

# A Review of the Parasitic Copepods of Fish recorded from Ceylon with Descriptions of Additional Forms

BY

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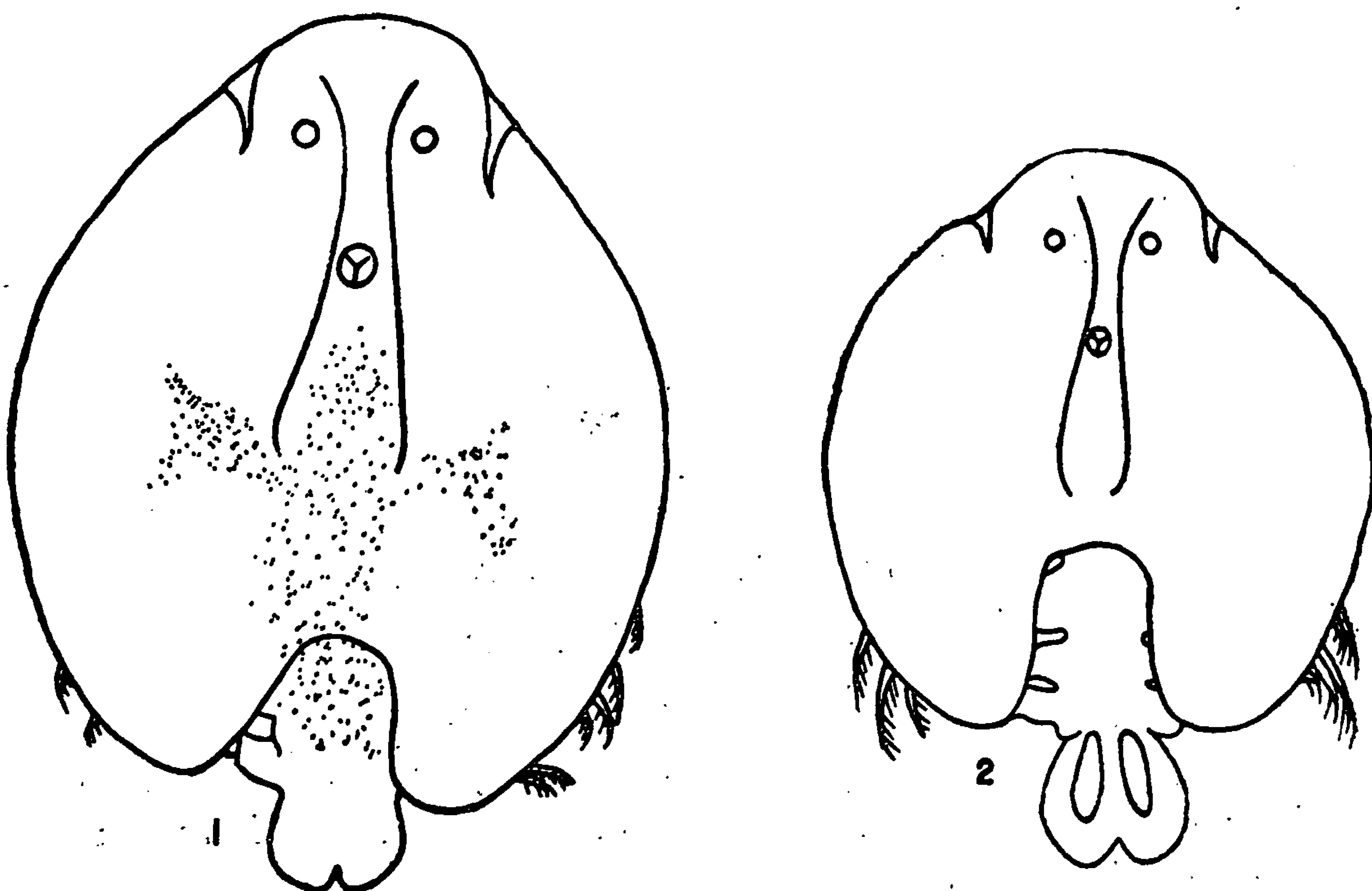
THE beginning of our knowledge of the copepods parasitic on fish from Ceylon is due to Bassett-Smith (1898 *a*) who, in a paper on "Further New Parasitic Copepods found on Fish in the Indo-Tropical Region", included seven species collected at Trincomalee and Colombo. Later in the same year, in a paper on "Some New or Rare Parasitic Copepods from the Indo-Tropical Region", he (Bassett-Smith, 1898 *b*) included three more species from Ceylon. Soon after, more of these parasites were obtained from Ceylon during Herdmann's investigation of the Pearl Banks. From this collection, one lot consisting of eleven species was described by Thompson and Scott (1903) and a second lot consisting of seven species was described by Wilson (1906). At that stage the number of species recorded from Ceylon made up to a total of twenty-eight; and there the matter rested for another quarter of a century until, quite by chance, while collecting marine animals on a reef, I came across a newly dead half-beak with a lernaeid parasite projecting from its body. Since then, in a number of occasional papers (Kirtisinghe, 1932-35, 1937, 1950, 1956, 1960) I have described thirty-eight more species of parasitic copepods from Ceylon. However, my collection included many more species which were put aside for later attention. In the present paper, while dealing with those forms in my collection which I have not recorded or described earlier, I have put together all the known forms of parasitic copepods of fish from Ceylon. This has given me the opportunity of carrying out such revision as has become necessary of my own earlier work as well as of the earlier work of the other authors in this field. A list of the host fishes with their respective parasitic copepods is also provided. Types of new species, at present in the author's private collection, will be deposited in the Fisheries Department, Colombo, Ceylon.

## Family ARGULIDAE

### ARGULUS Muller

#### *Argulus nativus* Kirtisinghe

*Argulus nativus* Kirtisinghe, 1959, pp. 253-256, figs.



Figs. 1, 2. *Argulus nativus* Kirtisinghe. 1, female; 2, male.

*Occurrence.* On the outer surface of the body of *Promicrops lanceolatus* (Bloch), off Ambalangoda, on the south west coast.

*Distribution.* Not recorded elsewhere.

*Female* (Fig. 1). Cephalothorax subcircular, slightly longer than wide; anterolateral sinuses shallow; posterior lobes rounded, reaching to base of abdomen; posterior sinus leaving only the last two thoracic segments visible in dorsal view; no distinct respiratory areas. Abdomen short, cleft less than a fourth of its length. Dorsal surface partly pigmented. Total length 5.8 mm..

*Male* (Fig. 2). Cephalothorax more nearly circular than in female, its posterior sinus leaving the last three thoracic segments visible in dorsal view. Abdominal lobes more oval than in female. Dorsal surface unpigmented. Total length 4.7 mm..

*Remarks.* Although *A. nativus* is the only indigenous argulid recorded from this region, mention must be made of the presence of an introduced species. *A. foliaceus* Linn. (Fig. 3), which lives on the external surface of the body and on the gills of a large number of fresh water fish and tadpoles from almost all over Europe, has been brought over to Ceylon with the mirror carp and trout that were stocked in the lakes and streams in and around Nuwara Eliya. The specimen figured was obtained on the outer surface of the body of a mirror carp from the lake in Nuwara Eliya.

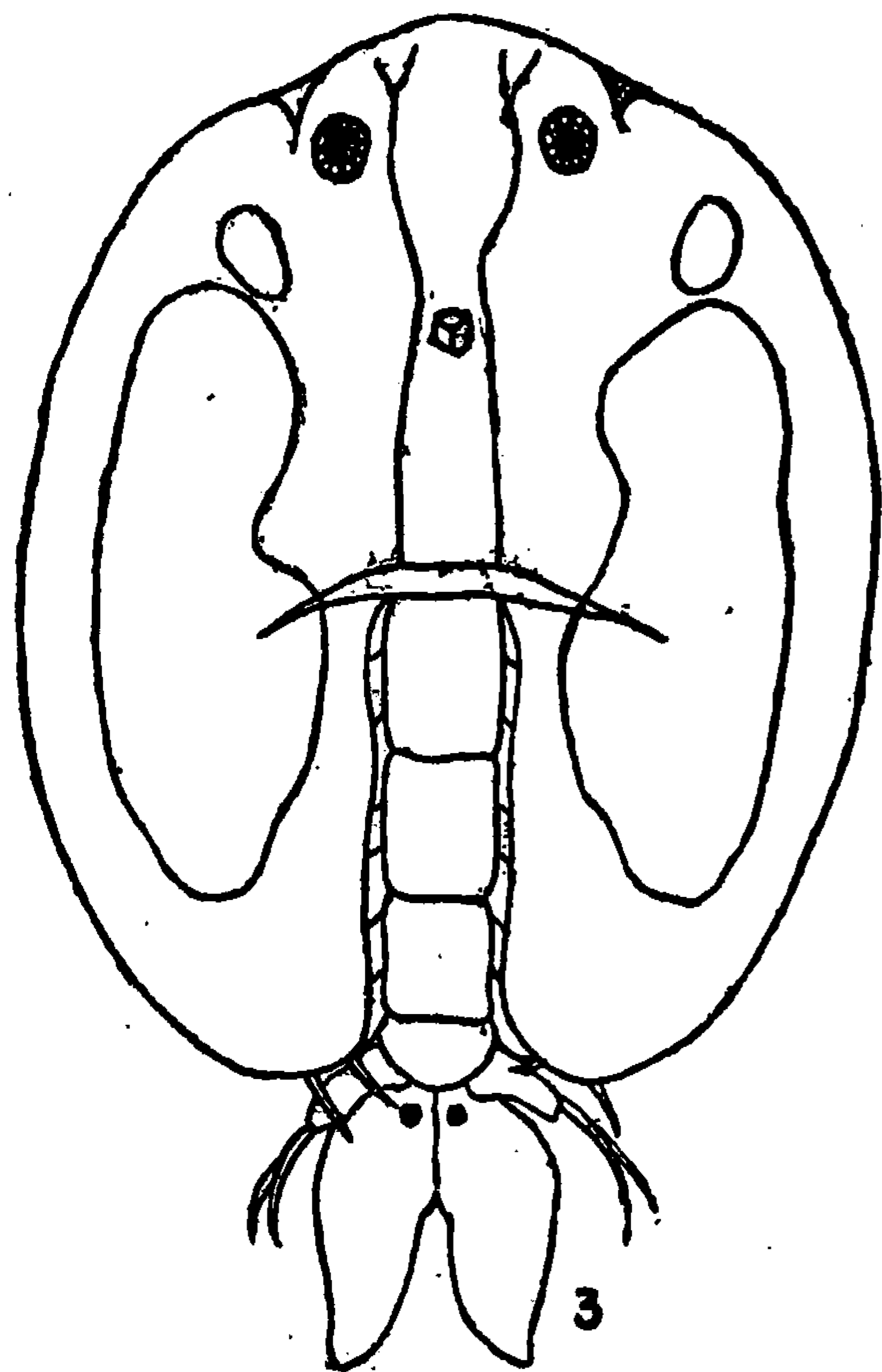


Fig. 3. *Argulus foliaceus* Linn.. Female.

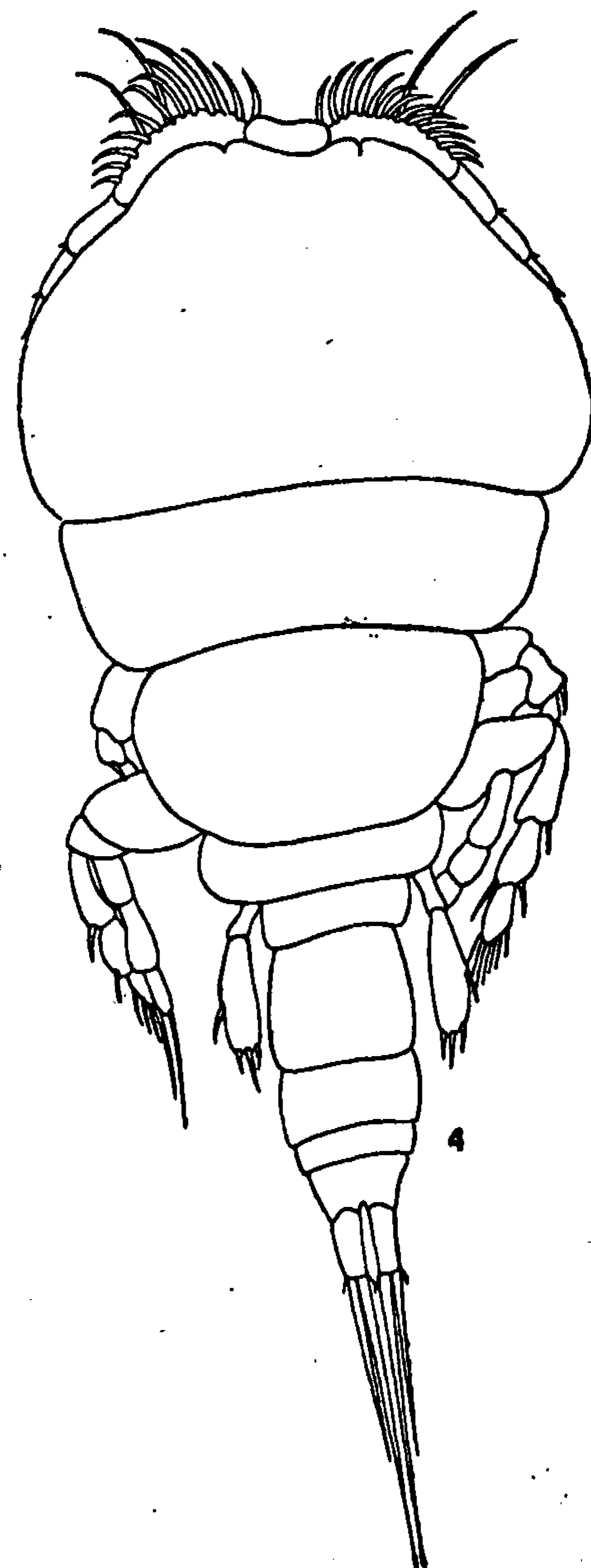


Fig. 4. *Bomolochus unicirrus* Richiardi. Female.

#### Family **BOMOLOCHIDAE**

#### *BOMOLOCHUS* Nordmann

#### *Bomolochus unicirrus* Richiardi

*Bomolochus unicirrus* Richiardi, 1879, *Processi verbali Soc. Tosc. Sci. Natur.*; Brian 1902, pp. 3-6. pl. 1, figs. 1-8.; 1924, pp. 9-11, fig. 5; Thompson and Scott, 1903, p. 293.

*Bomolochus tumidus* Shiino, 1957, pp. 417-422, figs. 3 and 4.

*Occurrence.* In the gill chamber of *Centriscus scutatus* Linn. on the Pearl Banks (Thompson and Scott). I have obtained a few female specimens from the gills of *Tylosurus leiurus* (Bleeker) at Hikkaduwa, on the south west coast.

*Distribution.* The species type was described by Richiardi from the Mediterranean (host unrecorded); the species also occurs in the branchial cavity of *Lichia vadigo* off Mauritania (Brian) and on the gills and inner surface of the operculum of *Cololabis saira* off Owase, Japan (Shiino).

*Female* (Fig. 4). Cephalothorax semi-elliptical, wider than long. Second to fifth thoracic segments narrowing progressively backwards; third thoracic segment longer than second and overlapping the fourth segment which may, in its turn, overlap the fifth. Genital segment comparatively long. Abdomen narrowing gradually backwards, second abdominal segment the shortest. Basal joint of first antenna with two long setae in addition to the anterior fringe of setae. Caudal rami tipped with two long setae, the inner of which is nearly twice as long as the outer. Length of body 1.9 mm..

*Male.* Not known.

*Remarks.* The only character by which Shiino distinguishes his *B. tumidus* from *B. unicirrus* is the union of the fifth and sixth segments in the former. However, his figure of this region in *B. tumidus* shows a well marked constriction between these two segments. It does not seem to provide a strong enough basis for making out a separate species.

#### *Bomolochus scomberesocis* Kroyer

*Bomolochus scomberesocis* Kroyer, 1863, pp. 217-219. Thompson and Scott, 1903, p. 293.

*Bomolochus denticulatus* Bassett-Smith, 1898 a, pp. 78-80, pl.3, fig. 1.

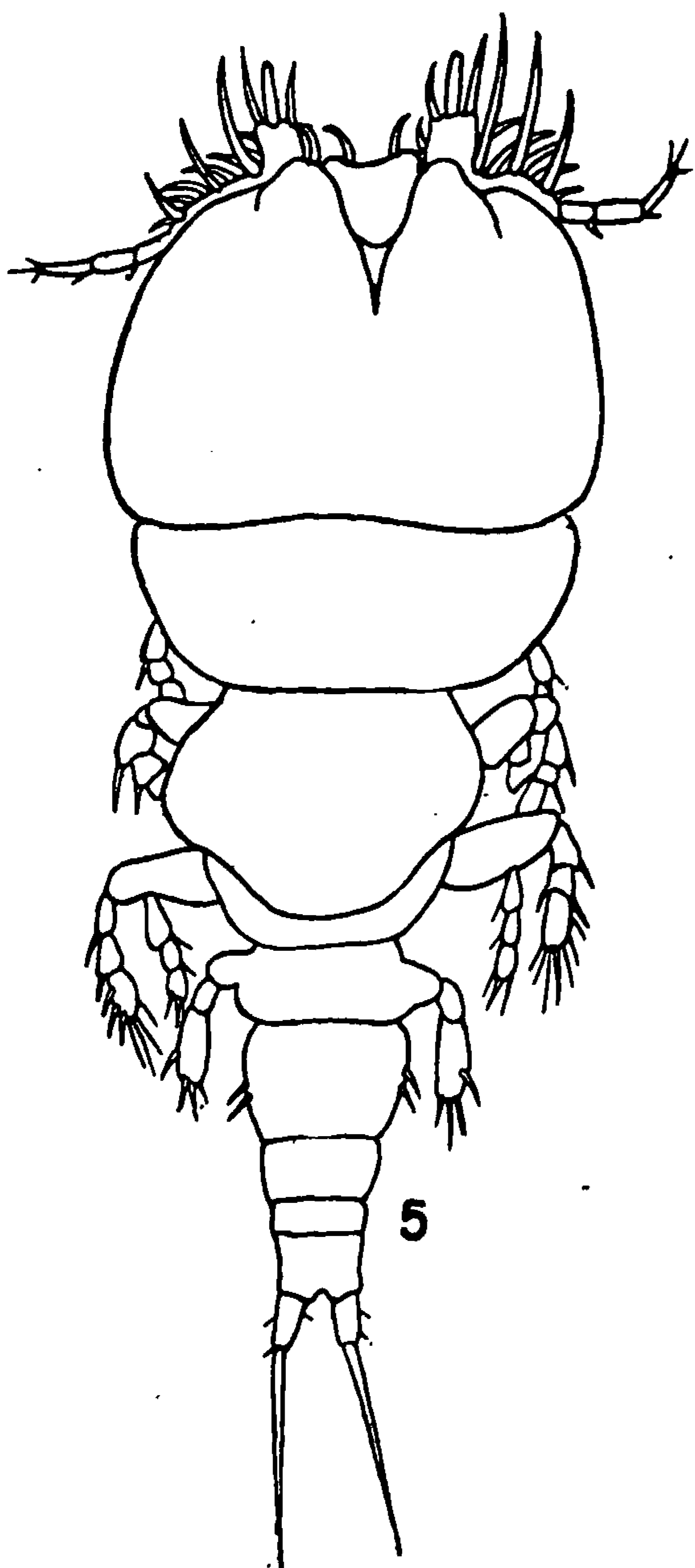


Fig. 5. *Bomolochus scomberesocis* Kroyer. Female.

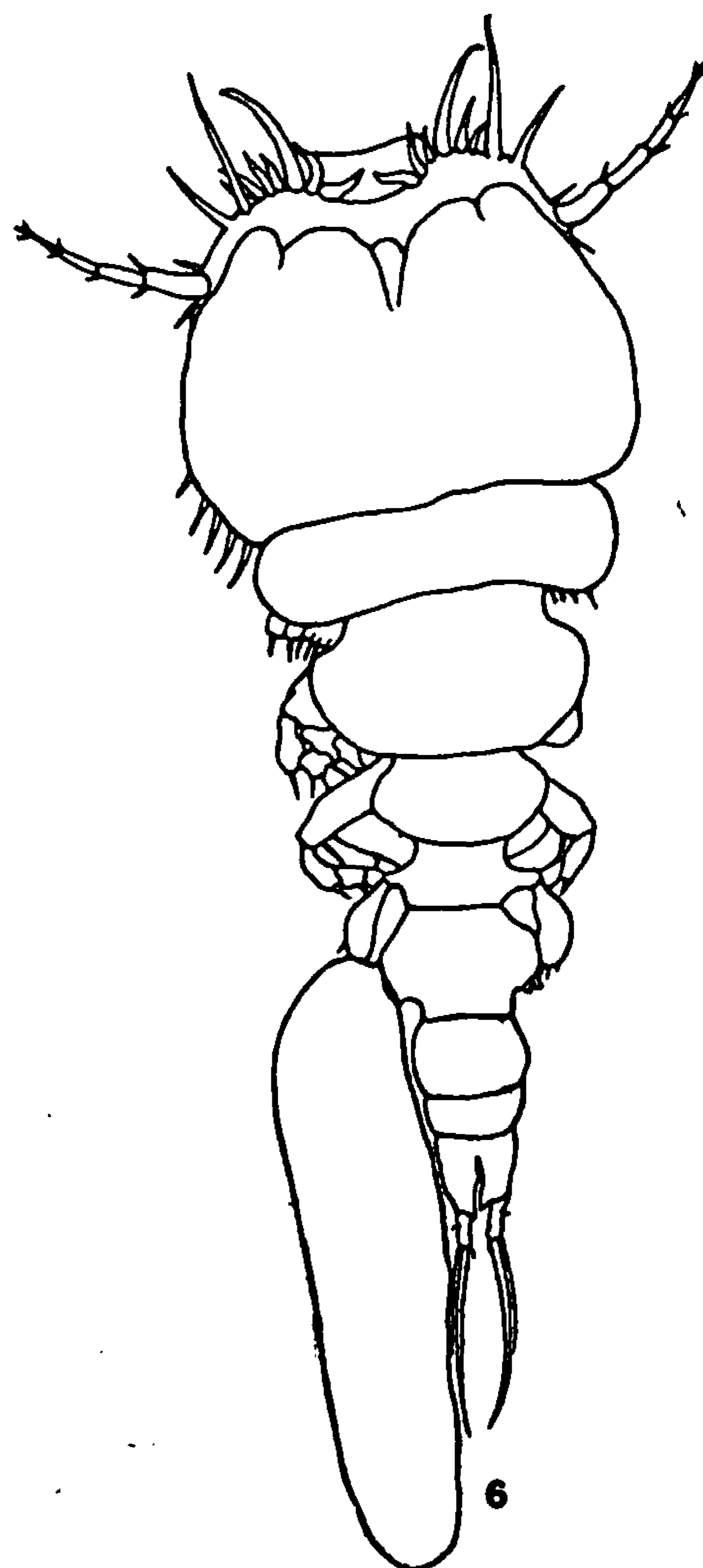


Fig. 6. *Bomolochus megaceros* Heller. Female.

*Occurrence.* On the gills of *Selaroides leptolepis* (Cuvier) off Aripu (Thompson and Scott); in the gill cavity of *Sphyræna jello* Cuvier at Trincomalee and at Colombo, and on the gills of *Hemirhamphus far* at Trincomalee (Bassett-Smith). I too have obtained several female specimens from the gills of *Sphyræna jello* bought in the Colombo market.

*Distribution.* The species type was obtained by Kroyer in the Atlantic, host unrecorded.

*Female* (Fig. 5). Cephalothorax semi-elliptical. Second thoracic segment nearly as wide as the cephalothorax; third thoracic segment narrower but longer than second, bulging dorsally and overlapping the narrow fourth segment. Middle abdominal segment the shortest. Caudal rami tipped with a single long seta. On each side of the central fossa of the cephalothorax is an anterior projection bearing three setaceous horns, the middle horn of which is blunter than the lateral horns. Total length 2.2 mm..

*Male.* Not known.

*Remarks.* The reasons given by Bassett-Smith for separating this form into a different species are not significant. I have retained it in Kroyer's species as Thompson and Scott have done.

### *Bomolochus megaceros* Heller

*Bomolochus megaceros* Heller, 1865, pp. 153-157, pl. 13, fig. 2; Bassett-Smith, 1898 b, pp. 358-359, pl. 10, fig. 1; Gnanamutthu, 1949, pp. 359-362, figs. 1-6.

*Occurrence.* On the gills of *Parastromateus niger* (Bloch) at Colombo (Bassett-Smith). I too have obtained female specimens of this parasite on the gills of the same host fish bought in the Colombo market.

*Distribution.* On the gills of *Parastromateus niger* in the Indian Ocean (Heller), at Baluchistan and at Bombay (Bassett-Smith) and at Madras (Gnanamutthu); on *Atule djedaba* at Aden (Bassett-Smith).

*Female* (Fig. 6). Cephalothorax semi-elliptical, wider than long. Free thoracic segments narrowing gradually backwards, third segment longer than the second and the fourth. Genital segment slightly wider than long. Second abdominal segment shorter than the other two abdominal segments. Caudal rami tipped with two setae, the inner of which is much longer than the outer. Basal joint of first antenna furnished with an anterior row of 12-13 setae and three other more enlarged setae. Total length 3.4 mm..

*Male.* Known only from a single specimen described by Bassett-Smith. According to him the cephalothorax is elongate and there are only two short, free thoracic segments. The enlarged genital segment is oval and the abdomen consists of only two segments. The second maxilliped is very large and powerful. Total length 1 mm.. (Male not seen. Description from Bassett-Smith).

*Remarks.* The "male" of this form described by Gnanamutthu, very different from the description and figure by Bassett-Smith, is merely a young female.

