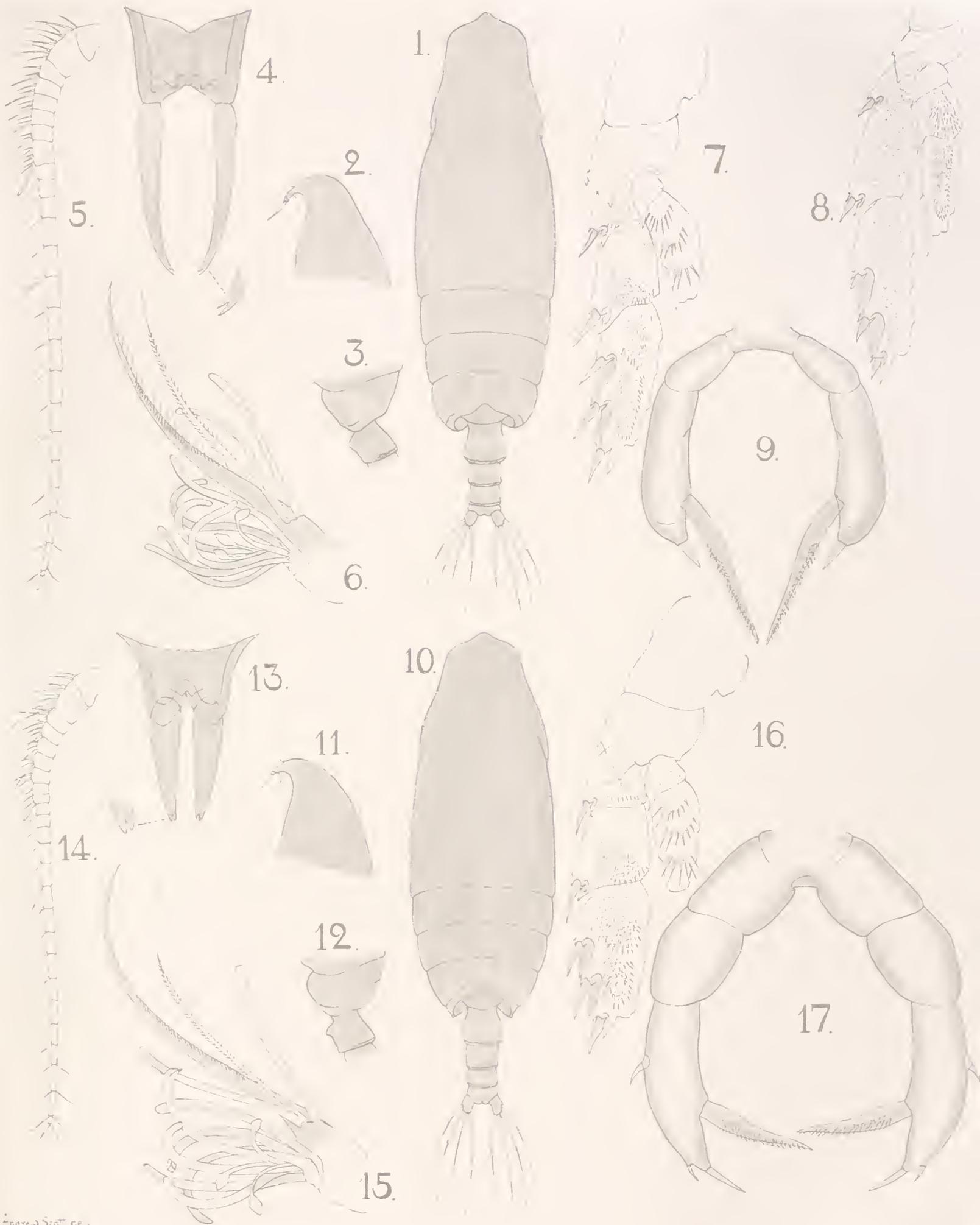
## PLATE XXX.

Figs. 1—9. *Scolecithricella curticauda* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 19$ .
- Fig. 2. Female, head, lateral view.  $\times 19$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 19$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 19$ .
- Fig. 6. Female, first maxilliped, distal portion.  $\times 90$ .
- Fig. 7. Female, second foot.  $\times 90$ .
- Fig. 8. Female, fourth foot.  $\times 45$ .
- Fig. 9. Female, fifth feet.  $\times 181$ .

Figs. 10—17. *Scolecithricella tydemani* nov. sp.

- Fig. 10. Female, dorsal view.  $\times 19$ .
- Fig. 11. Female, head, lateral view.  $\times 19$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 19$ .
- Fig. 13. Female, rostrum.  $\times 181$ .
- Fig. 14. Female, antennule.  $\times 19$ .
- Fig. 15. Female, first maxilliped, distal portion.  $\times 90$ .
- Fig. 16. Female, second foot.  $\times 60$ .
- Fig. 17. Female, fifth feet.  $\times 181$ .



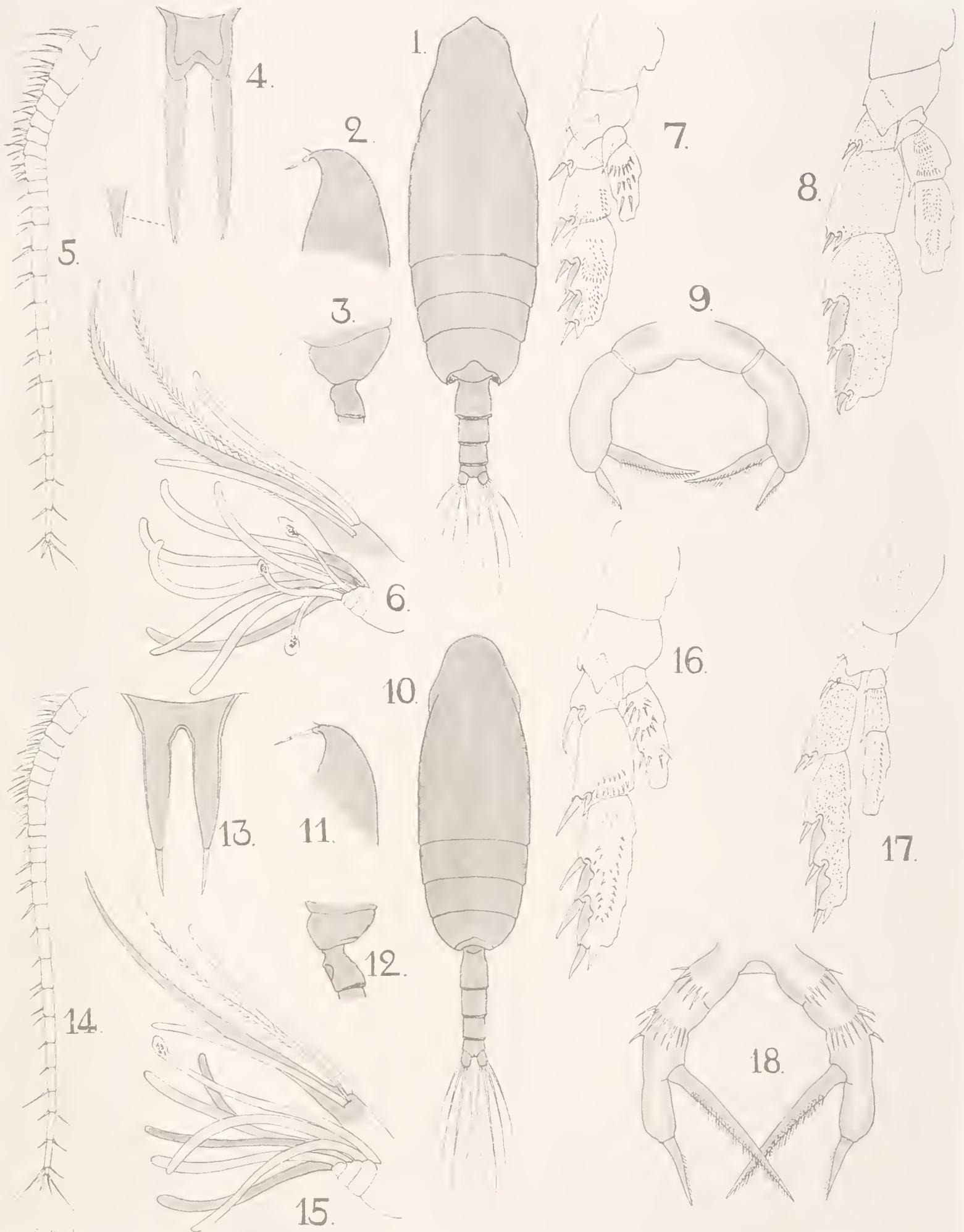
## PLATE XXXI.

Figs. 1—9. *Scolecithricella obtusifrons* (G. O. Sars).

- Fig. 1. Female, dorsal view.  $\times 23,5$ .
- Fig. 2. Female, head lateral view.  $\times 23,5$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 23,5$ .
- Fig. 6. Female, first maxilliped, distal portion.  $\times 181$ .
- Fig. 7. Female, second foot.  $\times 60$ .
- Fig. 8. Female, fourth foot.  $\times 60$ .
- Fig. 9. Female, fifth feet.  $\times 181$ .

Figs. 10—18. *Scolecithricella gracilis* G. O. Sars.

- Fig. 10. Female, dorsal view.  $\times 23,5$ .
- Fig. 11. Female, head, lateral view.  $\times 23,5$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 13. Female, rostrum.  $\times 181$ .
- Fig. 14. Female, antennule.  $\times 23,5$ .
- Fig. 15. Female, first maxilliped, distal portion.  $\times 181$ .
- Fig. 16. Female, second foot.  $\times 90$ .
- Fig. 17. Female, fourth foot.  $\times 60$ .
- Fig. 18. Female, fifth feet.  $\times 260$ .



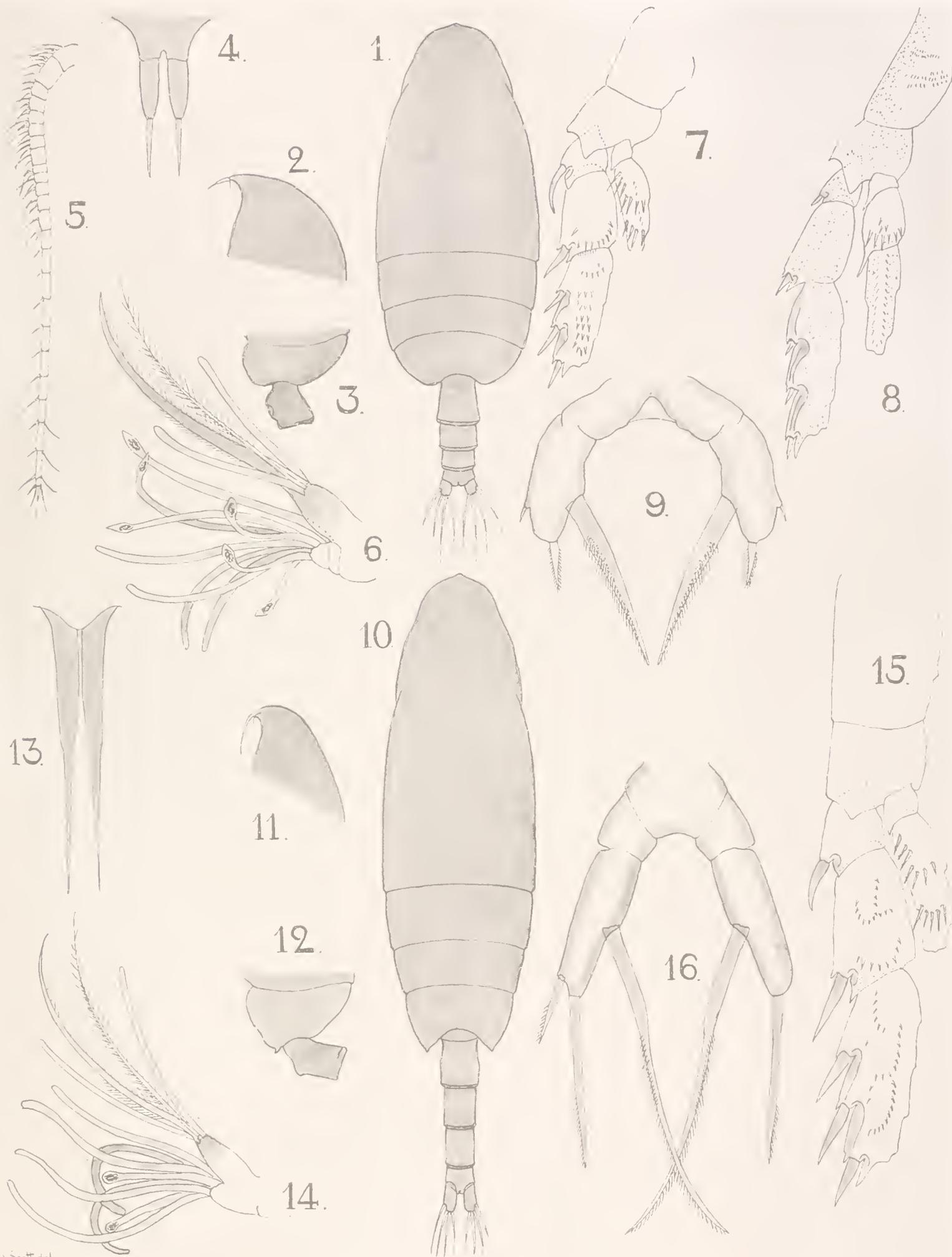
## PLATE XXXII.

Figs. 1—9. *Scolecithricella valida* (Farran).

- Fig. 1. Female, dorsal view.  $\times 31,5$ .
- Fig. 2. Female, head, lateral view.  $\times 31,5$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 31,5$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 31,5$ .
- Fig. 6. Female, first maxilliped, distal portion.  $\times 181$ .
- Fig. 7. Female, second foot.  $\times 90$ .
- Fig. 8. Female, fourth foot.  $\times 90$ .
- Fig. 9. Female, fifth feet.  $\times 260$ .

Figs. 10—16. *Scaphocalanus elongatus* nov. sp.

- Fig. 10. Female, dorsal view.  $\times 47$ .
- Fig. 11. Female, head, lateral view.  $\times 47$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 47$ .
- Fig. 13. Female, rostrum.  $\times 390$ .
- Fig. 14. Female, first maxilliped, distal portion.  $\times 181$ .
- Fig. 15. Female, second foot.  $\times 181$ .
- Fig. 16. Female, fifth feet.  $\times 390$ .



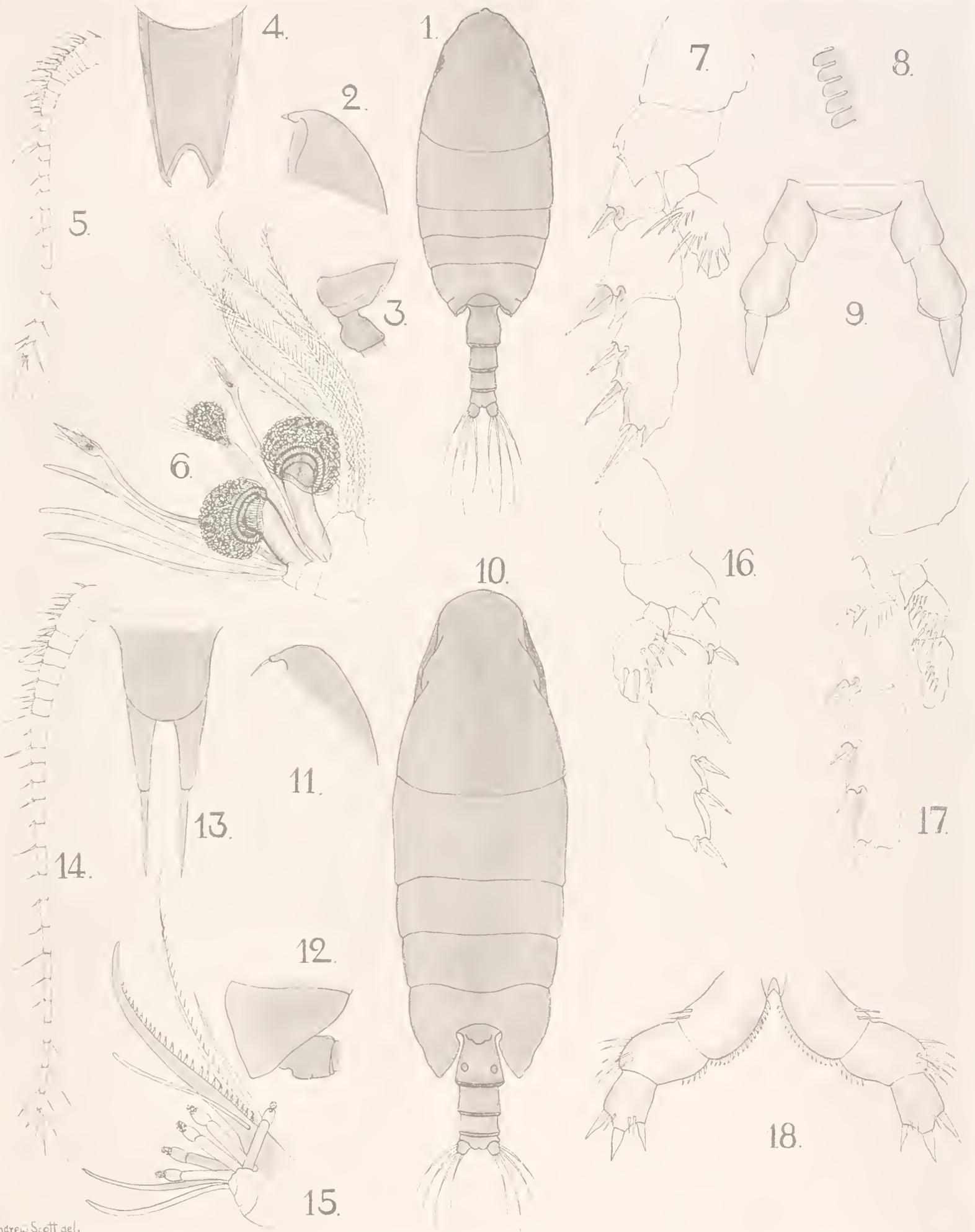
## PLATE XXXIII.

Figs. 1—9. *Heteramalla dubia* (T. Scott).

- Fig. 1. Female, dorsal view.  $\times 23,5$ .
- Fig. 2. Female, head, lateral view.  $\times 23,5$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 23,5$ .
- Fig. 6. Female, first maxilliped, distal portion.  $\times 90$ .
- Fig. 7. Female, second foot.  $\times 90$ .
- Fig. 8. Female, part of terminal spine, exopodite of second foot.
- Fig. 9. Female, fifth feet.  $\times 390$ .

Figs. 10—18. *Xanthocalanus agilis* Giesbrecht.

- Fig. 10. Female, dorsal view.  $\times 45$ .
- Fig. 11. Female, head, lateral view.  $\times 45$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 45$ .
- Fig. 13. Female, rostrum.  $\times 390$ .
- Fig. 14. Female, antennule.  $\times 45$ .
- Fig. 15. Female, first maxilliped, distal portion.  $\times 181$ .
- Fig. 16. Female, second foot.  $\times 120$ .
- Fig. 17. Female, fourth foot.  $\times 120$ .
- Fig. 18. Female, fifth feet.  $\times 260$ .



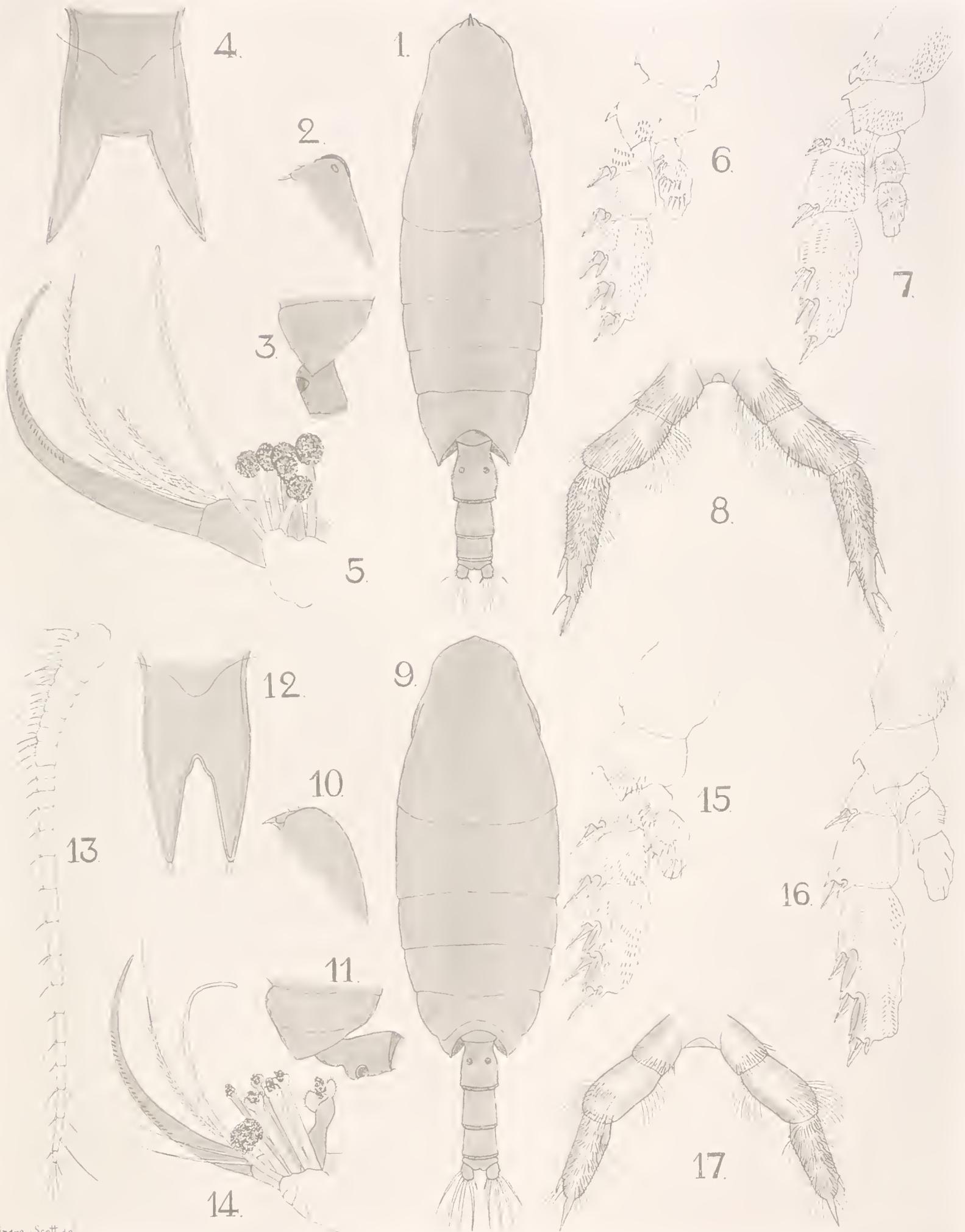
## PLATE XXXIV.

Figs. 1—8. *Onchocalanus cristatus* (Wolfenden).

- Fig. 1. Female, dorsal view.  $\times 19$ .
- Fig. 2. Female, head, lateral view.  $\times 19$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 19$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, first maxilliped, distal portion.  $\times 90$ .
- Fig. 6. Female, second foot.  $\times 45$ .
- Fig. 7. Female, fourth foot.  $\times 45$ .
- Fig. 8. Female, fifth feet.  $\times 120$ .

Figs. 9—17. *Onchocalanus hirtipes* G. O. Sars.

- Fig. 9. Female, dorsal view.  $\times 23,5$ .
- Fig. 10. Female, head, lateral view.  $\times 23,5$ .
- Fig. 11. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 12. Female, rostrum.  $\times 181$ .
- Fig. 13. Female, antennule.  $\times 23,5$ .
- Fig. 14. Female, first maxilliped, distal portion.  $\times 90$ .
- Fig. 15. Female, second foot.  $\times 60$ .
- Fig. 16. Female, fourth foot.  $\times 60$ .
- Fig. 17. Female, fifth feet.  $\times 120$ .