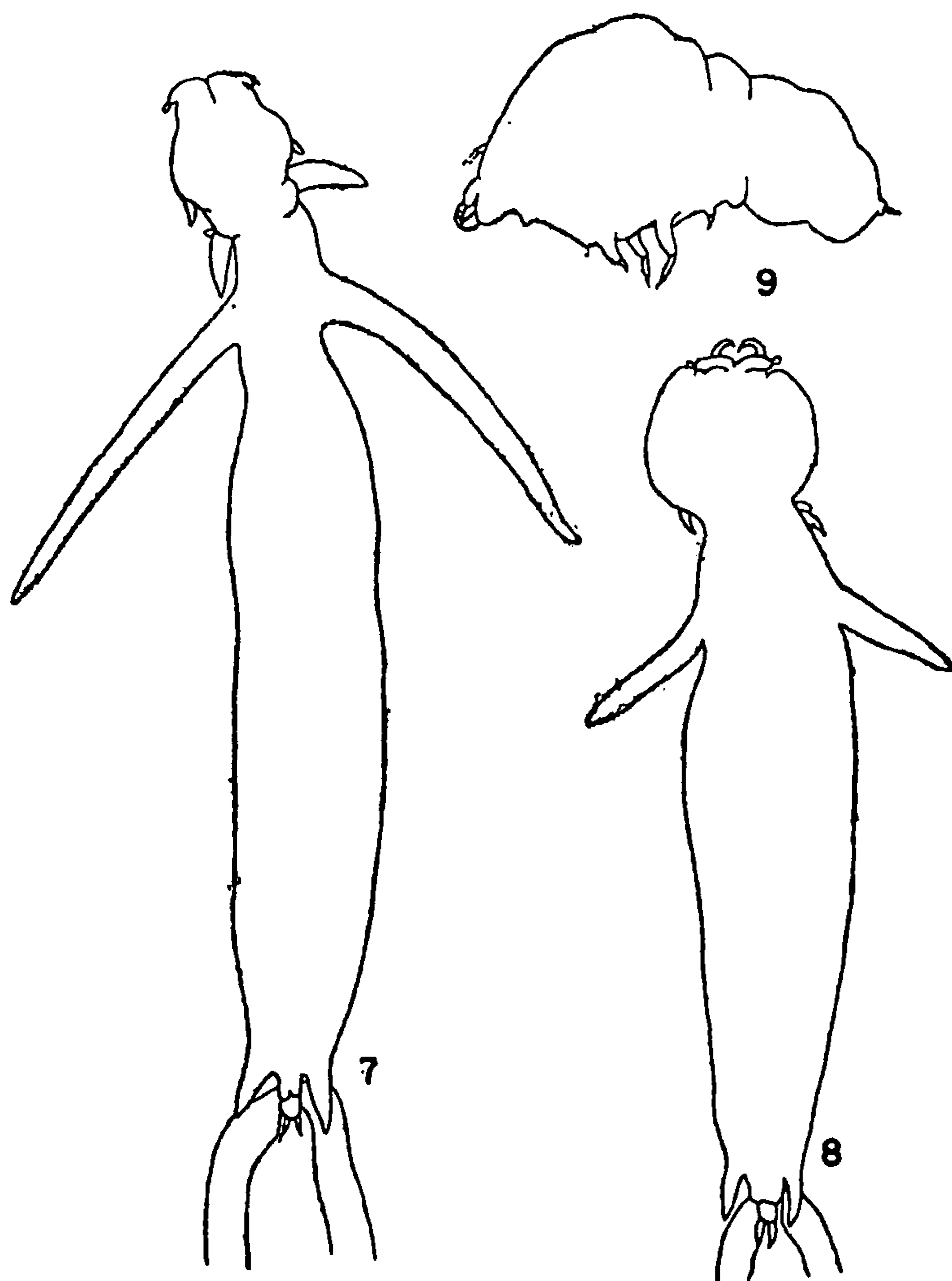
## Family CHONDRACANTHIDAE

### CHONDRACANTHUS Delaroche

#### *Chondracanthus alatus* Heller

*Chondracanthus alatus* Heller, 1865, pp. 231-232, pl. 23, fig. 3; Bassett-Smith, 1898, p. 14; Kirtisinghe, 1956, p. 20

*Protochondracanthus psettodis* Kirtisinghe, 1950, p. 85, figs. 44-51.



Figs. 7-9. *Chondracanthus alatus* Heller. 7, female ; 8, juvenile female ; 9, male.

**Occurrence.** On the gill filaments of *Psettodes erumei* (Bloch) bought in the Colombo market.

**Distribution.** On *Hippoglossus nolako* off Singapore (Heller) and on *Psettodes erumei* off Bombay (Bassett-Smith).

**Female** (Figs. 7, 8). Head oval, longer than wide with a short median dorsal suture anteriorly and a pair of postero-lateral cephalic barbs. Thoracic region, marked off from the head by a slight constriction, narrower than the head and bearing a pair of long, postero-laterally directed processes with tapering ends. Trunk cylindrical, wider than thorax, with a pair of short conical processes at the posterior corners of the genital segment. Abdomen small, one-segmented, carrying a pair of conical caudal rami of about the same length as the abdomen. Length 7 mm..

**Male** (Fig. 9). Body pyriform. Thoracic region incompletely segmented. Abdomen of a single segment bearing a pair of conical caudal rami. Length 0.3 mm..

### ACANTHOCHONDRIA Oakley

#### *Acanthochondria cynoglottidis* (Thompson and Scott)

*Chondracanthus cynoglottidis* Thompson and Scott, 1903, p. 294, fig. 1

*Acanthochondria cynoglottidis* Oakley, 1930, p. 186

**Occurrence.** In the nasal caecum of *Cynoglossus puncticeps* (Richardson) and of *C. brachycephalus* Bleeker on the Pearl Banks off Ceylon (Thompson and Scott).

**Distribution.** Not recorded elsewhere.

**Female.** Head rounded, as wide as the widest part of the body. Latter narrow for about a third of its length from the front end when it expands at the genital segment. Abdomen small, one-segmented, caudal rami small and tapering. Length 4.65mm.. (Not seen. Description from Thompson and Scott).

**Male.** Not known.

*Acanthochondria cornuta* (Muller)

*Lernaea cornuta* Muller, 1777, p. 124, pl. 33, fig. 1

*Chondracanthus cornutus* Thompson and Scott, 1903, p. 294; Scott, T. and A. 1913, p. 168, pl. 47, figs. 1 and 2, pl. 52, fig. 5, pl. 53, figs. 1-9

*Acanthochondria cornuta* Oakley, 1930, p. 189, fig. 3; Van Oorde-de Lint and Schuurmans Stekhoven, 1936, p. 109, fig. 53.

**Occurrence.** On the gills of *Cynoglossus macrolepidotus* (Bleeker) on the Pearl Banks (Thompson and Scott).

**Distribution.** On the gills of several species of *Pleuronectes*, *Rhombus*, and *Lepidorhombus* in the North Sea, English Channel and the Atlantic coast of N. America (Scott, T. and A.; Van Oorde-de Lint and Schuurmans Stekhoven).

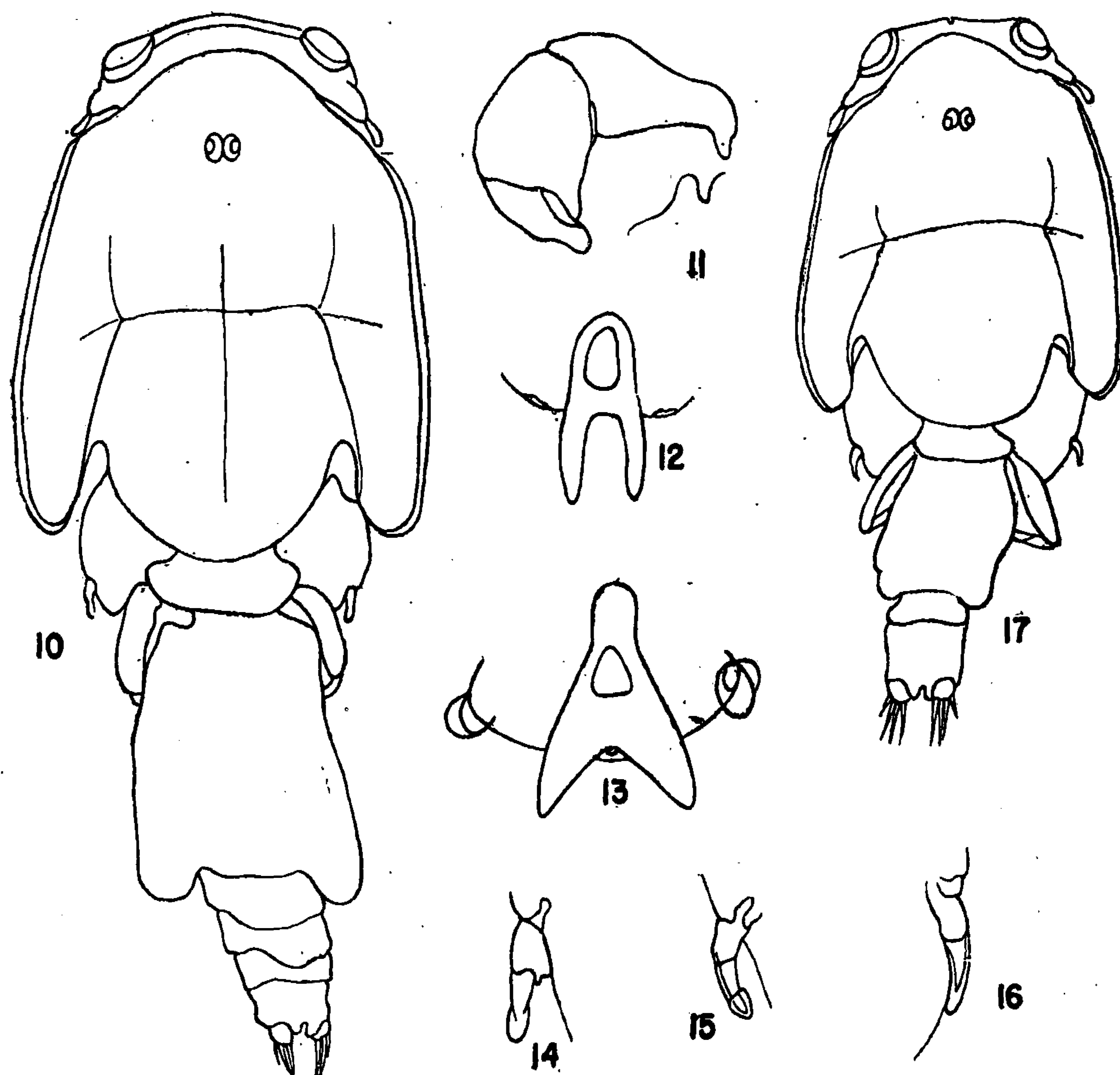
**Female.** Head ovate, somewhat longer than broad, thorax narrow. Genital segment wider than head, moderately elongated, flattened, and usually with a constriction dividing it into subequal portions; postero-lateral corners of the genital segment produced backwards into narrow processes. Abdomen very small, of two segments, and rather shorter than the lateral processes of the genital segment. Total length 6 mm..

**Male.** Cephalothorax considerably enlarged and apparently unsegmented, arched dorsally. Abdomen composed of three or four segments. Caudal rami small. Length 0.5 mm..

(Not seen. Description from Scott, T. and A.)

## Family CALIGIDAE

## CALIGUS Muller

*Caligus coryphaenae* Steenstrup and Lütken

Figs. 10-17. *Caligus coryphaenae* Steenstrup and Lutken. Female. 10, entire animal; 11, first maxilla; 12, sternal furca of juvenile female; 13, sternal furca of adult female. 14-16, claw on third leg; 17, juvenile female.

*Caligus coryphaenae* Steenstrup and Lütken, 1961, p. 20, pl. 4, fig. 7; Brian 1935, p. 202 fig. 19; Heegaard, 1949, p. 241, figs. 6-10; Barnard, 1955, p. 256, fig. 88 a-d; Shiino, 1959b, pp. 2-8, figs. 1 and 2; Kurian, 1961, pp. 68-70, figs. 16-24

*Caligus aliuncus* Wilson, 1905, p. 576, pl. 9; and 1935, p. 330; Causey, 1953, p. 8

*Caligus elongatus* Heegaard, 1943a, p. 11, figs. 21-31

*Caligus tesserafer* Shiino, 1952, p. 89, fig. 5

*Caligus bengoensis* Scott, T. 1895, p. 30, pl. 14, fig. 19

*Caligus euthynnus* Kurian 1961, pp. 63-67, figs. 1-15

*Caligus alveolaris* Heegaard, 1962, pp. 156-157, figs. 37-44

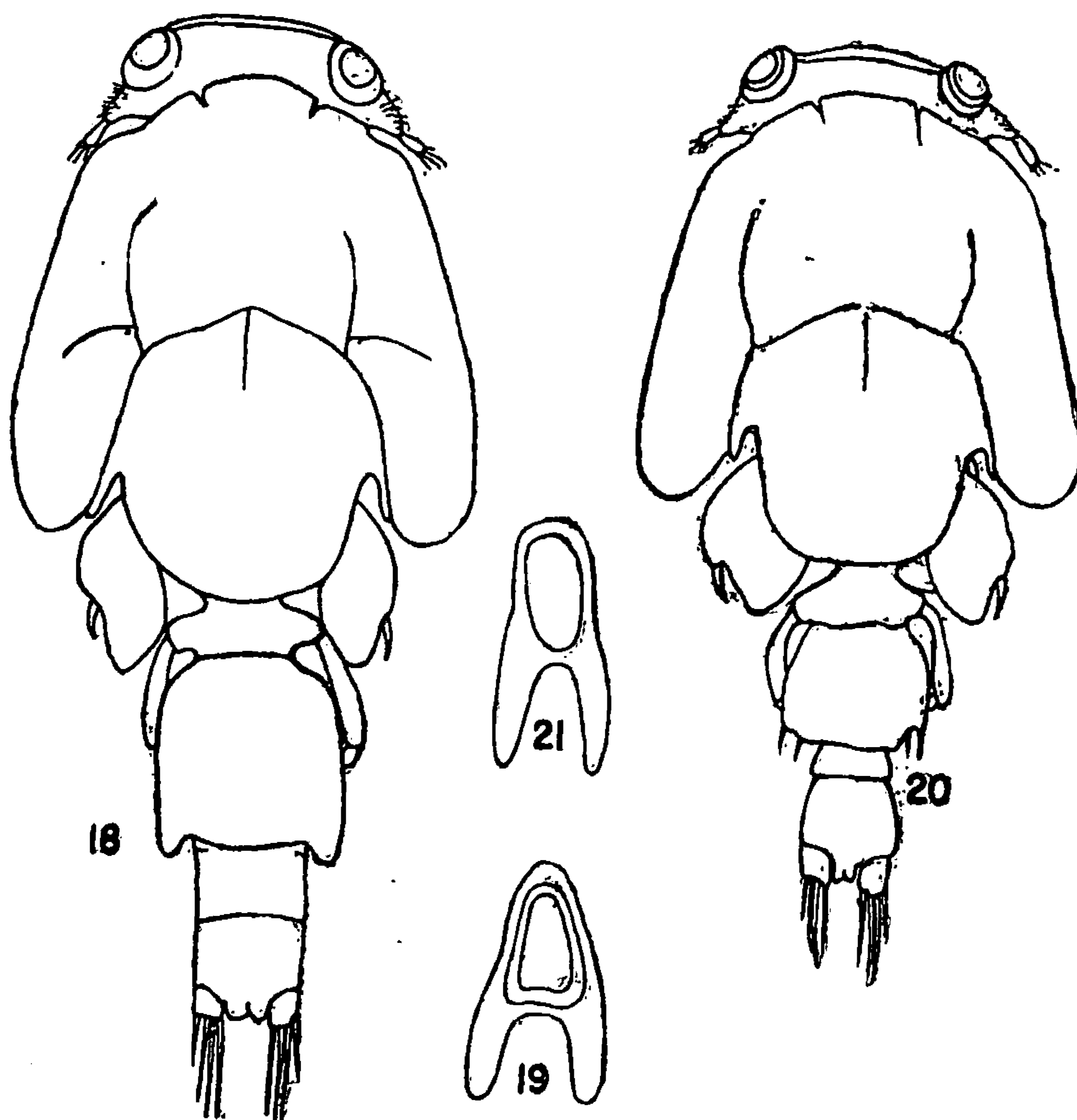
**Occurrence.** One adult female and one juvenile female on the outer surface of the body of *Katsuwonus pelamis* (Linn.) and one juvenile female and three males on the outer surface of the body of a carangid off Hikkaduwa on the south west coast.

**Distribution.** On *Katsuwonus pelamis*, *Coryphaena hippurus* and *Euthynnus lineatus* in the Pacific (Shiino, Heegaard), on *Neothynnus albacora* and *Euthynnus affinis* in the Indian Ocean (Shiino, Kurian), on *Euthynnus alleteratus* off North Queensland, Australia (Heegaard), in the Mediterranean (Brian) and on *Coryphaena hippurus* and *Euthynnus alleteratus* in the Atlantic (Steenstrup and Lutken, Wilson).

**Female** (Figs. 10-19). Lunules hemispherical. Cephalothorax longer than wide, a little more or less than half the entire length; median lobe much more than a third of the width of the cephalothorax projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment short and broad. Genital segment quadrangular, with short postero-lateral lobes. Abdomen of two to four segments. Caudal rami short, scarcely extending beyond the bilobed tip of the abdomen. Length 7 mm..

**Male** (Figs. 20, 21). Cephalothorax as in female but more than half the entire length. Genital segment nearly square with the fifth and sixth legs clearly visible at its postero-lateral corners. Abdomen of two segments, proximal segment shorter than the terminal. Length 4 mm..

**Remarks.** Since Heegaard (1949) and Shiino (1959 b) discussed the synonymy of *Caligus coryphaenae* Steenstrup and Lütken, two other forms bearing strong resemblances to this species have been described as new species by Kurian (1961) and by Heegaard (1962). The variable characters



Figs. 18-21. *Caligus coryphaenae* Steenstrup and Lutken. 18, female; 19, sternal furca of female; 20, male; 21, sternal furca of male.

among all these forms appear to be the number of abdominal segments, the presence or absence of the first maxilla, the shape of the sternal furca and the shape of the claw on the exopodite of the third thoracic leg. The half dozen specimens in my collection provide some evidence on these four points.

There can be no doubt that that the two specimens from *Katsuwonus pelamis*, though both of them are slightly mutilated in the hind body region, are an adult and a juvenile form of the female of *Caligus coryphaenae*. The juvenile form has only two abdominal segments while the adult has four. Wilson (1935) found that his *Caligus aliuncus* of a length of 5mm. had only three abdominal segments while those of a length of 7.6 mm. had four segments in the abdomen. Heegaard (1949) and Barnard (1955) gave the number of abdominal segments in *C. coryphaenae* as two, three or four.

The first maxilla (Fig. 11) is in a reduced state in the adult while it is indistinguishable in the juvenile. Wilson (1935) also stated that the first maxillae are "really present but so minute as to escape detection." The figures (12, 13, 21) of the sternal furca show its change in shape from the juvenile to the adult female and male. That the shape of the claw on the third leg changes from the pointed to the spatulate type is proved by fig. 15 which is a drawing of a spatulate claw that was accidentally damaged in handling. It shows that the pointed claw becomes spatulate with growth, by the deposition of chitinous material on the outside.

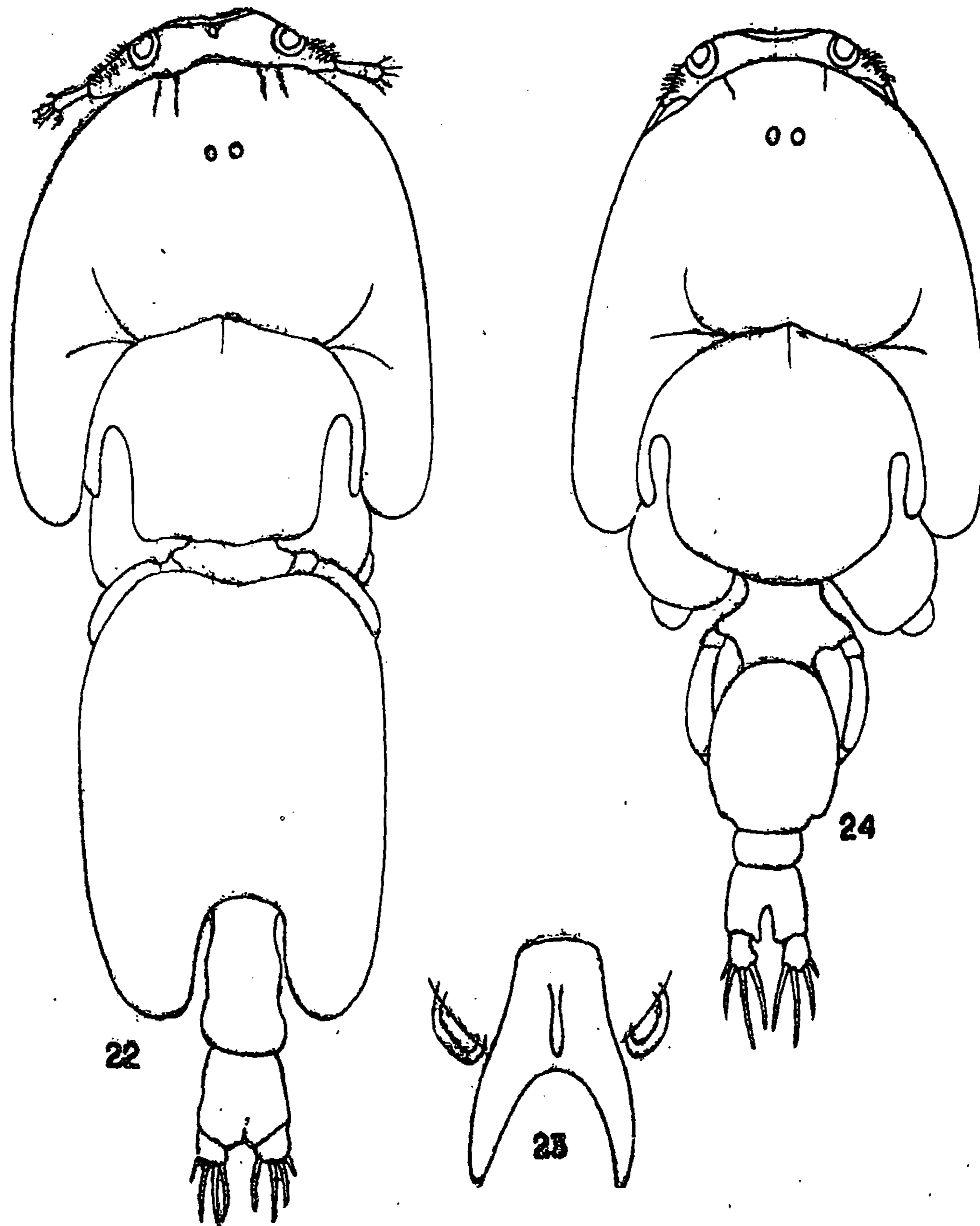
Where the male (fig. 20) is known it shows no great variation from the central type.

#### *Caligus infestans* Heller

*Caligus infestans* Heller, 1865, pp. 167-169 pl. 14, figs. 3 and 4; Nunes-Ruivo and Fourmanoir 1956, pp. 69-71, fig. 1.

*Caligus sphyraenae* Nunes-Ruivo and Fourmanoir, 1956, pp. 71-73, figs. 2 and 3.

*Caligus maculatus* Heegaard, 1962, pp. 157-158, figs. 45-53



Figs. 22-24. *Caligus infestans* Heller. 22, female; 23, sternal furca of female; 24, male.



*Occurrence.* On the gills of *Cybium commersoni* (Lacepede) off Mullaitivu on the north-east coast and off Panadura on the west coast.

*Distribution.* On the gills of *Scomber* sp. in the Indian Ocean (Heller) and on the walls of the branchial cavity and on the skin of *Cybium commersoni* and *Sphyaena picuda* Bloch off Madagascar (Nunes-Ruivo and Fourmanoir).

*Female* (Figs 22, 23). Cephalothorax slightly more or less than half the entire length; lunules moderate; median lobe more than half the width of the cephalothorax, extending beyond the posterior level of the lateral lobes. Genital segment flask-shaped, with well developed postero-lateral lobes in the adults. Abdomen of two segments, proximal segment slightly the longer. Total length 6.5 mm..

*Male* (Fig. 24). Cephalothorax as in female but more than half the entire length. Genital segment oval. Abdomen a little shorter than the genital segment, two-segmented, proximal segment short and ring-like. Total length 4 mm..

*Remarks.* From the figure of the male of *C. sphyaenae* Nunes-Ruivo and Fourmanoir given by these authors there is no doubt that this species is identical with *C. infestans* Heller. Such differences as are shown between the females of these two species in regard to the shape of the genital segment and the sternal furca are due to the immature condition of the female specimens from which *C. sphyaenae* was described.

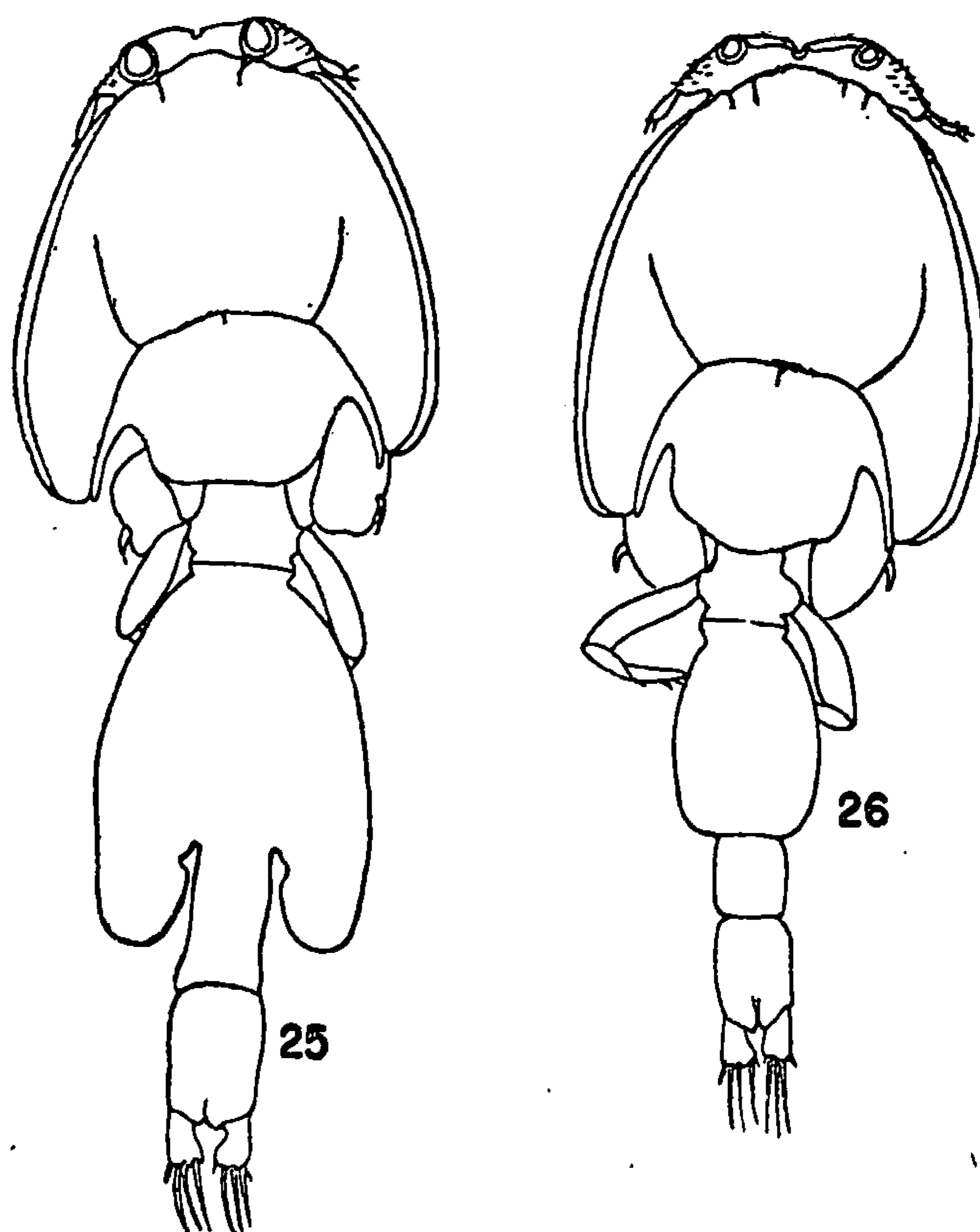
#### *Caligus productus* Dana

*Caligus productus* Dana, 1852, p. 1354, pl. 94, fig. 4; Steentrup and Lutken, 1861, p. 357 pl. 3, fig. 6. Kroyer, 1863, p. 138, pl. 3, fig. 4 a-i; Brian, 1906, p. 42; Shino, 1959b, pp. 14-20, figs. 6-8.