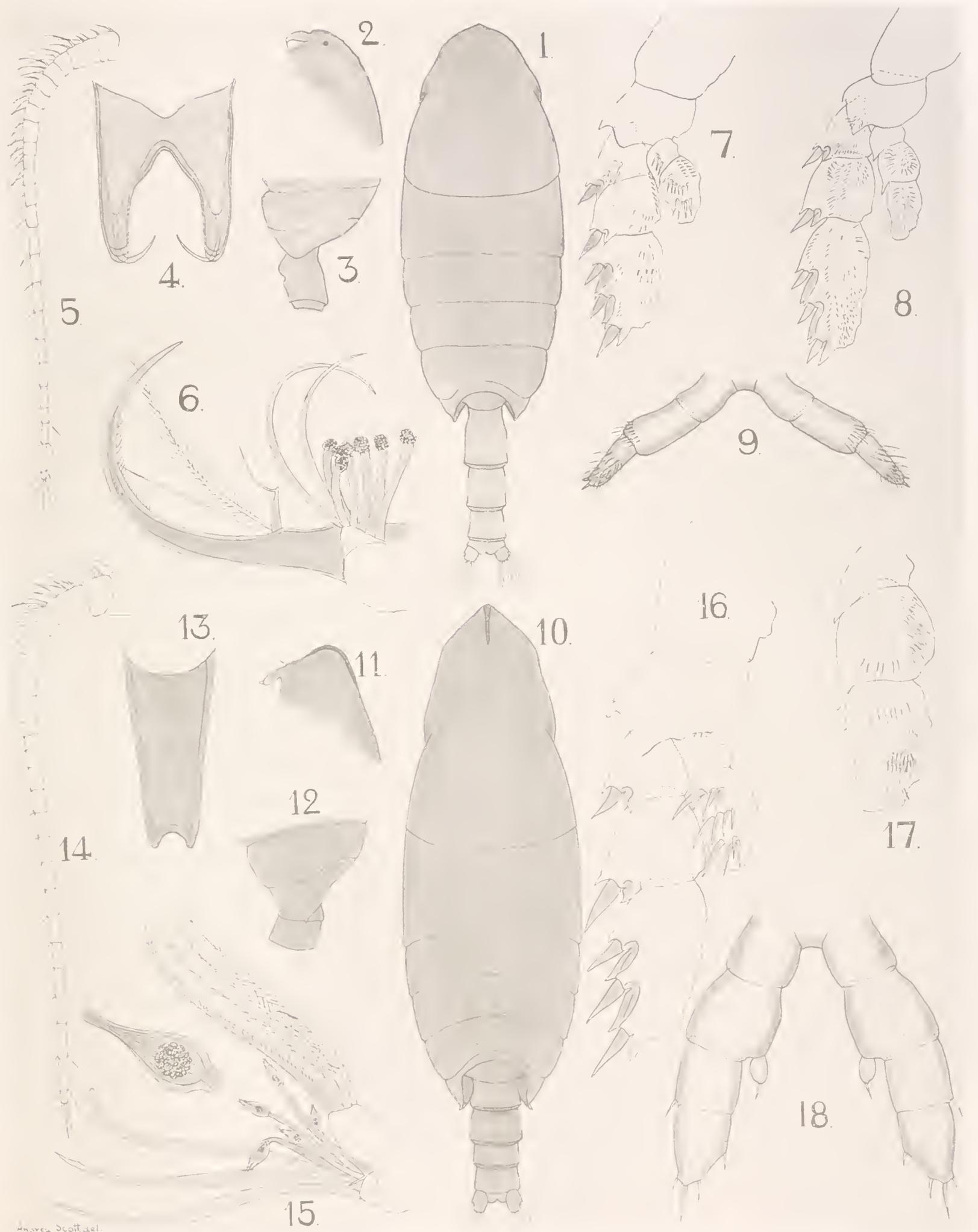
## PLATE XXXV.

Figs. 1—9. *Cornucalanus simplex* Wolfenden.

- Fig. 1. Female, dorsal view.  $\times 23,5$ .
- Fig. 2. Female, head, lateral view.  $\times 23,5$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 23,5$ .
- Fig. 4. Female, rostrum.  $\times 181$ .
- Fig. 5. Female, antennule.  $\times 23,5$ .
- Fig. 6. Female, first maxilliped, distal portion.  $\times 120$ .
- Fig. 7. Female, second foot.  $\times 60$ .
- Fig. 8. Female, fourth foot.  $\times 60$ .
- Fig. 9. Female, fifth feet.  $\times 136$ .

Figs. 10—18. *Brachycalanus gigas* nov. sp.

- Fig. 10. Male, dorsal view.  $\times 19$ .
- Fig. 11. Male, head, lateral view.  $\times 19$ .
- Fig. 12. Male, last thoracic and first abdominal segments.  $\times 19$ .
- Fig. 13. Male, rostrum.  $\times 90$ .
- Fig. 14. Male, antennule.  $\times 19$ .
- Fig. 15. Male, first maxilliped, distal portion.  $\times 90$ .
- Fig. 16. Male, second foot.  $\times 60$ .
- Fig. 17. Male, fourth foot, endopodite only.  $\times 90$ .
- Fig. 18. Male, fifth feet.  $\times 90$ .



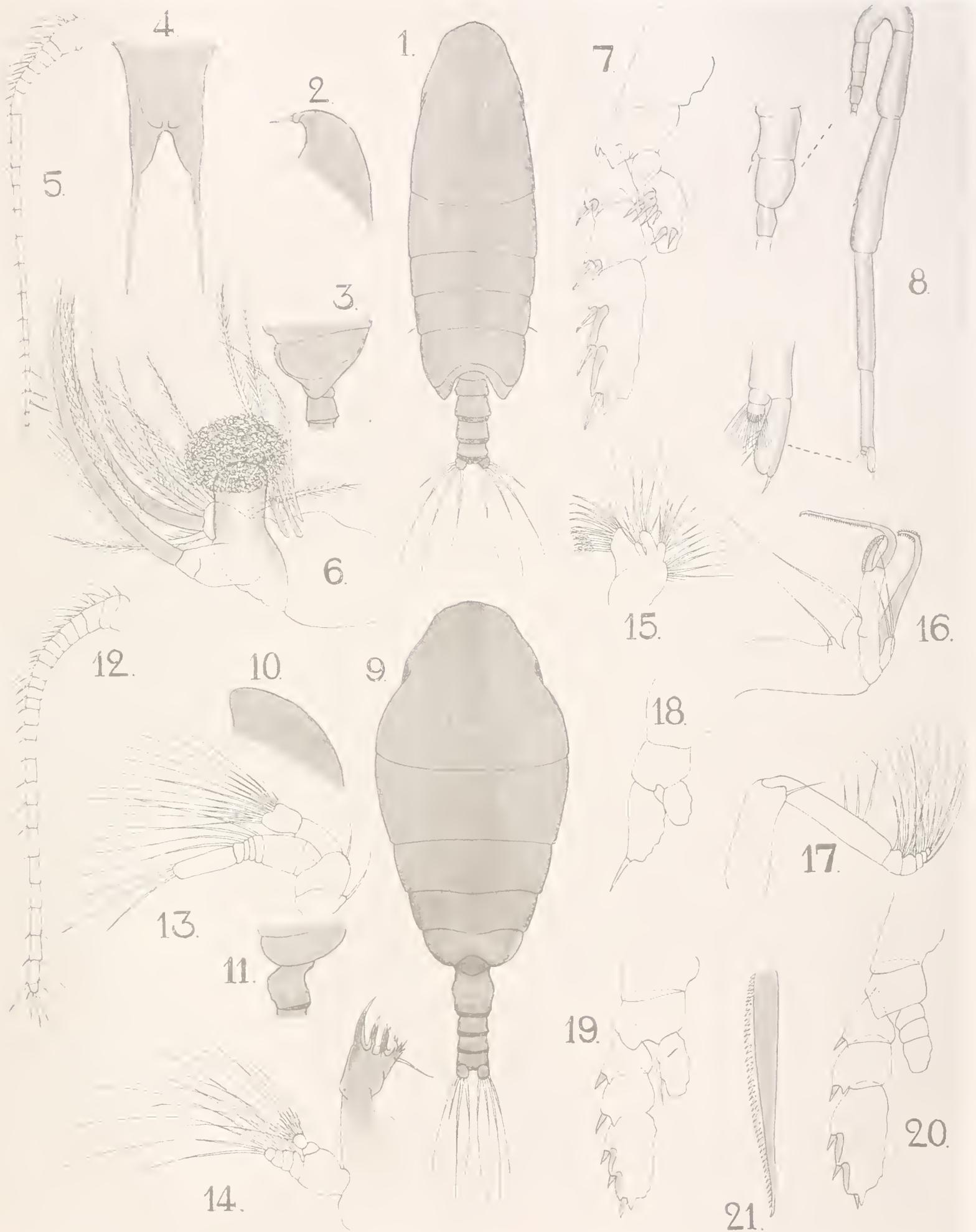
## PLATE XXXVI.

Figs. 1—8. *Amallophora typica* T. Scott.

- Fig. 1. Male, dorsal view.  $\times 36$ .
- Fig. 2. Male, head, lateral view.  $\times 36$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 36$ .
- Fig. 4. Male, rostrum.  $\times 90$ .
- Fig. 5. Male, antennule.  $\times 36$ .
- Fig. 6. Male, first maxilliped, distal portion.  $\times 260$ .
- Fig. 7. Male, second foot.  $\times 120$ .
- Fig. 8. Male, fifth feet.  $\times 120$ .

Figs. 9—21. *Chiridiella macrodactyla* G. O. Sars.

- Fig. 9. Female, dorsal view.  $\times 36$ .
- Fig. 10. Female, head, lateral view.  $\times 36$ .
- Fig. 11. Female, last thoracic and first abdominal segments.  $\times 36$ .
- Fig. 12. Female, antennule.  $\times 36$ .
- Fig. 13. Female, antenna.  $\times 90$ .
- Fig. 14. Female, mandible and palp.  $\times 90$ .
- Fig. 15. Female, maxilla.  $\times 60$ .
- Fig. 16. Female, first maxilliped.  $\times 60$ .
- Fig. 17. Female, second maxilliped.  $\times 60$ .
- Fig. 18. Female, first foot.  $\times 90$ .
- Fig. 19. Female, second foot.  $\times 90$ .
- Fig. 20. Female, fourth foot.  $\times 90$ .
- Fig. 21. Female, terminal spine, exopodite of fourth foot.  $\times 190$ .



## PLATE XXXVII.

Figs. 1—8. *Pseudodiaptomus clevei* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 60$ .
- Fig. 2. Female, head, lateral view.  $\times 60$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 4. Female, antennule.  $\times 60$ .
- Fig. 5. Female, fifth foot.  $\times 390$ .
- Fig. 6. Male, abdomen, dorsal view.  $\times 60$ .
- Fig. 7. Male, antennule, right side.  $\times 60$ .
- Fig. 8. Male, fifth feet.  $\times 260$ .

Figs. 9—11. *Metridia brevicauda* Giesbrecht.

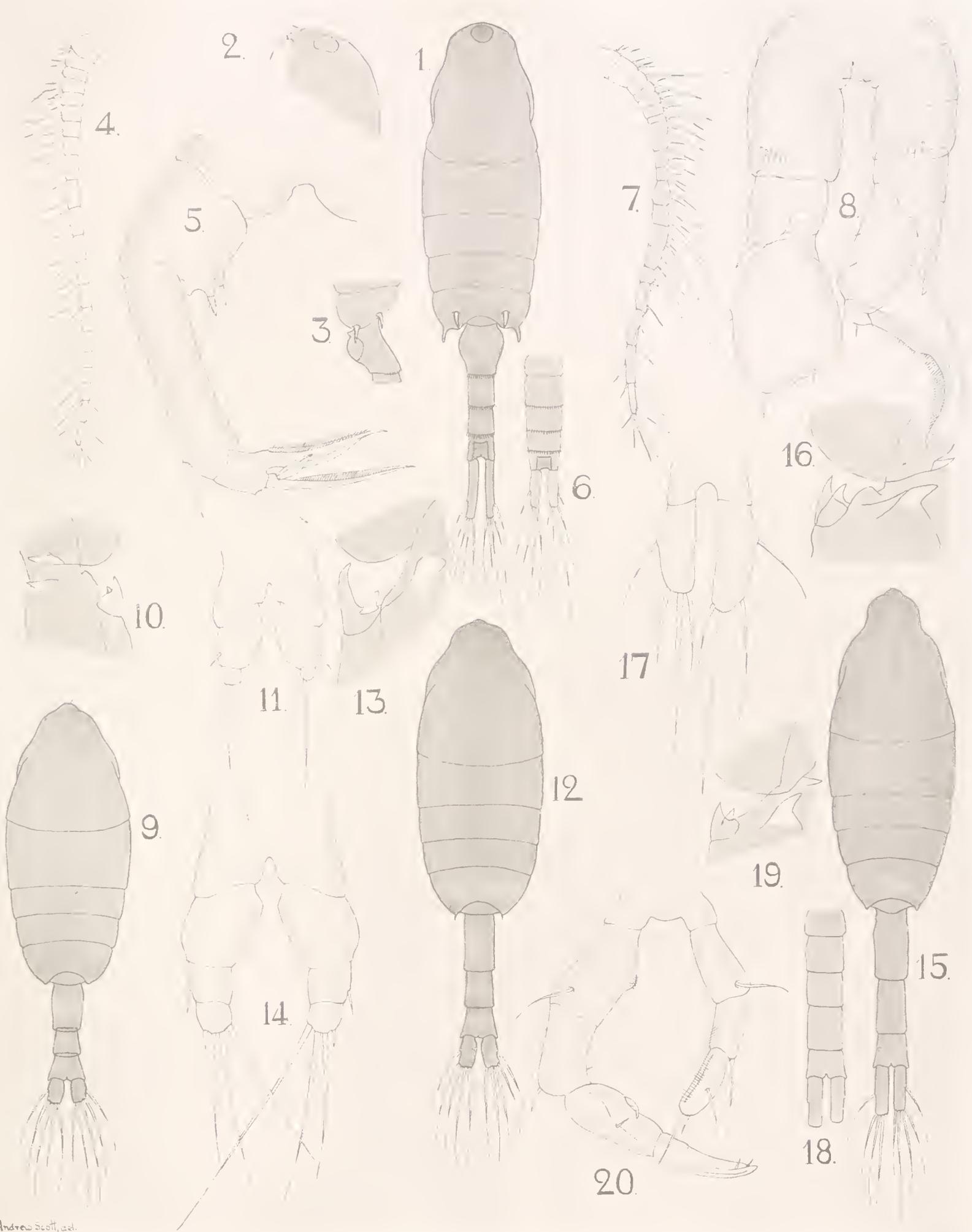
- Fig. 9. Female, dorsal view.  $\times 45$ .
- Fig. 10. Female, second foot, hooks on basal joint of endopodite.  $\times 380$ .
- Fig. 11. Female, fifth feet.  $\times 260$ .

Figs. 12—14. *Metridia boccki* Giesbrecht.

- Fig. 12. Female, dorsal view.  $\times 36$ .
- Fig. 13. Female, second foot, hooks on basal joint of endopodite.  $\times 380$ .
- Fig. 14. Female, fifth feet.  $\times 260$ .

Figs. 15—20. *Metridia venusta* Giesbrecht.

- Fig. 15. Female, dorsal view.  $\times 36$ .
- Fig. 16. Female, second foot, hooks on basal joint of endopodite.  $\times 380$ .
- Fig. 17. Female, fifth feet.  $\times 181$ .
- Fig. 18. Male, abdomen, dorsal view.  $\times 45$ .
- Fig. 19. Male, second foot, hooks on basal joint of endopodite.  $\times 380$ .
- Fig. 20. Male, fifth feet.  $\times 181$ .



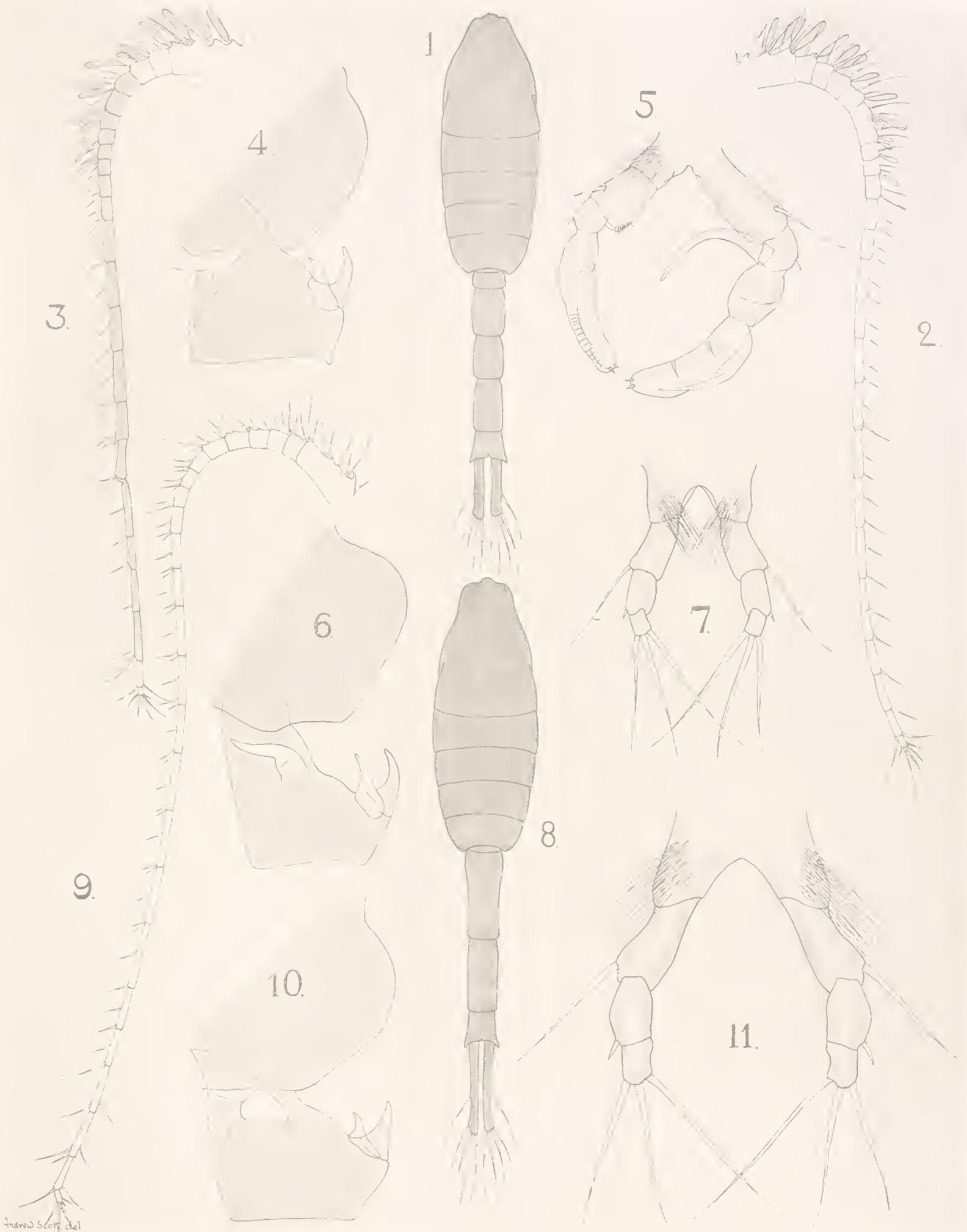
## PLATE XXXVIII.

Figs. 1—7. *Metridia princeps* Giesbrecht.

- Fig. 1. Male, dorsal view.  $\times 13$ .
- Fig. 2. Male, antennule, right side.  $\times 15,5$ .
- Fig. 3. Male, antennule, left side.  $\times 15,5$ .
- Fig. 4. Male, second foot, hooks on basal joint of endopodite.  $\times 144$ .
- Fig. 5. Male, fifth feet.  $\times 47$ .
- Fig. 6. Female, second foot, hooks on basal joint of endopodite.  $\times 144$ .
- Fig. 7. Female, fifth feet.  $\times 71$ .

Figs. 8—11. *Metridia macrura* G. O. Sars.

- Fig. 8. Female, dorsal view.  $\times 11,75$ .
- Fig. 9. Female, antennule.  $\times 15$ .
- Fig. 10. Female, second foot, hooks on basal joint of endopodite.  $\times 144$ .
- Fig. 11. Female, fifth feet.  $\times 89$ .



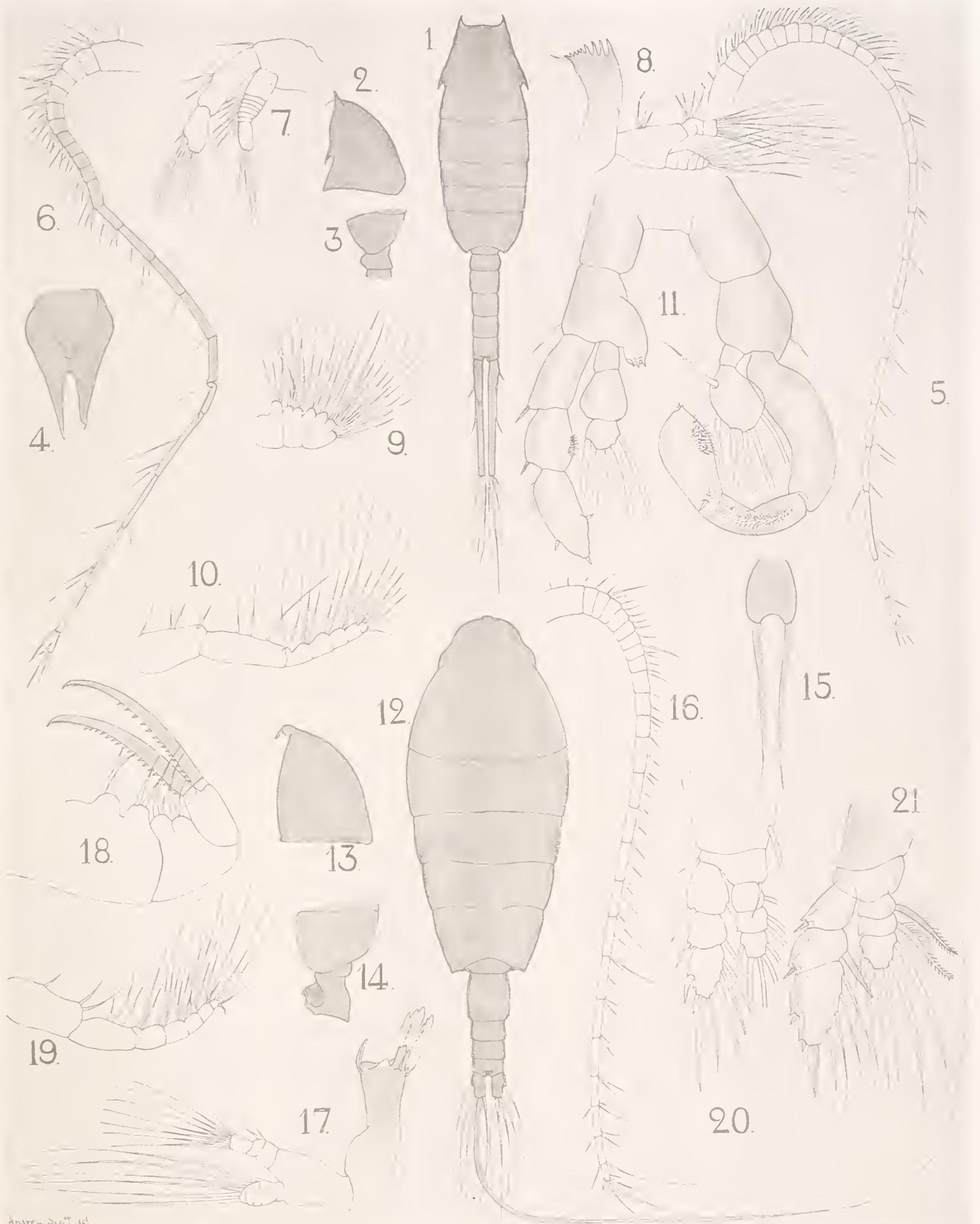
## PLATE XXXIX.

Figs. 1—11. *Lucicutia bicornuta* Wolfenden.

- Fig. 1. Male, dorsal view.  $\times 12,5$ .
- Fig. 2. Male, head, lateral view.  $\times 12,5$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 12,5$ .
- Fig. 4. Male, rostrum.  $\times 200$ .
- Fig. 5. Male, antennule, right side.  $\times 22,5$ .
- Fig. 6. Male, antennule, left side.  $\times 22,5$ .
- Fig. 7. Male, antenna.  $\times 36$ .
- Fig. 8. Male, mandible and palp.  $\times 36$ .
- Fig. 9. Male, first maxilliped.  $\times 36$ .
- Fig. 10. Male, second maxilliped.  $\times 36$ .
- Fig. 11. Male, fifth feet.  $\times 328$ .

Figs. 12—21. *Mesorhabdus truncatus* nov. sp.

- Fig. 12. Female, dorsal view.  $\times 15$ .
- Fig. 13. Female, head lateral view.  $\times 15$ .
- Fig. 14. Female, last thoracic and first abdominal segments.  $\times 15$ .
- Fig. 15. Female, rostrum.  $\times 96$ .
- Fig. 16. Female, antennule.  $\times 22,5$ .
- Fig. 17. Female, mandible and palp.  $\times 48$ .
- Fig. 18. Female, first maxilliped.  $\times 72$ .
- Fig. 19. Female, second maxilliped.  $\times 36$ .
- Fig. 20. Female, first foot.  $\times 36$ .
- Fig. 21. Female, fifth foot.  $\times 36$ .



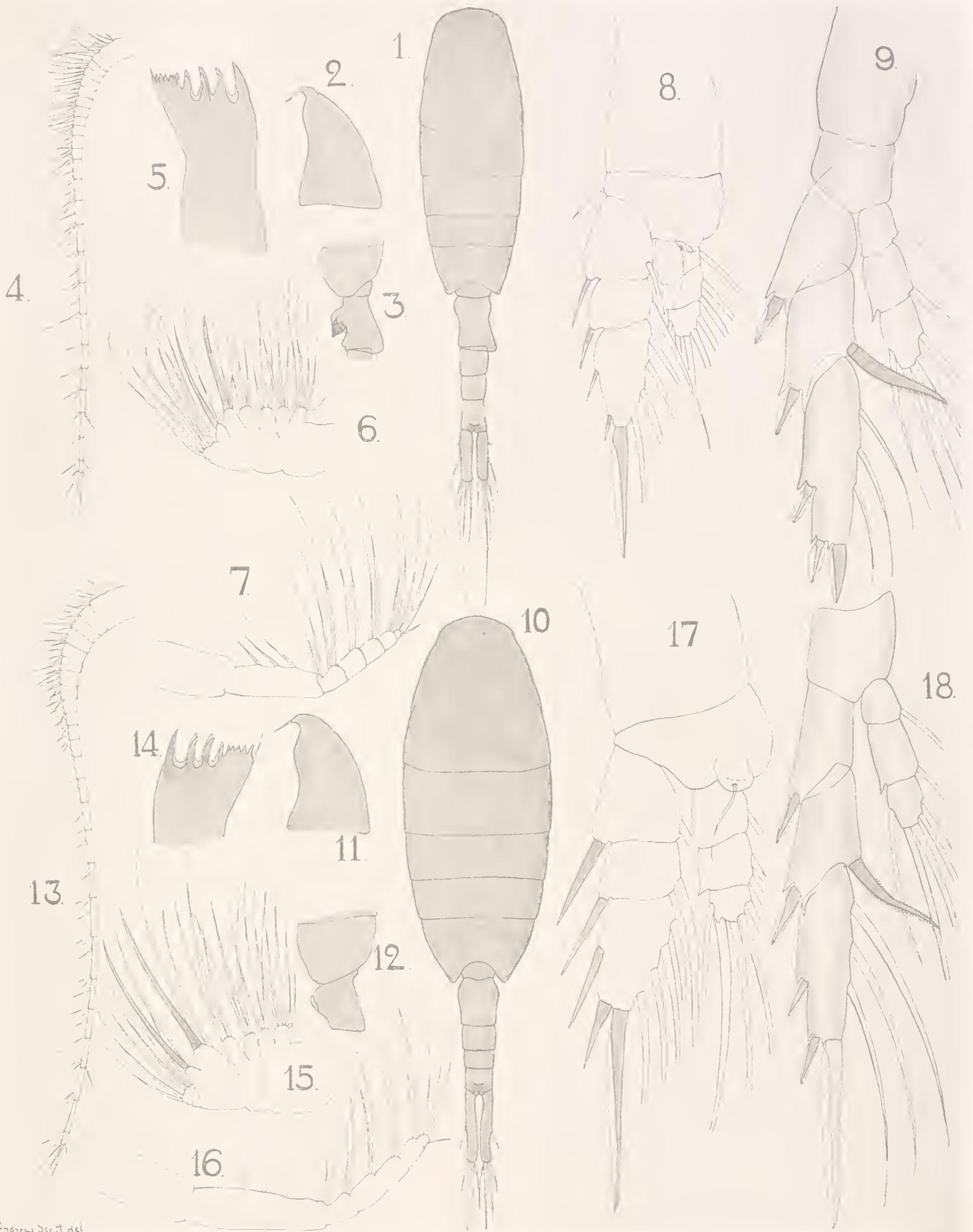
## PLATE XL.

Figs. 1—9. *Lucicutia pera* nov. sp.

- Fig. 1. Female, dorsal view. × 30.
- Fig. 2. Female, head, lateral view. × 30.
- Fig. 3. Female, last thoracic and first abdominal segments. × 30.
- Fig. 4. Female, antennule. × 29.
- Fig. 5. Female, mandible. × 144.
- Fig. 6. Female, first maxilliped. × 96.
- Fig. 7. Female, second maxilliped. × 70.
- Fig. 8. Female, first foot. × 144.
- Fig. 9. Female, fifth foot. × 144.

Figs. 10—18. *Lucicutia philyra* nov. sp.

- Fig. 10. Female, dorsal view. × 29.
- Fig. 11. Female, head, lateral view. × 29.
- Fig. 12. Female, last thoracic and first abdominal segments. × 29.
- Fig. 13. Female, antennule. × 29.
- Fig. 14. Female, mandible. × 66.
- Fig. 15. Female, first maxilliped. × 96.
- Fig. 16. Female, second maxilliped. × 70.
- Fig. 17. Female, first foot. × 144.
- Fig. 18. Female, fifth foot. × 144.



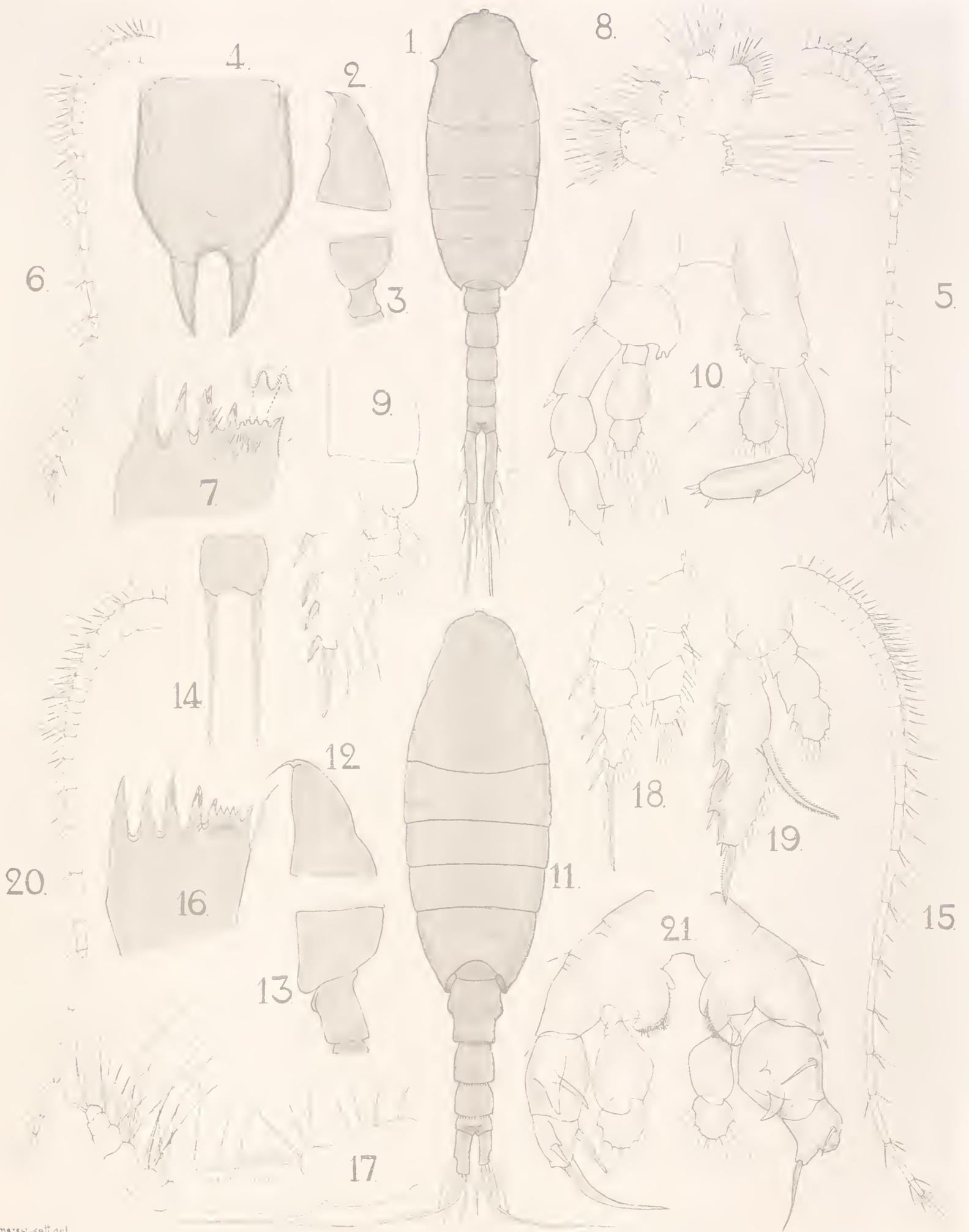
## PLATE XLI.

Figs. 1—10. *Lucicutia maxima* Steuer.

- Fig. 1. Male, dorsal view.  $\times 13,5$ .
- Fig. 2. Male, head, lateral view.  $\times 13,5$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 13,5$ .
- Fig. 4. Male, rostrum.  $\times 273$ .
- Fig. 5. Male, antennule, right side.  $\times 15$ .
- Fig. 6. Male, antennule, left side.  $\times 15$ .
- Fig. 7. Male, mandible.  $\times 142$ .
- Fig. 8. Male, maxilla.  $\times 48$ .
- Fig. 9. Male, first foot.  $\times 48$ .
- Fig. 10. Male, fifth feet.  $\times 48$ .

Figs. 11—21. *Disseta palumboi* Giesbrecht.

- Fig. 11. Female, dorsal view.  $\times 15,7$ .
- Fig. 12. Female, head, lateral view.  $\times 15,7$ .
- Fig. 13. Female, last thoracic and first abdominal segments.  $\times 15,7$ .
- Fig. 14. Female, rostrum.  $\times 108$ .
- Fig. 15. Female, antennule.  $\times 15$ .
- Fig. 16. Female, mandible.  $\times 108$ .
- Fig. 17. Female, second maxilliped.  $\times 48$ .
- Fig. 18. Female, first foot.  $\times 48$ .
- Fig. 19. Female, fifth foot.  $\times 48$ .
- Fig. 20. Male, antennule, left side.  $\times 15$ .
- Fig. 21. Male, fifth feet.  $\times 48$ .



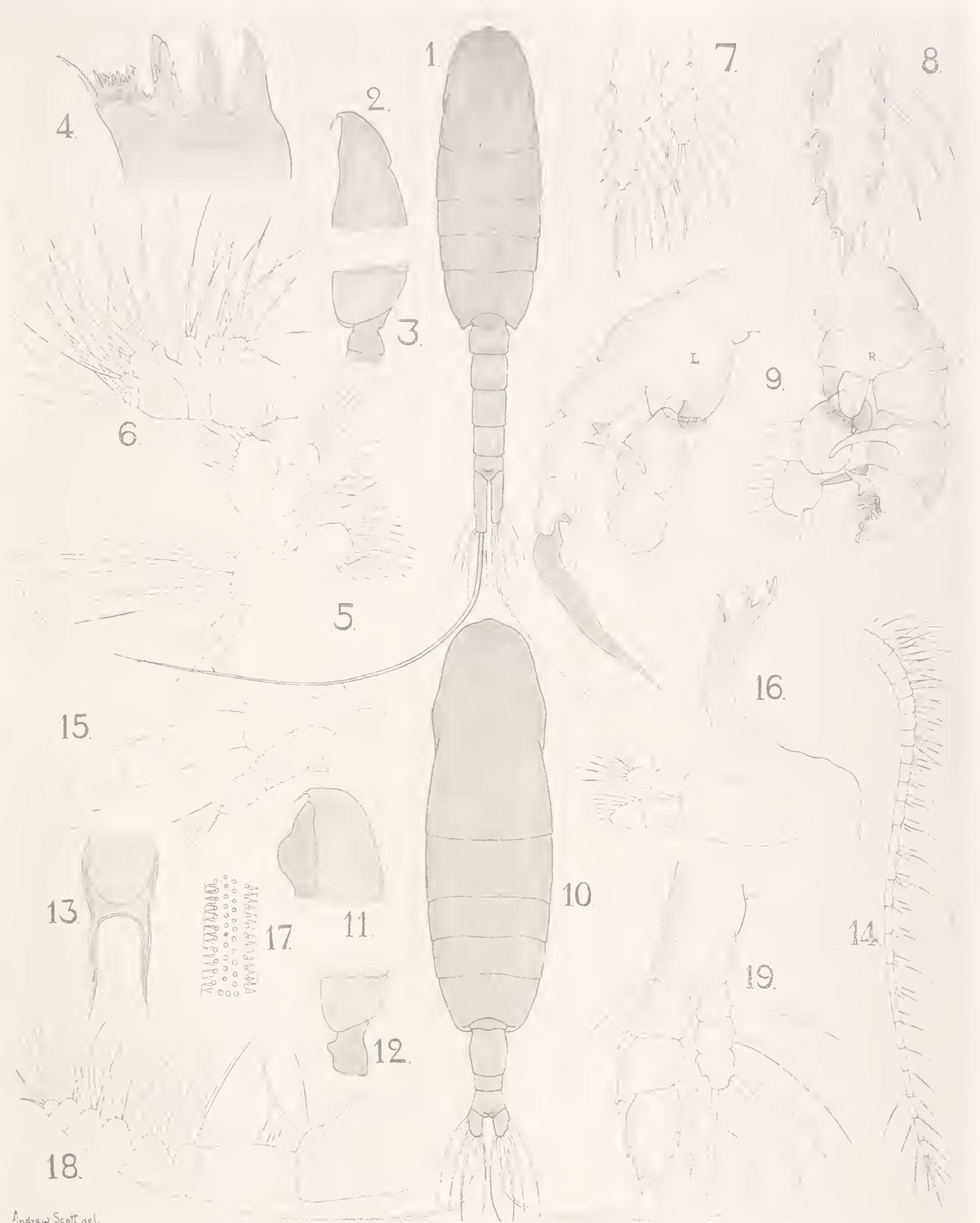
## PLATE XLII.

Figs. 1—9. *Disseta scopularis* (Brady).

- Fig. 1. Male, dorsal view.  $\times 11,5$ .
- Fig. 2. Male, head, lateral view.  $\times 11,5$ .
- Fig. 3. Male, last thoracic and first abdominal segments.  $\times 11,5$ .
- Fig. 4. Male, mandible.  $\times 144$ .
- Fig. 5. Male, maxilla.  $\times 48$ .
- Fig. 6. Male, first maxilliped.  $\times 48$ .
- Fig. 7. Male, first foot.  $\times 36$ .
- Fig. 8. Male, fourth foot, end joint of exopodite.  $\times 36$ .
- Fig. 9. Male, fifth feet.  $\times 48$ .

Figs. 10—19. *Angaptilus placitus* nov. sp.

- Fig. 10. Female, dorsal view.  $\times 11,5$ .
- Fig. 11. Female, head, lateral view.  $\times 11,5$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 11,5$ .
- Fig. 13. Female, rostrum.  $\times 71$ .
- Fig. 14. Female, antennule.  $\times 10$ .
- Fig. 15. Female, antenna.  $\times 10$ .
- Fig. 16. Female, mandible and palp.  $\times 48$ .
- Fig. 17. Female, maxilla, part of one of the hairs.  $\times 400$ .
- Fig. 18. Female, second maxilliped.  $\times 28$ .
- Fig. 19. Female, fifth foot.  $\times 48$ .



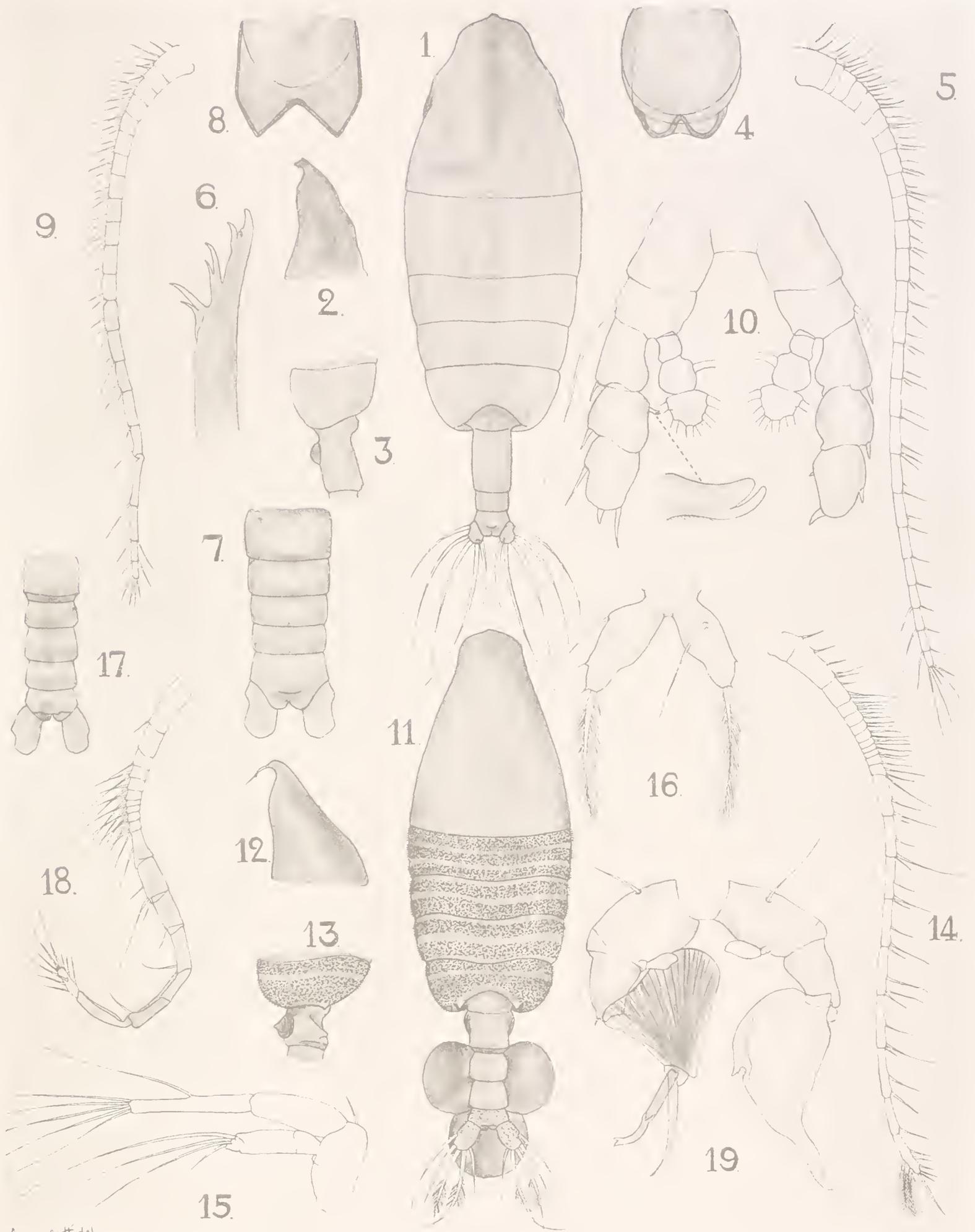
## PLATE XLIII.

Figs. 1—10. *Augaptilus validus* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 13,5$ .
- Fig. 2. Female, head, lateral view.  $\times 13,5$ .
- Fig. 3. Female, last thoracic and first abdominal segments.  $\times 13,5$ .
- Fig. 4. Female, rostrum.  $\times 24$ .
- Fig. 5. Female, antennule.  $\times 15$ .
- Fig. 6. Female, mandible.  $\times 71$ .
- Fig. 7. Male, abdomen, dorsal view.  $\times 30$ .
- Fig. 8. Male, rostrum.  $\times 24$ .
- Fig. 9. Male, antennule, left side.  $\times 15$ .
- Fig. 10. Male, fifth feet.  $\times 48$ .

Figs. 11—19. *Paraugaptilus similis* nov. sp.

- Fig. 11. Female, dorsal view.  $\times 36$ .
- Fig. 12. Female, head, lateral view.  $\times 36$ .
- Fig. 13. Female, last thoracic and first abdominal segments.  $\times 36$ .
- Fig. 14. Female, antennule.  $\times 36$ .
- Fig. 15. Female, antenna.  $\times 71$ .
- Fig. 16. Female, fifth feet.  $\times 96$ .
- Fig. 17. Male, abdomen, dorsal view.  $\times 48$ .
- Fig. 18. Male, antennule, left side.  $\times 36$ .
- Fig. 19. Male, fifth feet.  $\times 96$ .



## PLATE XLIV.

Figs. 1—3. *Chiridius ? obtusifrons* G. O. Sars.

- Fig. 1. Female, dorsal view. × 36.
- Fig. 2. Female, head, lateral view. × 36.
- Fig. 3. Female, last thoracic and first abdominal segments, left side. × 36.

Figs. 4—7. *Arietellus aculeatus* (T. Scott).

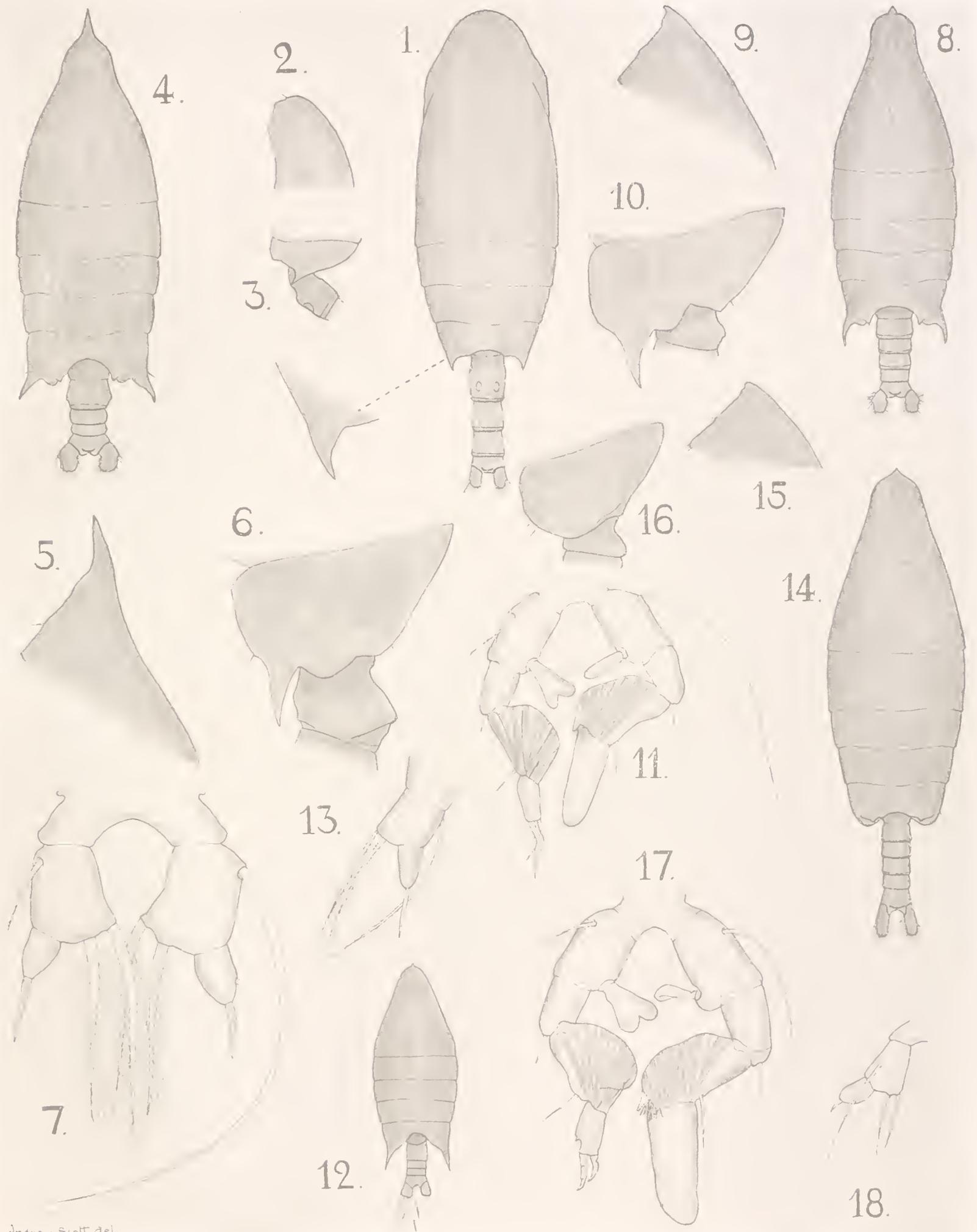
- Fig. 4. Female, dorsal view. × 21,6.
- Fig. 5. Female, head, lateral view. × 79.
- Fig. 6. Female, last thoracic and first abdominal segments, left side. × 53.
- Fig. 7. Female, fifth pair of feet. × 144.