*Caligus monacanthi* Kroyer, 1863, p. 133, pl. 3, fig. 2 a-e; Wilson, 1937, p. 244, fig. 6.

*Caligus lobatus* Wilson, 1935, p. 1, figs. 1-10.

*Caligus Katuwo* Yamaguti, 1936, pp. 6-8, pl. 4, fig. 55, pl. 5, figs. 56-58; Shiino, 1954a p. 246, fig. 1; Nunes-Ruivo, 1954, p. 11, pl. 1, fig. b, pl. 2, fig. b.



Figs. 25, 26. *Caligus productus* Dana. 25, female; 26, male.

*Occurrence.* In the gill chamber of *Coryphaena hippurus* Linn., *Katsuwonus pelamis* (Linn.) and *Euthynnus affinis* (Cantor) off Hikkaduwa.

*Distribution.* On *Katsuwonus pelamis*, *Coryphaena hippurus*, *Auxis thazard*, *Neothynnus albacora* in the Pacific (Shiino, Yamaguti); *Chrysophrys aurata* in the Mediterranean (Brian); on *Katsuwonus pelamis*, *Sphyraena barracuda*, *Coryphaena hippurus* in the Atlantic (Dana, Wilson, Steenstrup and Lutken).

*Female* (Fig. 25). Cephalothorax semi-elliptical, slightly longer than wide, less than half the entire length; lunules almost spherical; median lobe half the width of the cephalothorax, scarcely projecting beyond the posterior level of the lateral lobes. Genital segment flask-shaped, with well developed postero-lateral lobes. Abdomen of two nearly equal segments. Total length 5 mm.

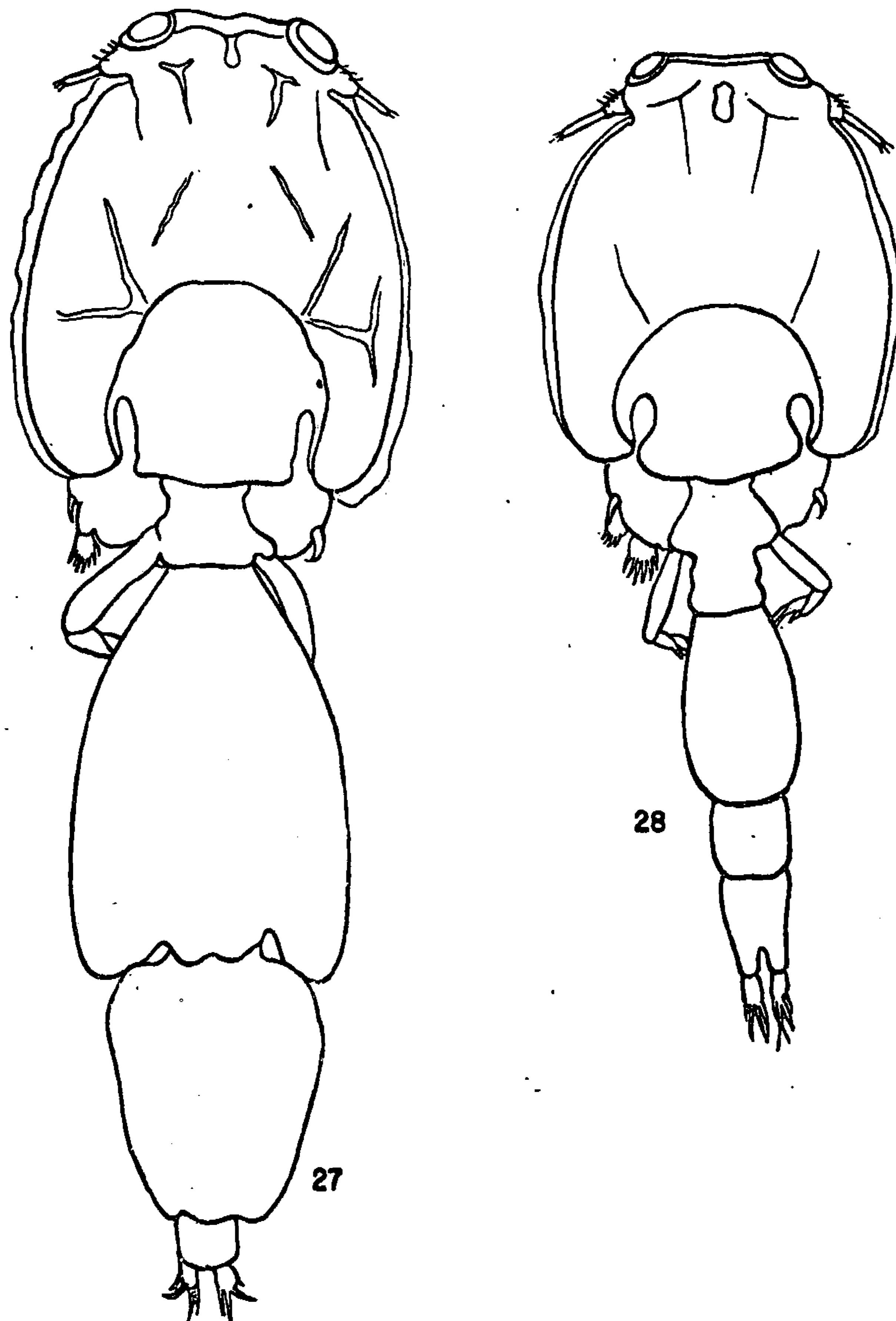
*Male* (Fig. 26). Cephalothorax as in the female but about half the entire length. Genital segment barrel-shaped. Abdomen of two segments, proximal segment a little shorter than the distal. Total length 4.4 mm.

*Remarks.* This record extends the known distribution of the species from the Pacific, Atlantic and Mediterranean Oceans into the Indian Ocean.

#### *Caligus constrictus* Heller

*Caligus constrictus* Heller, 1865, pp. 175-176, pl. 15, fig. 5; Kirtisinghé, 1956, pp. 14-15, figs. 1-4; Pillai, 1961, pp. 93-96, fig. 4.

*Midias carangis* Rangnekar, 1956, pp. 49-52, figs.



Figs. 27, 28. *Caligus constrictus* Heller. 27, female; 28, male.

*Occurrence.* On the roof of the mouth cavity of several carangid species and on the gills of *Alectis indica* (Ruppell) bought in the Colombo market.

*Distribution.* On the gills of *Stromateus* sp. in the Indian Ocean (Heller); on the gills of *Carangoides chrysophrys* (Cuvier) off Bombay (Rangnekar); on the roof of the mouth cavity of *Carangoides malabaricus* (Bloch) off Trivandrum, South India (Pillai).

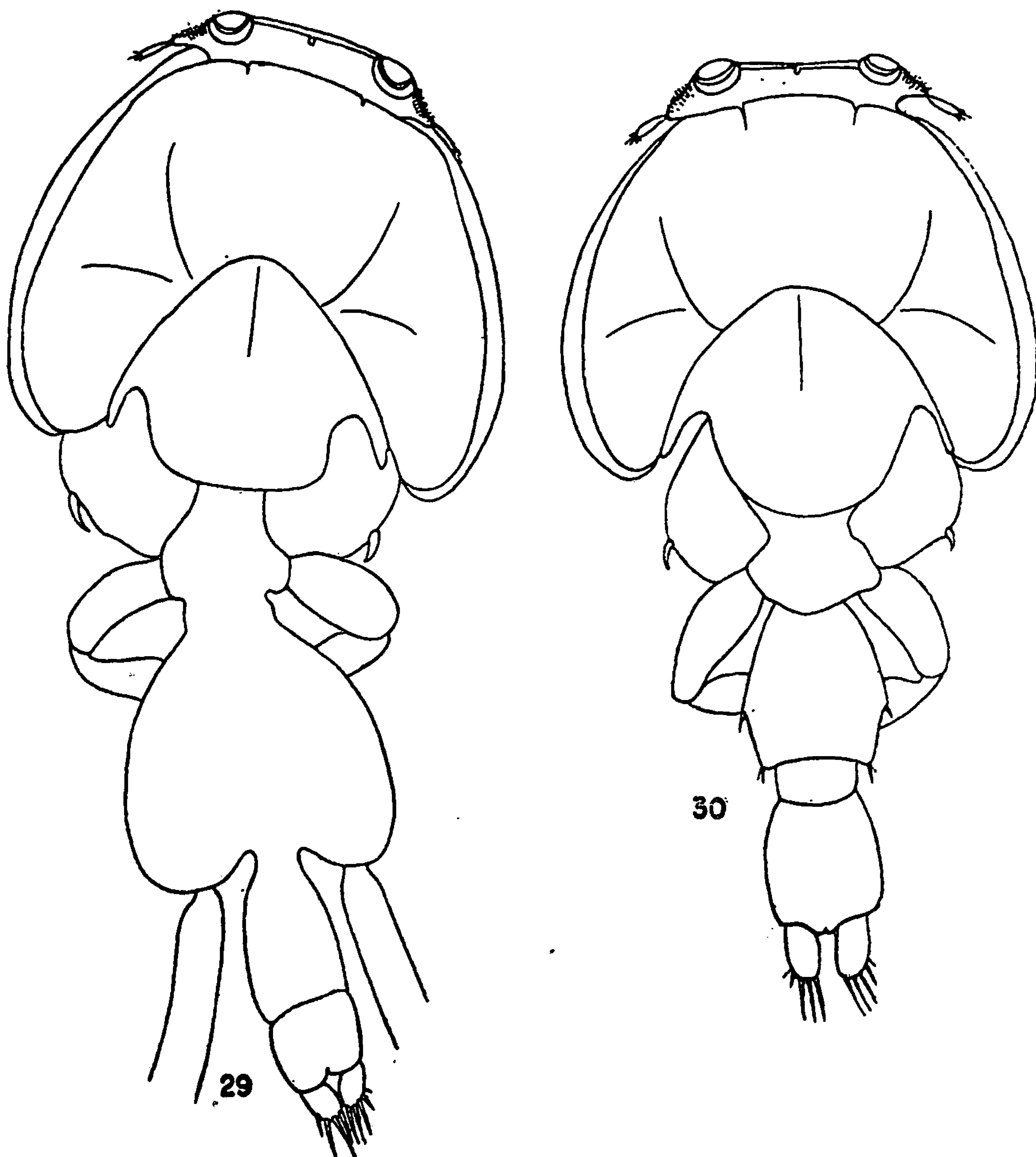
*Female* (Fig. 27). Cephalothorax longer than wide, much less than half the entire length; lunules hemispherical; median lobe about half the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Genital segment flask-shaped, not quite as long as the cephalothorax, with short postero-lateral lobes. Abdomen of two segments, proximal segment broad, more than four times as long as the short distal segment. Total length 6 mm..

*Male* (Fig. 28). Cephalothorax as in female but a little longer in proportion to the rest of the body. Free thoracic segment longer than in the female, with annular constrictions. Genital segment ovate. Abdomen about as long as the genital segment, two-segmented, proximal segment a little shorter than the distal. Total length 5 mm..

*Remarks.* The fact that this species was established by Heller from the male only has made its subsequent identification a matter of some difficulty. In parasitic copepods with dimorphic sexes it is not easy to recognize female specimens when the species is known from the male only and to recognize male specimens when the species is known from the female only. I believe that Wilson's (1937, 1937 a) identification of some female specimens as those of *Caligus constrictus* is at fault; likewise the more recent identification of Shiino, again of some female specimens only, as belonging to this species. I was more fortunate in that my collections contained both sexes and therefore sure of my identification. Recently Pillai (1961) has found that I was correct.

*Caligus robustus* Bassett-Smith

*Caligus robustus* Bassett-Smith, 1898b, pp. 361-363, pl. 11, figs. 1 and 2; Wilson, 1913, p. 273, pl. 28; Brian, 1924, p. 15; Bere, 1936, p. 582.



Figs. 29, 30. *Caligus robustus* Bassett-Smith. 29, female; 30, male.

*Occurrence.* On the inner surface of the operculum and on the gill arches of *Neothynnus macropterus* (Schlegel), *Selar mate* (Cuvier) and *Atule djedeba* at Trinemalee (Bassett-Smith). I have obtained it in the branchial cavity of *Caranx melampygus* Cuvier bought in the Colombo market.

*Distribution.* On *Megalaspis cordyli* off Aden (Bassett-Smith; on *Bathystoma remator* and *Carnax crysos* off Jamaica (Wislon), on *Caranx hippos* off Mauritania (Brian): on *Paratractos crysos* and *Caranx hippos* in the gulf of Mexico (Bere).

*Female* (Fig. 29). Cephalothorax semi-elliptical, wider than long, less than half the entire length; lunules hemispherical; median lobe about half the width of the cephalothorax, scarcely projecting beyond the posterior level of the lateral lobes. Genital segment sac-like, with distinct postero-lateral lobes. Abdomen about as long as the genital segment, two-segmented, proximal segment longer than the distal. Total length 10 mm..

*Male* (Fig. 30). Cephalothorax as in the female but about half the entire length. Genital segment with fifth and sixth legs showing as spines on its lateral margins and postero-lateral corners. Abdomen two-segmented, proximal segment shorter and narrower than the distal segment. Total length 5 mm..

### *Caligus diaphanus* Nordmann

*Caligus diaphanus*, Kroyer, 1863, p. 79, pl. 7, fig. 5; Thompson and Scott, 1903, p. 293; Brian, 1906, p. 43, and 1924, pp. 15-16; Scott, T. and A. 1913, p. 60, pl. 17; van Oorde-de Lint and Schuurmans Stekhoven, 1936, p. 135, fig. 97

*Caligus multispinosus* (not Shen), Pillai, 1961, pp. 89-91, fig. 2

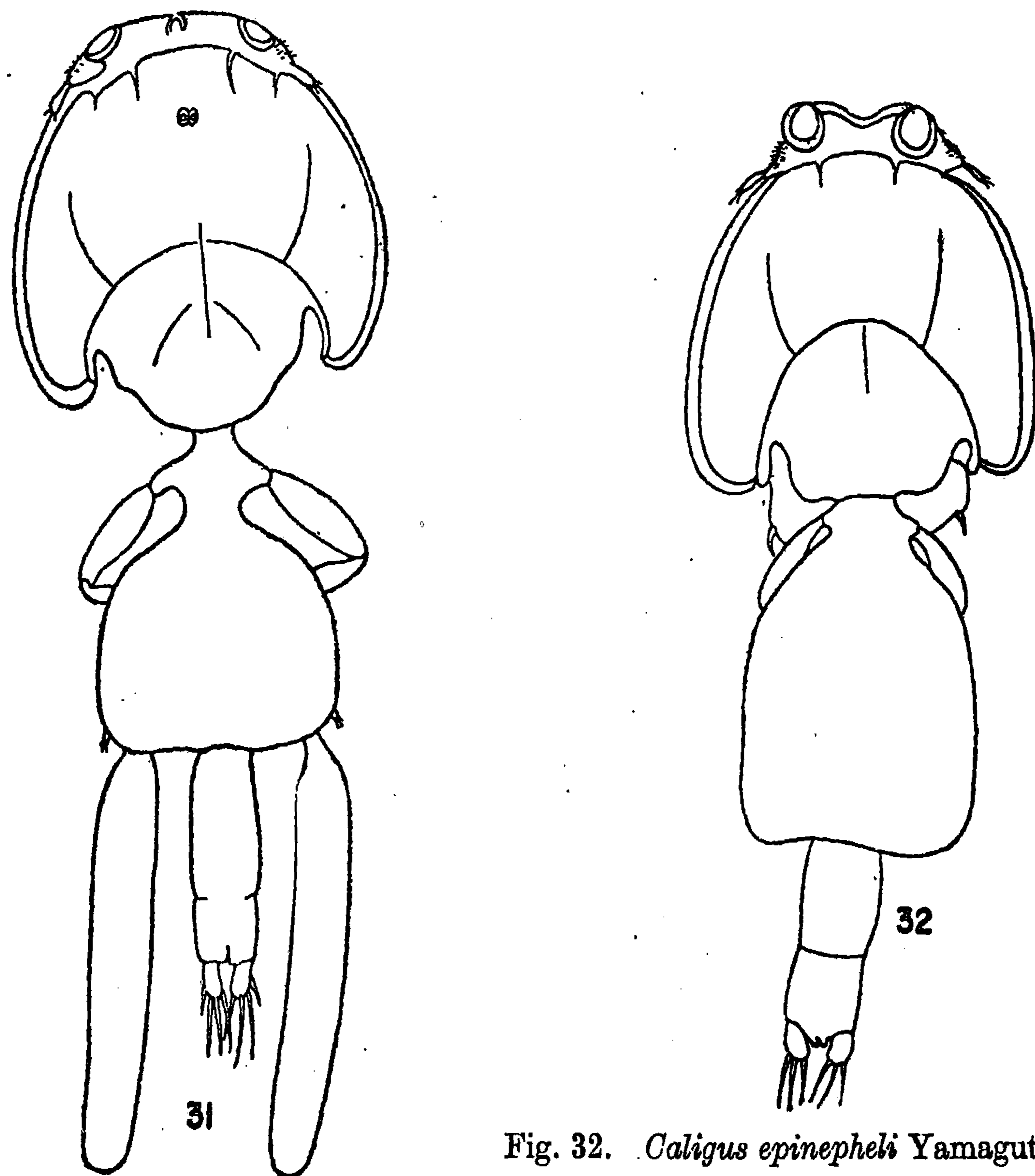


Fig. 31. *Caligus diaphanus* Nordmann. Female.

Fig. 32. *Caligus epinepheli* Yamaguti. Female.

*Occurrence.* On *Autisthes puta* (Cuvier) on the Pearl Banks (Thompson and Scott); I have obtained it in the mouth cavity of *Lates Calcarifer* (Bloch) bought in the Colombo market.

*Distribution.* On *Trigla* spp. in the North Sea and around the British Isles (Scott) on *Trigla* spp. and on *Solea vulgaris* off Mauritania (Brian), on *Pampus argenteus* at Trivandrum (Pillai).

*Female* (Fig. 31). Cephalothorax as long as broad, less than half the entire length; lunules hemispherical; median lobe about half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment narrow. Genital segment sac-shaped. Abdomen about as long as the genital segment, two-segmented, proximal segment longer than the distal. Total length 3.4 mm.

*Male.* Cephalothorax as in female, but more than half the entire length. Genital segment barrel-shaped. Abdomen of two segments, proximal segment the shorter. Total length 2 mm.

*Remarks.* Brian (1924) has expressed the opinion that *Caligus torpedinis* Heller is probably a synonym of *C. diaphanus*.

#### *Caligus epinepheli* Yamaguti

*Caligus epinepheli* Yamaguti, 1936, pp. 4-5, pl. 3, figs. 27-39.

*Caligus cossackii* (not Bassett-Smith), Rangnekar and Murti, 1959, pp. 78-81, figs.

*Occurrence.* In the mouth cavity of *Chorinemus* sp. off Hikkaduwa.

*Distribution.* On the gills of *Drepane punctata* off Bombay (Rangnekar and Murti), of *Epinephelus septemfasciatus* at Kuki and of *E. akara* at Tarumi, Japan (Yamaguti).

*Female* (Fig. 32). Cephalothorax as long as broad, less than half the entire length; lunules spherical; median lobe about half the width of the cephalothorax, projecting but little beyond the posterior level of the lateral lobes. Free thoracic segment short. Genital segment flask-shaped, postero-lateral lobes hardly developed. Abdomen shorter than the genital segment, two-segmented, proximal segment slightly longer than the distal. Total length 4.8 mm.

*Male.* Cephalothorax as in female but about half the entire length. Genital segment oval. Abdomen of two, nearly equal segments. Total length 4.1 mm. (Male not seen; description according to Rangnekar and Murti)

*Remarks.* Yamaguti observed that *Caligus epinepheli* closely resembles *C. mutabilis* Wilson. It also closely resembles *C. cossackii* Bassett-Smith but is distinguishable by the character of the first thoracic leg which in *C. epinepheli* bears a rudimentary endopodite, bifid terminal claws on the third joint and is without the three usual setose hairs on the posterior margin of this joint.

#### *Caligus cossackii* Bassett-Smith

*Caligus cossackii* Bassett-Smith, 1898 a, pp. 85-86, pl. 4, fig. 3; Heegaard, 1943 a, pp. 5-8 fig. 12; Barnard, 1955, p. 248, fig. 8 e.

*Caligus indicus* Pillai, 1961, p. 102-103, fig. 9.

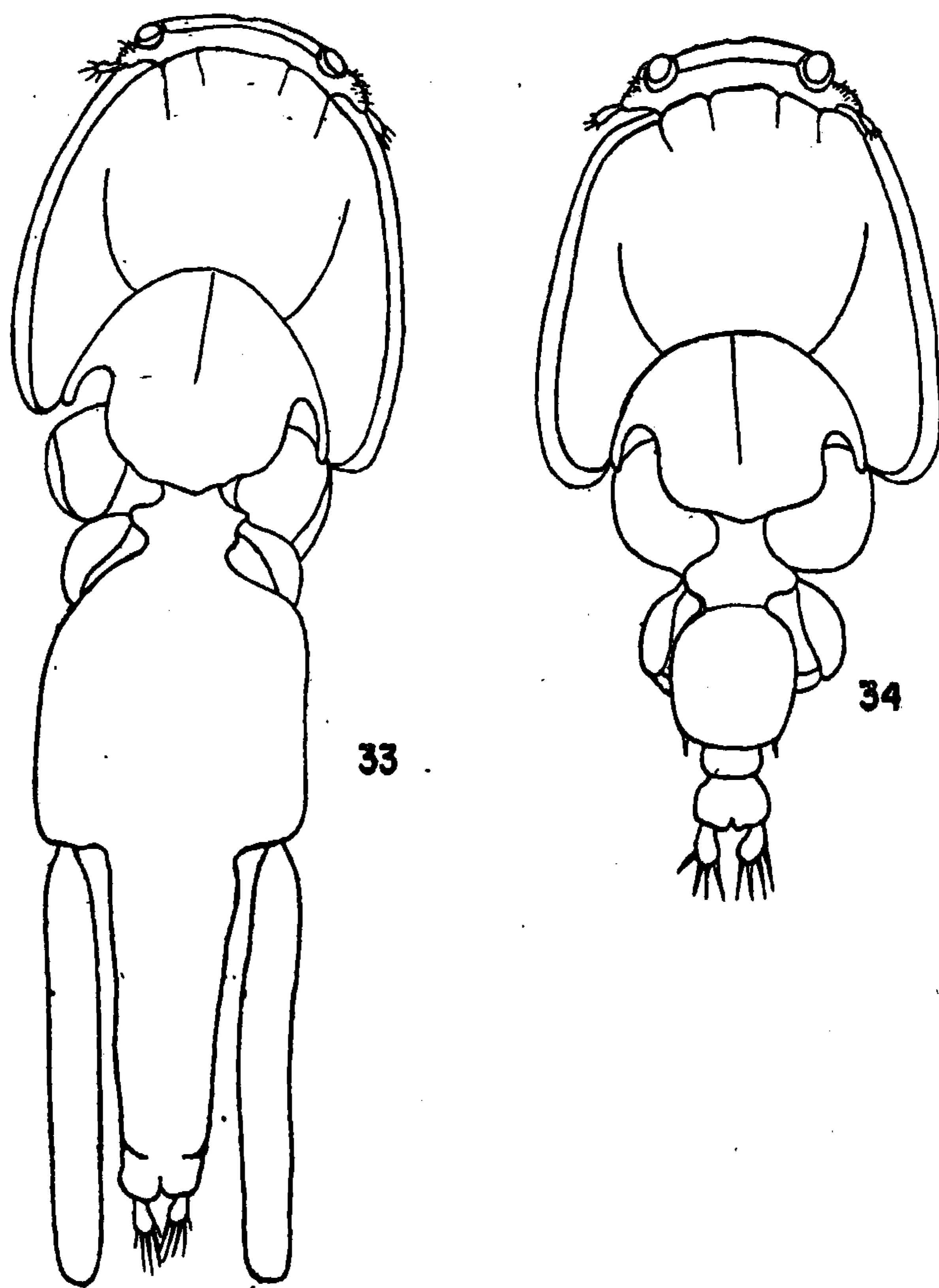
*Occurrence.* In the branchial cavity of *Rhabdosargus sarba* (Forsk.) off Colombo (Bassett-Smith).

*Distribution.* In the branchial cavity of *Rhabdosargus sarba* off Bundar Abbas, in the Persian Gulf (Bassett-Smith); on the gills of *Acanthopagrus berda* (Forsk.) off Madagascar (Heegaard, Barnard); on the inner surface of the operculum of *Trachinotus blochi* (Lacepede) off Vishingom, South India (Pillai).

*Female.* Cephalothorax about as long as wide, less than half the entire length; lunules spherical; median lobe about half the width of the cephalothorax, scarcely projecting beyond the posterior level of the lateral lobes. Free thoracic segment short. Genital segment flask-shaped, with short postero-lateral lobes, only a little shorter than the cephalothorax. Abdomen two-segmented, segments of nearly equal lengths. Total length 6 mm.

*Male.* Cephalothorax as in female, but nearly half the entire length. Genital segment elongated oval, with anterior and posterior annulations. Second maxilliped with a double crowned tubercle on inner border. Total length 2.2 mm.

(Not seen. Description according to other authors).

*Caligus cybii* Bassett-Smith*Caligus cybii* Bassett-Smith, 1898, p. 6, pl. 2, fig. 3.*Caligus brevisoris* (not Shen), Pillai, 1961, pp. 87-89, fig. 1.Figs. 33, 34. *Caligus cybii* Bassett-Smith. 33, female; 34, male.

**Occurrence.** In the branchial chamber of *Cybium commersoni* (Lacepède) bought in the Colombo market.

**Distribution.** In the branchial chamber of *Indocybium lineolatum* (Cuvier) off Bombay (Bassett-Smith); on the inner surface of the operculum of *Indocybium guttatum* (Bloch and Schneider) off Vishingom (Pillai).

**Female** (Fig. 33). Cephalothorax semi-elliptical, about as long as wide, much less than half the entire length; lunules not quite hemispherical; median lobe half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment short. Genital segment squarish, with rounded shoulders. Abdomen clearly longer than the genital segment, two-segmented; proximal segment stout and long, distal segment very short. Total length 5.5 mm.

**Male** (Fig. 34). Cephalothorax as in female but more than half the entire length. Genital segment nearly circular. Abdomen not quite as long as the genital segment, two-segmented, proximal segment narrower and shorter than the distal. Terminal claw of second antenna with two prongs. Total length 3.4 mm.

*Caligus arii* Bassett-Smith*Caligus arii* Bassett-Smith, 1898 a, pp. 82-83, pl. 4, fig. 1.

**Occurrence.** On the roof of the mouth cavity and in the gill chamber of *Arius acutirostris* off Trincomalee (Bassett-Smith).

**Distribution.** Not recorded elsewhere.

*Female.* Cephalothorax nearly circular, less than half the entire length; lunules spherical; median lobe less than half the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Genital segment flask-shaped; with well developed postero-lateral lobes. Abdomen long, of two segments, distal segment very short. Anal laminae reduced to short papillae. Total length 6 mm.. (Not seen. Description according to Bassett-Smith).

*Male.* Not known.

*Caligus longicaudus* Bassett-Smith

*Caligus longicaudus* Bassett-Smith 1898, pp. 8-9, pl. 4, figs. 1 & 2,

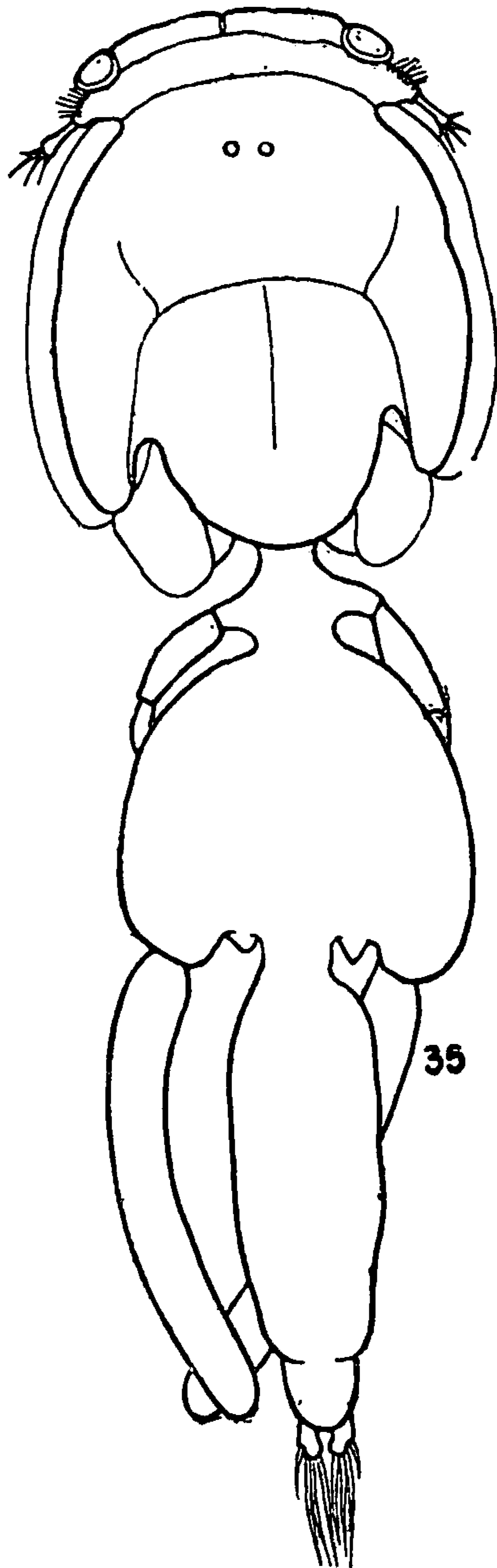


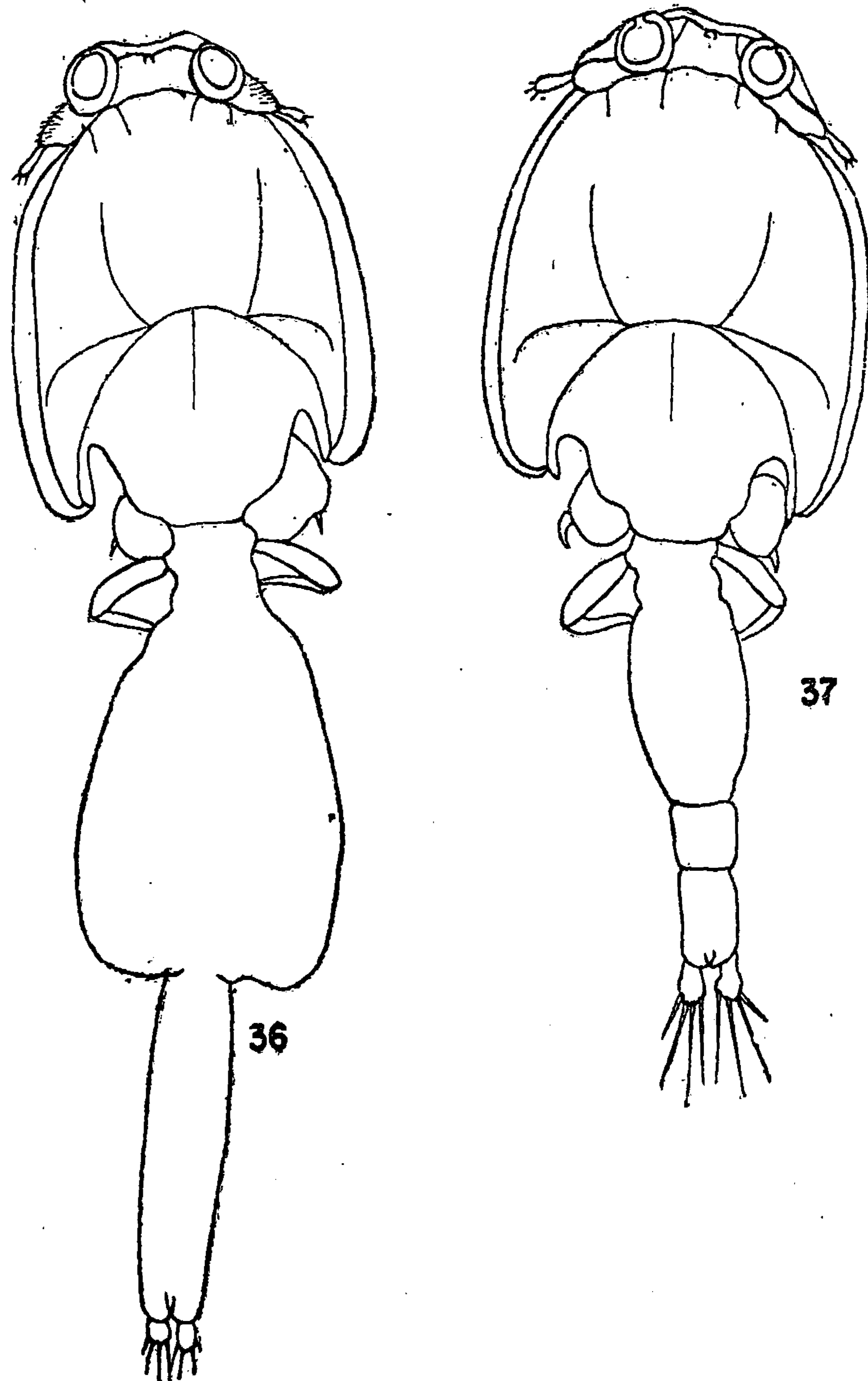
Fig. 35. *Caligus longicaudus* Bassett-Smith Female.

*Occurrence.* In the branchial cavity of *Chirocentrus dorab* (Forsk.) bought in the Colombo market.

*Distribution.* On *Trichiurus haumela* and *Chirocentrus dorab* off Bombay (Bassett-Smith)

*Female.* (Fig 35). Cephalothorax nearly circular, much less than half the entire length; lunules hemispherical; median lobe more than half the width of the cephalothorax, projecting slightly beyond the posterior level of the lateral lobes. Genital segment sac-like with short postero-lateral lobes. Abdomen almost as long as the cephalothorax, two-segmented, distal segment much shorter and narrower than the proximal segment. Total length 5.4 mm..

*Male.* Two abdominal segments more nearly equal (Bassett-Smith). (Male not seen).

*Caligus dakari* Van Beneden*Caligus dakari* Van Beneden, 1892, p. 243, pl. 5, figs. 1-4*Caligus arii* (not Bassett-Smith) Barnard, 1955, p. 248, fig. 10 a, bFigs. 36, 37. *Caligus dakari* Van Beneden. 36, female ; 37, male.

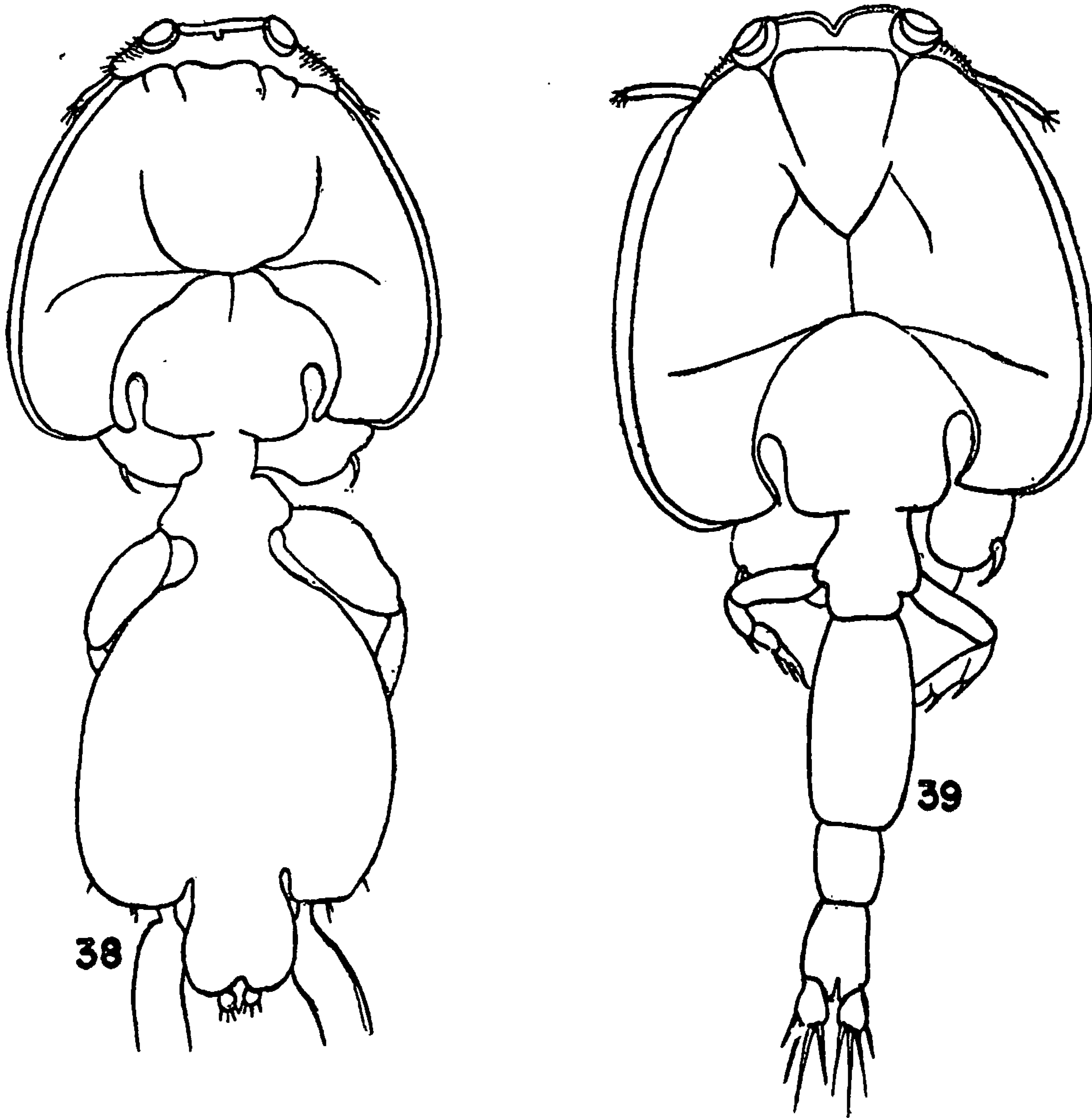
**Occurrence.** In the gill chamber of *Arius* sp. bought in the Colombo market.

**Distribution.** On *Arius dussumieri* off South Africa (Barnard).

**Female** (Fig. 36). Cephalothorax less than half the entire length ; lunules spherical ; median lobe more than half the width of the cephalothorax, projecting but little beyond the posterior level of the lateral lobes. Genital segment flask-shaped, with slightly developed postero-lateral lobes. Abdomen of a single, long, cylindrical segment, nearly as long as the genital segment. Total length 4.6. mm..

**Male** (Fig. 37). Cephalothorax as in female but half the entire length. An annular constriction between the free thoracic segment and the barrel-shaped genital segment. Abdomen nearly as long as the genital segment, two-segmented, proximal segment shorter than the distal. Total length 3.5 mm..



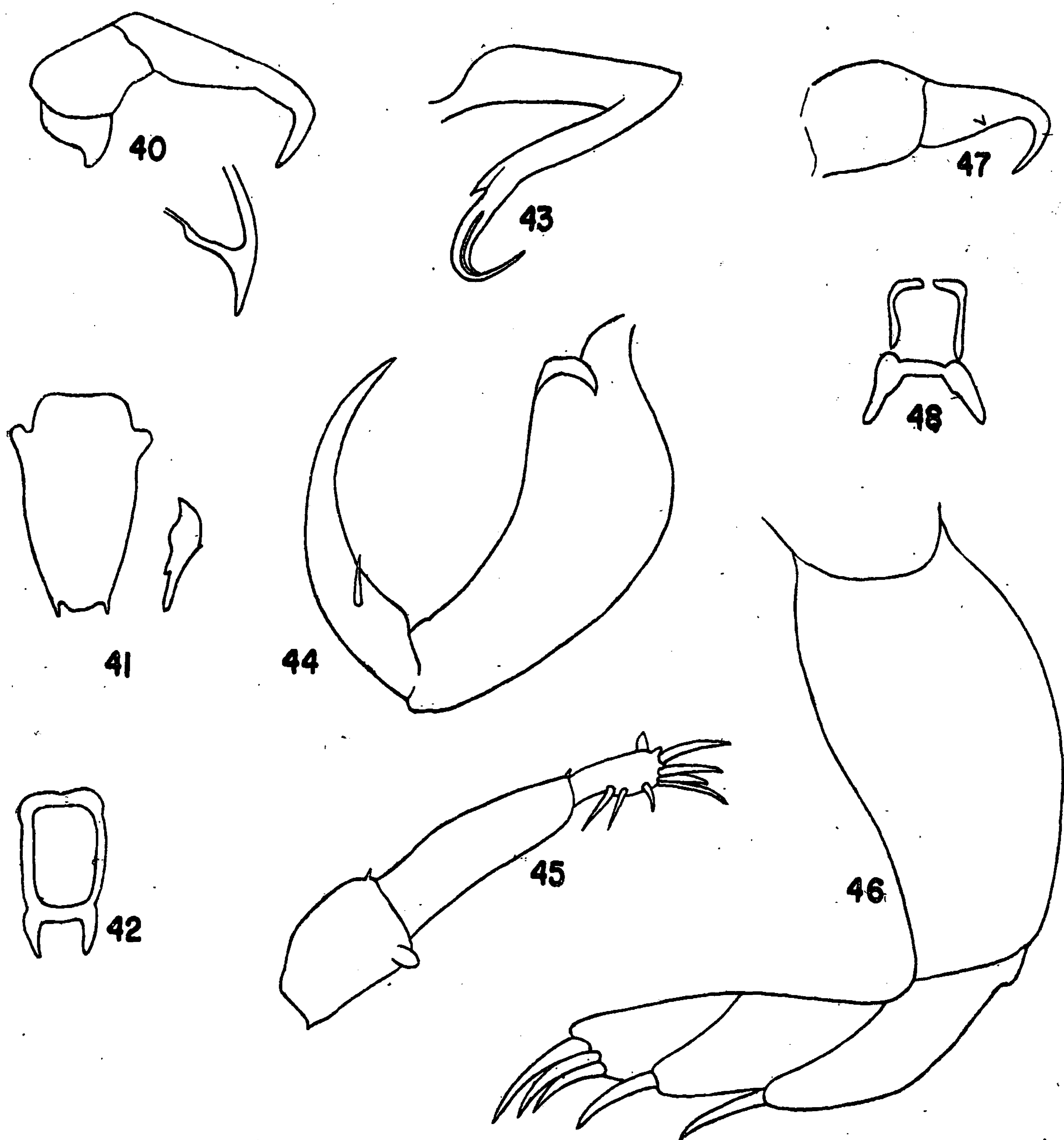
*Caligus platurus* n. sp.Figs. 38, 39. *Caligus platurus* n. sp.. 38, female ; 39, male.

**Occurrence.** In the branchial chamber of *Caranx melampygus* Cuvier and of *Caranx* sp. off Hikkaduwa. Numerous specimens were obtained of both sexes.

**Female** (Fig. 38). Cephalothorax semi-elliptical, narrowed in front, less than half the entire length ; lunules moderate ; median lobe about a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment narrow. Genital segment ovate, with short postero-lateral lobes. Abdomen of a single segment with convex lateral margins. Anal laminae small, each lamina with four small setae, three of which are close together on the inner side while the fourth seta is on the outer side, a little separated from the rest. Terminal hook of the second antenna long. Second maxilla carries a short inner branch. First maxilliped has an inner lobe and second maxilliped has a small spine on its terminal claw and a ridged groove on its basal joint. Sternal furca with large rectangular base and two very small rami. Basal joint of first leg with a vestigial endopodite. Fourth leg stout, four jointed, with the usual five spines. Total length 4 mm..

**Male** (Fig. 39). Cephalothorax as in female but almost half the entire length. Genital segment not wider than the free thoracic segment, barrel-shaped. Abdomen about as long as the genital segment, two-segmented, proximal segment a little shorter than the distal. Terminal hook of second antenna not as long as in female and carrying an accessory spine. Sternal furca with a squarish base and rami directed outwards more than in female. Other appendages as in female. Total length 3 mm..

**Remarks.** In respect of the genital segment and abdomen this new species resembles *Caligus minimus* Otto. In the latter the cephalothorax and anal laminae are quite different and the male too is not at all like that of the present species.



Figs. 40-48. *Caligus platurus* n. sp.. 40-46, female. 40, second antenna and first maxilla; 41, mouth cone and second maxilla; 42, sternal furca; 43, first maxilliped; 44, second maxilliped; 45, first leg; 46, fourth leg. 47-48, male. 47, second antenna; 48, sternal furca.

#### *Caligus curtus* Muller

*Caligus curtus*: Muller, 1785, p. 130, pl. 21, fig. 1; Wilson, 1905, pp. 578-582, pl. 10; Scott, T. and A. 1913, p. 45, pl. 24, figs. 1 and 2; Van Oorde-de Lint and Schuurmans Stekhoven, 1936, p. 128, fig. 89; Heegaard, 1945, p. 5.

*Caligus mulleri* Leach, 1816, p. 405, pl. 20

*Caligus bicuspidatus* Nordmann, 1832, p. 28

*Caligus diaphanus* (not Nordmann) Baird, 1850, p. 269, pl. 32, fig. 1

*Caligus aeglefini* Kroyer, 1863, p. 89, pl. 7, fig. 3 a-f

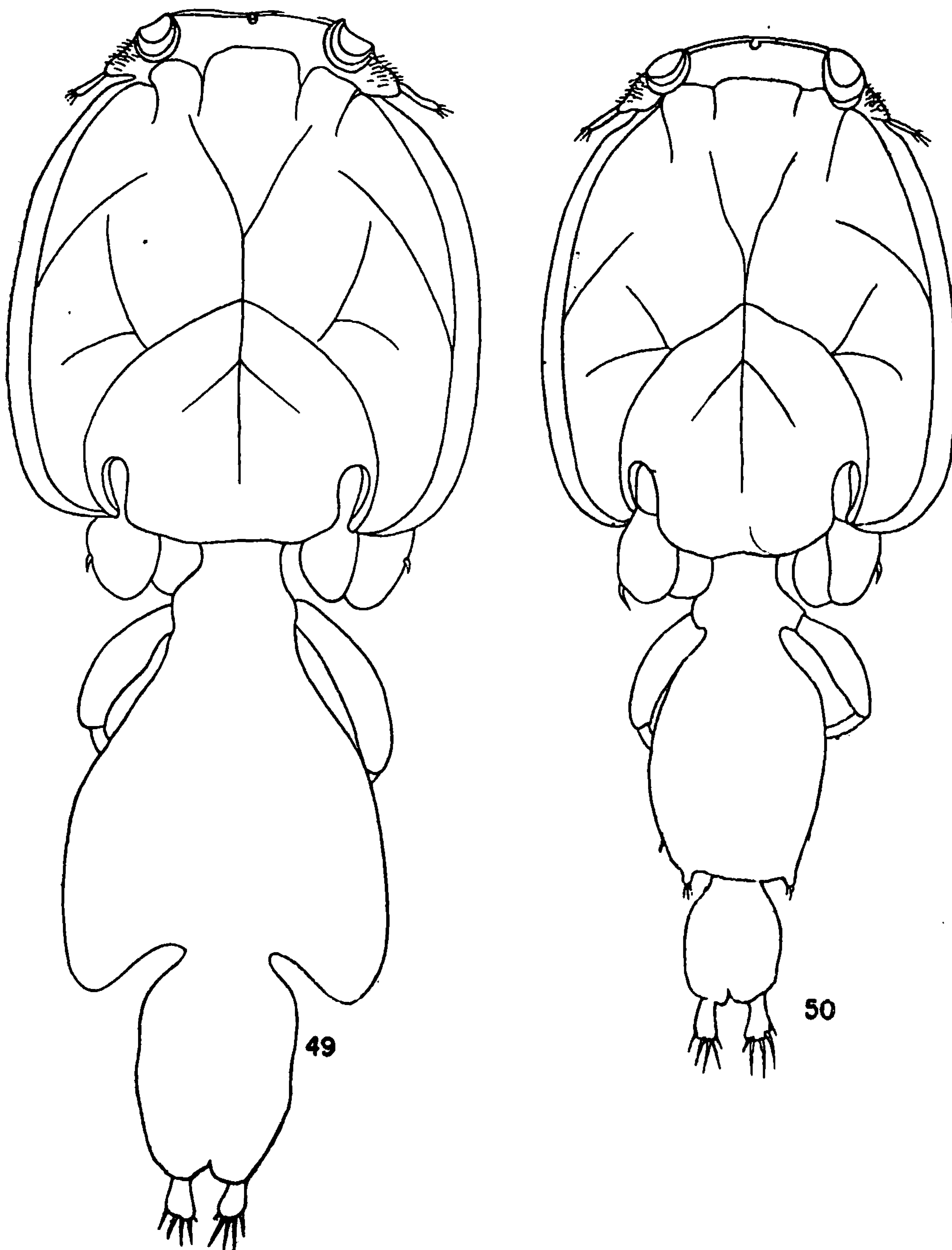
**Occurrence.** In the branchial chamber of *Pristipomoides typus* Bleeker bought in the Colombo market.

**Distribution.** On various host fish, especially gadoids, in the North Atlantic (Heegaard), round the British Isles (Scott, Baird), and off the east coast of North America (Wilson).

*Female* (Fig. 49). Cephalothorax semi-elliptical, longer than wide, a little less than half the entire length; lunules moderate; median lobe about half the width of the cephalothorax, projecting but little beyond the posterior level of the lateral lobes. Genital segment sac-shaped with postero-lateral lobes. Abdomen short, of a single segment, with convex lateral margins. Total length 5.5 mm..

*Male* (Fig. 50). Cephalothorax as in female but more than half the entire length. Genital segment barrel-shaped, fifth and sixth legs visible at its postero-ateral corners. Abdomen of a single segment, shorter than the genital segment, with convex lateral margins. Total length 4.7 mm..

*Remarks.* As is only to be expected, the specimens from these waters are markedly smaller than those described from colder waters.



Figs. 49-50. *Caligus curtus* Muller. 49, female; 50, male.

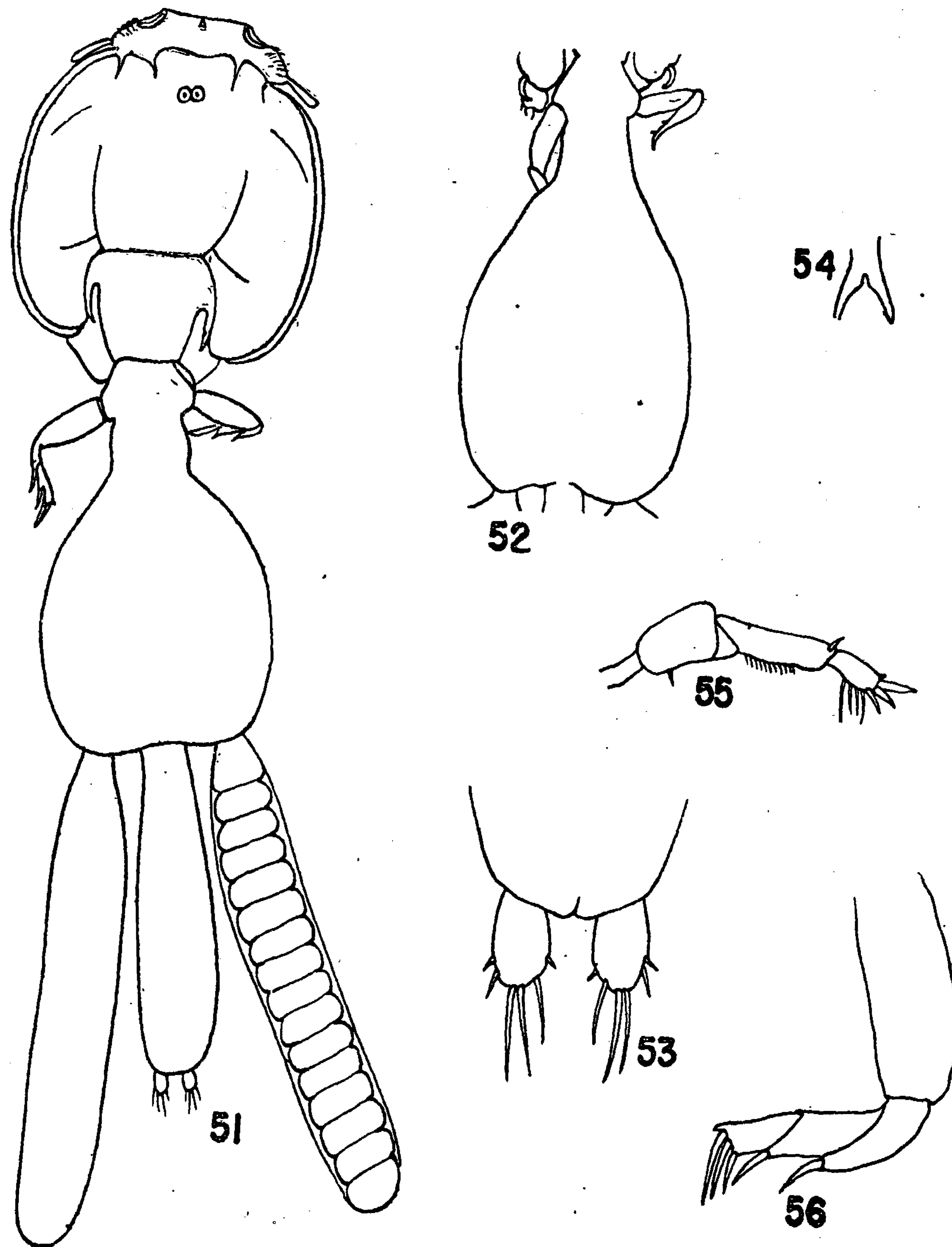
*Caligus clavatus* n. sp.