Figs. 8—13. *Arietellus setosus* Giesbrecht.

- Fig. 8. Male, dorsal view. × 22.
- Fig. 9. Male, head, lateral view. × 106.
- Fig. 10. Male, last thoracic and first abdominal segments, left side. × 53.
- Fig. 11. Male, fifth pair of feet. × 72.
- Fig. 12. Female, dorsal view, after ESTERLY. × 9.
- Fig. 13. Female, fifth foot, after ESTERLY. × 83.

Figs. 14—18. *Arietellus simplex* G. O. Sars.

- Fig. 14. Male, dorsal view. × 16.
- Fig. 15. Male, head, lateral view. × 79.
- Fig. 16. Male, last thoracic and first abdominal segments, left side. × 32.
- Fig. 17. Male, fifth feet. × 72.
- Fig. 18. Female, fifth foot, after ESTERLY. × 70.



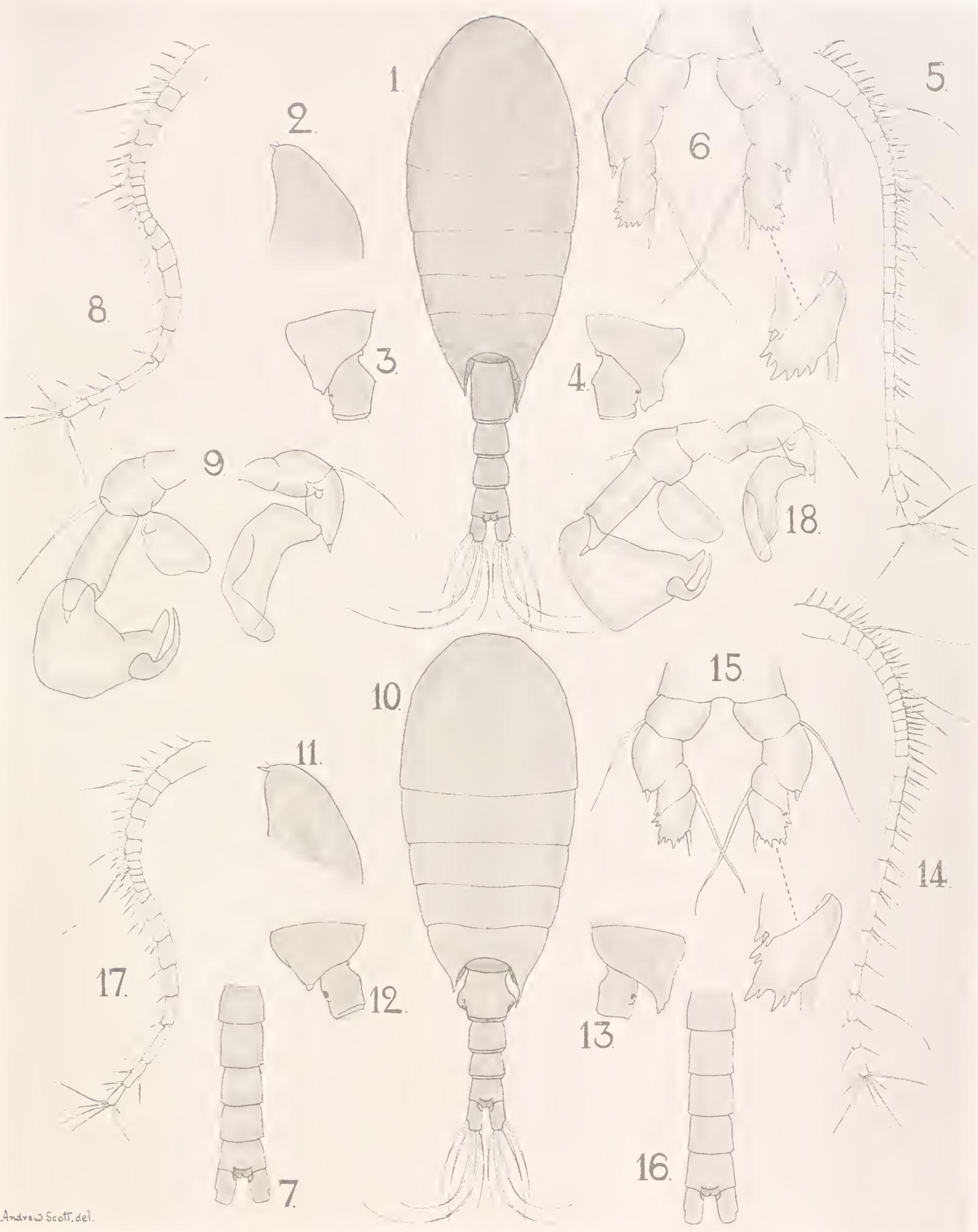
## PLATE XLV.

Figs. 1—9. *Phyllopus bidentatus* Brady.

- Fig. 1. Female, dorsal view.  $\times 36$ .
- Fig. 2. Female, head, lateral view.  $\times 36$ .
- Fig. 3. Female, last thoracic and first abdominal segments, left side.  $\times 36$ .
- Fig. 4. Female, last thoracic and first abdominal segments, right side.  $\times 36$ .
- Fig. 5. Female, antennule.  $\times 48$ .
- Fig. 6. Female, fifth feet.  $\times 143$ .
- Fig. 7. Male, abdomen, dorsal view.  $\times 48$ .
- Fig. 8. Male, antennule, left side.  $\times 48$ .
- Fig. 9. Male, fifth feet.  $\times 71$ .

Figs. 10—18. *Phyllopus impar* Farran.

- Fig. 10. Female, dorsal view.  $\times 36$ .
- Fig. 11. Female, head, lateral view.  $\times 36$ .
- Fig. 12. Female, last thoracic and first abdominal segments, left side.  $\times 36$ .
- Fig. 13. Female, last thoracic and first abdominal segments, right side.  $\times 36$ .
- Fig. 14. Female, antennule.  $\times 48$ .
- Fig. 15. Female, fifth feet.  $\times 143$ .
- Fig. 16. Male, abdomen, dorsal view.  $\times 48$ .
- Fig. 17. Male, antennule, left side.  $\times 48$ .
- Fig. 18. Male, fifth feet.  $\times 71$ .



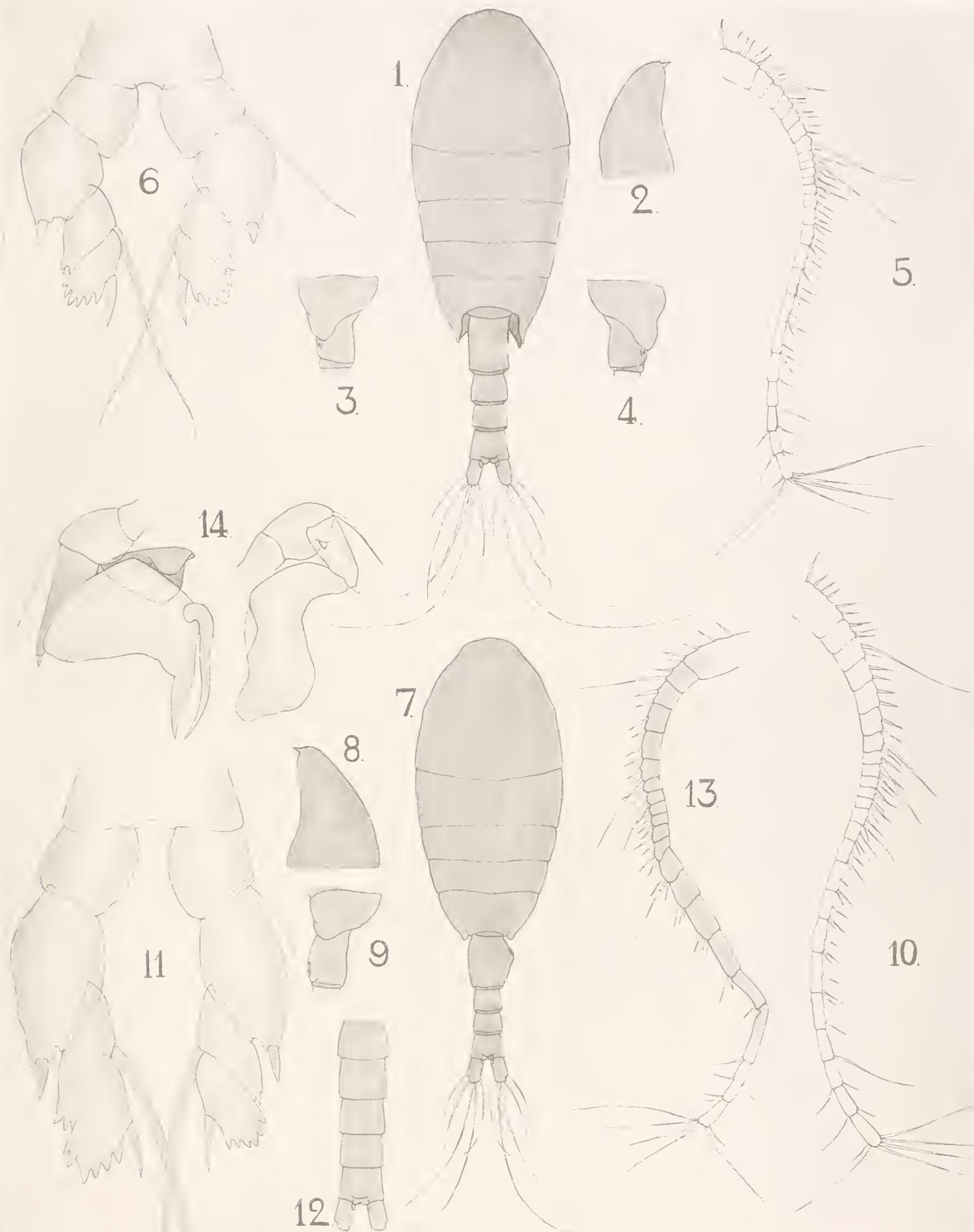
## PLATE XLVI.

Figs. 1—6. *Phyllopus giesbrechti* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 36$ .
- Fig. 2. Female, head, lateral view.  $\times 36$ .
- Fig. 3. Female, last thoracic and first abdominal segments, left side.  $\times 36$ .
- Fig. 4. Female, last thoracic and first abdominal segments, right side.  $\times 36$ .
- Fig. 5. Female, antennule.  $\times 48$ .
- Fig. 6. Female, fifth feet.  $\times 200$ .

Figs. 7—14. *Phyllopus helgae* Farran.

- Fig. 7. Female, dorsal view.  $\times 36$ .
- Fig. 8. Female, head, lateral view.  $\times 36$ .
- Fig. 9. Female, last thoracic and first abdominal segments, left side.  $\times 36$ .
- Fig. 10. Female, antennule.  $\times 71$ .
- Fig. 11. Female, fifth feet.  $\times 273$ .
- Fig. 12. Male, abdomen, dorsal view.  $\times 48$ .
- Fig. 13. Male, antennule, left side.  $\times 71$ .
- Fig. 14. Male, fifth feet.  $\times 95$ .



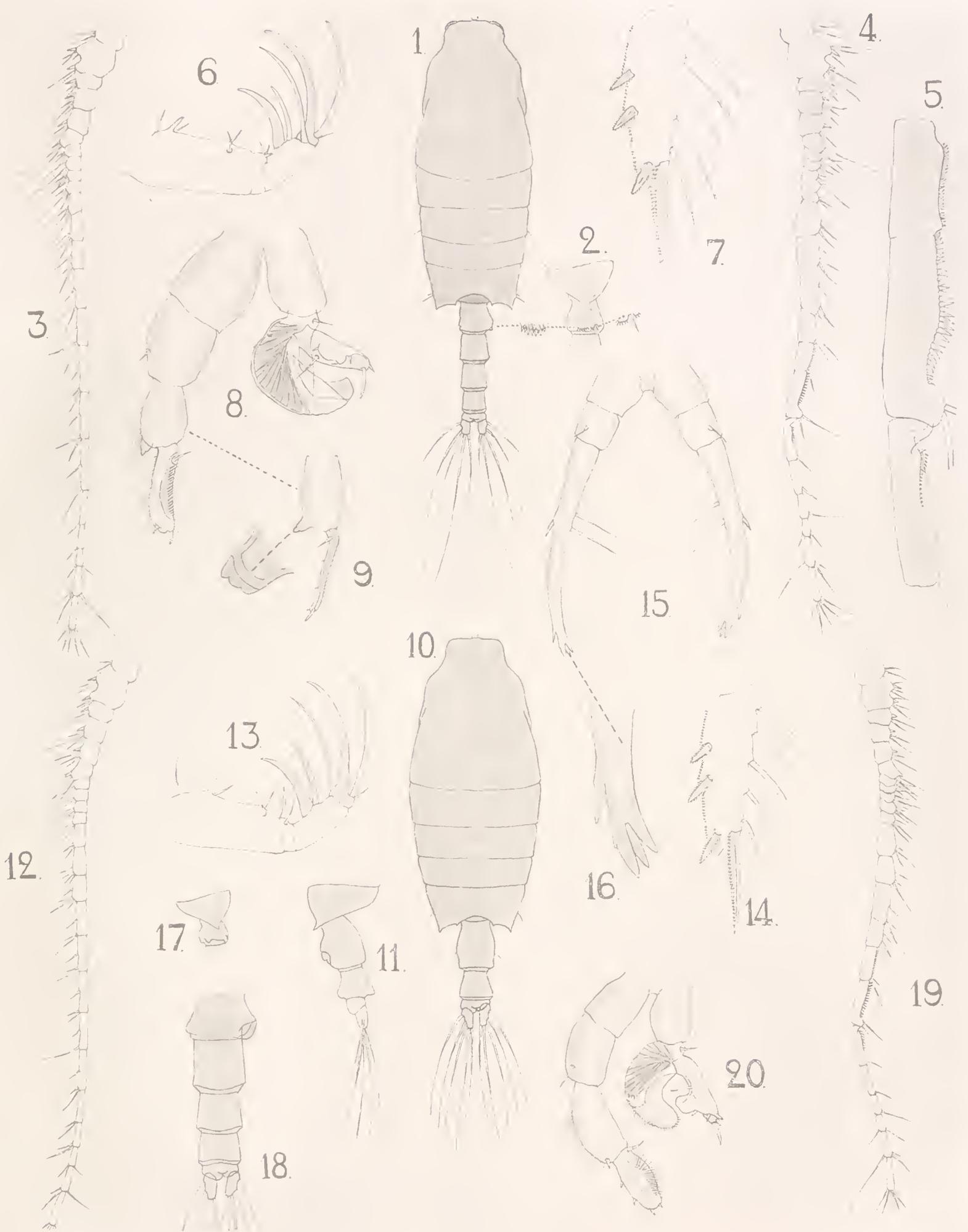
## PLATE XLVII.

Figs. 1—9. *Candacia bradyi* A. Scott.

- Fig. 1. Male, dorsal view. × 45.
- Fig. 2. Male, last thoracic and first abdominal segments, right side. × 45.
- Fig. 3. Male, antennule, left side. × 71.
- Fig. 4. Male, antennule, right side. × 71.
- Fig. 5. Male, antennule, right side, hinge joints. × 273.
- Fig. 6. Male, first maxilliped. × 71.
- Fig. 7. Male, third foot, terminal spine on last joint of exopodite. × 164.
- Fig. 8. Male, fifth feet. × 143.
- Fig. 9. Male, fifth foot, terminal joints of left side, edge view. × 143.

Figs. 10—20. *Candacia discaudata* nov. sp.

- Fig. 10. Female, dorsal view. × 45.
- Fig. 11. Female, last thoracic and first abdominal segments. × 45.
- Fig. 12. Female, antennule. × 71.
- Fig. 13. Female, first maxilliped. × 71.
- Fig. 14. Female, third foot, terminal spine on last joint of exopodite. × 164.
- Fig. 15. Female, fifth feet. × 143.
- Fig. 16. Female, fifth foot, apex of last joint. × 410.
- Fig. 17. Male, last thoracic and first abdominal segments, right side. × 45.
- Fig. 18. Male, abdomen, dorsal view. × 71.
- Fig. 19. Male, antennule, right side. × 71.
- Fig. 20. Male, fifth feet. × 143.



## PLATE XLVIII.

### Figs. 1—5. *Calanopia elliptica* (Dana).

- Fig. 1. Female, dorsal view.  $\times 60$ .
- Fig. 2. Female, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 3. Female, fifth feet.  $\times 250$ .
- Fig. 4. Male, abdomen, dorsal view.  $\times 96$ .
- Fig. 5. Male, fifth feet.  $\times 250$ .

### Figs. 6—10. *Calanopia minor* A. Scott.

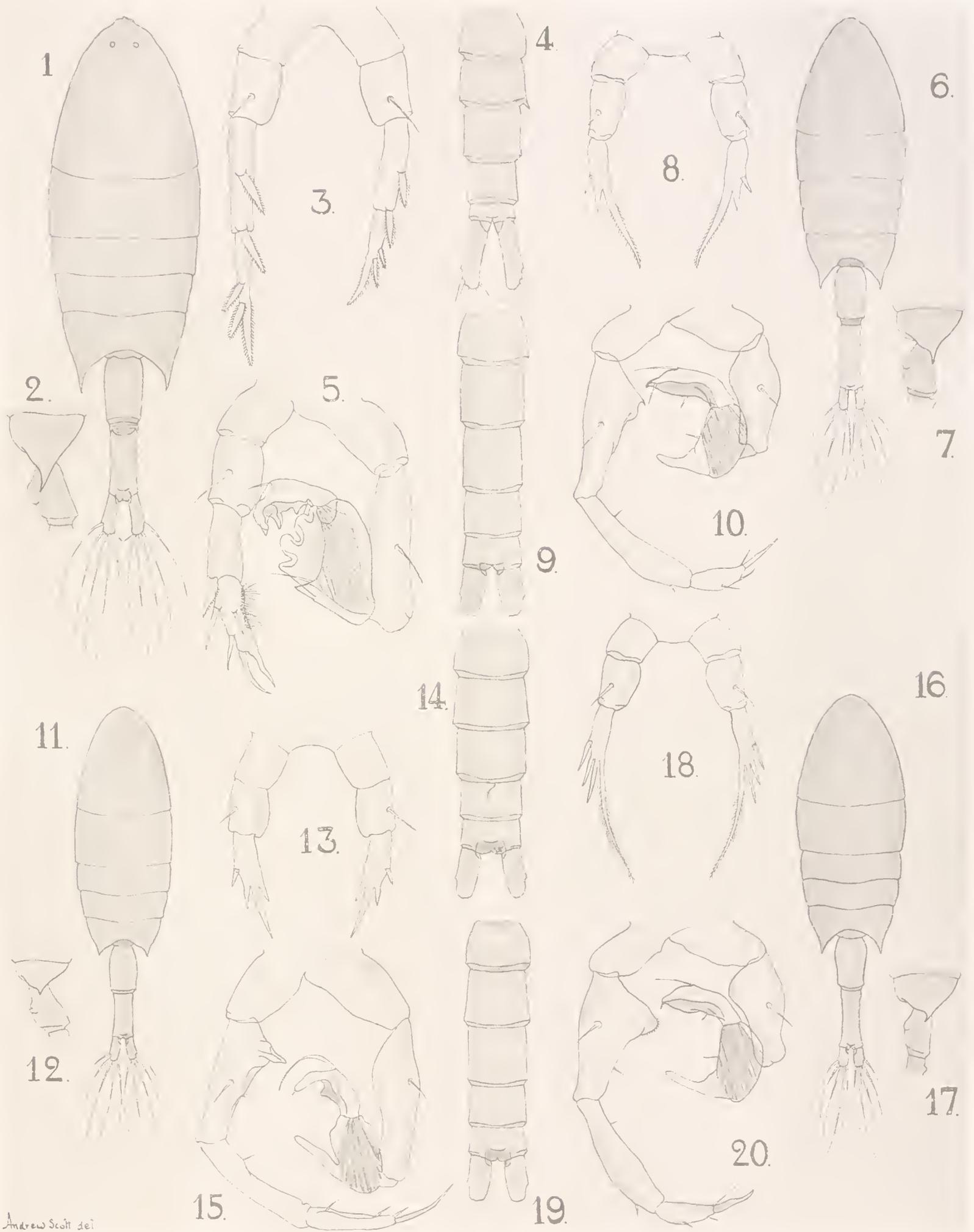
- Fig. 6. Female, dorsal view.  $\times 60$ .
- Fig. 7. Female, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 8. Female, fifth feet.  $\times 273$ .
- Fig. 9. Male, abdomen, dorsal view.  $\times 143$ .
- Fig. 10. Male, fifth feet.  $\times 273$ .

### Figs. 11—15. *Calanopia americana* Dahl.

- Fig. 11. Female, dorsal view.  $\times 60$ .
- Fig. 12. Female, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 13. Female, fifth feet.  $\times 273$ .
- Fig. 14. Male, abdomen, dorsal view.  $\times 143$ .
- Fig. 15. Male, fifth feet.  $\times 273$ .

### Figs. 16—20. *Calanopia aurivillii* Cleve.

- Fig. 16. Female, dorsal view.  $\times 60$ .
- Fig. 17. Female, last thoracic and first abdominal segments.  $\times 60$ .
- Fig. 18. Female, fifth feet.  $\times 273$ .
- Fig. 19. Male, abdomen, dorsal view.  $\times 143$ .
- Fig. 20. Male, fifth feet.  $\times 273$ .



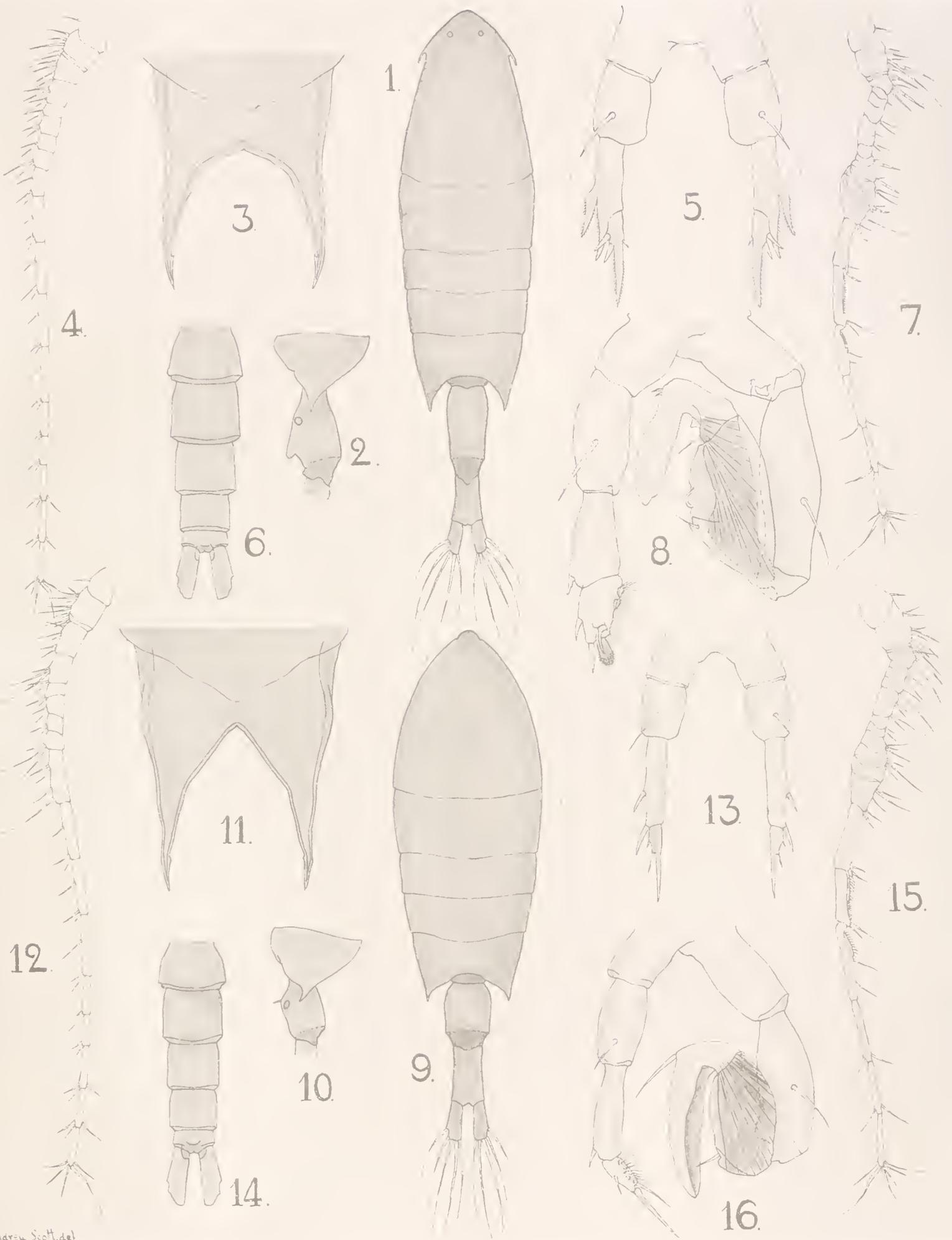
## PLATE XLIX.

Figs. 1—8. *Calanopia thompsoni* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 45.5$ .
- Fig. 2. Female, last thoracic and first abdominal segments.  $\times 45.5$ .
- Fig. 3. Female, rostrum.  $\times 273$ .
- Fig. 4. Female, antennule.  $\times 57$ .
- Fig. 5. Female, fifth feet.  $\times 250$ .
- Fig. 6. Male, abdomen, dorsal view.  $\times 71$ .
- Fig. 7. Male, antennule, right side.  $\times 57$ .
- Fig. 8. Male, fifth feet.  $\times 250$ .

Figs. 9—16. *Calanopia herdmani* nov. sp.

- Fig. 9. Female, dorsal view.  $\times 61.5$ .
- Fig. 10. Female, last thoracic and first abdominal segments.  $\times 61.5$ .
- Fig. 11. Female, rostrum.  $\times 546$ .
- Fig. 12. Female, antennule.  $\times 96$ .
- Fig. 13. Female, fifth feet.  $\times 250$ .
- Fig. 14. Male, abdomen, dorsal view.  $\times 142$ .
- Fig. 15. Male, antennule, right side.  $\times 96$ .
- Fig. 16. Male, fifth feet.  $\times 250$ .



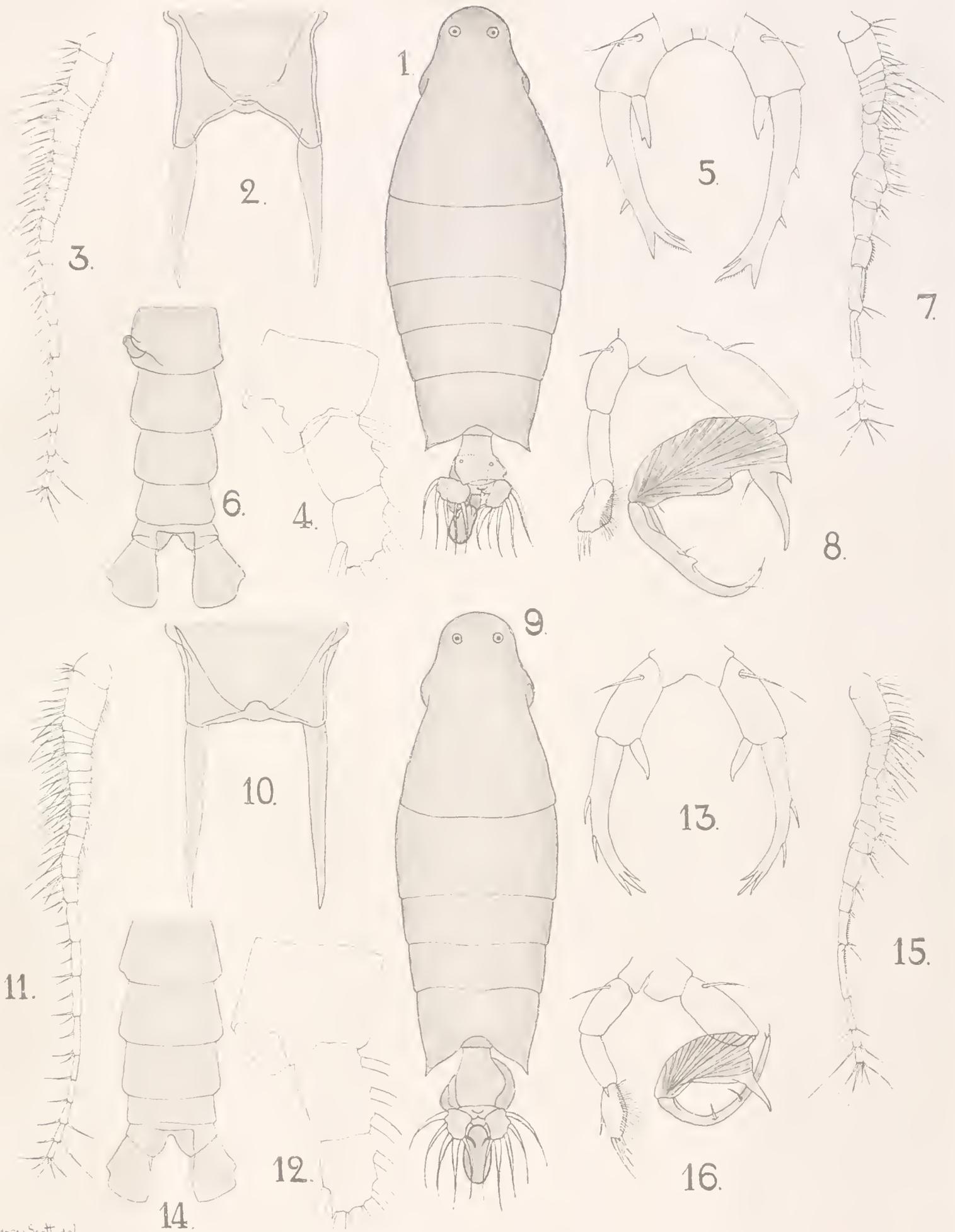
## PLATE L.

Figs. 1—8. *Labidocera bataviae* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 47$ .
- Fig. 2. Female, rostrum.  $\times 273$ .
- Fig. 3. Female, antennule.  $\times 48$ .
- Fig. 4. Female, first foot, endopodite.  $\times 273$ .
- Fig. 5. Female, fifth feet.  $\times 144$ .
- Fig. 6. Male, abdomen, dorsal view.  $\times 144$ .
- Fig. 7. Male, antennule, right side.  $\times 48$ .
- Fig. 8. Male, fifth feet.  $\times 144$ .

Figs. 9—16. *Labidocera madurae* nov. sp.

- Fig. 9. Female, dorsal view.  $\times 47$ .
- Fig. 10. Female, rostrum.  $\times 273$ .
- Fig. 11. Female, antennule.  $\times 48$ .
- Fig. 12. Female, first foot, endopodite.  $\times 273$ .
- Fig. 13. Female, fifth feet.  $\times 144$ .
- Fig. 14. Male, abdomen, dorsal view.  $\times 144$ .
- Fig. 15. Male, antennule, right side.  $\times 48$ .
- Fig. 16. Male, fifth feet.  $\times 144$ .



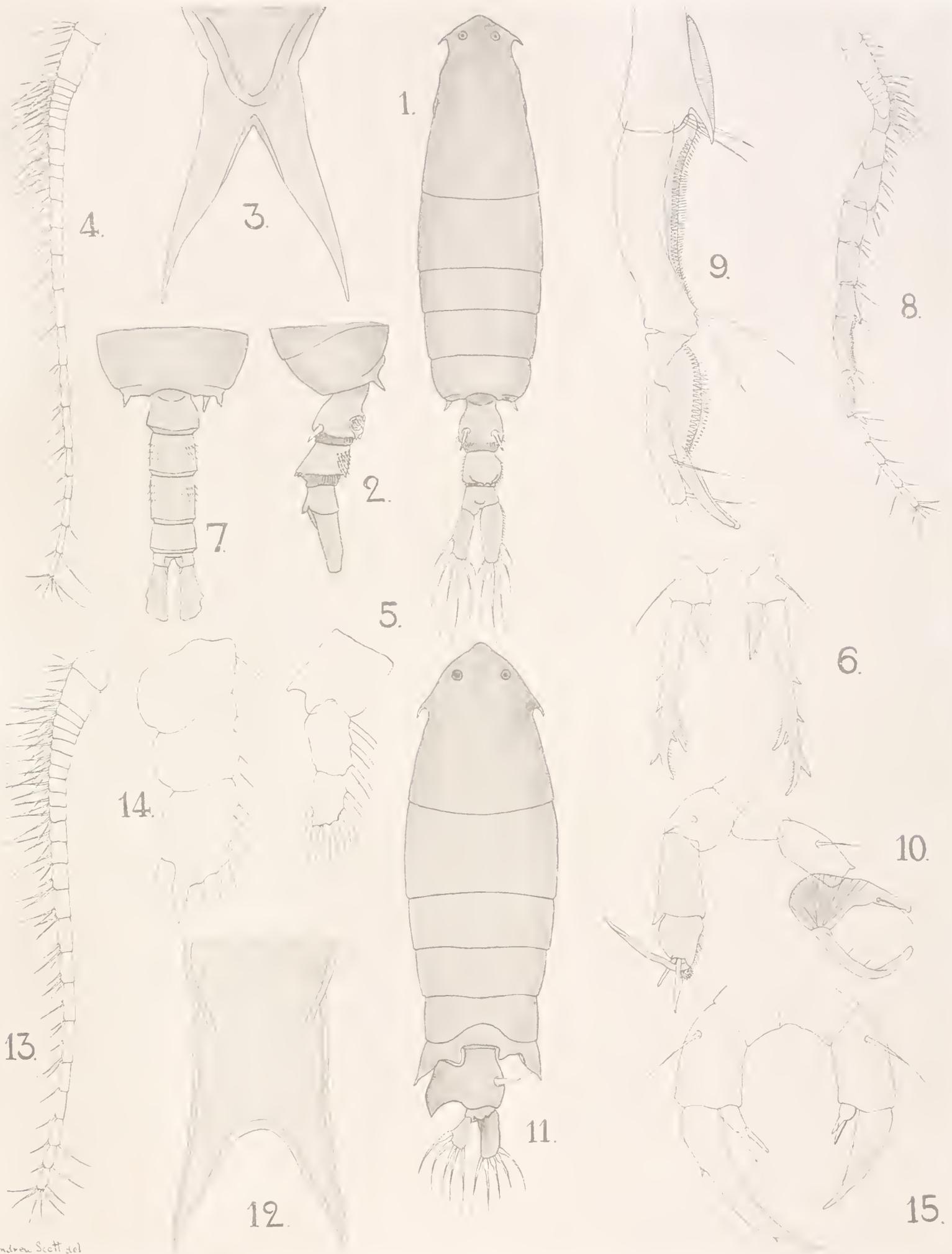
## PLATE LI.

Figs. 1—10. *Labidocera laevidentata* (Brady).

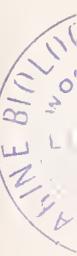
- Fig. 1. Female, dorsal view.  $\times 60$ .
- Fig. 2. Female, last thoracic segment and abdomen, right side.  $\times 60$ .
- Fig. 3. Female, rostrum.  $\times 450$ .
- Fig. 4. Female, antennule.  $\times 72$ .
- Fig. 5. Female, second foot, endopodite.  $\times 273$ .
- Fig. 6. Female, fifth feet.  $\times 144$ .
- Fig. 7. Male, abdomen, dorsal view.  $\times 96$ .
- Fig. 8. Male, antennule, right side.  $\times 72$ .
- Fig. 9. Male, antennule, right side, hinge joints.  $\times 273$ .
- Fig. 10. Male, fifth feet.  $\times 144$ .

Figs. 11—15. *Pontella alata* nov. sp.

- Fig. 11. Female, dorsal view.  $\times 31,5$ .
- Fig. 12. Female, rostrum.  $\times 273$ .
- Fig. 13. Female, antennule.  $\times 48$ .
- Fig. 14. Female, first foot, endopodite.  $\times 273$ .
- Fig. 15. Female, fifth feet.  $\times 48$ .



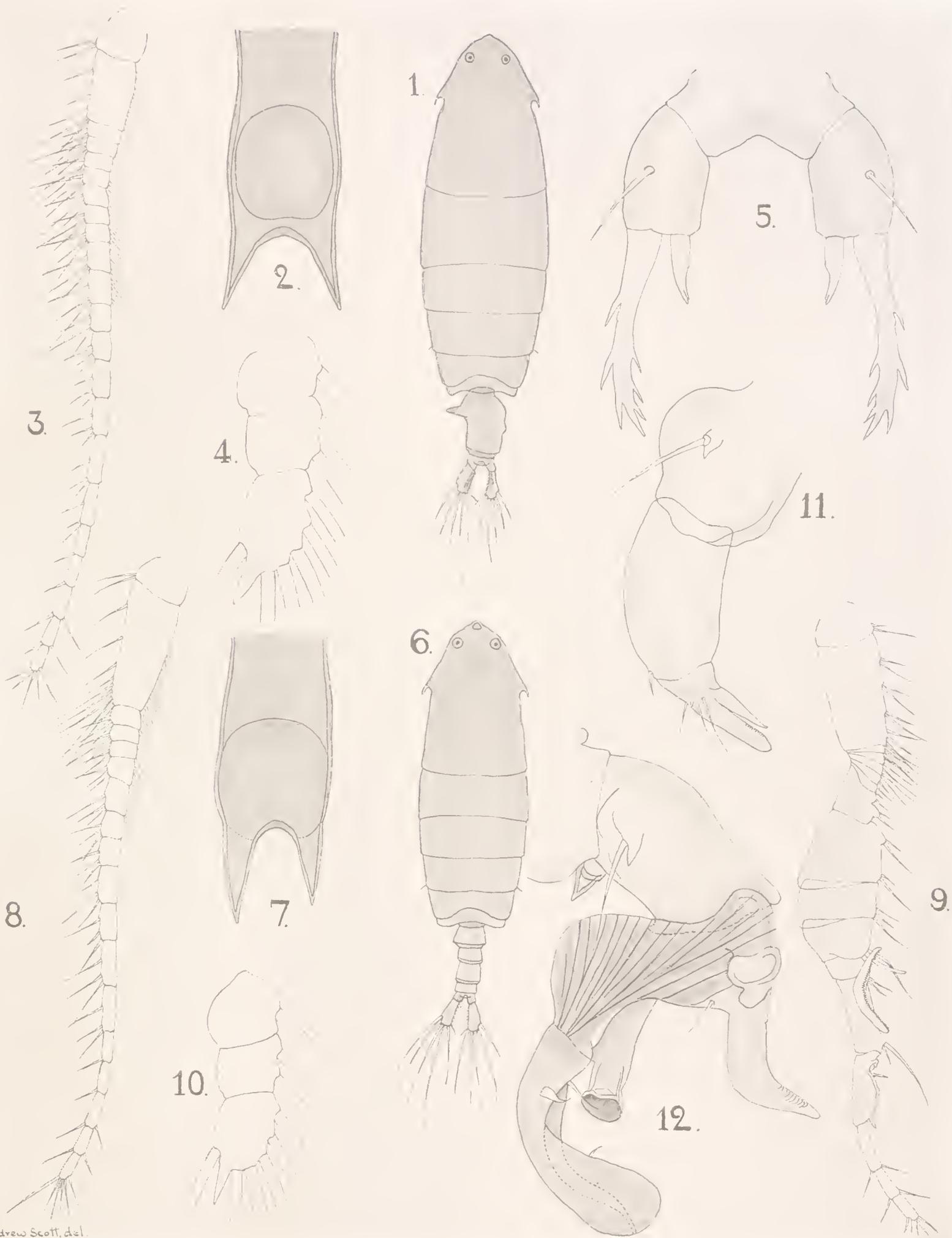
Andrew Scott del



## PLATE LII.

Figs. 1--12. *Pontella denticauda* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 31,5$ .
- Fig. 2. Female, rostrum.  $\times 250$ .
- Fig. 3. Female, antennule.  $\times 72$ .
- Fig. 4. Female, second foot, endopodite.  $\times 273$ .
- Fig. 5. Female, fifth feet.  $\times 250$ .
- Fig. 6. Male, dorsal view.  $\times 31,5$ .
- Fig. 7. Male, rostrum.  $\times 250$ .
- Fig. 8. Male, antennule, left side.  $\times 72$ .
- Fig. 9. Male, antennule, right side.  $\times 72$ .
- Fig. 10. Male, first foot, endopodite.  $\times 273$ .
- Fig. 11. Male, fifth foot, left side.  $\times 164$ .
- Fig. 12. Male, fifth foot, right side.  $\times 164$ .



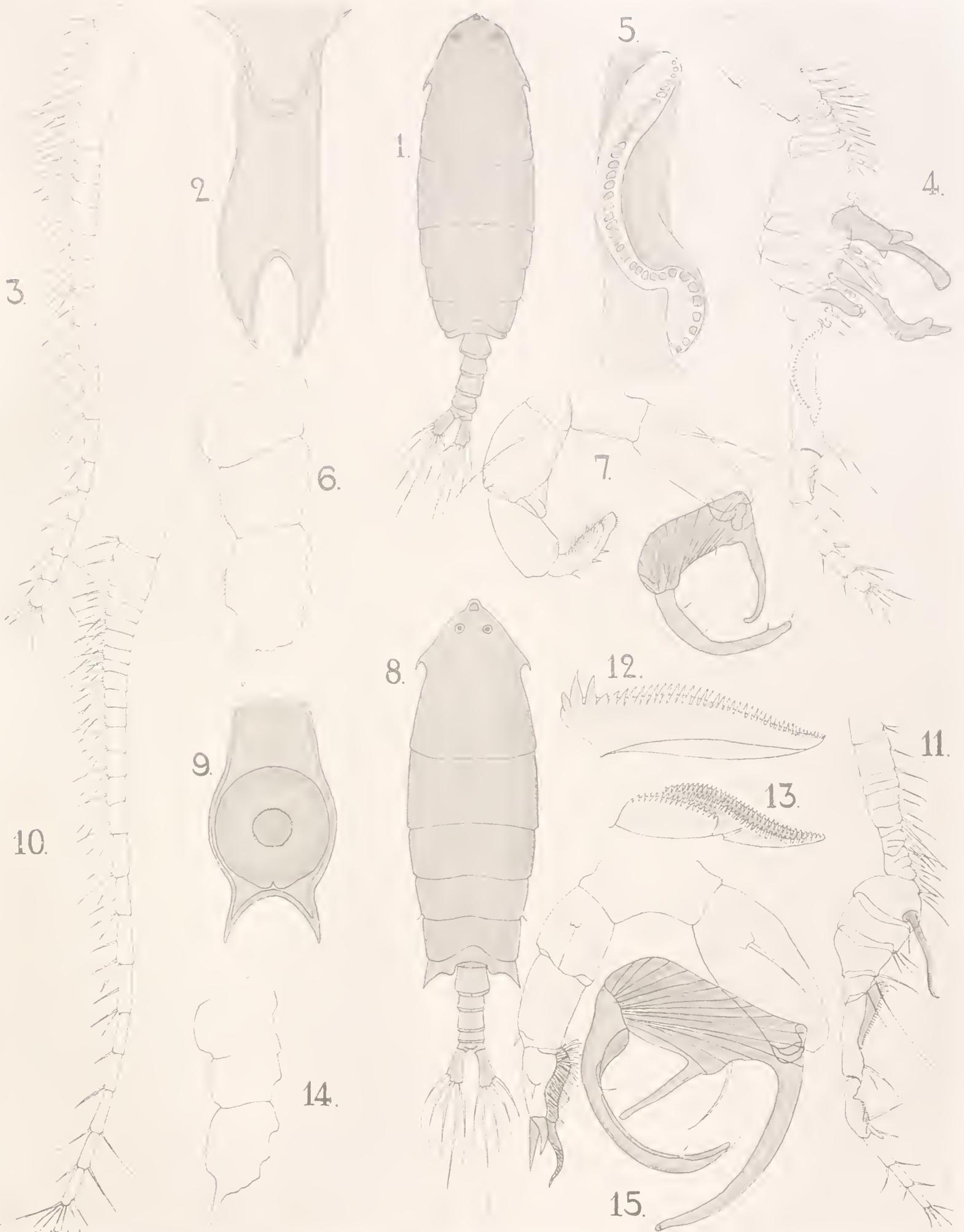
## PLATE LIII.

Figs. 1—7. *Pontella forficula* nov. sp.

- Fig. 1. Male, dorsal view.  $\times 31,5$ .
- Fig. 2. Male, rostrum.  $\times 288$ .
- Fig. 3. Male, antennule, left side.  $\times 72$ .
- Fig. 4. Male, antennule, right side.  $\times 72$ .
- Fig. 5. Male, antennule, right side, proximal marginal plate.  $\times 450$ .
- Fig. 6. Male, first foot, endopodite.  $\times 410$ .
- Fig. 7. Male, fifth feet.  $\times 108$ .

Figs. 8—15. *Pontella cerami* nov. sp.

- Fig. 8. Male, dorsal view.  $\times 31,5$ .
- Fig. 9. Male, rostrum.  $\times 144$ .
- Fig. 10. Male, antennule, left side.  $\times 72$ .
- Fig. 11. Male, antennule, right side.  $\times 48$ .
- Fig. 12. Male, antennule, right side, proximal marginal plate.  $\times 250$ .
- Fig. 13. Male, antennule, right side, distal marginal plate.  $\times 250$ .
- Fig. 14. Male, first foot, endopodite.  $\times 273$ .
- Fig. 15. Male, fifth feet.  $\times 96$ .



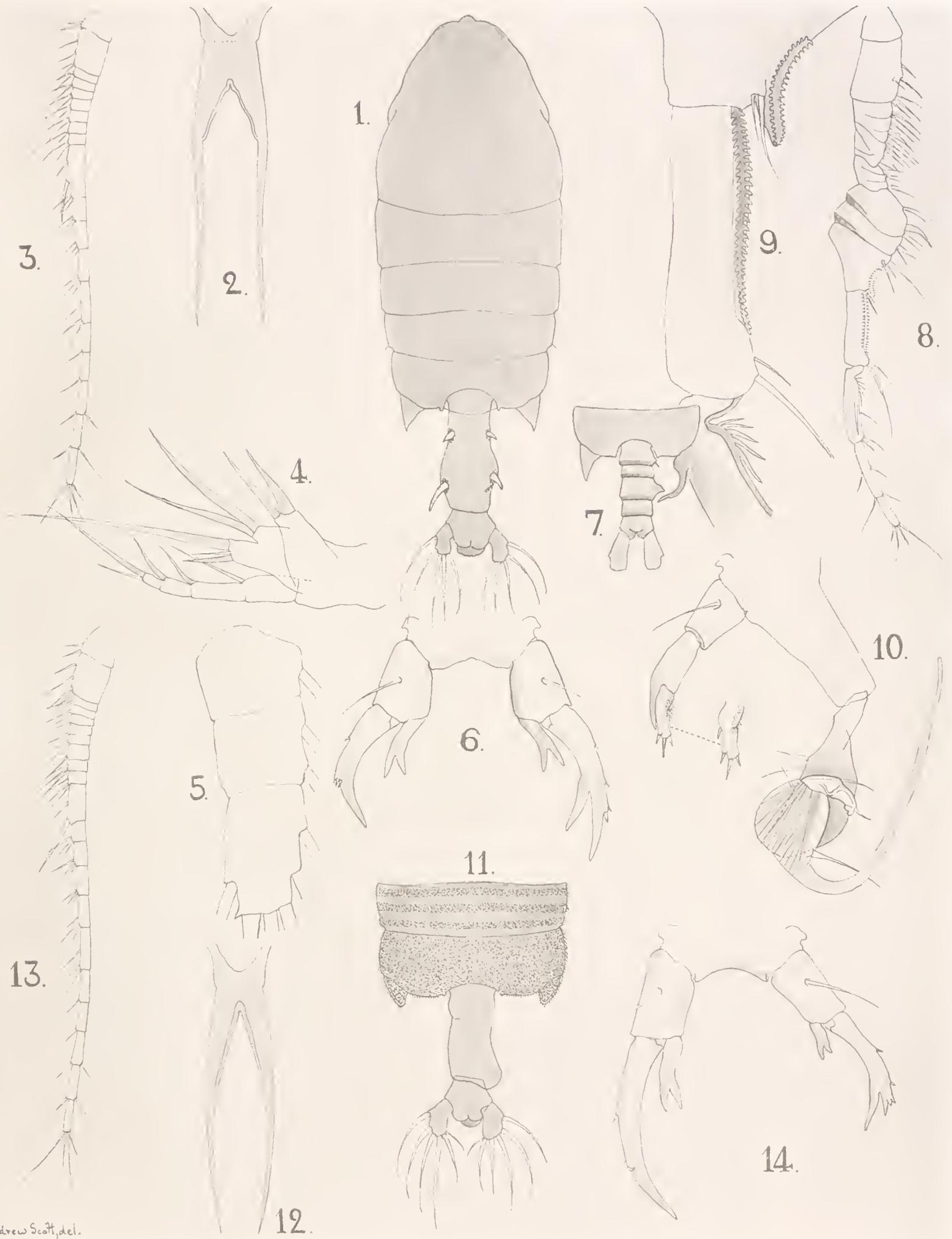
## PLATE LIV.