*Occurrence.* This new species is described from a collection of 10 mature females from the mouth cavity of *Sphyræns obtusata* Cuvier bought in the Cōlombo market.

*Female* (Figs. 51-56). Cephalothorax nearly circular, about a third in the entire length; lunules shallow; median lobe about one third the width of the cephalothorax, projecting slightly beyond the posterior margin of the lateral lobes. Free thoracic segment about as wide as the median lobe of the cephalothorax, not clearly marked off from the genital segment. Latter sac-like; in some specimens (fig. 52) the neck of the sac is longer than in others. Abdomen of a single club-shaped segment, about as long as the genital segment. Anal laminae small (fig. 53), each lamina furnished with three long terminal setae, a shorter lateral seta on outer margin, and a pair of minute setae on either side. Sternal furca small, with a pair of tapering divergent rami on a narrow base (fig. 54). Fourth leg four jointed with the usual five spines on the last three joints. Total length from 3.4 to 4 mm..

*Male*. Not found

*Remarks*. This new species, named from its club-shaped abdomen, has some superficial resemblance to *Caligus dussumieri* Rangnekar (1957), due to the shape of the genital segment and the long abdomen of a single segment. The two species, however, are otherwise clearly different.



Figs. 51-56. *Caligus clavatus* n. sp.. Female. 51, entire animale; 52, genital segment; 53, anal laminae; 54, sternal furca; 55, first leg; 56, fourth leg.

*Caligus benedeni* Bassett-Smith

*Caligus (Sciaenophilus) benedeni* Bassett-Smith, 1898, pp. 9-10. pl. 4, fig. 3

*Caligus benedeni* Thompson and Scott, 1903, p. 294; Capart, 1941, p. 172

*Sciaenophilus benedeni* Bere, 1936, p. 587

*Occurrence.* In the gill chamber of *Johnius diacanthus* (Lacepede) from Palk Strait (Thompson and Scott).

*Distribution.* On the gills of *Johnius diacanthus* off Bombay (Bassett-Smith) ; on *Larimus fasciatus* in the Gulf of Mexico (Bere) ; on *Johnius hololepidotus* and on *J. angolensis* off West Africa (Capart).

*Female.* Cephalothorax nearly circular ; lunules very small. Free thoracic segment short and narrow. Genital segment longer than wide, larger than the cephalothorax. Abdomen long, of a single segment, constricted anteriorly. Total length 6mm..

*Male.* Not known.

(Not seen ; included on the authority of Thompson and Scott. Description from Bassett-Smith).

*Caligus longicervicis* Gnanamuthu

*Caligus longicervicis* Gnanamuthu, 1950, pp. 115-116, pl. 3



Fig. 57 *Caligus longicervicis* Gnanamuthu. Female.

*Occurrence.* In the branchial chamber of *Trichiurus savalla* Cuvier off Hikkaduwa

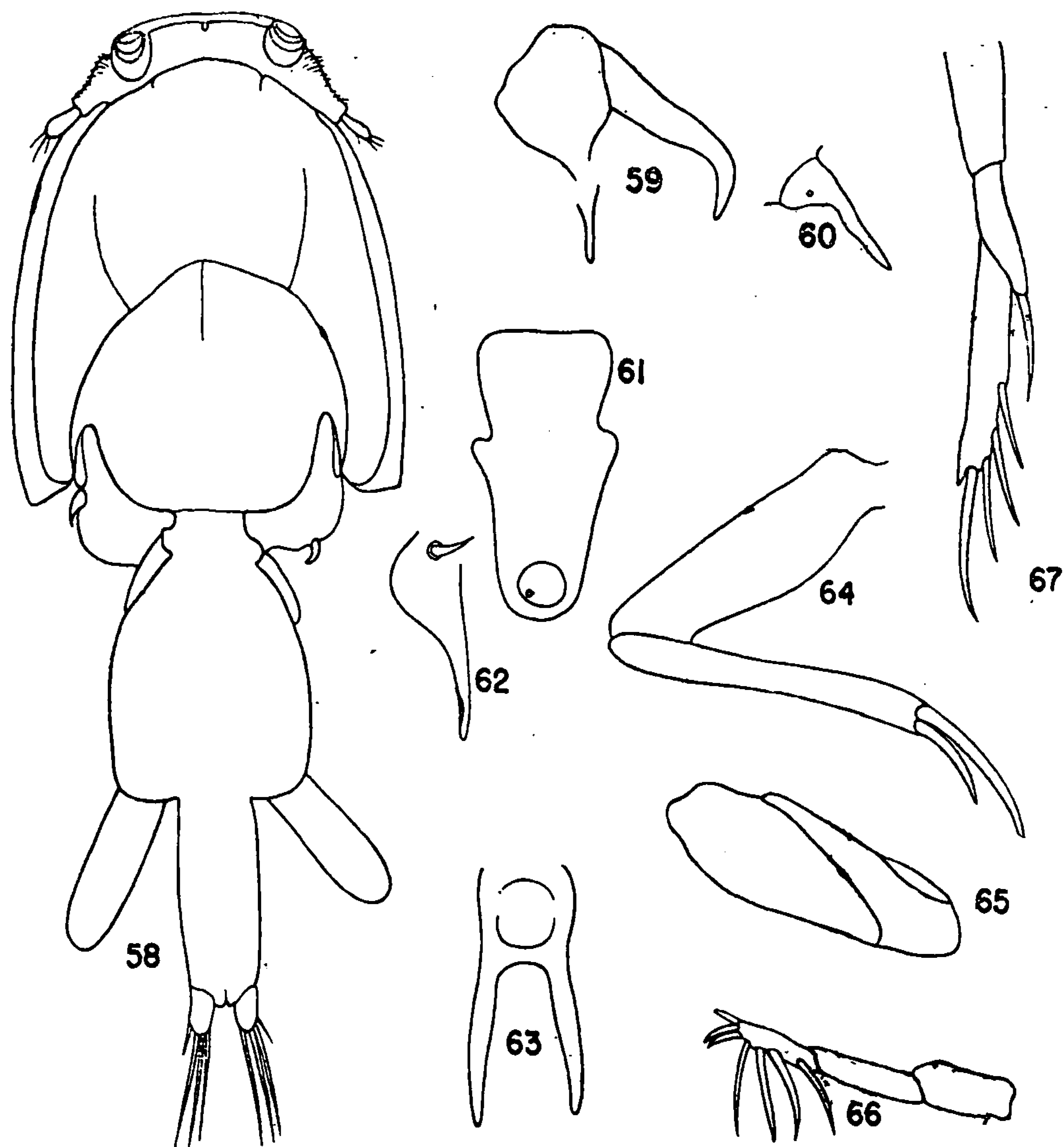
*Distribution.* In the mouth and branchial cavities of *Trichiurus kaumela* (Forsk.) off Madras (Gnanamuthu).

*Female* (Fig. 57). Cephalothorax about as long as broad, much less than half the entire length ; lunules moderate ; median lobe nearly half the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment comparatively long. Genital segment flask-shaped, nearly as long as the cephalothorax. Abdomen of a single long segment. Total length 4.1mm..

*Male.* Cephalothorax as in female, not quite half the entire length. Free thoracic segment long, with annular constrictions anterior and posterior to the bases of the fourth legs. Genital segment oval, only a little longer than the preceding segment. Abdomen of two, nearly equal segments. Total length 2.6mm.. (Male not seen; description according to Gnanamuthu).

*Caligus acutus* new name

*Caligus affinis* (not Heller) Kurian, 1961, pp. 71-72, figs. 37-45.



Figs. 58-67. *Caligus acutus* (Kurian). Female. 58, entire animal; 59, second antenna; 60, first maxillia; 61, mouth cone; 62, second maxilla; 63, sternal furca; 64, first maxilliped; 65, second maxilliped; 66, first leg; 67, fourth leg.

*Occurrence.* On the outer body surface of a flatfish and in the gill chamber of *Gasterin lineatus* (Linn.) bought in the Colombo market.

*Distribution.* On the outer body surface of *Eythynnus affinis* (Cantor) off Kerala, S. India (Kurian)

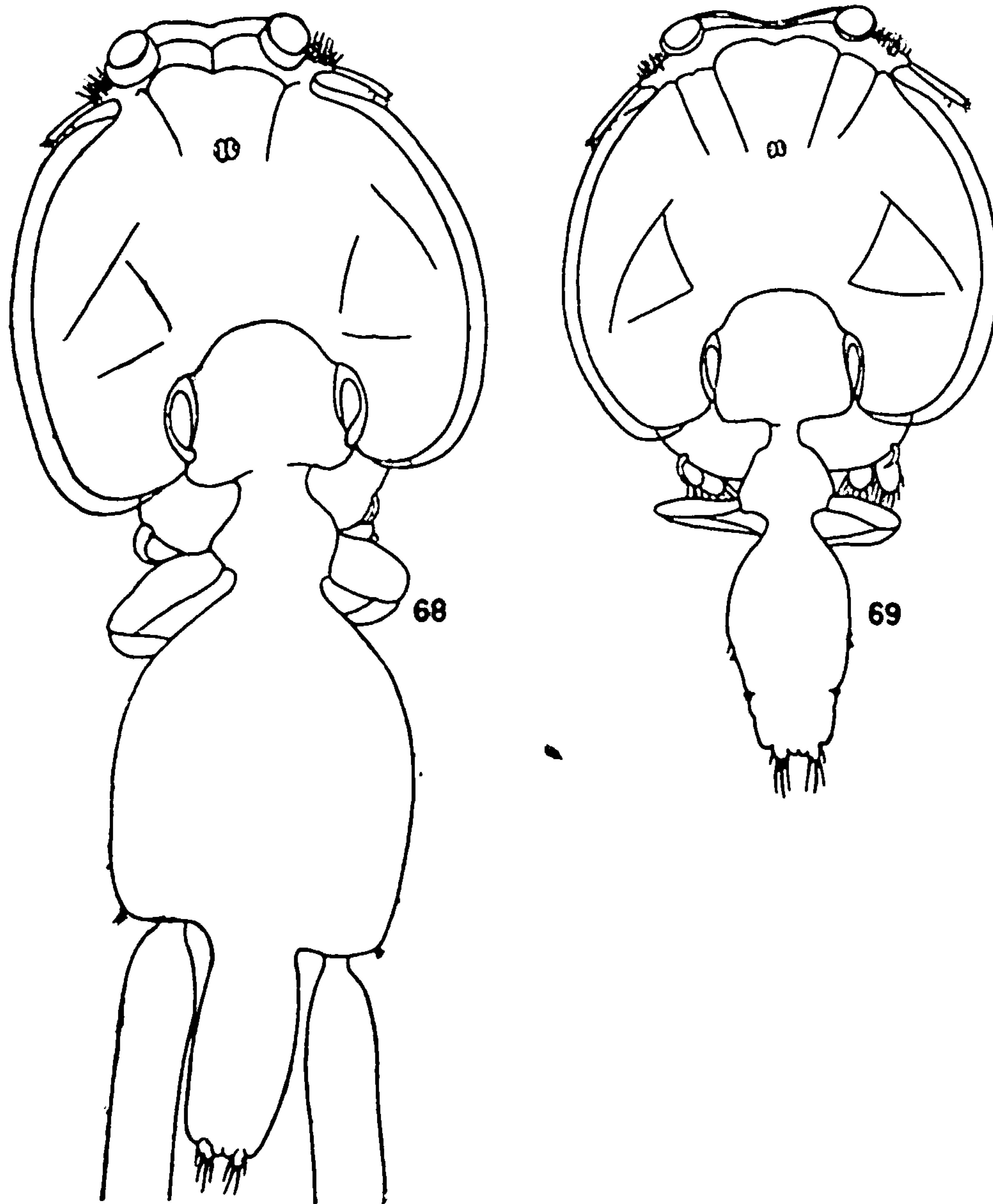
*Female* (Figs. 58-67). Cephalothorax semi-elliptical, almost half the entire length; lunules moderate; median lobe more than half the width of the cephalothorax, projecting but little beyond the posterior level of the lateral lobes. Free thoracic segment short, not clearly separated from the genital segment. Latter flask-shaped. Abdomen of a single segment, as long as the genital segment. Anal laminae longer than broad, tipped with three long terminal setae and with a shorter lateral seta. Total length 4.1 mm..

*Male.* Not known.

*Remarks.* A characteristic feature of this species is the long, pointed nature of the second antennary hooks, the maxillary hooks, the furcal rami and the spines of the fourth leg. On the other hand, the egg strings are unusually short. The proposed new specific name *acutus*, signifying the pointed nature of the above mentioned appendages, replaces the specific name *affinis*, under which it was originally described by Kurian, as this name is preoccupied by *C. affinis* Heller, 1866.

*Caligus tenax* Heller

*Caligus tenax* Heller, 1865, pp. 172-173, pl. 15, fig. 3; Bassett-Smith, 1898b, pp. 363-364, pl. 11, fig. 3; Wilson, 1913, p. 208, pl. 26, pl. 29, figs. 99-101; Kirtisinghe, 1937, pp. 437-439, figs. 15-29



Figs. 68, 69. *Caligus tenax* Heller. 68, female; 69, male.

**Occurrence.** On the gills of several species of carangids off Ceylon (Bassett-Smith, Kirtisinghe).

**Distribution.** On the gills of *Caranx hippos* off Brazil (Heller); on the gills of *Caranx hippos* and *C. crysos* off the West Indies (Wilson).

**Female** (Fig. 68). Cephalothorax nearly circular, less than half the entire length; lunules moderate; median lobe about a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment about as wide as long. Genital segment acorn-shaped, about two thirds as long as the cephalothorax. Abdomen of a single segment, more than half as long as the genital segment. Total length 4.5 mm..

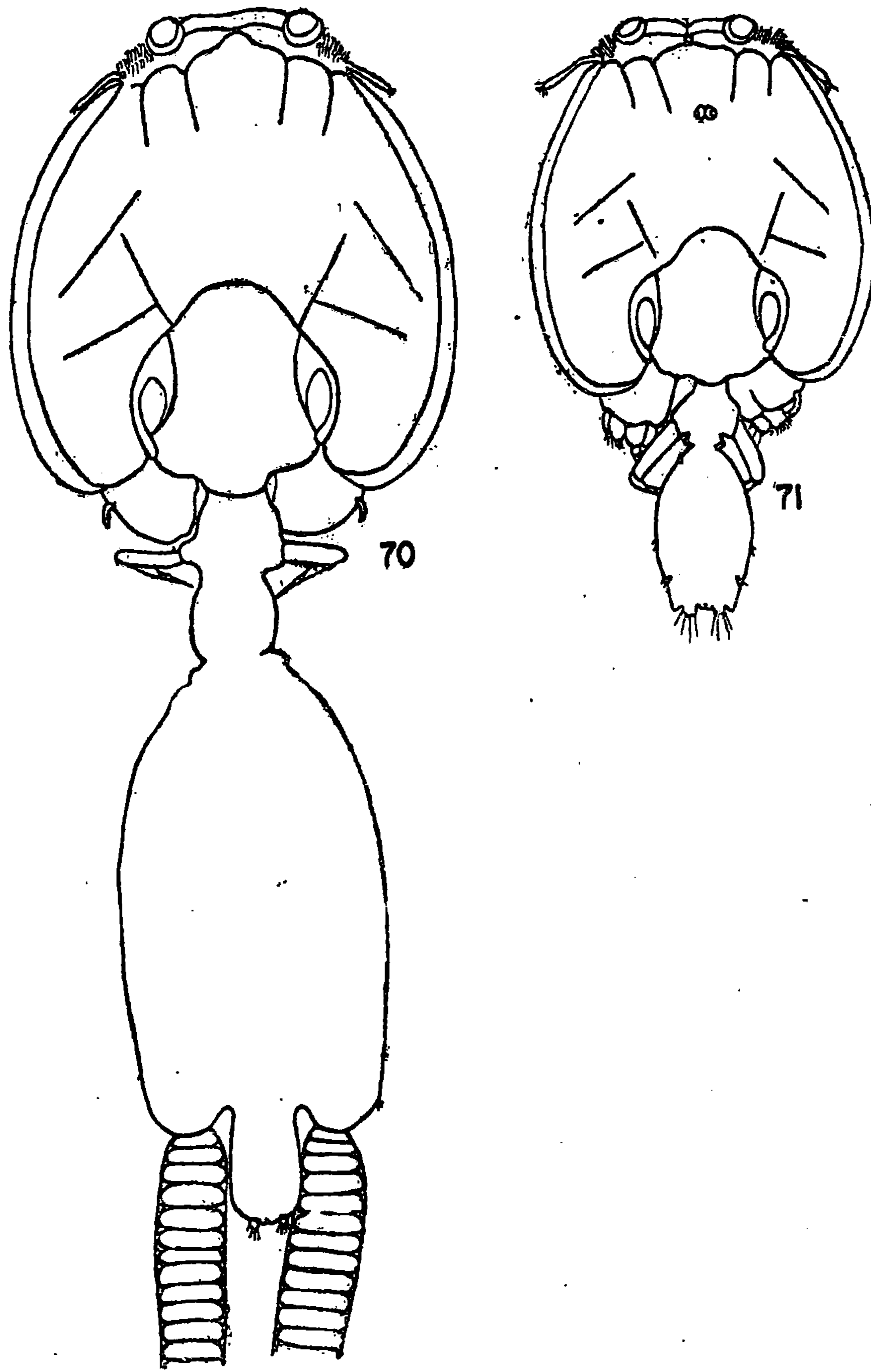
**Male** (Fig. 69). Cephalothorax as in the female but just over half the total length. Free thoracic segment narrowed in front. Genital segment flask-shaped, separated by a pair of lateral notches from the short, single-segmented abdomen. Total length 3 mm..

*Caligus confusus* (Wilson), Pillai.

*Caligus constrictus* (not Heller) Wilson, 1937a, p. 25, pl. 3, figs. 3 a-i: (not Heller) Shiino, 1959a, p. 285, figs. 9-10.

*Caligus alalongae* (not Kroyer) Kirtisinghe, 1937, pp. 435-437, figs. 1-4; (not Kroyer) Yamaguti, 1954, pp. 379-381, pl. 2, fig. 19, pl. 3, fig. 21.

*Caligus confusus* Pillai, 1961, p. 104, fig. 10.



Figs. 70, 71. *Caligus confusus* (Wilson). 70, female; 71, male.

**Occurrence.** In the branchial chamber of several species of carangids off Negombo, Colombo and Hikkaduwa.

**Distribution.** In the mouth cavity of *Caranx hippos*, *Elagatis bipinnulatus* and *Coryphaena hippurus* off Panama and the Galapagos (Wilson); on the gills of *Elagatis* sp. and *Caranx* sp. off Macassar., Celebes (Yamaguti); on *Seriola* sp. from the East Pacific (Shiino); on the gill arches of *Caranx sanson* (Forsk.) off Trivandrum, South India (Pillai).

**Female** (Fig. 70). Cephalothorax nearly circular, less than half the entire length; lunules moderate; median lobe about a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment narrow, often with one or two annular constrictions. Genital segment nearly as long as the cephalothorax, flask-shaped or more rectangular with squarish shoulders. Abdomen of a single segment, much shorter than the genital segment. Anal laminae minute. Total length 4.5 mm..



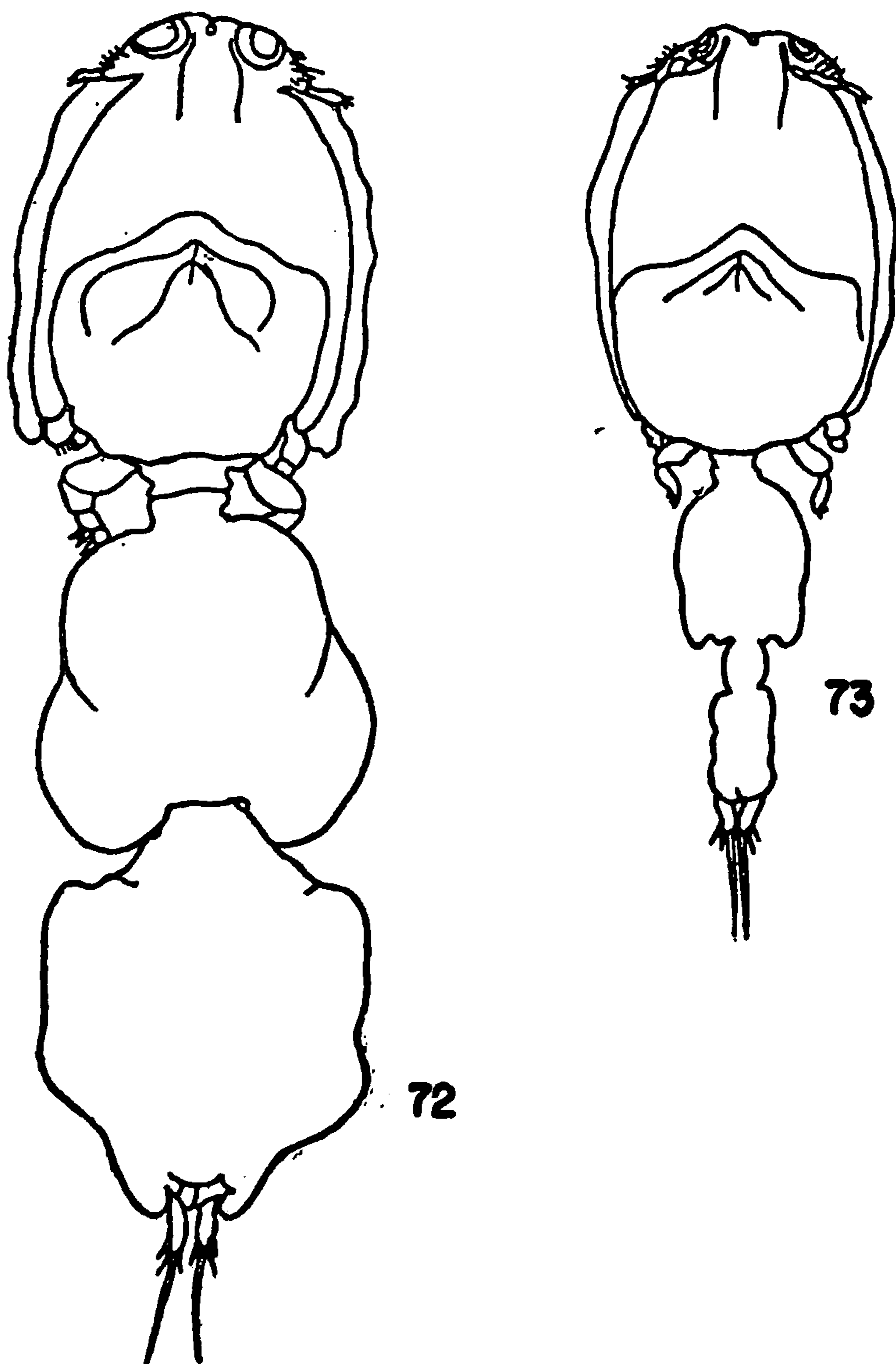
*Male* (Fig 71). Cephalothorax as in female but more than half the entire length. Free thoracic segment short with an annular constriction behind the base of the fourth legs. Genital segment flask-shaped. Abdomen of a single segment only slightly narrower than the genital segment. Total length 2.3 mm..

*PARAPETALUS* Steenstrup & Lutken

*Parapetalus hirsutus* (Bassett-Smith)

*Caligus hirsutus* Bassett-Smith, 1898, pp. 6-7, pl. 3, figs. 1 and 2; Shen 1957, pp. 373-374, pl. 8.

*Parapetalus hirsutus* Wilson, 1912, pp. 239-240, pl. 33, figs. 28-35; Kirtisinghe, 1950, p. 77; figs. 1-4; Pillai, 1962, pp. 288-290, fig. 1.



Figs. 72, 73. *Parapetalus hirsutus* Steenstrup and Lutken. 72, female; 73, male.

*Occurrence.* On the inner surface of the operculum of *Eleutheronema tetradactylum* (Shaw) bought in the Colombo market.

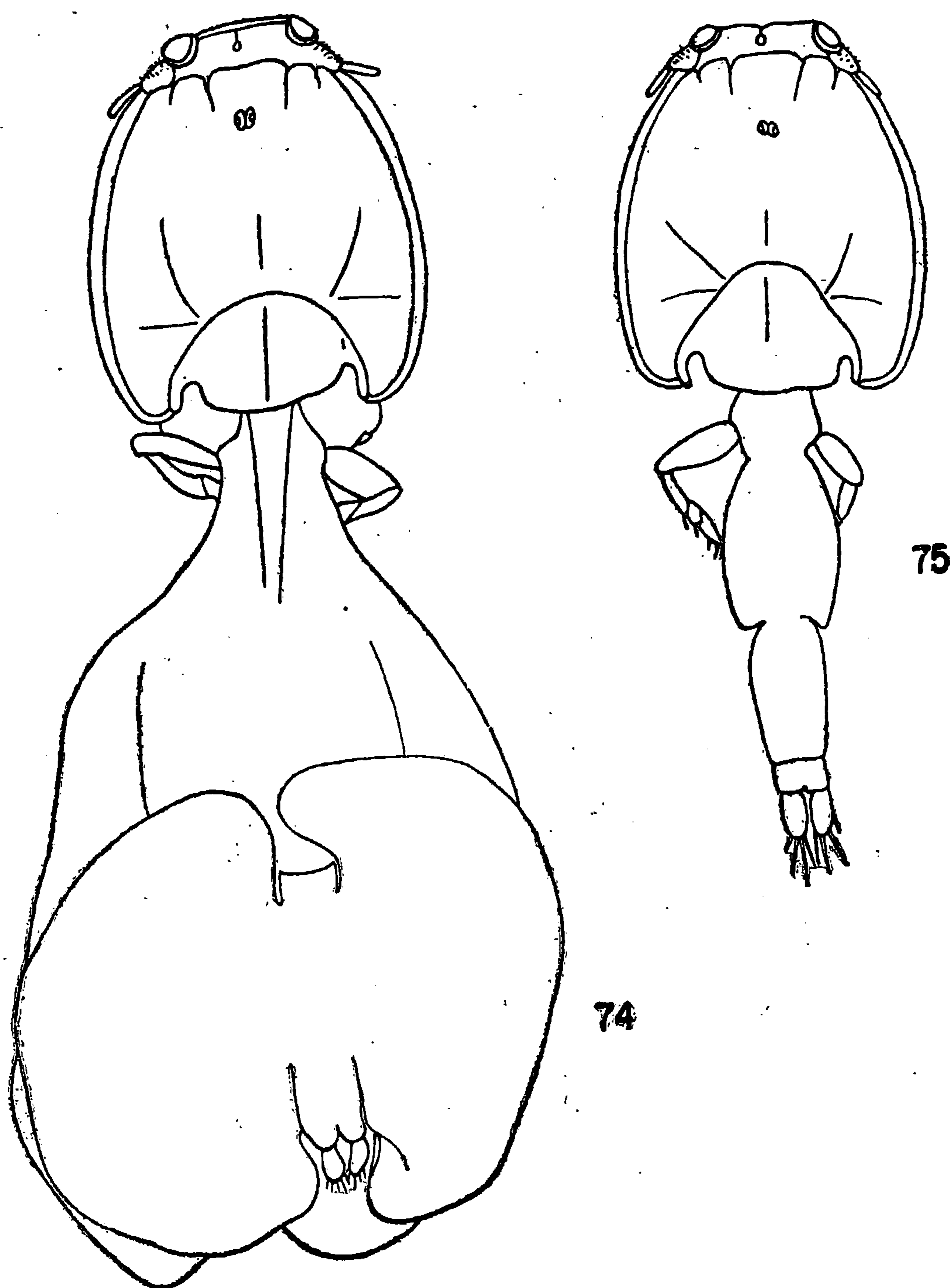
*Distribution.* On *Eleutheronema tetradactylum* off Batavia (Wilson), off China (Shen), of Bombay (Bassett-Smith); on *Polynemus plebius* off Trivandrum (Pillai).