Figs. 1—10. *Pontellopsis macronyx* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 60$ .
- Fig. 2. Female, rostrum.  $\times 273$ .
- Fig. 3. Female, antennule.  $\times 72$ .
- Fig. 4. Female, second maxilliped.  $\times 250$ .
- Fig. 5. Female, first foot, endopodite.  $\times 546$ .
- Fig. 6. Female, fifth feet.  $\times 144$ .
- Fig. 7. Male, last thoracic segment and abdomen, dorsal view.  $\times 60$ .
- Fig. 8. Male, antennule, right side.  $\times 72$ .
- Fig. 9. Male, antennule, right side, hinge joints.  $\times 273$ .
- Fig. 10. Male, fifth feet.  $\times 144$ .

Figs. 11—14. *Pontellopsis pexa* nov. sp.

- Fig. 11. Female, last thoracic segments and abdomen, dorsal view.  $\times 60$ .
- Fig. 12. Female, rostrum.  $\times 250$ .
- Fig. 13. Female, antennule.  $\times 72$ .
- Fig. 14. Female, fifth feet.  $\times 144$ .



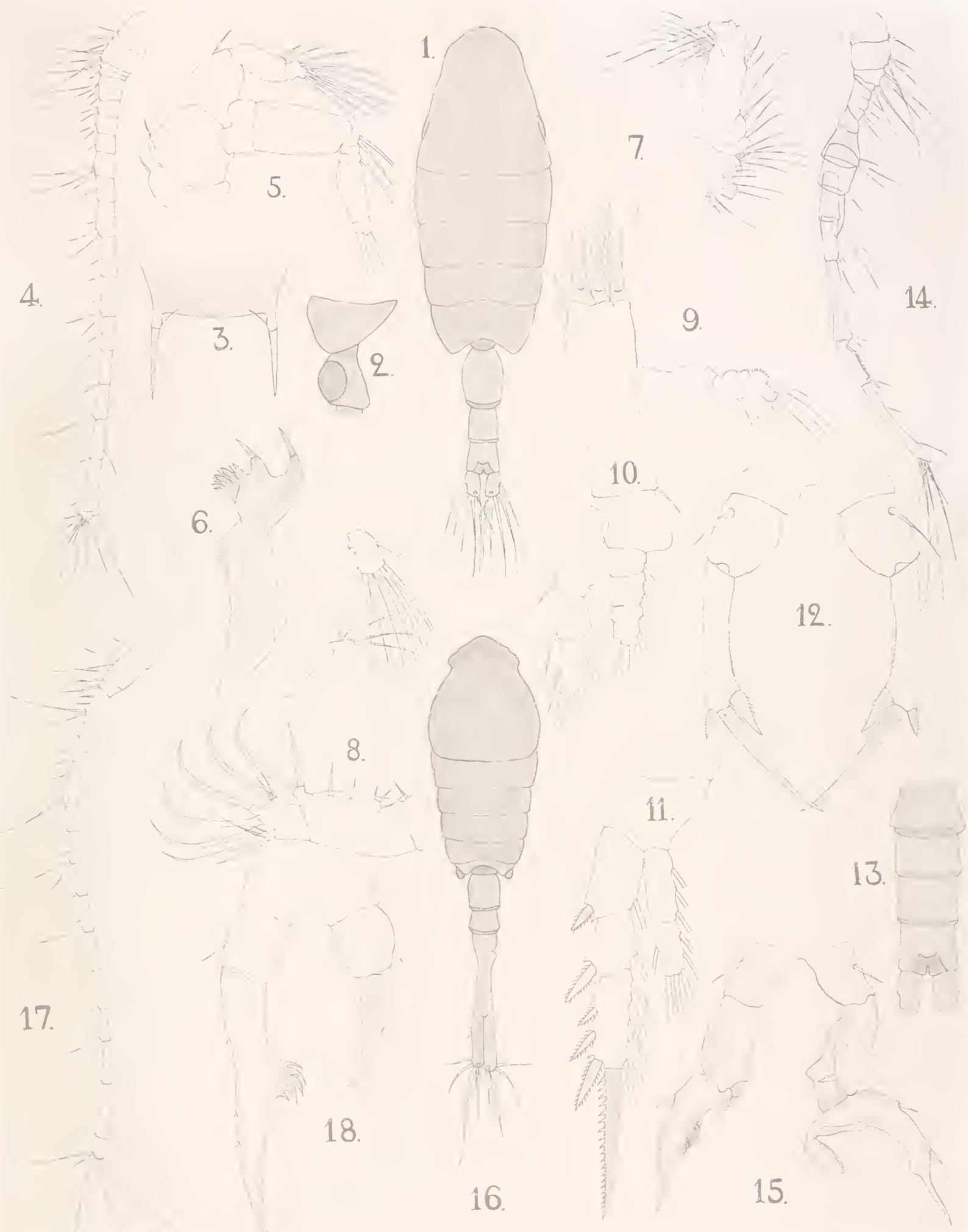
## PLATE LV.

Figs. 1—15. *Neopontella typica* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 90$ .
- Fig. 2. Female, last thoracic and first abdominal segments.  $\times 90$ .
- Fig. 3. Female, rostrum.  $\times 410$ .
- Fig. 4. Female, antennule.  $\times 144$ .
- Fig. 5. Female, antenna.  $\times 273$ .
- Fig. 6. Female, mandible and palp.  $\times 273$ .
- Fig. 7. Female, maxilla.  $\times 273$ .
- Fig. 8. Female, first maxilliped.  $\times 164$ .
- Fig. 9. Female, second maxilliped.  $\times 450$ .
- Fig. 10. Female, first foot.  $\times 273$ .
- Fig. 11. Female, third foot.  $\times 273$ .
- Fig. 12. Female, fifth feet.  $\times 410$ .
- Fig. 13. Male, abdomen, dorsal view.  $\times 144$ .
- Fig. 14. Male, antennule, right side.  $\times 144$ .
- Fig. 15. Male, fifth feet.  $\times 328$ .

Figs. 16—18. *Tortanus barbatus* (Brady).

- Fig. 16. Female, dorsal view.  $\times 60$ .
- Fig. 17. Female, antennule.  $\times 90$ .
- Fig. 18. Female, fifth foot.  $\times 273$ .



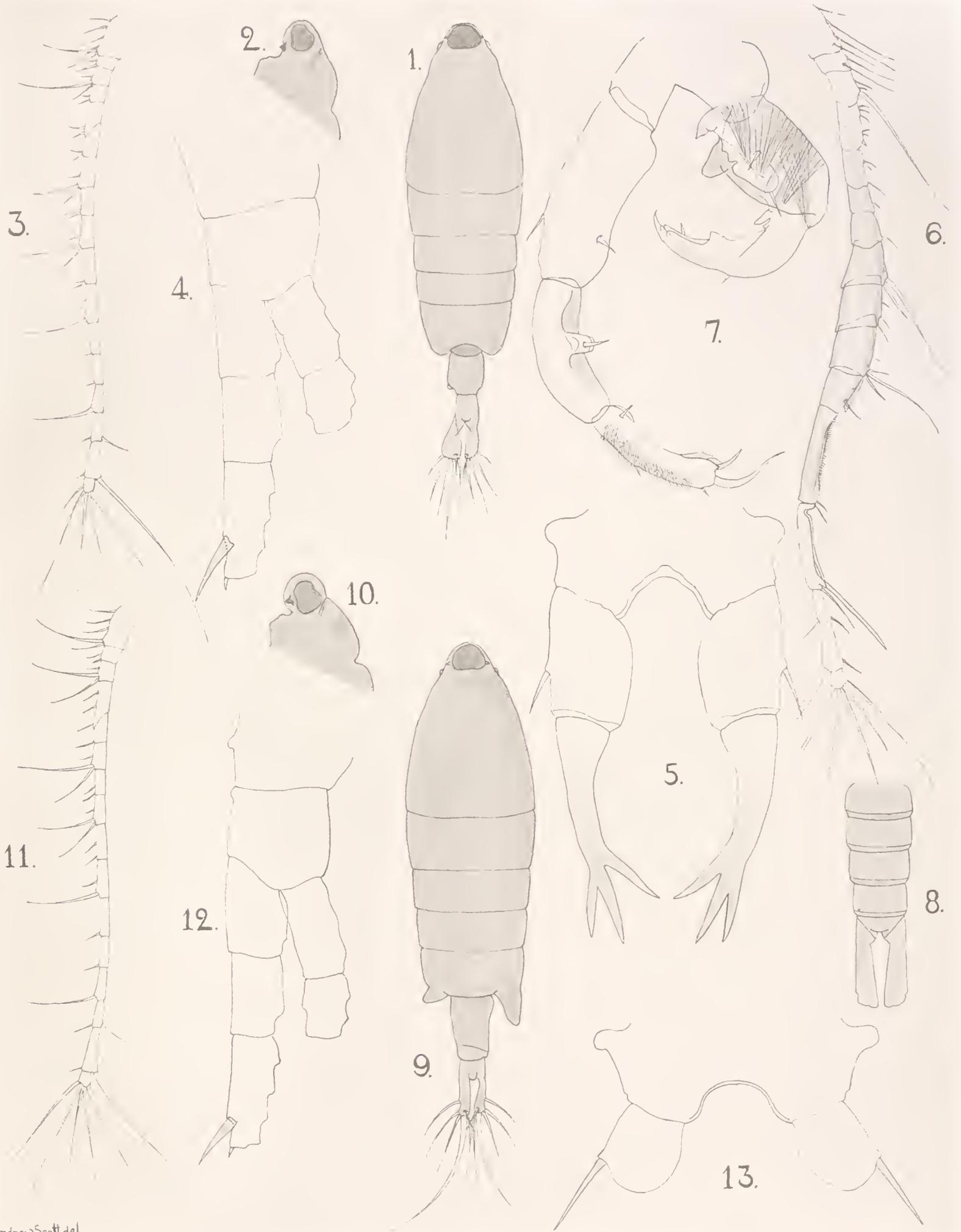
## PLATE LVI.

Figs. 1—8. *Tortanus murrayi* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 36$ .
- Fig. 2. Female, head, lateral view.  $\times 36$ .
- Fig. 3. Female, antennule.  $\times 48$ .
- Fig. 4. Female, first foot.  $\times 280$ .
- Fig. 5. Female, fifth feet.  $\times 273$ .
- Fig. 6. Male, antennule, right side.  $\times 72$ .
- Fig. 7. Male, fifth feet.  $\times 144$ .
- Fig. 8. Male, abdomen, dorsal view.  $\times 72$ .

Figs. 9—13. *Tortanus brevipes* nov. sp.

- Fig. 9. Female, dorsal view.  $\times 45$ .
- Fig. 10. Female, head, lateral view.  $\times 45$ .
- Fig. 11. Female, antennule.  $\times 48$ .
- Fig. 12. Female, first foot.  $\times 280$ .
- Fig. 13. Female, fifth feet.  $\times 546$ .



## PLATE LVII.

Figs. 1—2. *Monstrilla gracilicanda* Giesbrecht.

Fig. 1. Female, dorsal view.  $\times 31,5$ .

Fig. 2. Female, fifth foot.  $\times 144$ .

Figs. 3—4. *Monstrilla longicornis*, I. C. Thompson.

Fig. 3. Female, dorsal view.  $\times 36,3$ .

Fig. 4. Female, fifth foot.  $\times 144$ .

Figs. 5—6. *Monstrilla orcula*, nov. sp.

Fig. 5. Female, dorsal view.  $\times 31,5$ .

Fig. 6. Female, fifth foot.  $\times 144$ .

Figs. 7—8. *Monstrilla inserta* nov. sp.

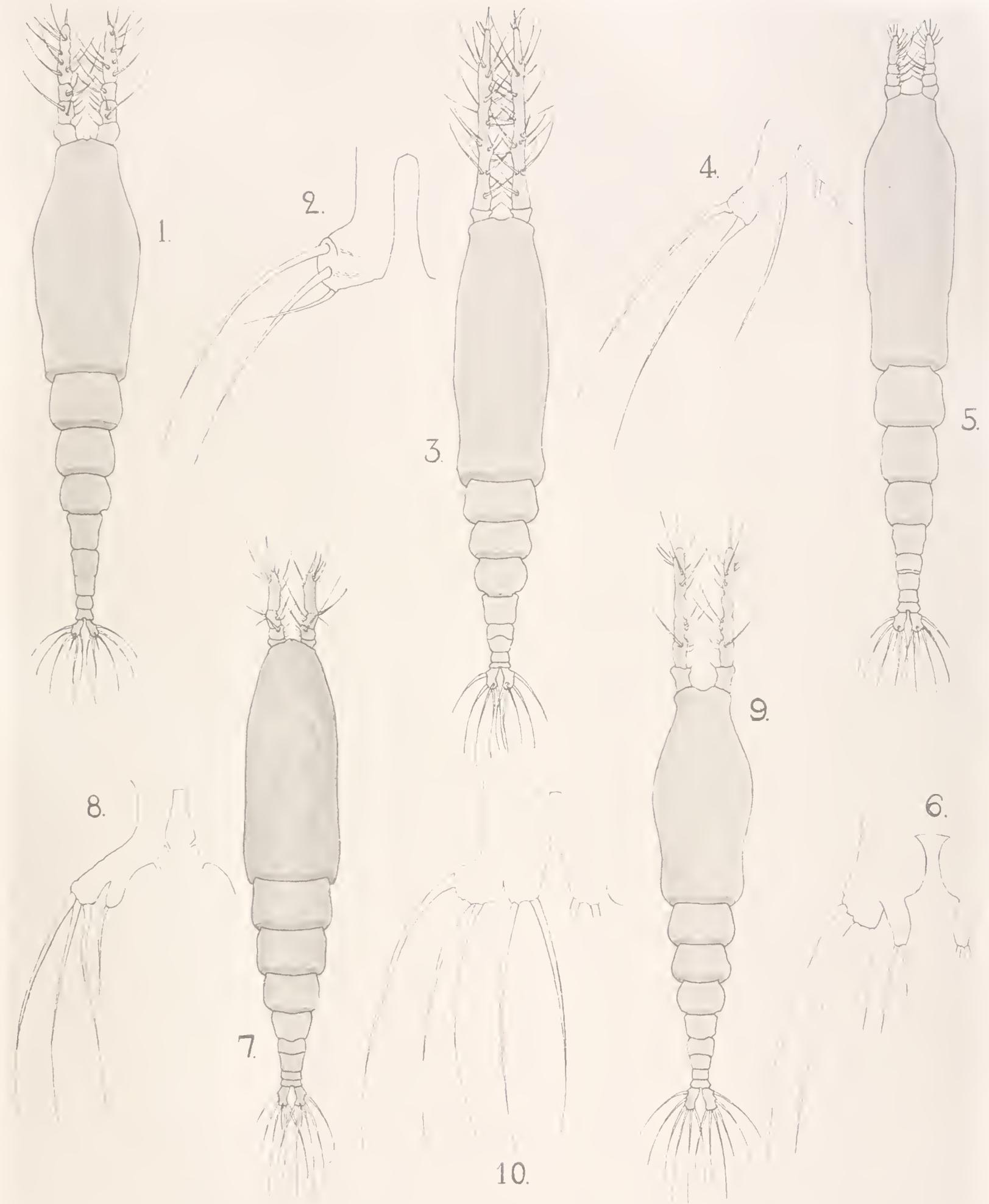
Fig. 7. Female, dorsal view.  $\times 31,5$ .

Fig. 8. Female, fifth foot.  $\times 144$ .

Figs. 9—10. *Monstrilla cymbula* nov. sp.

Fig. 9. Female, dorsal view.  $\times 31,5$ .

Fig. 10. Female, fifth foot.  $\times 144$ .



## PLATE LVIII.

Figs. 1—2. *Monstrilla helgolandica* Claus.

- Fig. 1. Female, dorsal view.  $\times 60$ .  
Fig. 2. Female, fifth feet.  $\times 144$ .

Fig. 3—4. *Monstrilla longipes* nov. sp.

- Fig. 3. Female, dorsal view.  $\times 60$ .  
Fig. 4. Female, fifth feet.  $\times 250$ .

Figs. 5—6. *Monstrilla turgida* nov. sp.

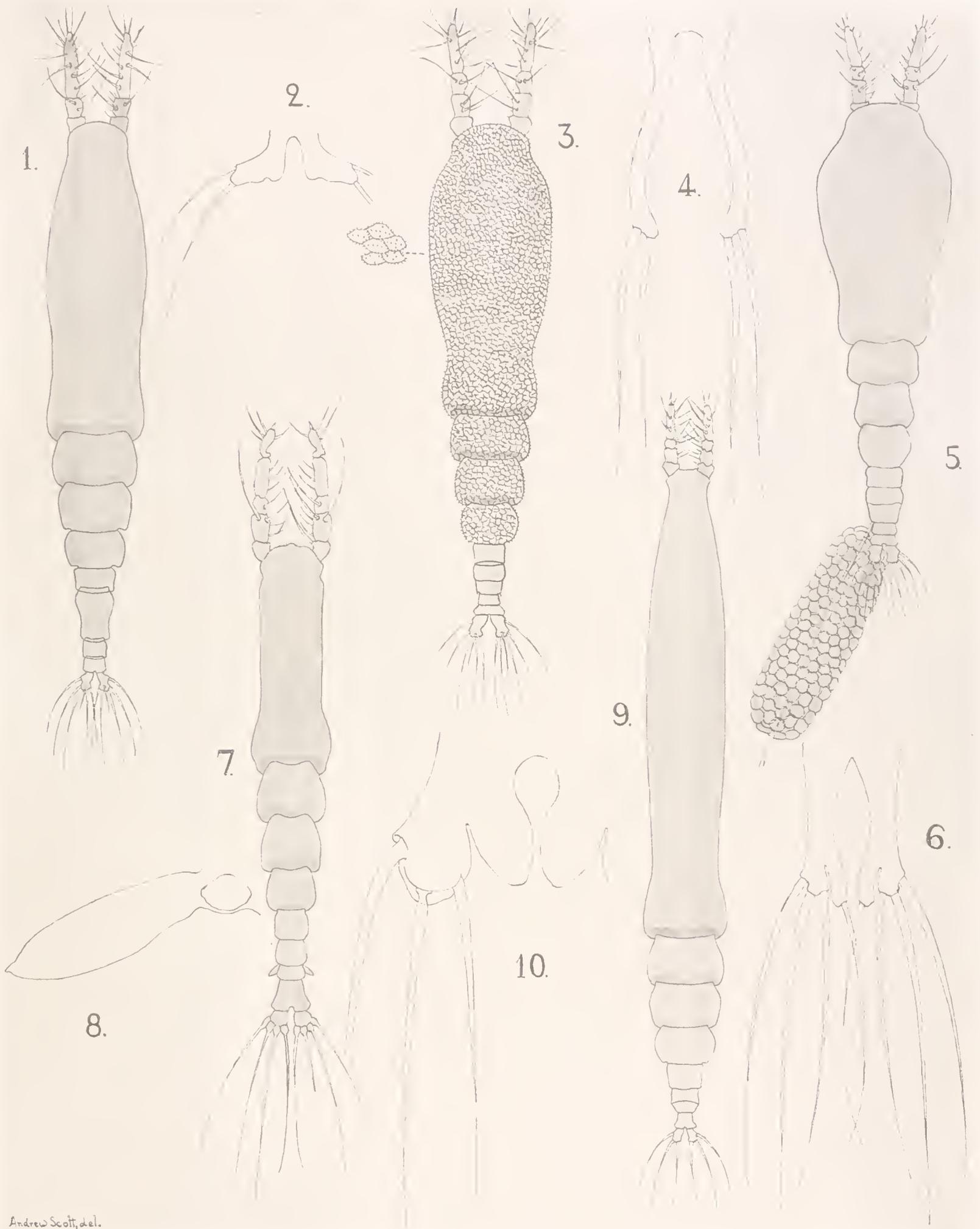
- Fig. 5. Female, dorsal view.  $\times 60$ .  
Fig. 6. Female, fifth feet.  $\times 250$ .

Figs. 7—8. *Thaumaleus bullatus* nov. sp.

- Fig. 7. Male, dorsal view.  $\times 60$ .  
Fig. 8. Male, fifth foot.  $\times 450$ .

Figs. 9—10. *Thaumaleus gigas* nov. sp.

- Fig. 9. Female, dorsal view.  $\times 19$ .  
Fig. 10. Female, fifth foot.  $\times 144$ .



## PLATE LIX.

Figs. 1—4. *Longipedia scotti* G. O. Sars.

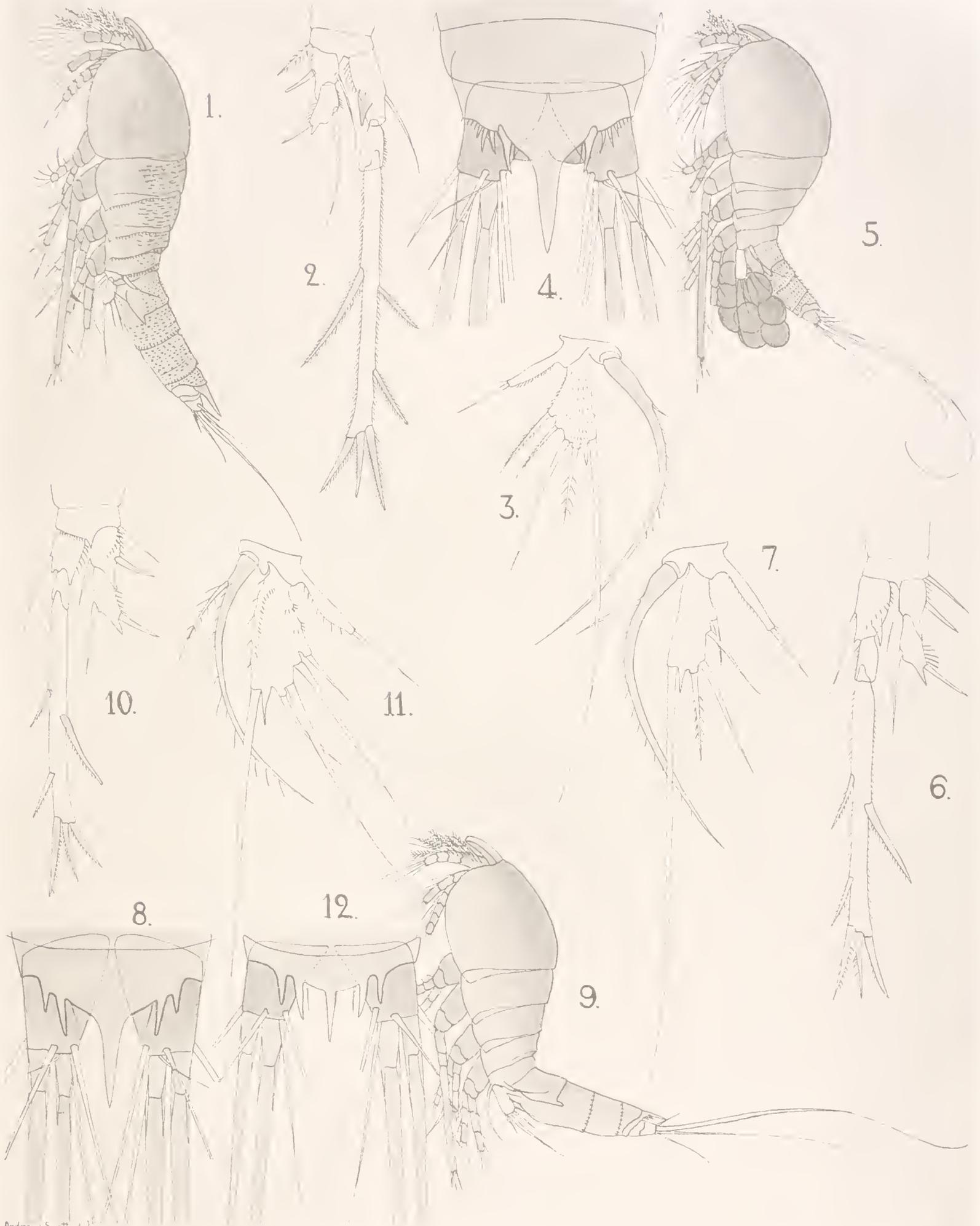
- Fig. 1. Female, lateral view.  $\times 60$ .
- Fig. 2. Female, second foot, exopodite incomplete.  $\times 144$ .
- Fig. 3. Female, fifth foot.  $\times 273$ .
- Fig. 4. Female, anal segment and furca.  $\times 273$ .

Fig. 5—8. *Longipedia coronata* Claus.

- Fig. 5. Female, lateral view.  $\times 90$ .
- Fig. 6. Female, second foot, exopodite incomplete.  $\times 250$ .
- Fig. 7. Female, fifth foot.  $\times 410$ .
- Fig. 8. Female, anal segment and furca.  $\times 450$ .

Figs. 9—12. *Longipedia weberi* nov. sp.

- Fig. 9. Female, lateral view.  $\times 90$ .
- Fig. 10. Female, second foot, exopodite incomplete.  $\times 250$ .
- Fig. 11. Female, fifth foot.  $\times 410$ .
- Fig. 12. Female, anal segment and furca.  $\times 450$ .



## PLATE LX.

Fig. 1—7. *Ameira sibogae* nov. sp.

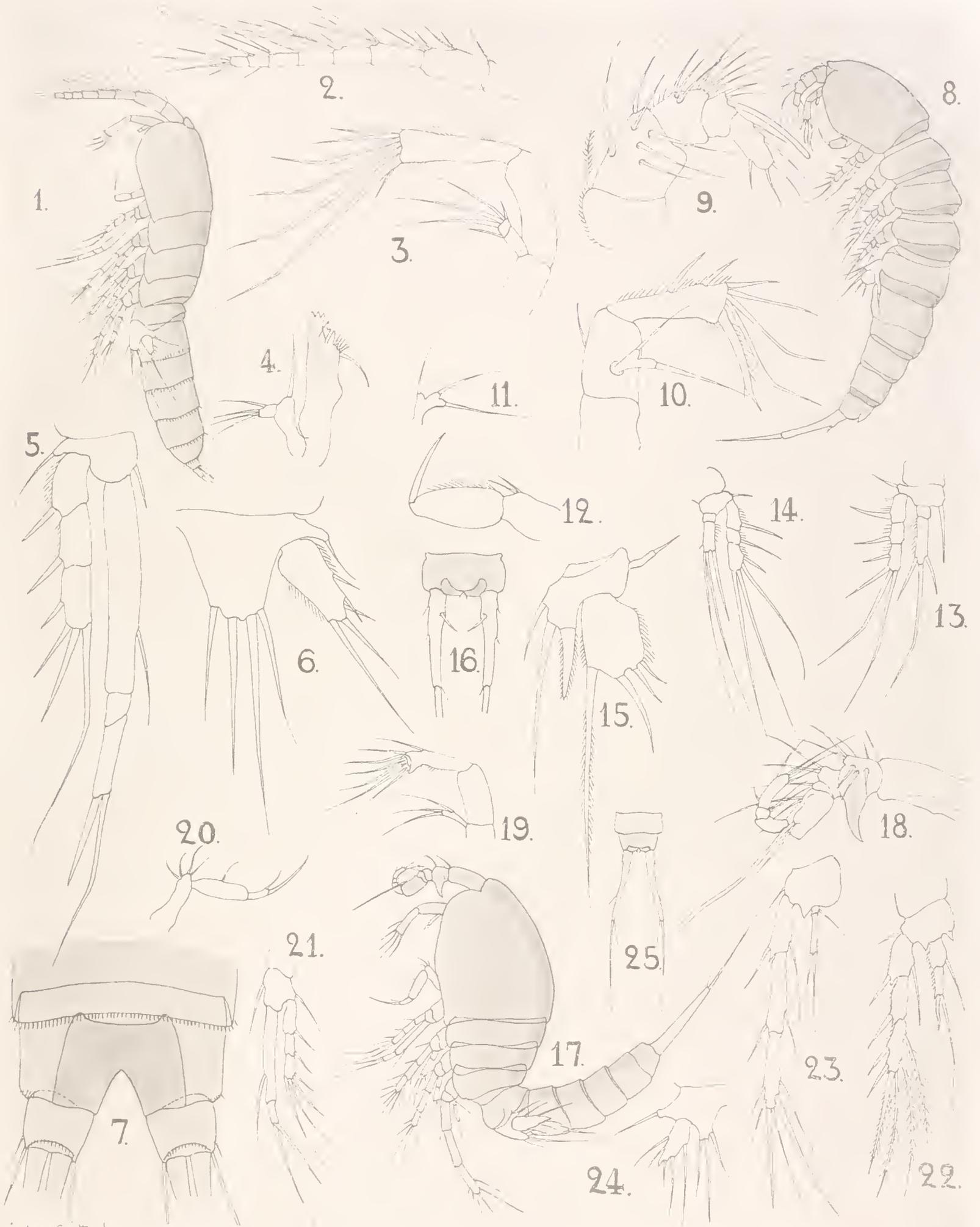
- Fig. 1. Female, lateral view.  $\times 181$ .
- Fig. 2. Female, antennule.  $\times 410$ .
- Fig. 3. Female, antenna.  $\times 820$ .
- Fig. 4. Female, mandible and palp.  $\times 820$ .
- Fig. 5. Female, first foot.  $\times 820$ .
- Fig. 6. Female, fifth foot.  $\times 820$ .
- Fig. 7. Female, anal segment and furca.  $\times 820$ .

Fig. 8—16. *Cletodes latipes* nov. sp.

- Fig. 8. Female, lateral view.  $\times 181$ .
- Fig. 9. Female, antennule.  $\times 820$ .
- Fig. 10. Female, antenna.  $\times 820$ .
- Fig. 11. Female, mandible palp.  $\times 820$ .
- Fig. 12. Female, second maxilliped.  $\times 820$ .
- Fig. 13. Female, first foot.  $\times 450$ .
- Fig. 14. Female, fourth foot.  $\times 450$ .
- Fig. 15. Female, fifth foot.  $\times 820$ .
- Fig. 16. Female, anal segment and furca.  $\times 273$ .

Fig. 17—25. *Phyllopodopsyllus longicaudatus* nov. sp.

- Fig. 17. Male, lateral view.  $\times 181$ .
- Fig. 18. Male, antennule.  $\times 410$ .
- Fig. 19. Male, antenna.  $\times 410$ .
- Fig. 20. Male, second maxilliped.  $\times 410$ .
- Fig. 21. Male, first foot.  $\times 410$ .
- Fig. 22. Male, third foot.  $\times 410$ .
- Fig. 23. Male, fourth foot.  $\times 410$ .
- Fig. 24. Male, fifth foot.  $\times 410$ .
- Fig. 25. Male, anal segment and furca.  $\times 144$ .



## PLATE LXI.

Figs. 1—8. *Harpacticus cristatus* nov. sp.

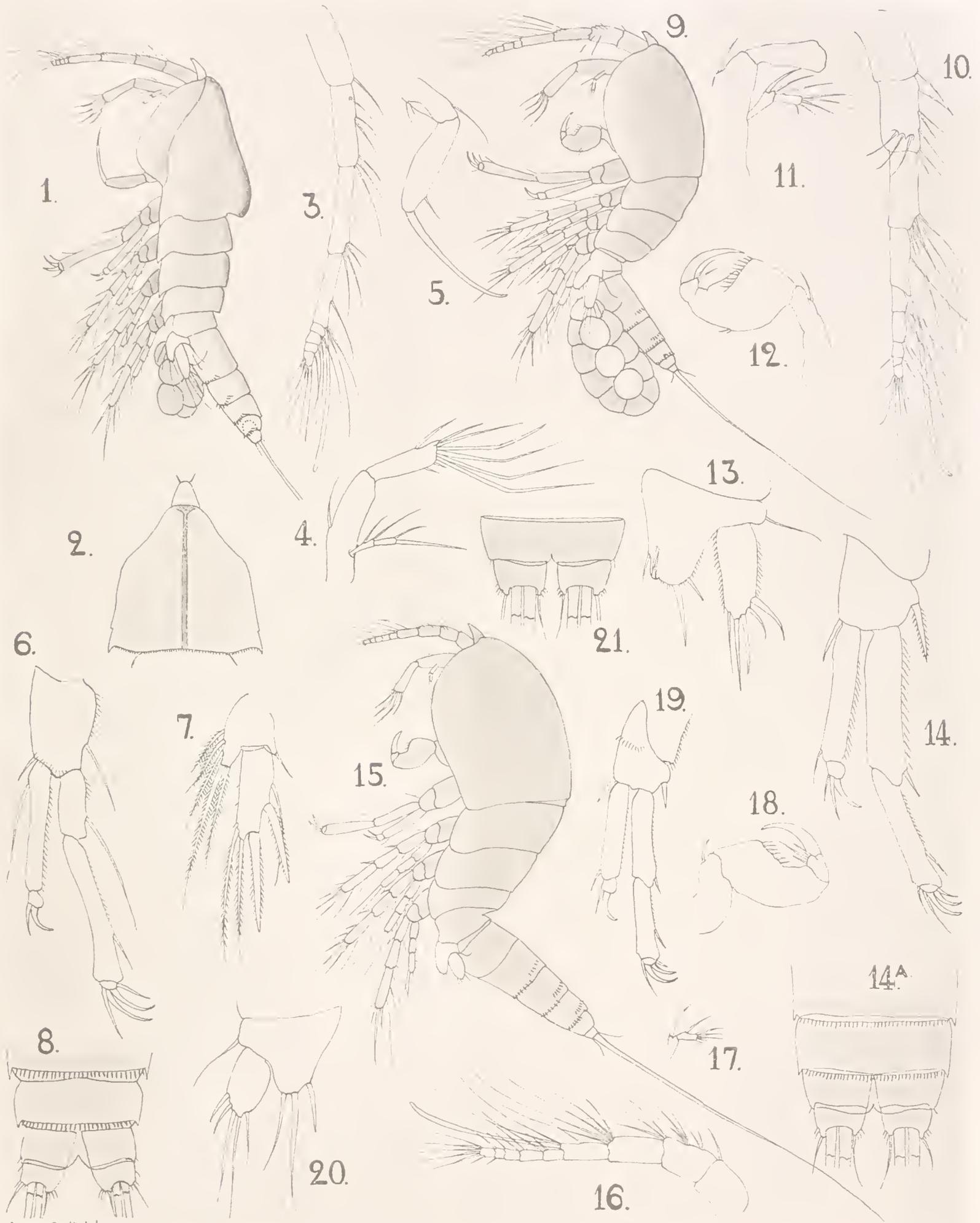
- Fig. 1. Female, lateral view.  $\times 181$ .
- Fig. 2. Female, cephalic segment, dorsal view.  $\times 181$ .
- Fig. 3. Female, antennule.  $\times 410$ .
- Fig. 4. Female, antenna.  $\times 410$ .
- Fig. 5. Female, second maxilliped.  $\times 410$ .
- Fig. 6. Female, first foot.  $\times 410$ .
- Fig. 7. Female, fifth foot.  $\times 410$ .
- Fig. 8. Female, anal segment and furca.  $\times 410$ .

Figs. 9—14A. *Harpacticus clausi* nov. sp.

- Fig. 9. Female, lateral view.  $\times 120$ .
- Fig. 10. Female, antennule.  $\times 410$ .
- Fig. 11. Female, antenna.  $\times 410$ .
- Fig. 12. Female, second maxilliped.  $\times 410$ .
- Fig. 13. Female, first foot.  $\times 410$ .
- Fig. 14. Female, fifth foot.  $\times 410$ .
- Fig. 14A. Female, anal segment and furca.  $\times 410$ .

Figs. 15—21. *Harpacticus glaber* Brady.

- Fig. 15. Female, lateral view.  $\times 181$ .
- Fig. 16. Female, antennule.  $\times 410$ .
- Fig. 17. Female, antenna, exopodite only.  $\times 410$ .
- Fig. 18. Female, second maxilliped.  $\times 410$ .
- Fig. 19. Female, first foot.  $\times 373$ .
- Fig. 20. Female, fifth foot.  $\times 410$ .
- Fig. 21. Female, anal segment and furca.  $\times 410$ .



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## PLATE LXII.

Figs. 1—5. *Phyllothalestris mysis* (Claus).

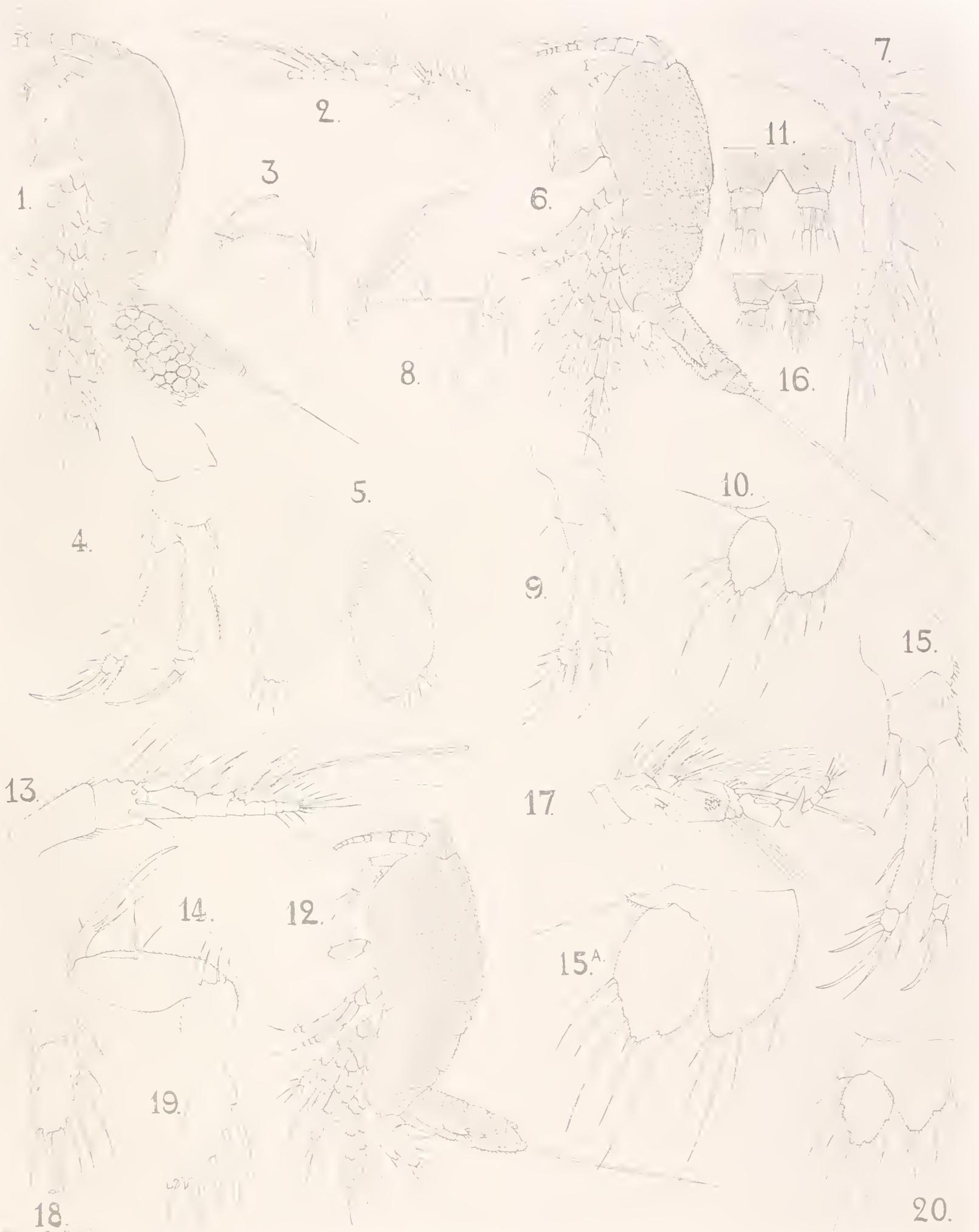
- Fig. 1. Female, lateral view.  $\times 94$ .
- Fig. 2. Female, antennule.  $\times 144$ .
- Fig. 3. Female, second maxilliped.  $\times 144$ .
- Fig. 4. Female, first foot.  $\times 144$ .
- Fig. 5. Female, fifth foot.  $\times 72$ .

Figs. 6—11. *Rhynchothalestris similis* nov. sp.

- Fig. 6. Female, lateral view.  $\times 60$ .
- Fig. 7. Female, antennule.  $\times 273$ .
- Fig. 8. Female, second maxilliped.  $\times 273$ .
- Fig. 9. Female, first foot.  $\times 144$ .
- Fig. 10. Female, fifth foot.  $\times 144$ .
- Fig. 11. Female, anal segment and furca.  $\times 164$ .

Figs. 12—20. *Rhynchothalestris rufocincta* (Norman).

- Fig. 12. Female, lateral view.  $\times 95$ .
- Fig. 13. Female, antennule.  $\times 273$ .
- Fig. 14. Female, second maxilliped.  $\times 410$ .
- Fig. 15. Female, first foot.  $\times 273$ .
- Fig. 15A. Female, fifth foot.  $\times 273$ .
- Fig. 16. Female, anal segment and furca.  $\times 164$ .
- Fig. 17. Male, antennule.  $\times 273$ .
- Fig. 18. Male, second foot, endopodite only.  $\times 273$ .
- Fig. 19. Male, third foot, end joint of endopodite only.  $\times 410$ .
- Fig. 20. Male, fifth foot.  $\times 273$ .



## PLATE LXIII.

Figs. 1—7. *Pseudothalestris sarsi* nov. sp.

- Fig. 1. Female, lateral view.  $\times 120$ .
- Fig. 2. Female, antennule.  $\times 410$ .
- Fig. 3. Female, antenna, exopodite only.  $\times 410$ .
- Fig. 4. Female, second maxilliped.  $\times 410$ .
- Fig. 5. Female, first foot.  $\times 273$ .
- Fig. 6. Female, fifth foot.  $\times 410$ .
- Fig. 7. Female, anal segment and furca.  $\times 410$ .

Figs. 8—14. *Eudactylopus latipes* (T. Scott).

- Fig. 8. Female, lateral view.  $\times 60$ .
- Fig. 9. Female, antennule.  $\times 410$ .
- Fig. 10. Female, antenna, exopodite only.  $\times 410$ .
- Fig. 11. Female, second maxilliped.  $\times 410$ .
- Fig. 12. Female, first foot.  $\times 200$ .
- Fig. 13. Female, fifth foot.  $\times 72$ .
- Fig. 14. Female, anal segment and furca.  $\times 144$ .

Figs. 15—24. *Tydemanella typica* nov. sp.

- Fig. 15. Female, lateral view.  $\times 60$ .
- Fig. 16. Female, antennule.  $\times 205$ .
- Fig. 17. Female, antenna, exopodite and part of endopodite.  $\times 410$ .
- Fig. 18. Female, mandible.  $\times 410$ .
- Fig. 19. Female, mandible palp.  $\times 410$ .
- Fig. 20. Female, maxilla.  $\times 273$ .
- Fig. 21. Female, second maxilliped.  $\times 205$ .
- Fig. 22. Female, first foot.  $\times 273$ .
- Fig. 23. Female, fifth foot.  $\times 410$ .
- Fig. 24. Female, anal segment and furca.  $\times 273$ .



## PLATE LXIV.

Figs. 1—6. *Canuella curticaudata* (Thompson and Scott).

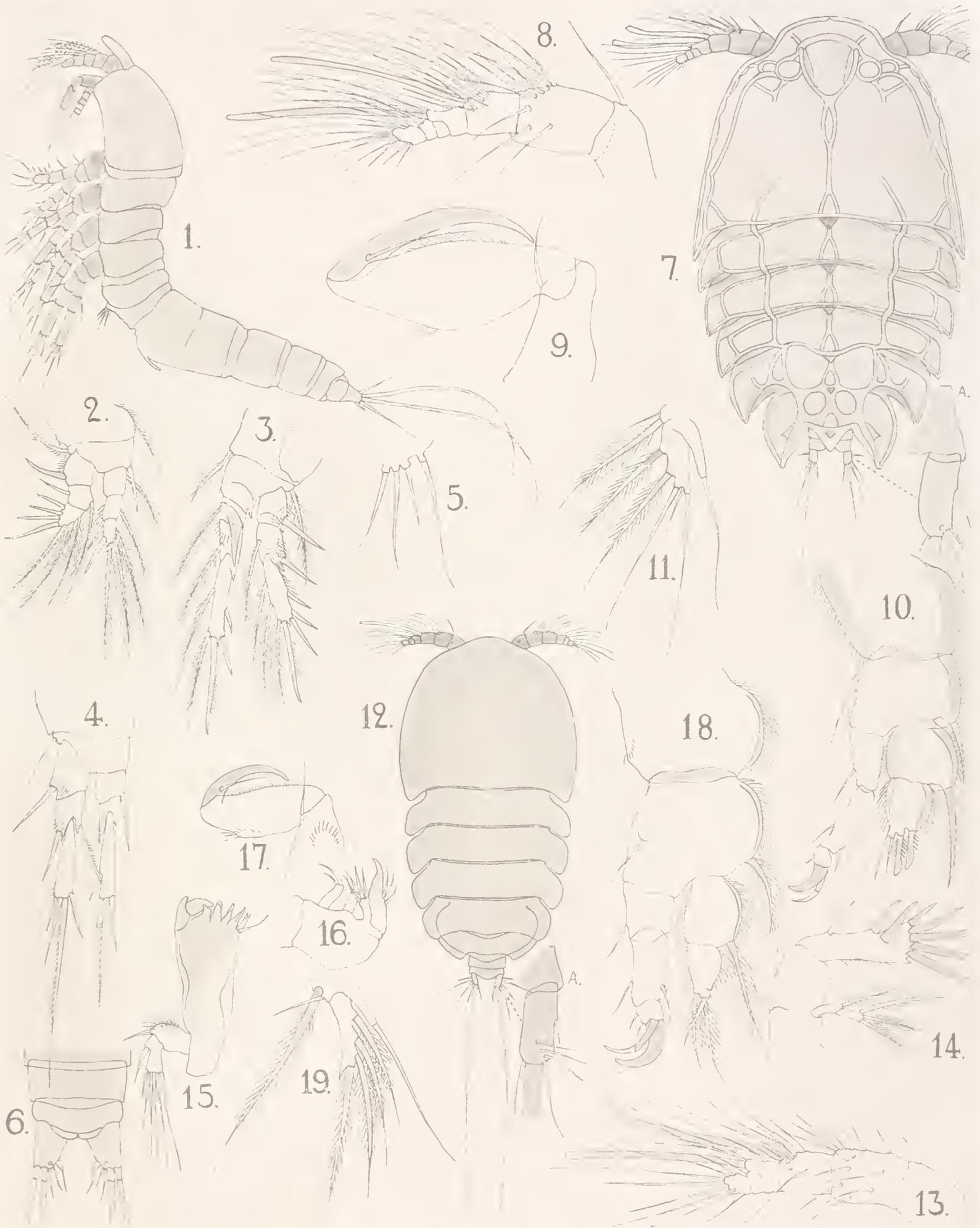
- Fig. 1. Female, lateral view.  $\times 90$ .
- Fig. 2. Female, first foot.  $\times 205$ .
- Fig. 3. Female, second foot.  $\times 205$ .
- Fig. 4. Female, fourth foot.  $\times 205$ .
- Fig. 5. Female, fifth foot.  $\times 546$ .
- Fig. 6. Female, anal segment and furca.  $\times 144$ .

Figs. 7—11. *Peltidium falcatum* nov. sp.

- Fig. 7. Female, dorsal view.  $\times 90$ . A. furca.  $\times 410$ .
- Fig. 8. Female, antennule.  $\times 273$ .
- Fig. 9. Female, second maxilliped.  $\times 273$ .
- Fig. 10. Female, first foot.  $\times 164$ .
- Fig. 11. Female, fifth foot.  $\times 273$ .

Figs. 12—19. *Eupeltidium glabrum* nov. sp.

- Fig. 12. Female, dorsal view.  $\times 60$ . A. furca.  $\times 410$ .
- Fig. 13. Female, antennule.  $\times 273$ .
- Fig. 14. Female, antenna.  $\times 205$ .
- Fig. 15. Female, mandible and palp.  $\times 273$ .
- Fig. 16. Female, first maxilliped.  $\times 205$ .
- Fig. 17. Female, second maxilliped.  $\times 144$ .
- Fig. 18. Female, first foot.  $\times 205$ .
- Fig. 19. Female, fifth foot.  $\times 273$ .



## PLATE LXV.

Figs. 1—5. *Parapeltidium johnstoni* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 60$ . A. furca  $\times 310$ .
- Fig. 2. Female, antennule.  $\times 205$ .
- Fig. 3. Female, second maxilliped.  $\times 144$ .
- Fig. 4. Female, first foot.  $\times 164$ .
- Fig. 5. Female, fifth foot.  $\times 164$ .