*Female.* (Fig. 72). Cephalothorax longer than wide less than half the entire length; lunules moderate; median lobe more than half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Genital segment nearly circular, dorsally convex, posterolaterally produced into rounded lobes which overlap the anterior end of the abdomen. Abdomen indistinctly of two segments, the longer distal segment much widened until it is an elongated oval. Anal laminae longer than wide. Total length 6 mm..

*Male* (Fig. 73). Cephalothorax as in female but about half the entire length. Genital segment flask-shaped. Abdomen two segmented, proximal segment shorter than the distal. Total length 4 mm..

*Parapetalus occidentalis* Wilson

*Parapetalus occidentalis* Wilson, 1908, p. 606, p 1. 53; Causey 1955, p. 6; Pillai, 1962, p. 293, fig. 3.



Figs. 74, 75. *Parapetalus occidentalis* Wilson. 74, female; 75, male.

*Occurrence.* On the gills of *Rachycentron canadus* (Linn.) bought in the Colombo market.

*Distribution.* On *Rachycentron canadus* off Trivandrum and on *Johnius* sp. off Vishingom (Pillai); on *Johnius* spp. off North Carolina and Louisiana (Wilson, Causey).

*Female* (Fig. 74). Cephalothorax semi-elliptical, longer than wide, about a third of the entire length; lunules moderate; median lobe about half the width of the cephalothorax not projecting beyond the posterior level of the lateral lobes. Fourth thoracic segment not completely marked off from the genital segment. Genital segment narrow in front, broad behind, postero-laterally produced into wing-like expansions which extend back beyond the hind end of the body. Abdomen of two segments, proximal segment the longer and produced laterally into inflated expansions lying dorsal to the wings of the genital segment but not extending quite as far back as the former. Anal laminae oval. Total length 6 mm..

*Male* (Fig 75). Cephalothorax as in female but less than half the entire length. Genital segment flask-shaped. Abdomen a little longer than genital segment, two-segmented, proximal segment much longer than the distal. Total length 4mm..

### MIDIAS Wilson

#### *Midias lobodes* Wilson

*Midias lobodes* Wilson, 1911, pp. 626-628, pl. 65, and 1913, p. 225.; Causey 1953, p. 11; Shiino, 1958, pp. 98-105, figs. 1-3.

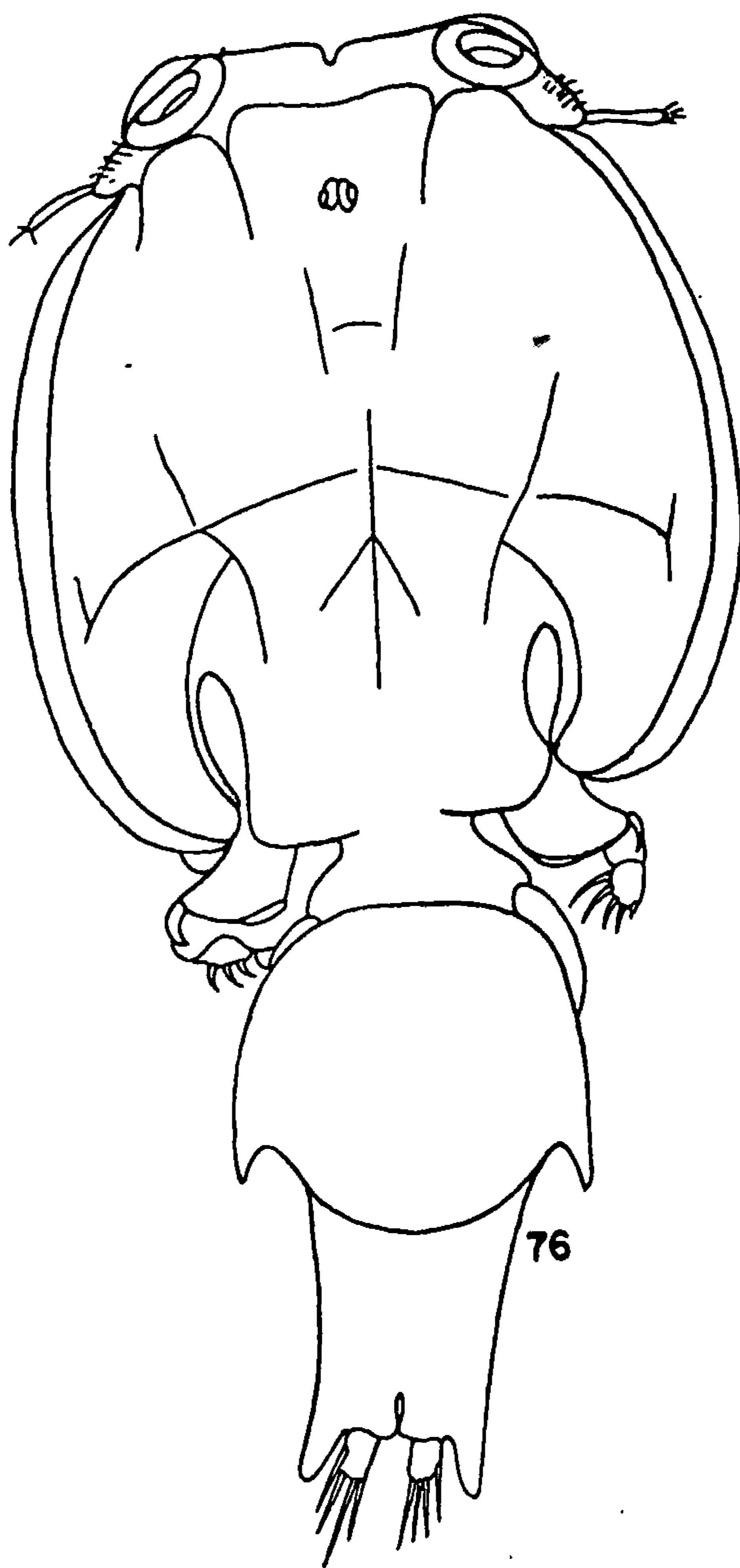


Fig. 76. *Midias lobodes* Wilson. Male.

*Occurrence.* On the outer surface of the body of *Sphyraena* sp. off Hikkaduwa.

*Distribution.* On the outer surface of the body of *Sphyraena barracuda* in the Indian Ocean (Shiino), off the Dry Tortugas, Florida and Jamaica (Wilson) and off Texas (Causey).

*Female.* Cephalothorax nearly circular, much less than half the entire length; Lunules moderate; median lobe about half the width of the cephalothorax not projecting beyond the posterior level of the lateral lobes. Free thoracic segment nearly as wide as the median lobe of the cephalothorax. Genital segment trapezoidal, narrow in front, about two-thirds as long as the cephalothorax. Abdomen two-segmented, only slightly shorter than the genital segment, proximal segment longer than the distal, laterally expanded into dorsally curving lobes; distal segment squarish with postero-lateral processes covered with tiny tubercles. Anal laminae as long as the postero-lateral processes of abdomen, each lamina with four plumose setae. Total length 10 mm.. (Female not seen; description from Shiino).

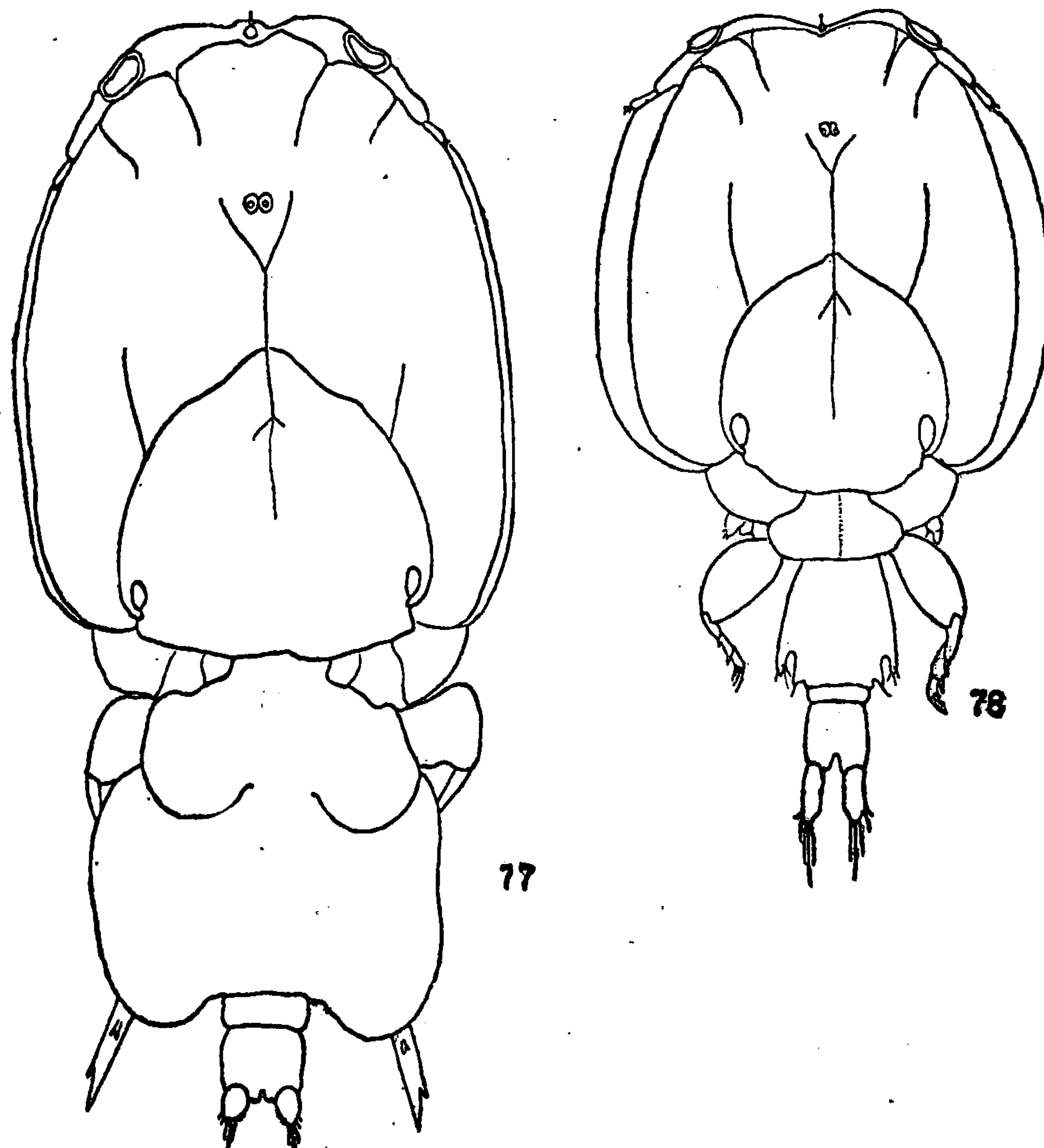
*Male* (Fig. 76). Cephalothorax as in female but little more than half the entire length. Genital segment with convex lateral margins produced postero-laterally into hook-like processes. Abdomen of a single segment with postero-lateral processes as in female. Total length 6.2 mm..

*Remarks.* *Caligus cornutus* Heegaard (1962) from the outer surface of the body of *Sphyræna jello* (?) in Australian waters is clearly a *Midias* sp. which, but for differences in the shape of the sternal furca and first maxilla as figured by Heegaard, might well be a male of *Midias lobodes* Wilson.

### TUXOPHORUS Wilson

#### *Tuxophorus wilsoni* Kirtisinghe

*Tuxophorus wilsoni* Kirtisinghe, 1937, pp. 445-448, figs. 74-78; Pillai, 1961, pp. 122-123, fig. 20.



Figs. 77, 78. *Tuxophorus wilsoni* Kirtisinghe. 77, female; 78, male.

*Occurrence.* On the outer surface of the body of *Chorinemus* sp. off Hikkaduwa.

*Distribution.* On the outer surface of the body of *Chorinemus lysan* off Trivandrum (Pillai).

*Female* (Fig. 77). Cephalothorax semi-elliptical, longer than wide, more than half the entire length; lunules moderate; median lobe about half the width of the cephalothorax and projecting but little beyond the posterior level of the lateral lobes. Dorsal plates on free thoracic segment overlapping the anterior part of genital segment. Latter quadrangular, wider than long with rounded postero-lateral lobes. Abdomen short of two-segments, distal segment the longer. Fifth leg a strong spine directed obliquely backwards. Total length 4 mm..

*Male* (Fig. 78). Cephalothorax as in female but more than half the entire length. Free thoracic segment with faintly separated dorsal plates. Genital segment trapezoidal, narrower anteriorly, fifth and sixth legs visible at its postero-lateral corners. Total length 3 mm..

*Tuxophorus cybii* Nunes-Ruivo and Fourmanoir

*Tuxophorus cybii* Nunes-Ruivo and Fourmanoir, 1956, pp. 76-78, fig.

*Tuxophorus solandri* Kurian, 1961, pp. 72-75, figs. 25-36.

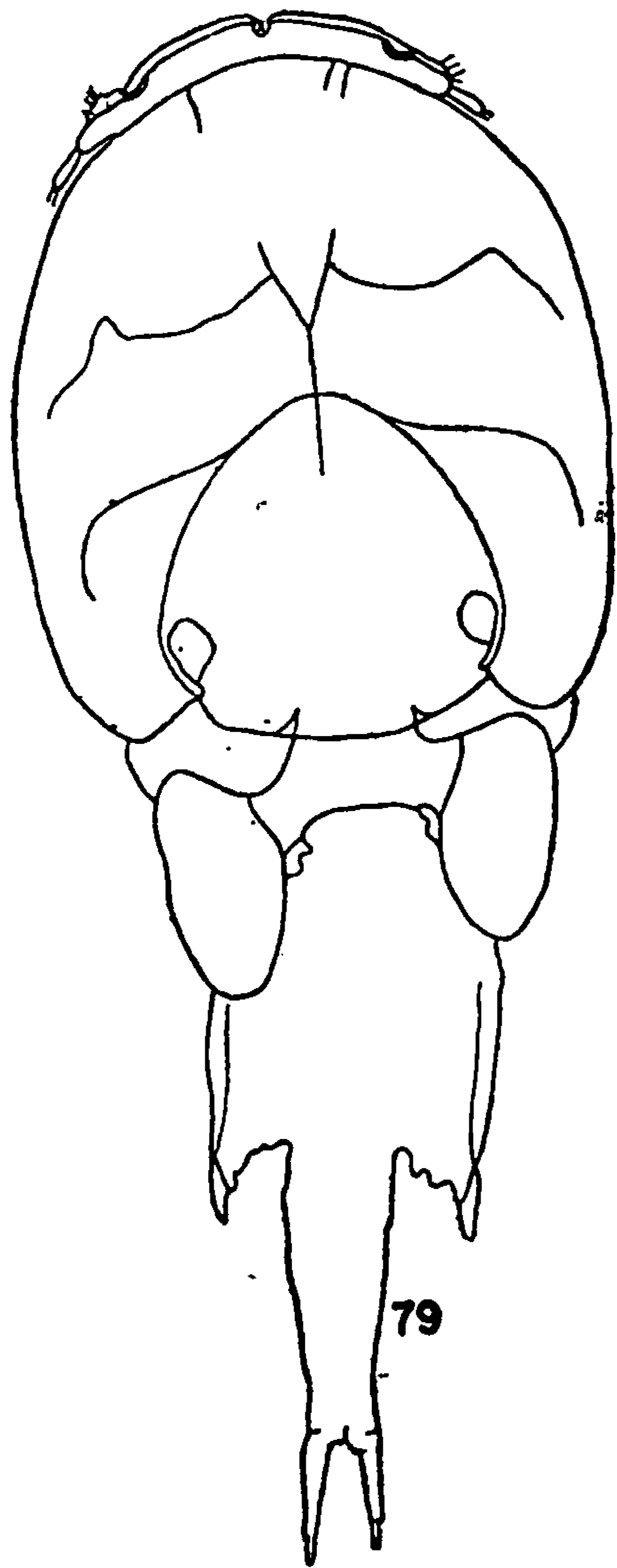


Fig. 79. *Tuxophorus cybii* Nunes-Ruivo and Fourmanoir. Female.

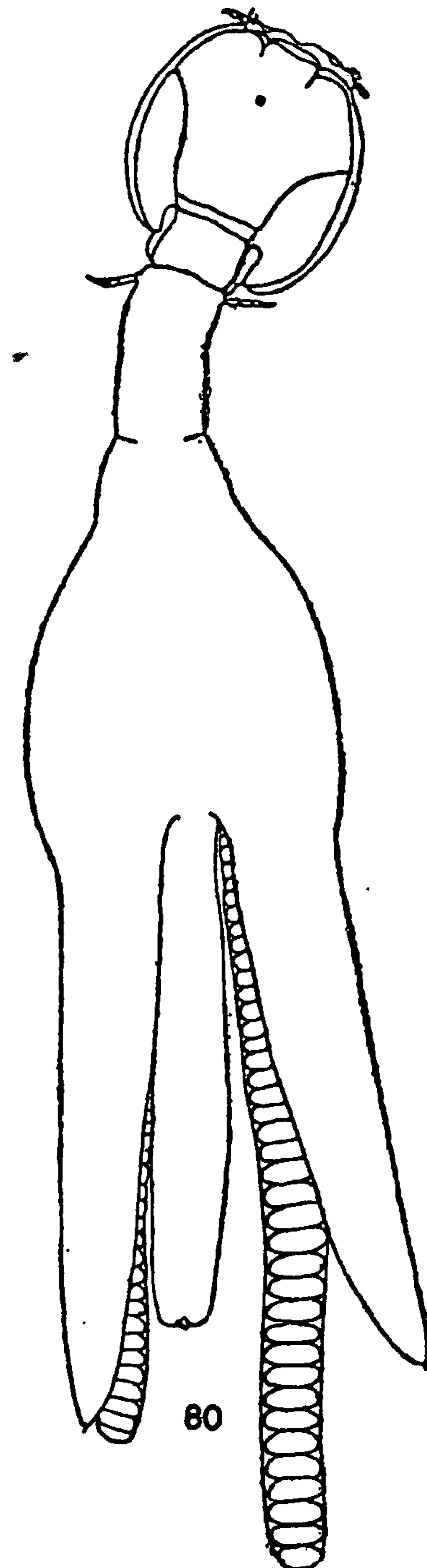


Fig. 80. *Caligodes laciniatus* (Kroyer). Female.

*Occurrence.* On the outer surface of the body of *Cybium commersoni* (Lacepede) off Hikkaduwa.

*Distribution.* On the gills of *Cybium commersoni* off Madagascar (Nunes-Ruivo and Fourmanoir); on the surface of the body of *Acanthocybium solandri* off Kerala, India (Kurian).

*Female* (Fig. 79). Cephalothorax semi-elliptical, longer than wide, a little less than half the entire length; lunules shallow; median lobe about half the width of the cephalothorax, scarcely projecting beyond the posterior level of the lateral lobes. Dorsal plates on free thorax segment longer than wide, their posterior ends overlapping the shoulders of the genital segment. Latter flask-shaped, about as long as wide with stout spines at the postero-lateral corners. Abdomen of a single long segment, narrowing posteriorly. Anal rami in the form of stout processes with terminal spines. Total length 8.5 mm..

*Male.* Not known.

### CALIGODES Heller

#### *Caligodes laciniatus* (Kroyer)

*Sciaenophilus laciniatus* Kroyer, 1863, p. 153, pl. 8, fig. 3.

*Caligodes Laciniatus* Heller, 1865, 180; Kirtisinghe, 1937, pp. 439-441, figs. 30-40; Capart, 1963, p. 654; Rangnekar, 1959, pp. 49-51, fig. 3; Pillai, 1961, p. 114, fig. 15.

*Occurrence.* In the mouth cavity of *Tylosurus strongylurus* (van Hasselt) and of *T. leiurus* (Bleeker) off Hikkaduwa.

*Distribution.* On *Tylosurus crocodylus* from West Africa (Capart); on *T. contrainii* off Italy (Brian); on *Belone* sp. in the Indian Ocean (Kroyer, Heller); on *T. strongylurus* off Bombay (Rangnekar); on *T. crocodylus* and *Ablennes hians* off South India (Pillai).

*Female* (Fig. 80). Cephalothorax circular and very small in comparison to the rest of the animal; lunules shallow. Fourth thoracic segment passing imperceptibly into the genital segment which is sac-like, narrow in front, becoming much swollen behind and produced at its posterior corners into laminate processes, each process tipped with a spine. Abdomen cylindrical, of one segment as long, more or less, as the processes of the genital segment. Anal laminae minute. Total length 7.7 mm..

*Male.* Not known.

### PARECHETUS Pillai

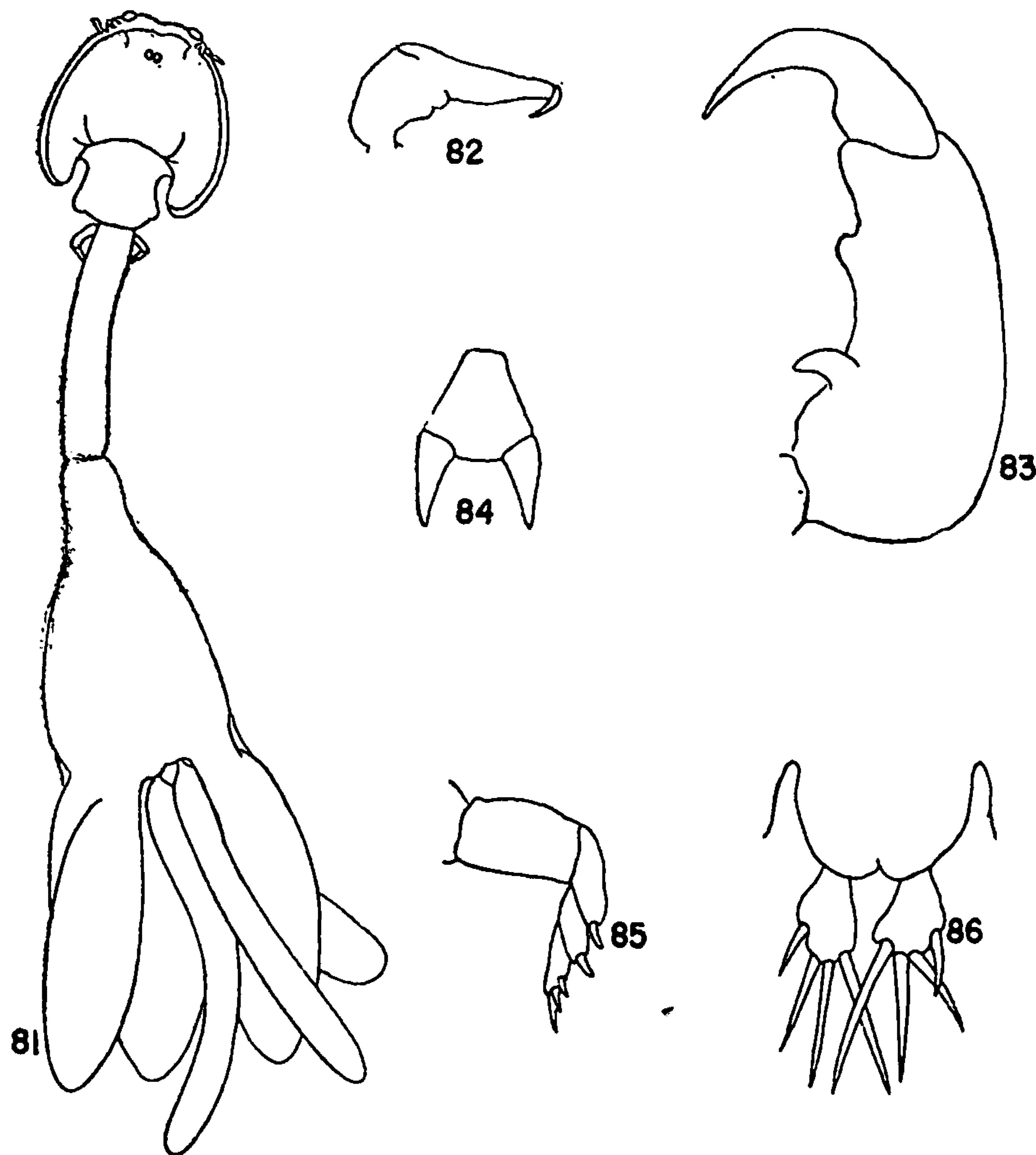
#### *Parechetus constrictus* n.sp.

*Occurrence.* Four female specimens were attached to the mucous membrane of the floor of the buccal cavity, on either side of the tongue, of *Caranx melampygus* Cuvier bought in the Colombo Market. Two of the specimens were still without egg-strings. The most mature specimen of the four is made the type of this new species.

*Female* (Fig. 81). Cephalothorax as in *Caligus* but very small. Fourth thoracic segment extending a long way back as the cylindrical neck, separated behind by a well marked constriction from the genital segment. Latter sac-shaped, its anterior end cylindrical end separated from the neck by the constriction mentioned above. The broader hind margin of the genital segment produced into a pair of wings at the sides. Dorso-medially the genital segment is continuous with the abdomen the sides of which are also produced into a pair of wings, of nearly the same size as the postero-lateral wings of the genital segment, leaving only the very hind end of the abdomen free. Each anal lamina carries four plumose setae. The egg-strings extend a little way beyond the posterior ends of the wings. Length of cephalothorax 1 mm., of neck 1.3 mm., genital segment and petaloid processes 3.5 mm.. Total length 5.8 mm..

*Male.* Not known.

*Remarks.* Pillai (1961, 1962) created the genus *Parechetus* with *Caligodes carangis* Bassett-Smith as the type species. The new species described and figured here agrees with the type species in the characters of this genus. Apart from minor details of the appendages, *P. constrictus* is readily distinguished from *P. carangis* (Bassett-Smith) by the shorter neck of the former and the definite constriction which marks off its neck from the genital segment.