Figs. 6—10. *Peltidium intermedium* nov. sp.

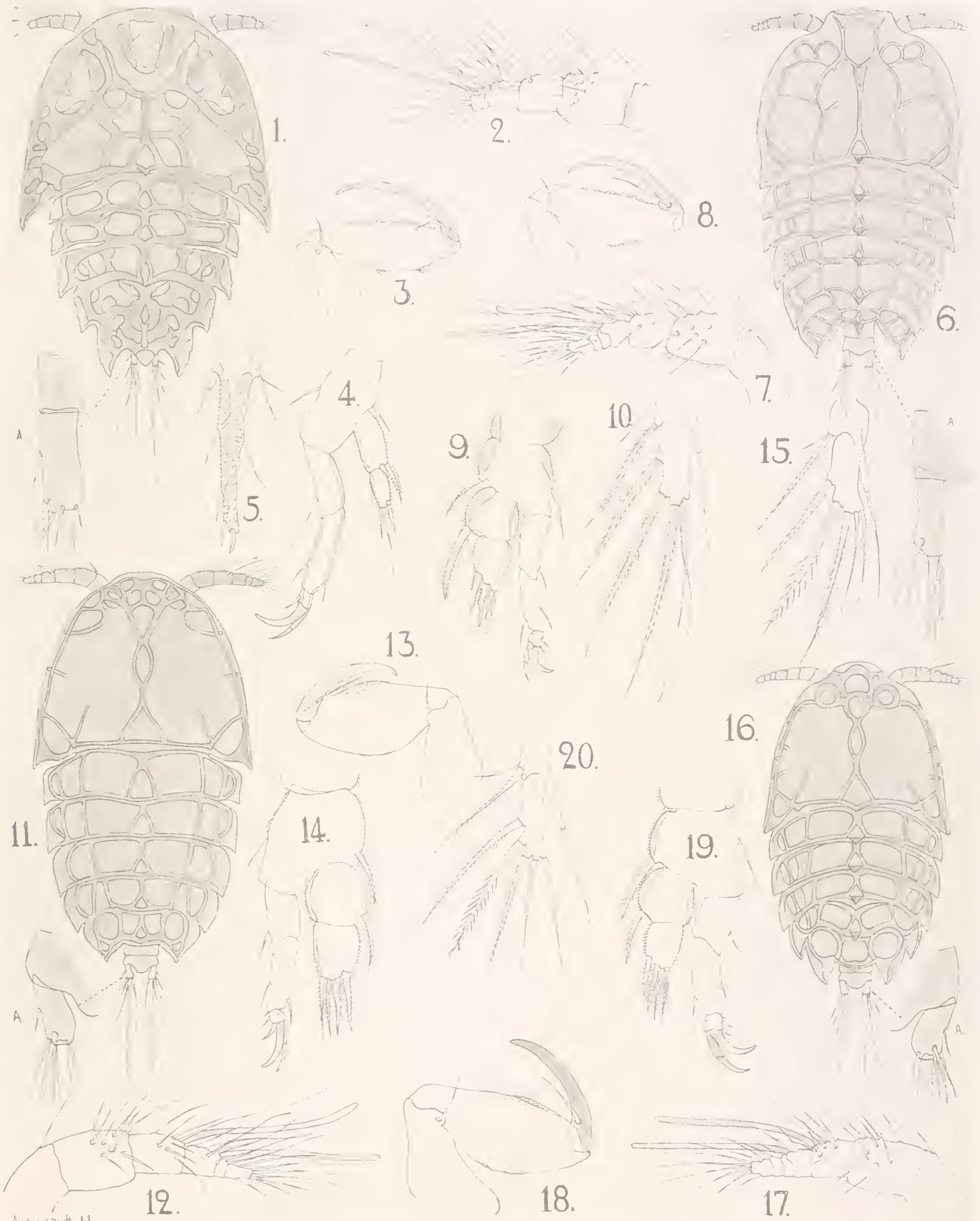
- Fig. 6. Female, dorsal view.  $\times 90$ . A. furca.  $\times 410$ .
- Fig. 7. Female, antennule.  $\times 273$ .
- Fig. 8. Female, second maxilliped.  $\times 205$ .
- Fig. 9. Female, first foot.  $\times 164$ .
- Fig. 10. Female, fifth foot.  $\times 410$ .

Figs. 11—15. *Peltidium exiguum* nov. sp.

- Fig. 11. Female, dorsal view.  $\times 90$ . A. furca.  $\times 410$ .
- Fig. 12. Female, antennule.  $\times 273$ .
- Fig. 13. Female, second maxilliped.  $\times 205$ .
- Fig. 14. Female, first foot.  $\times 205$ .
- Fig. 15. Female, fifth foot.  $\times 410$ .

Figs. 16—20. *Peltidium minutum* nov. sp.

- Fig. 16. Female, dorsal view.  $\times 90$ . A. furca.  $\times 410$ .
- Fig. 17. Female, antennule.  $\times 273$ .
- Fig. 18. Female, second maxilliped.  $\times 273$ .
- Fig. 19. Female, first foot.  $\times 205$ .
- Fig. 20. Female, fifth foot.  $\times 410$ .



## PLATE LXVI.

Figs. 1—12. *Eupelte oblivia* nov. sp.

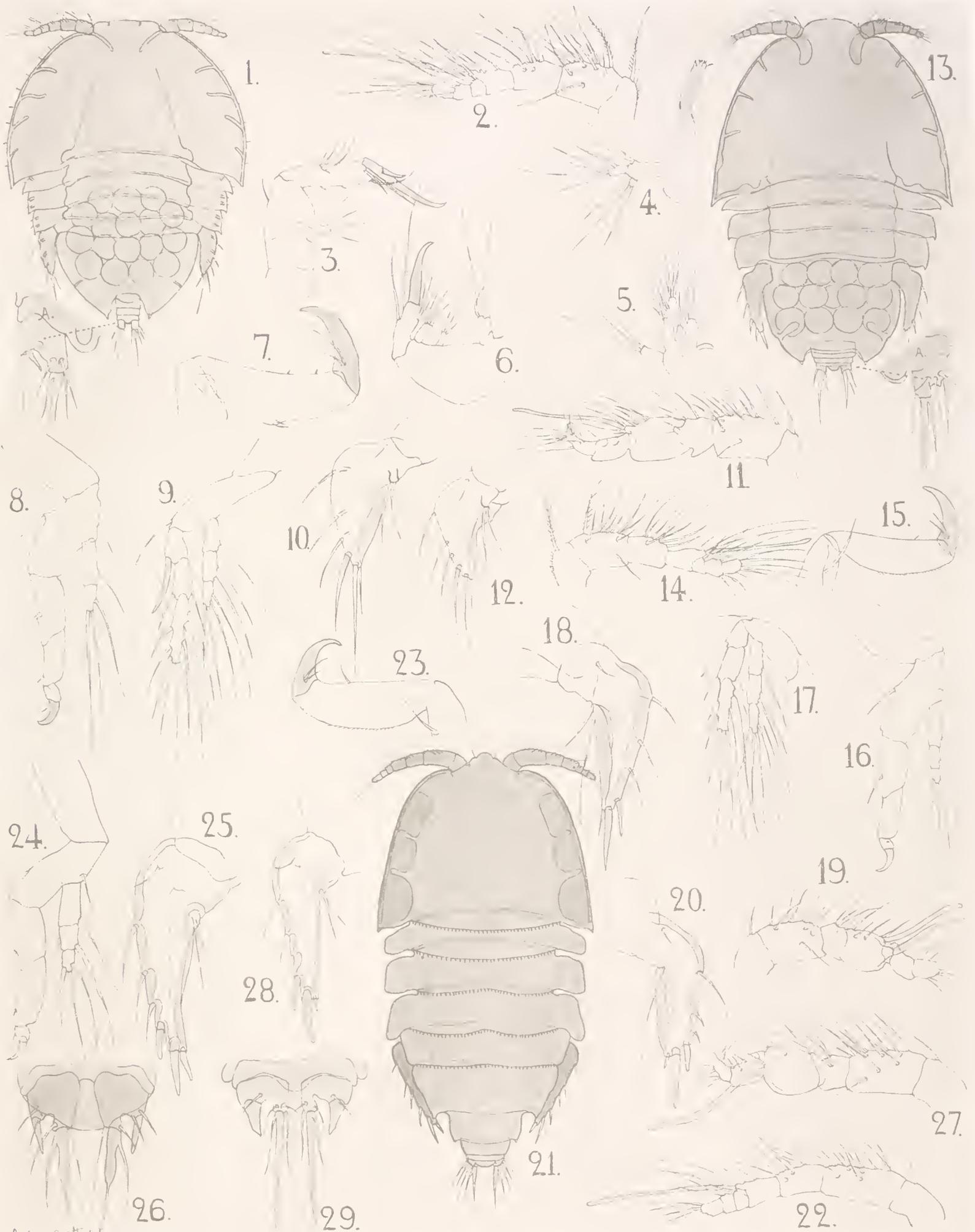
- Fig. 1. Female, dorsal view.  $\times 90$ . A. furca.  $\times 410$ .
- Fig. 2. Female, antennule.  $\times 273$ .
- Fig. 3. Female, antenna.  $\times 273$ .
- Fig. 4. Female, mandible and palp.  $\times 273$ .
- Fig. 5. Female, maxilla.  $\times 273$ .
- Fig. 6. Female, first maxilliped.  $\times 410$ .
- Fig. 7. Female, second maxilliped.  $\times 273$ .
- Fig. 8. Female, first foot.  $\times 273$ .
- Fig. 9. Female, fourth foot.  $\times 205$ .
- Fig. 10. Female, fifth foot.  $\times 205$ .
- Fig. 11. Male, antennule.  $\times 273$ .
- Fig. 12. Male, fifth foot.  $\times 205$ .

Figs. 13—20. *Alteuthella pellucida* nov. sp.

- Fig. 13. Female, dorsal view.  $\times 120$ . A. furca.  $\times 410$ .
- Fig. 14. Female, antennule.  $\times 273$ .
- Fig. 15. Female, second maxilliped.  $\times 273$ .
- Fig. 16. Female, first foot.  $\times 273$ .
- Fig. 17. Female, fourth foot.  $\times 205$ .
- Fig. 18. Female, fifth foot.  $\times 273$ .
- Fig. 19. Male, antennule.  $\times 205$ .
- Fig. 20. Male, fifth foot.  $\times 273$ .

Figs. 21—29. *Alteuthella spinicauda* nov. sp.

- Fig. 21. Female, dorsal view.  $\times 120$ .
- Fig. 22. Female, antennule.  $\times 273$ .
- Fig. 23. Female, second maxilliped.  $\times 273$ .
- Fig. 24. Female, first foot.  $\times 273$ .
- Fig. 25. Female, fifth foot.  $\times 273$ .
- Fig. 26. Female, anal segment and furca.  $\times 405$ .
- Fig. 27. Male, antennule.  $\times 273$ .
- Fig. 28. Male, fifth foot.  $\times 273$ .
- Fig. 29. Male, anal segment and furca.  $\times 405$ .



## PLATE LXVII.

Figs. 1—5. *Alteuthella pygmaca* nov. sp.

- Fig. 1. Female, dorsal view.  $\times 181$ . A. furca.  $\times 410$ .
- Fig. 2. Female, antennule.  $\times 273$ .
- Fig. 3. Female, second maxilliped.  $\times 273$ .
- Fig. 4. Female, first foot.  $\times 273$ .
- Fig. 5. Female, fifth foot.  $\times 273$ .

Figs. 6—17. *Lichomolgus anomalus* nov. sp.

- Fig. 6. Female, dorsal view.  $\times 120$ . A. furca.  $\times 410$ .
- Fig. 7. Female, antennule.  $\times 273$ .
- Fig. 8. Female, antenna.  $\times 273$ .
- Fig. 9. Female, mandible A, maxilla B.  $\times 410$ .
- Fig. 10. Female, first maxilliped.  $\times 410$ .
- Fig. 11. Female, second maxilliped.  $\times 410$ .
- Fig. 12. Male, second maxilliped.  $\times 273$ .
- Fig. 13. Female, first foot.  $\times 273$ .
- Fig. 14. Male, first foot.  $\times 273$ .
- Fig. 15. Female, fourth foot.  $\times 273$ .
- Fig. 16. Female, fifth foot.  $\times 205$ .
- Fig. 17. Male, abdomen.  $\times 205$ .

Figs. 18—24. *Pseudanthessius weberi* nov. sp.

- Fig. 18. Female, dorsal view.  $\times 90$ .
- Fig. 19. Female, antennule.  $\times 210$ .
- Fig. 20. Female, antenna.  $\times 205$ .
- Fig. 21. Female, mandible A, maxilla B.  $\times 410$ .
- Fig. 22. Female, first maxilliped.  $\times 410$ .
- Fig. 23. Female, maxilliped.  $\times 410$ .
- Fig. 24. Female, fourth foot.  $\times 205$ .



## PLATE LXVIII.

Figs. 1—10. *Hermannella concinna* nov. sp.

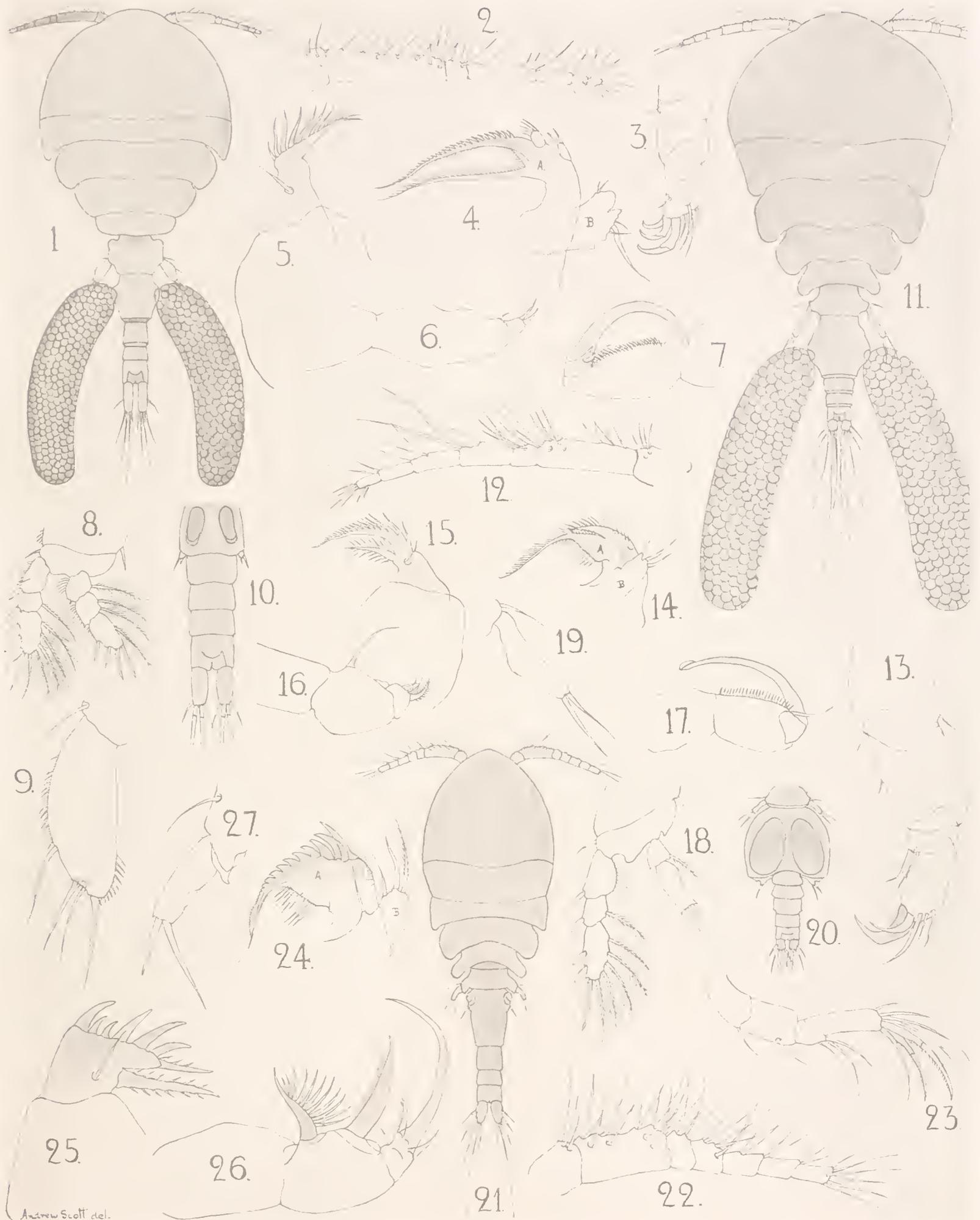
- Fig. 1. Female, dorsal view.  $\times 30$ .
- Fig. 2. Female, antennule.  $\times 96$ .
- Fig. 3. Female, antenna.  $\times 96$ .
- Fig. 4. Female, mandible A, maxilla B.  $\times 205$ .
- Fig. 5. Female, first maxilliped.  $\times 205$ .
- Fig. 6. Female, second maxilliped.  $\times 205$ .
- Fig. 7. Male, second maxilliped.  $\times 72$ .
- Fig. 8. Female, fourth foot.  $\times 72$ .
- Fig. 9. Female, fifth foot.  $\times 205$ .
- Fig. 10. Male, abdomen.  $\times 48$ .

Figs. 11—20. *Lichomolgus gracilipes* nov. sp.

- Fig. 11. Female, dorsal view.  $\times 60$ .
- Fig. 12. Female, antennule.  $\times 162$ .
- Fig. 13. Female, antenna.  $\times 205$ .
- Fig. 14. Female, mandible A, maxilla B.  $\times 273$ .
- Fig. 15. Female, first maxilliped.  $\times 273$ .
- Fig. 16. Female, second maxilliped.  $\times 273$ .
- Fig. 17. Male, second maxilliped.  $\times 160$ .
- Fig. 18. Female, fourth foot.  $\times 144$ .
- Fig. 19. Female, fifth foot.  $\times 410$ .
- Fig. 20. Male, abdomen.  $\times 72$ .

Figs. 21—27. *Pseudanthessius pectinatus* nov. sp.

- Fig. 21. Female, dorsal view.  $\times 60$ .
- Fig. 22. Female, antennule.  $\times 205$ .
- Fig. 23. Female, antenna.  $\times 164$ .
- Fig. 24. Female, mandible A, maxilla B.  $\times 273$ .
- Fig. 25. Female, first maxilliped.  $\times 273$ .
- Fig. 26. Female, second maxilliped.  $\times 273$ .
- Fig. 27. Female, fifth foot.  $\times 273$ .



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## PLATE LXIX.

Figs. 1—7. *Pseudanthessius parvus* nov. sp.

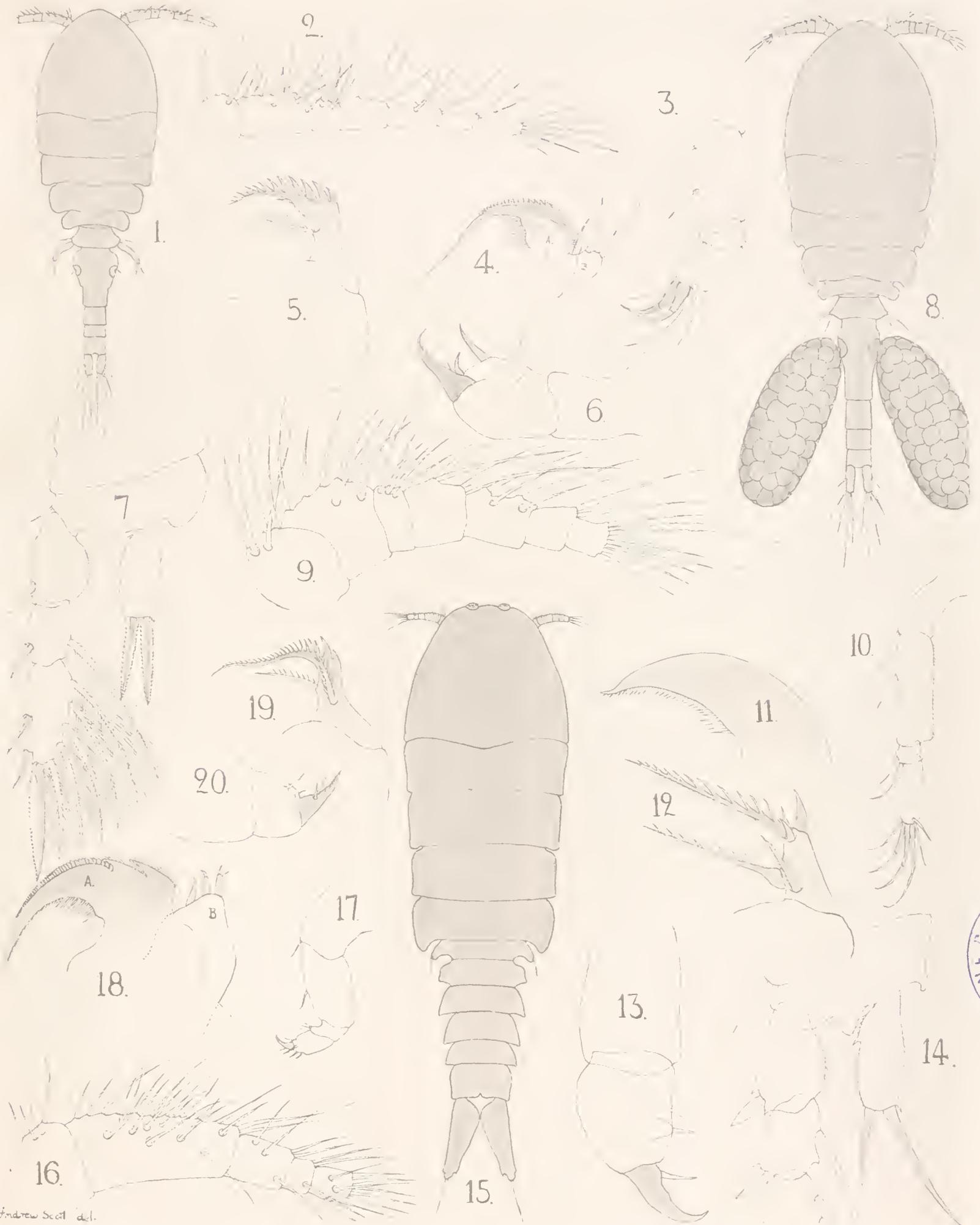
- Fig. 1. Female, dorsal view.  $\times 90$ .
- Fig. 2. Female, antennule.  $\times 273$ .
- Fig. 3. Female, antenna.  $\times 273$ .
- Fig. 4. Female, mandible A, maxilla B.  $\times 410$ .
- Fig. 5. Female, first maxilliped.  $\times 410$ .
- Fig. 6. Female, second maxilliped.  $\times 410$ .
- Fig. 7. Female, fourth foot.  $\times 410$ .

Figs. 8—14. *Pseudanthessius obscurus* nov. sp.

- Fig. 8. Female, dorsal view.  $\times 90$ .
- Fig. 9. Female, antennule.  $\times 410$ .
- Fig. 10. Female, antenna.  $\times 273$ .
- Fig. 11. Female, mandible.  $\times 410$ .
- Fig. 12. Female, first maxilliped.  $\times 410$ .
- Fig. 13. Female, second maxilliped.  $\times 410$ .
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- Fig. 15. Female, dorsal view.  $\times 23$ .
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- Fig. 20. Female, second maxilliped.  $\times 96$ .



Andrew Scott del.

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# Siboga-Expeditie

## THE COPEPODA OF THE SIBOGA EXPEDITION

BY

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PART I

### FREE-SWIMMING, LITTORAL and SEMI-PARASITIC COPEPODA

With 69 plates

Monographie XXIX<sup>a</sup> of:

### UITKOMSTEN OP ZOOLOGISCH, BOTANISCH, OCEANOGRAPHISCH EN GEOLOGISCH GEBIED

verzameld in Nederlandsch Oost-Indië 1899—1900

aan boord H. M. Siboga onder commando van  
Luitenant ter zee 1<sup>e</sup> kl. G. F. TYDEMAN

UITGEGEVEN DOOR

Dr. MAX WEBER

Prof. in Amsterdam, Leider der Expeditie

(met medewerking van de Maatschappij ter bevordering van het Natuurkundig  
Onderzoek der Nederlandsche Koloniën)

BOEKHANDEL EN DRUKKERIJ

VOORREKEN  
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LEIDEN



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ZOOLOGIQUES, BOTANIQUES, OcéANOGRAPHIQUES ET GÉOLOGIQUES

ENTREPRISES AUX

INDES NÉERLANDAISES ORIENTALES en 1899—1900,

à bord du SIBOGA

SOUS LE COMMANDEMENT DE

G. F. TYDEMAN

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