Figs. 81-86. *Parechetus constrictus* n. sp. . Female. 81, entire animal ; 82, second antenna ; 83, second maxilliped ; 84, sternal furca ; 85, fourth leg ; 86, anal laminae.

### *SYNESTIUS* Steenstrup and Lutken

#### *Synestius caliginus* Steenstrup and Lutken

*Synestius caliginus* Steenstrup and Lutken, 1861, pp. 364-365, pl. 6, fig. 11 ; Heller, 1865, p. 179 ; Gnanamuthu, 1950a, pp. 253-258, figs. 1-3 ; Shen, 1957, pp. 356-387, pl. 11.

*Occurrence.* On the gills of *Parastromateus niger* (Bleeker) bought in the Colombo market.

*Distribution.* On *Parastromateus niger* off South India (Steenstrup and Lutken) ; on *Pampus argenteus* in the Indian Ocean (Heller) ; on *Parastromateus niger* off Madras (Gnanamuthu) ; on *Stromatoides sinensis* off China (Shen).

*Female* (Fig. 87). Cephalothorax circular, less than a third of the entire length. Genital segment narrow anteriorly but broad and sac-like posteriorly, its postero-lateral corners produced on each side into a pair of processes of which one process is dorsal, cylindrical and long, the other is ventral, flattened and shorter than the former. Abdomen cigar-shaped, indistinctly two-segmented, proximal segment much shorter than the distal. Total length 4 mm..

*Male.* Cephalothorax as in female, but less than half the entire length. Genital segment flask-shaped. Abdomen about as long as the genital segment, two-segmented, proximal segment the shorter. Total length 3.5 mm.. (Male not seen. Description from Gnanamuthu).

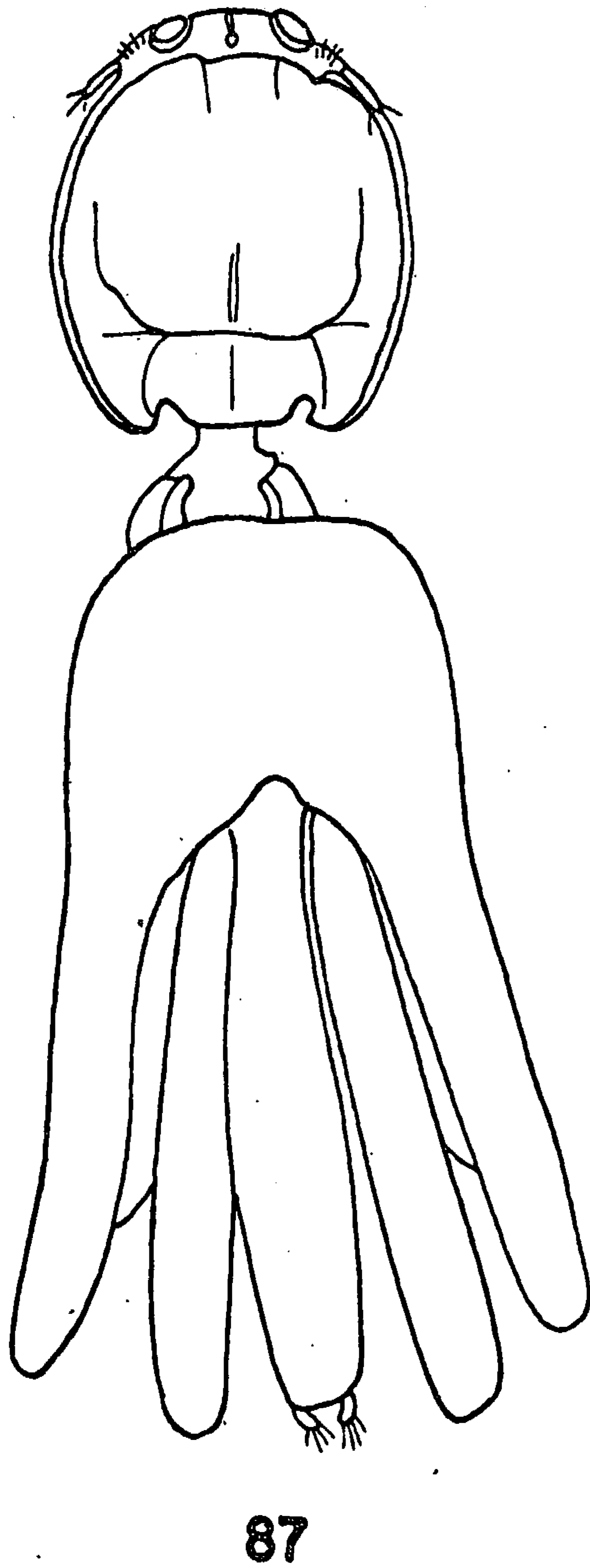


Fig. 87. *Synestius caliginus* Steenstrup and Lutken. Female.

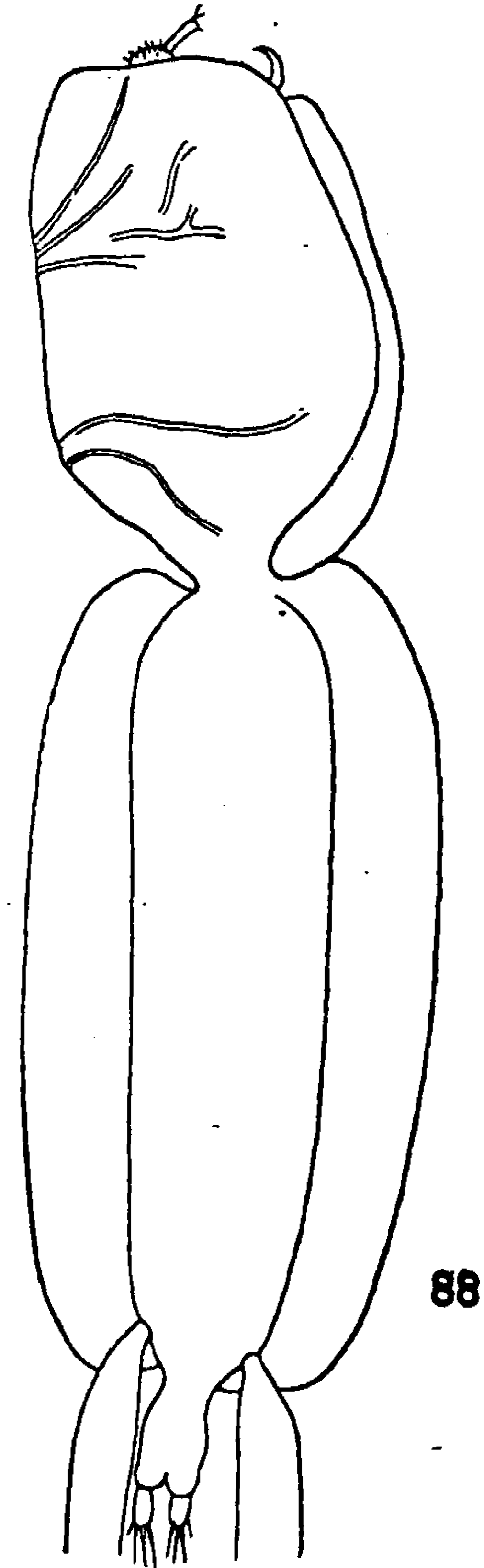


Fig. 88. *Hermilius longicornis* Bassett-Smith. Female.

### HERMILIUS Heller

#### *Hermilius longicornis* Bassett-Smith

*Hermilius longicornis* Bassett-Smith, 1898, a. pp. 80-82, pl. 3, fig. 2

*Hermilius pyriventris* (not Heller), Pillai, 1961, pp. 123-125, fig. 21

*Occurrence.* On the gills of *Arius acutirostris* at Trincomalee (Bassett-Smith); I have also found it on the gills of an *Arius* sp. bought in the Colombo market.

*Distribution.* On the gills of an *Arius* sp. off Trivandrum. (Pillai).

*Female* (Fig. 88). Cephalothorax less than half the entire length its margins turned strongly downwards, its dorsal surface marked by chitinous grooves which give it a characteristic appearance. Genital segment much longer than cephalothorax of an elongated oval shape, sides often flattened. Abdomen small, of a single segment. Anal laminae longer than wide. Total length 5.5 mm.

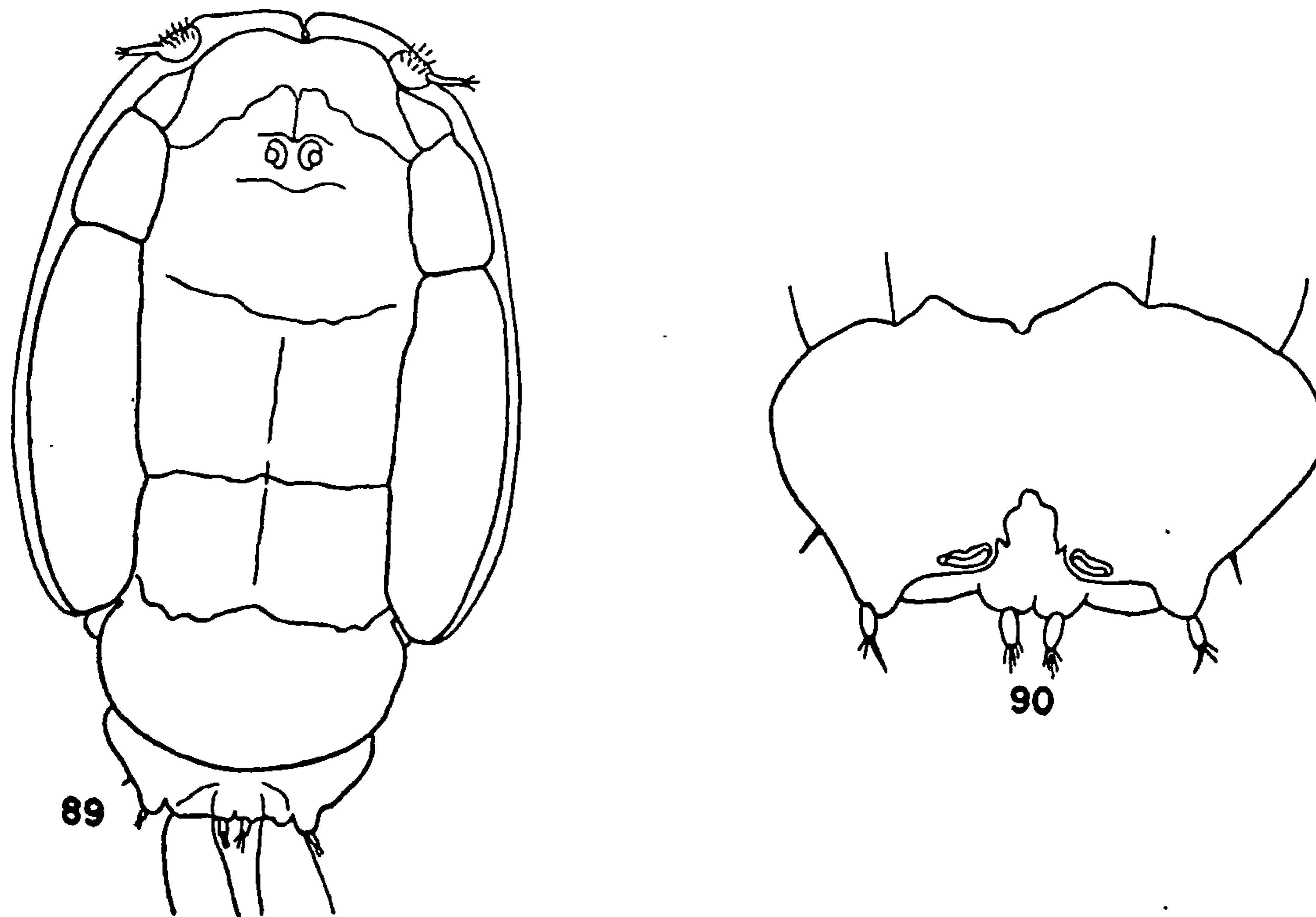
*Male.* Not known.

*Remarks.* Although Pillai included his specimens in Heller's species *H. pyriventris* he has subsequently informed me, in a private communication, that they belong to *H. longicornis* Bassett-Smith. Pillai's figures of the appendages etc. are evidence enough of the distinctness of these two species notwithstanding Barnard's (1955) surmise that they are probably synonymous. My figure (Fig. 88) shows the cephalothorax from the right side and the genital segment and abdomen from the ventral side, the specimen having been fixed in this twisted position.



*EIRGOS* Bere*Eirgos plataxus* (Rangnekar)

*Mappates plataxus* Rangnekar, 1958, pp. 303-308, figs. 1 and 2.



Figs. 89, 90. *Eirgos plataxus* (Rangnekar). Female. 89, entire animal; 90, ventral view of genital segment abdomen and anal laminae.

**Occurrence.** On the gills of *Platax teira* (Forsk.) bought in the Colombo market.

**Distribution.** On the gills of *Platax teira* off Bombay (Rangnekar).

**Female** (Fig. 89). Cephalothorax oval, longer than wide, more than half the entire length; median lobe about half the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Third thoracic segment with a semilunar dorsal plate extending over the fourth thoracic segment and over the anterior half of the genital segment. Latter wider than long, bearing the reduced fifth and sixth legs at its postero-lateral borders. Abdomen reduced to a short lobe bearing the anal rami. Total length 3 mm..

**Male.** Not known.

**Remarks.** Rangnekar created a new genus *Mappates* to accommodate this species. However, no character of this species necessitates its being in a genus separate from *Eirgos* Bere. Contrary to Rangnekar's observation, the abdomen (fig. 90) of this species has but a single segment. Bere's figure of an immature female of *Eirgos anurus* shows the same general features as Rangnekar's species.

*TREBIUS* Kroyer*Trebius exilis* Wilson

*Trebius exilis* Wilson, 1906, p. 194, pl. 2, figs. 20-23.

**Occurrence.** On *Rhinoptera javanica* Muller and Henle on the Pearl Banks off Ceylon (Wilson).

**Distribution.** Not recorded elsewhere.

*Female.* Cephalothorax semi-elliptical, longer than wide. Third thoracic segment only a little wider than fourth but considerably shorter and projecting nearly its entire length beyond the posterior level of the lateral lobes of the cephalothorax. Genital segment elliptical, connected with the fourth thoracic segment by a narrow neck. Abdomen narrow, of a single segment. Anal laminae elongate. Total length 5.75 mm..

*Male.* Cephalothorax relatively longer than in female, about half the entire length. Thoracic segments wider than in female, fourth segment of the same width as the genital segment and only a trifle longer than the third segment. Genital segment barrel-shaped, not quite one-fifth of the entire length. Fifth and sixth legs visible dorsally, the former at about the middle of the lateral margins, the latter at the posterior corners of the genital segment. Abdomen, of two nearly equal segments, shorter than the genital segment. Anal laminae narrow, nearly as long as the abdomen. Total length 2.75 mm.. (Not seen. Description from Wilson).

### ANURETES Heller

*Anuretes perplexus* Bassett-Smith

*Anuretes perplexus* Bassett-Smith, 1898a, pp. 89-91, pl. 5; fig. 3.

*Occurrence.* On *Lutianus* sp. off Trincomalee (Basset-Smith).

*Distribution.* Not recorded elsewhere.

*Female.* Cephalothorax rather wider than long, narrowed anteriorly. Median lobe a little more than a third of the width of the cephalothorax, projecting beyond the posterior level of the lateral lobes. Free thoracic segment very small. Genital segment almost round in outline except for a shallow posterior indentation. Abdomen not distinguishable. Anal laminae short. Total length 3 mm.. (Not seen. Description from Bassett-Smith.)

*Male.* Not known.

### LEPEOPHTHEIRUS Nordmann

*Lepeophtheirus aesopus* Wilson,

*Lepeophtheirus aesopus* Wilson, 1906, p. 192, figs. 11-19.

*Occurrence.* On an unrecorded host fish from the Pearl Banks off Ceylon (Wilson).

*Distribution.* Not recorded elsewhere.

*Female.* Cephalothorax ovate, narrowed anteriorly, less than half the entire length; median lobe about a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment short but about as wide as the median lobe. Genital segment quadrate, two-thirds the size of the cephalothorax, a little wider anteriorly than posteriorly, with evenly rounded corners. Abdomen indistinctly three-segmented, less than half the length of the genital segment. Anal laminae three times as long as wide. Total length 5.75 mm. (Not seen. Description from Wilson.)

*Male.* Not known.

*Lepeophtheirus gonistii* Yamaguti

*Lepeophtheirus gonistii* Yamaguti, 1936, pp. 10-13, pl. 9, figs. 132-133. Shiino, 1959, pp. 343-346, fig. 5.

*Occurrence.* In the branchial cavity of *Promicrops lanceolatus* (Bloch) off Colombo.

*Distribution.* On the outer surface of the body and on the gills of *Gonistius zonatus* from the Pacific (Yamaguti); on the outer surface of the body of several different host fish including the above off Japan (Shiino).

*Female* (Fig. 91). Cephalothorax nearly as long as wide; median lobe about half the width of the cephalothorax projecting a trifle beyond the posterior level of the lateral lobes. Genital segment transversely oval, one and a half times as wide as long. Abdomen of a single short segment. In dorsal view, fifth and sixth legs visible at the postero-lateral margins of the genital segment as two short spines. Total length 5.4 mm.

*Male*. Cephalothorax as in female, but two-thirds the entire length. Genital segment barrel-shaped, fifth and sixth legs visible, in dorsal view, at its postero-lateral margins as small papillae, Abdomen, of a single short segment. Total length 3 mm. (Male not seen. Description from Yamaguti.)

*Remarks*. *Lepeophtheirus plectropomi* Nunes-Ruivo and Fourmanoir (1956), from the walls of the branchial cavity of *Plectropomus maculatus* off Madagascar, appears to be merely a variant of *L. gonistii* differing from the latter only by the much elongated third and fourth spines of the fourth leg as shown in the figure by the joint authors.

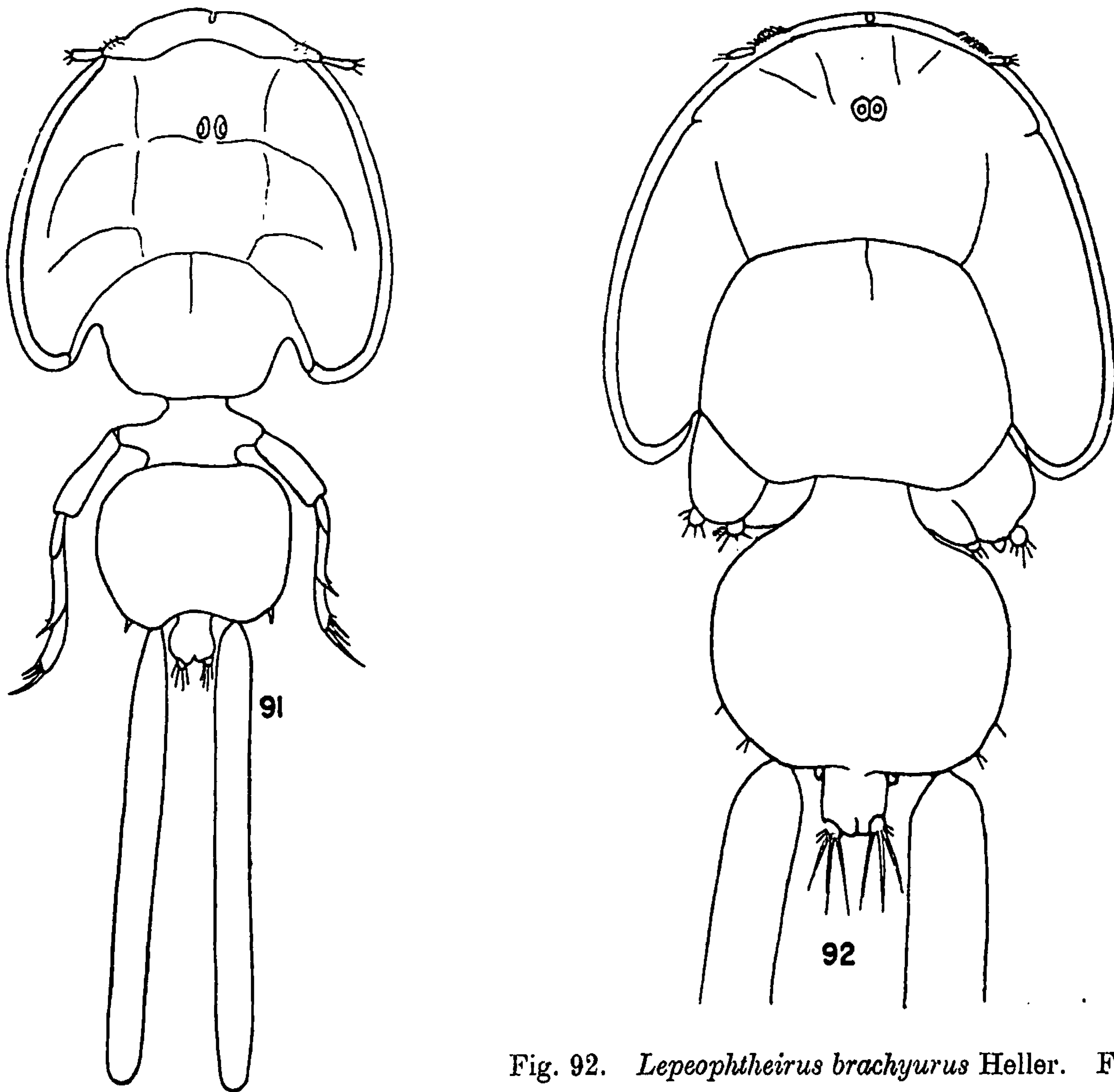


Fig. 91. *Lepeophtheirus gonistii* Yamaguti. Female.

Fig. 92. *Lepeophtheirus brachyurus* Heller. Female.

#### *Lepeophtheirus brachyurus* Heller

*Lepeophtheirus brachyurus* Heller, 1865, pp. 185-186, pl. 16, fig. 4; Wilson, 1906, pp. 190-192, pl. 1, figs. 1-10; Barnard, 1948, p. 248 and 1955, p. 253, fig. 12, c, d.

*Occurrence*. On the gills of *Arothron stellatus* (Bloch) (= *Tetrodon stellatus* Bloch and Schneider) on the Pearl Banks off Ceylon (Wilson). Through the courtesy of Mr. Langston Pereira, I have obtained numerous females of this species found infesting the outer surface of the skin and the gills of *Arothron reticulatus* (Bloch) in a tank of the "Panocean" aquarium at Colombo. The infestation was so heavy that it apparently brought about the death of the Blowfish.

*Female* (Fig. 92). Cephalothorax narrowed anteriorly, slightly wider than long, more than half the entire length; median lobe more than half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment very short and covered over by the median lobe of the cephalothorax. Genital segment transversely elliptical, one-third wider than long with evenly rounded sides and nearly straight posterior margin. Abdomen short, one-segmented. Anal laminae papillate. Total length 4.5 mm..

*Male*. Not known.

*Remarks*. The specimens obtained by me from *Arothron reticulatus* do not exceed 3 mm. in length (exclusive of the egg-strings). They are, therefore, smaller than Heller's specimens which were 4 mm. and Wilson's specimens which were 4.5 mm. in length. Wilson's figure of the fourth leg is inaccurate. It is figured well by Heller. In living specimens the white background colour is marked by fine reticulations of black pigment. This pigment is lost with preservation in alcohol so that, as described by Wilson, the colour becomes completely white.

#### *Lepeophtheirus longipalpus* Bassett-Smith

*Lepeophtheirus longipalpus* Bassett-Smith, 1898 a, pp. 88-89, pl. 5, fig. 2.

*Occurrence*. On the gills of *Arius acutirostris* off Trincomalee (Bassett-Smith).

*Distribution*. Not recorded elsewhere.

*Female*. Cephalothorax oval, longer than broad. Median lobe more than a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment about as long as broad, with a posterior annulation. Genital segment flask-shaped, with small postero-lateral lobes. Abdomen long and cylindrical, of two segments, the proximal segment being much longer than the distal. Sternal furca large and prominent with broad base bearing a pair of long, blunt, almost parallel rami. Length 7 mm.. (Not seen. Description from Bassett-Smith).

*Male*. Not known.

*Remarks*. Thompson and Scott (1903) identified *Lepeophtheirus thompsoni* Baird on *Arius venosus* Cuvier and Valenciennes from the Pearl Banks of Ceylon. *L. longipalpus* has a superficial resemblance to *L. thompsoni* and it is quite possible that Thompson and Scott were mistaken in their specific identification of the Ceylonese specimens. There is no way of checking this as they give neither description nor figures of these specimens.

#### *Lepeophtheirus rotundriventris* Bassett-Smith

*Lepeophtheirus rotundriventris* Bassett-Smith, 1898a, pp. 86-88, pl. 5, fig. 1.

*Occurrence*. In the gill chamber of *Lutianus* sp. off Hikkaduwa.

*Distribution*. In the gill chamber of *Serranus* sp. in the Persian Gulf (Bassett-Smith).

*Female* (Fig. 93). Cephalothorax about as long as wide, half the entire length; median lobe a little less than half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment narrow. Genital segment transversely oval. Abdomen of a single segment. Anal laminae papillate. Total length 3.9 mm...

*Male.* Cephalothorax as in female but more than two-thirds the entire length. Genital segment wider than long, with postero-lateral lobes giving it a crescentic shape. Abdomen of a single segment, narrowed anteriorly. Total length 4 mm.. (Male not seen. Description from Bassett-Smith).

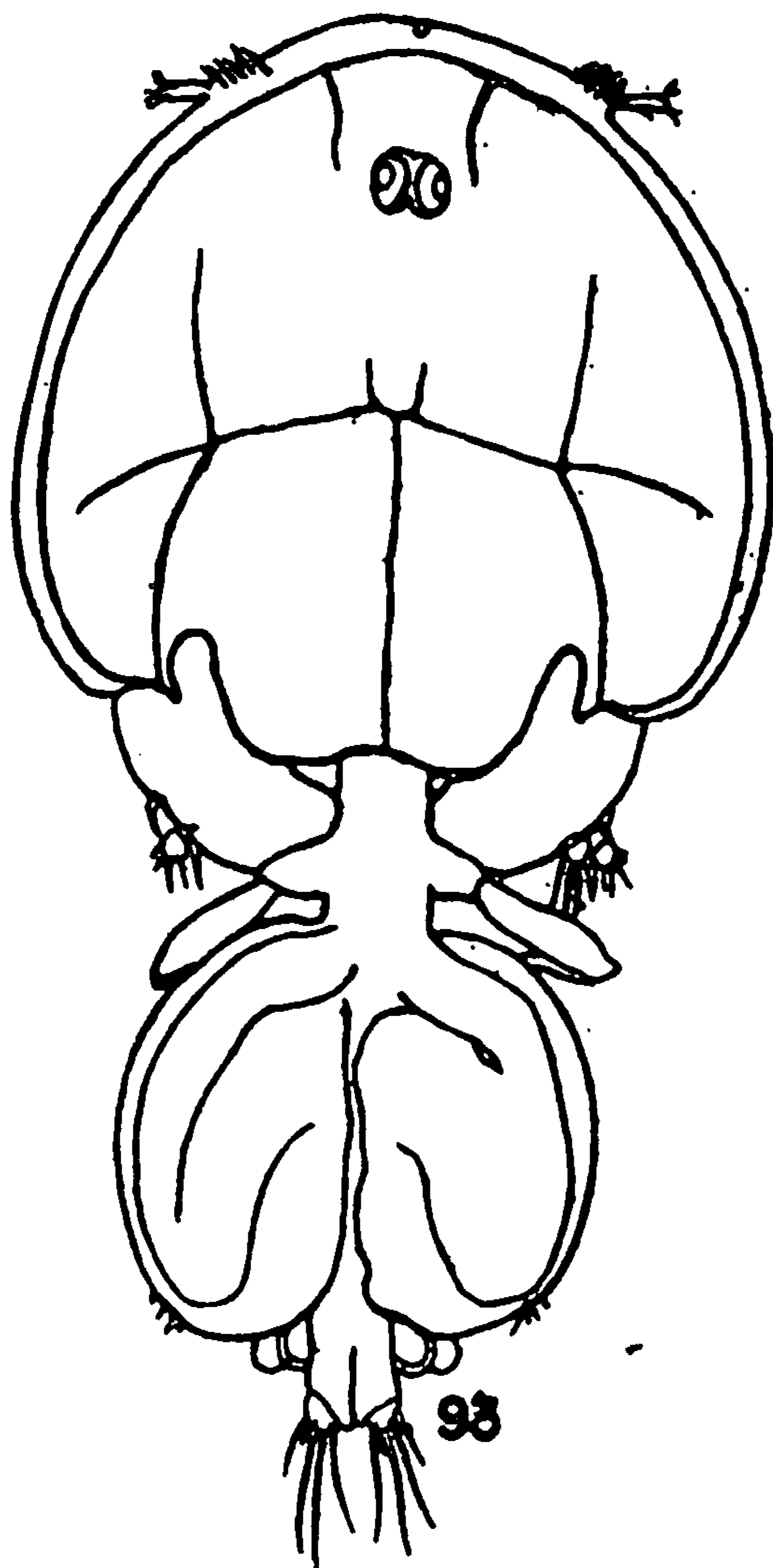


Fig. 93. *Lepeophtheirus rotundiventris* Bassett-Smith. Female.

*Lepeophtheirus spinifer* Kirtisinghe

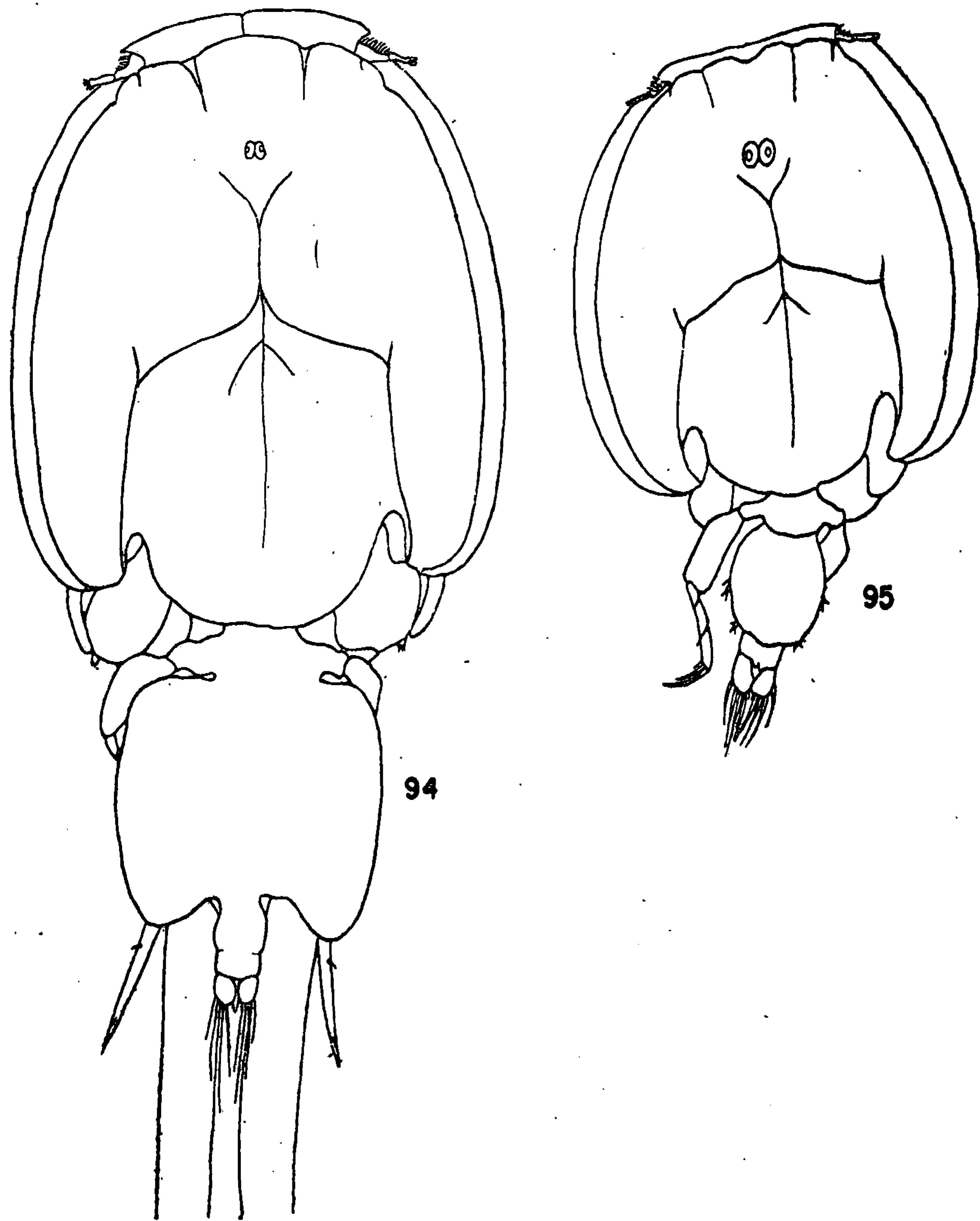
*Lepeophtheirus spinifer* Kirtisinghe, 1937, p. 441, figs. 41-58 ; Rangnekar, 1959, p. 51, fig. 4  
Pillai, 1961, pp. 128-129, fig. 23.

*Occurrence.* On the outer surface of the body of *Chorinemus* sp. off Hikkaduwa.

*Distribution.* On the outer surface of the body of *Rachycentron canadus* off Bombay (Rangnekar) ; on the outer surface of the body of the same host off Trivandrum and on the outer surface of the body of *Chorinemus tala* off Vishingom, South India (Pillai).

*Female* (Fig. 94). Cephalothorax elliptical, longer than wide, more than half the entire length ; median lobe about half the width of the cephalothorax, projecting slightly beyond the posterior level of the lateral lobes. Free thoracic segment short and wide. Genital segment quadrangular, with distinct postero-lateral lobes. Abdomen half the length of the genital segment, two-segmented, proximal segment longer than the distal. Anal laminae as long as distal abdominal segment. Fifth legs as long stout spines extending backwards beyond the anal laminae. Total length 4 mm..

*Male* (fig. 95). Cephalothorax about two-thirds the entire length. Genital segment barrel-shaped. Abdomen of a single short segment. Total length 2.5 mm..



Figs. 94, 95. *Lepeophtheirus spinifer* Kirtisinghe. 94. female; 95, male.

### *ALEBION* Kroyer

#### *Alebion megacephalus* Kirtisinghe

*Alebion megacephalus* Kirtisinghe, 1956, pp. 15-17, figs. 5-8.

*Occurrence.* On the outer surface of the body of a carcharinid shark off Hikkaduwa.

*Distribution.* Not recorded elsewhere.

*Female* (Fig. 96). Cephalothorax oval, longer than wide; median lobe about a third of the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment about as wide as the median lobe of the cephalothorax, its dorsal plates semi-circular with small posterior lobes overlapping the front part of the genital segment. Genital segment as wide as the free thoracic segment and about twice as long, its lateral margins convex and unarmed with spines but its posterior processes with spines along the inner margin and tip. Abdomen two-segmented, basal segment much shorter than the distal, with postero-lateral processes extending on either side of the latter to half way along its length. Total length 5 mm..

*Male.* Not known..

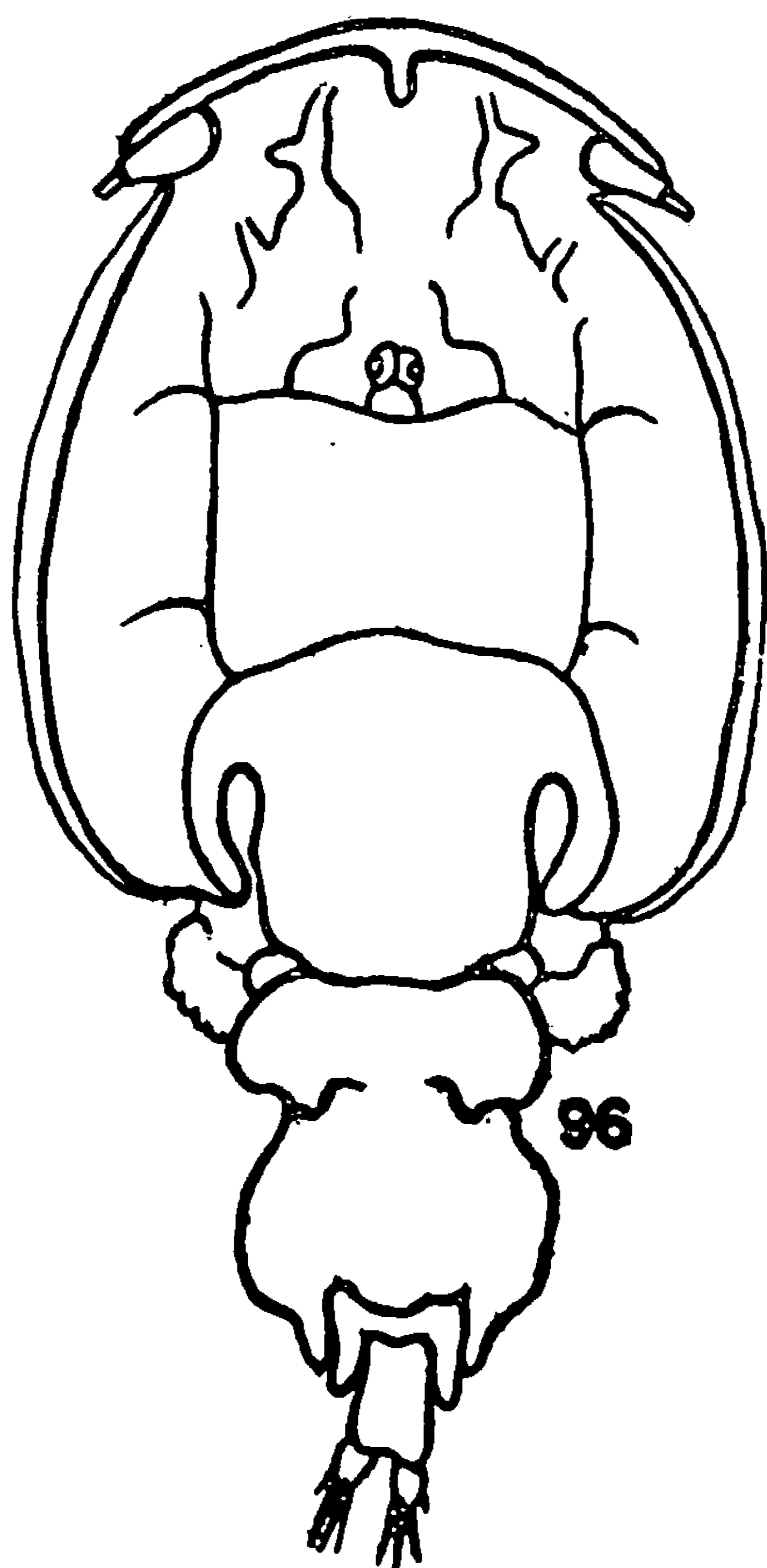


Fig. 96. *Alebion megacephalus* Kirtisinghe. Female.

### PANDARUS Leach

#### *Pandarus niger* Kirtisinghe

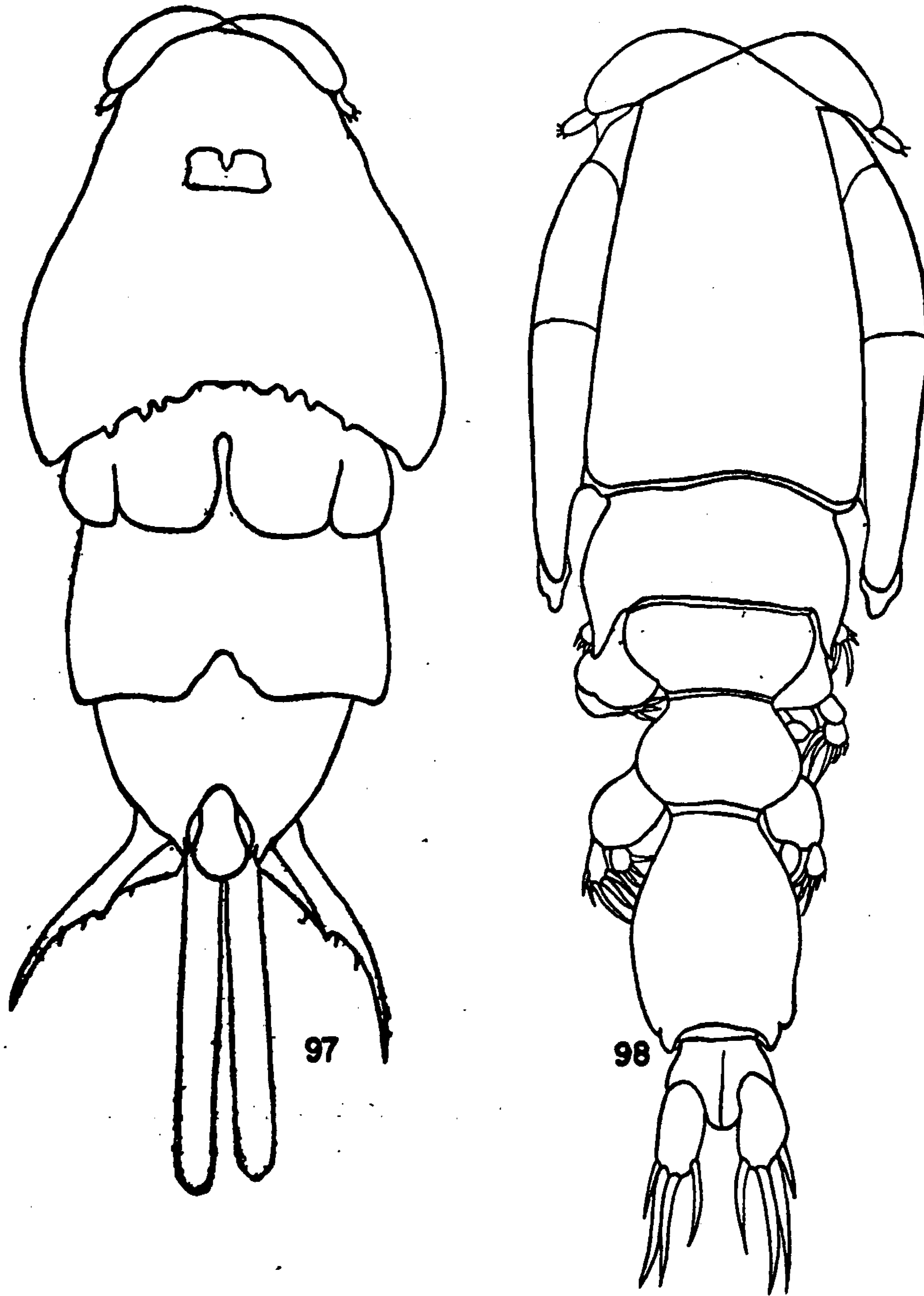
*Pandarus niger* Kirtisinghe, 1950, pp. 83-84, Figs. 13-28.

*Occurrence.* On the outer surface of the body of a carcharinid shark off Hikkaduwa.

*Distribution.* Not recorded elsewhere.

*Female* (Fig. 97). Cephalothorax triangular, narrow anteriorly broadening posteriorly to twice its width at the front end, its posterior margin toothed. Dorsal plates of the second segment extending to the posterior level of the plates on the third segment. Plates of the third segment wider than those of the second, separated from each other by a deep median incision. Plates of the fourth segment fused to form a single rectangular plate overlapping more than half the genital segment. Dorsal plates of the genital segment produced posteriorly into slightly bifid lobes on either side of the abdominal plate. Anal laminae large, pointed, divergent processes with two or three spines on inner margin. Dorsal plate of sixth segment longer than wide, narrowed anteriorly, with concave lateral margins and rounded posterior margin. Total length 6.5 mm..

*Male* (Fig. 98). Cephalothorax about as wide as long, a little more than one-third the entire length, its posterior margin serrated. Second thoracic segment wide, with pointed postero-lateral processes. Third and fourth segments gradually decreasing in size from that of the second segment. Genital segment flask-shaped. Abdomen indistinctly two-segmented, proximal segment very short. Anal laminae broadly oval, each lamina with four non-plumose setae. Total length 5 mm..



Figs. 97, 98. *Pandarus niger* Kirtisinghe. 97, female; 98, male.

### *PSEUDOPANDARUS* Kirtisinghe

#### *Pseudopandarus gracilis* Kirtisinghe

*Pseudopandarus gracilis* Kirtisinghe, 1950, p. 84, figs. 29-35.

*Occurrence.* On the outer surface of the body of a "large dogfish".

*Distribution.* Not recorded elsewhere.

*Female* (Fig. 99). Cephalothorax semi-elliptical, a little less than one-third the entire length its lateral lobes produced posteriorly into triangular projections. Dorsal plates of the second thoracic segment triangular; those of the third segment broad, covering about half the dorsal plate of the fourth segment. Dorsal plate of latter about as wide as the cephalothorax, its posterior margin with small symmetrical lobes. Dorsal plate of the genital segment elongate, narrowing a little posteriorly, its hinder margin produced into three prominent lobes, one median elongate oval lobe and two lateral triangular lobes. Abdomen visible only ventrally as a single large segment bearing two broad anal laminae, each lamina with five non-plumose setae. Total length 4 mm..

*Male.* Not known.



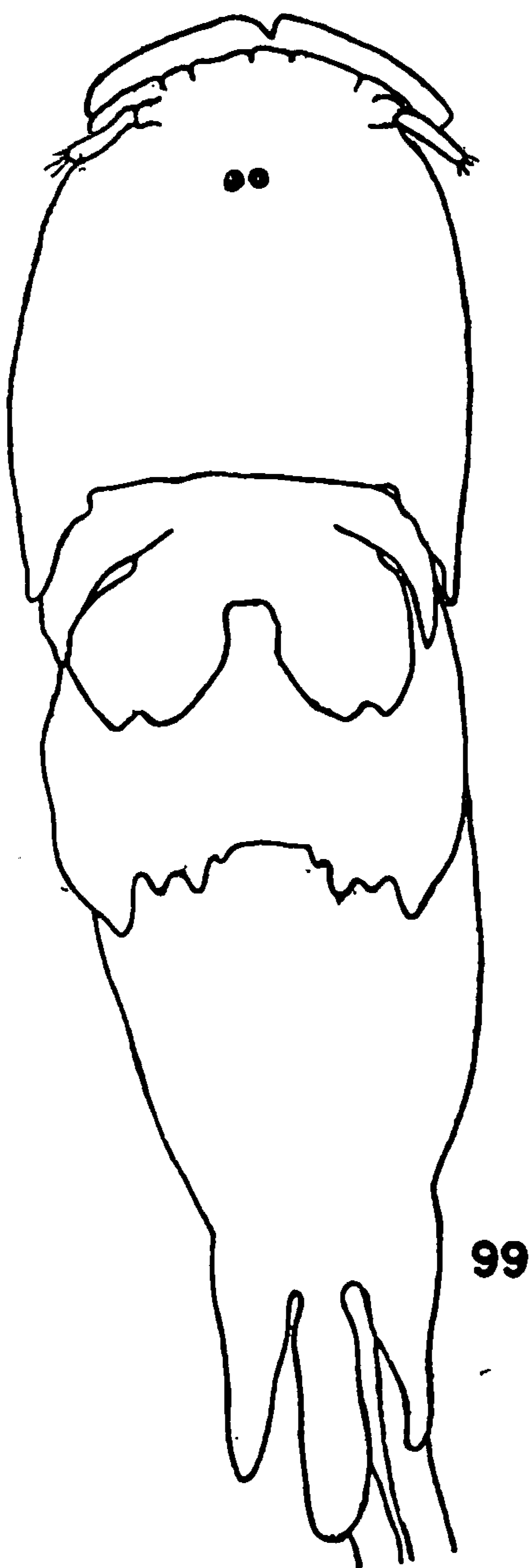


Fig. 99. *Pseudopandarus gracilis* Kirtisinghe. Female.

*DISSONUS* Wilson

*Dissonus spinifer* Wilson

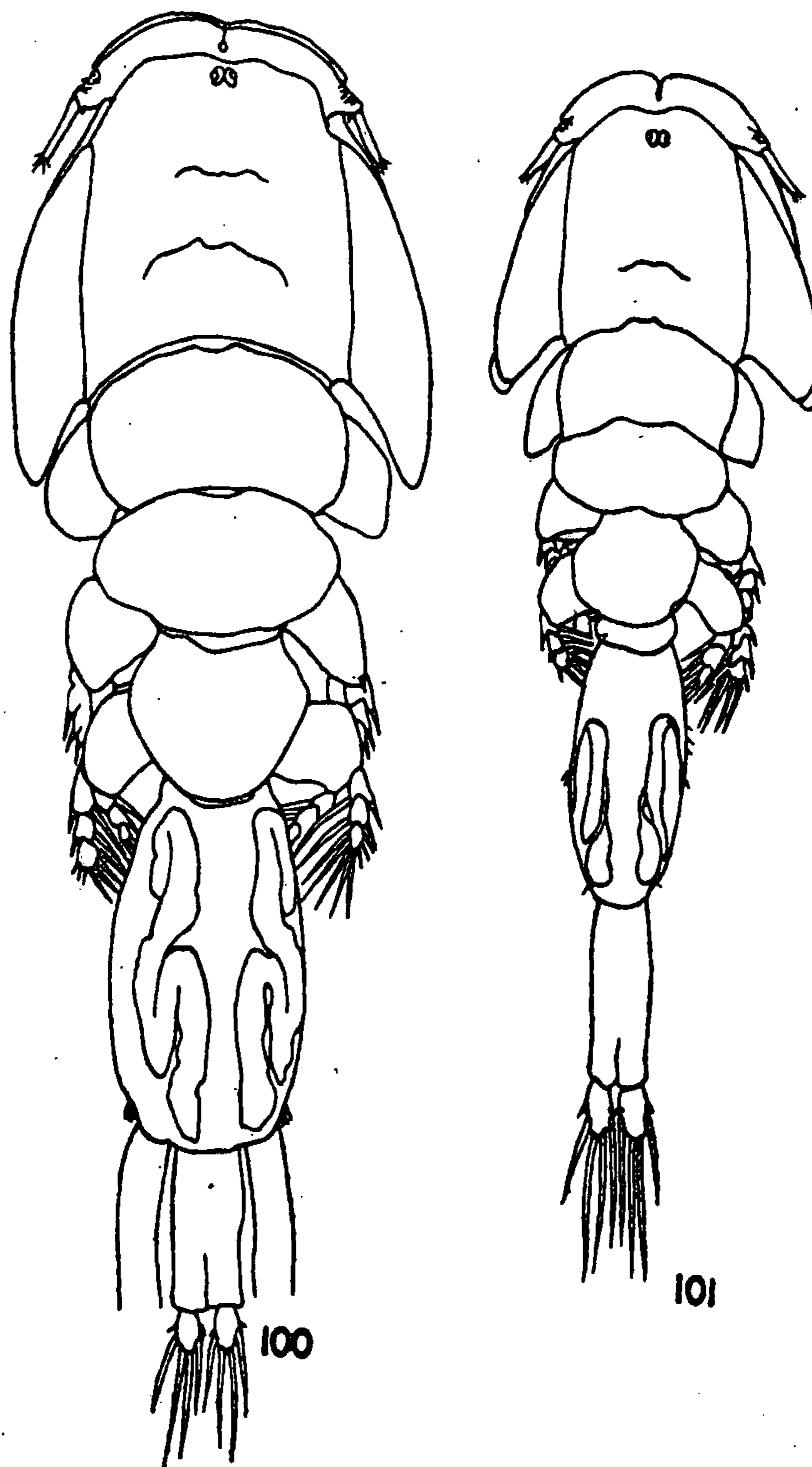
*Dissonus spinifer* Wilson, 1906, p.198, pl. 3, figs 34-37 and 1907, p. 717, pl. 20, figs, 71-72.

*Occurrence.* On an unrecorded host from the Pearl Banks off Ceylon (Wilson).

*Distribution.* Not recorded elsewhere.

*Female.* Cephalothorax semi-lunar, twice as wide as long. Second to fourth thoracic segments gradually diminishing in size backwards. Genital segment quadrangular. Entire ventral surface of the genital segment covered with stout scattered spines which point diagonally backwards. Abdomen of a single segment, less than half the length of the genital segment. Anal laminae oblong, each lamina with four large plumose setae. Total length 3 mm..

*Male.* Cephalothorax as in female. Genital segment elongate, barrel-shaped Abdomen not as wide as in female. Total length 3 mm.. (Not seen. Description from Wilson.)

*Dissonus furcatus* Kirtisinghe*Dissonus furcatus* Kirtisinghe, 1950, p. 77, figs. 5-12

Figs. 100, 101. *Dissonus furcatus* Kirtisinghe. 100, female; 101, male.

*Occurrence.* On the gill lamellae of an orectolobid shark.

*Distribution.* Not recorded elsewhere.

*Female* (Fig. 100). Cephalothorax semi-lunar, broader than long. Second and third thoracic segments of the same width as the median lobe of the cephalothorax. Lateral plates of segment not quite as wide as the lateral lobes of the cephalothorax. Fourth thoracic segment narrower but longer than either of the preceding segments. Genital segment barrel-shaped, its ventral surface furnished with bifurcated spines scattered in an arc almost confined to the anterior third of the segment. Abdomen of one segment about two-thirds the length of the genital segment and much longer than broad. Anal laminae oval. Total length 5.5 mm.

*Male* (Fig. 101). General appearance like that of the female but more slender. Abdomen comparatively longer and anal laminae larger than in the female. The bifurcated spines on the ventral side of the genital segment scattered in an arc occupying almost the anterior half of the segment. Total length 4.5 mm.

## GLOIOPOTES Steenstrup and Lutken

*Gloiopotes longicaudatus* (Marukawa)

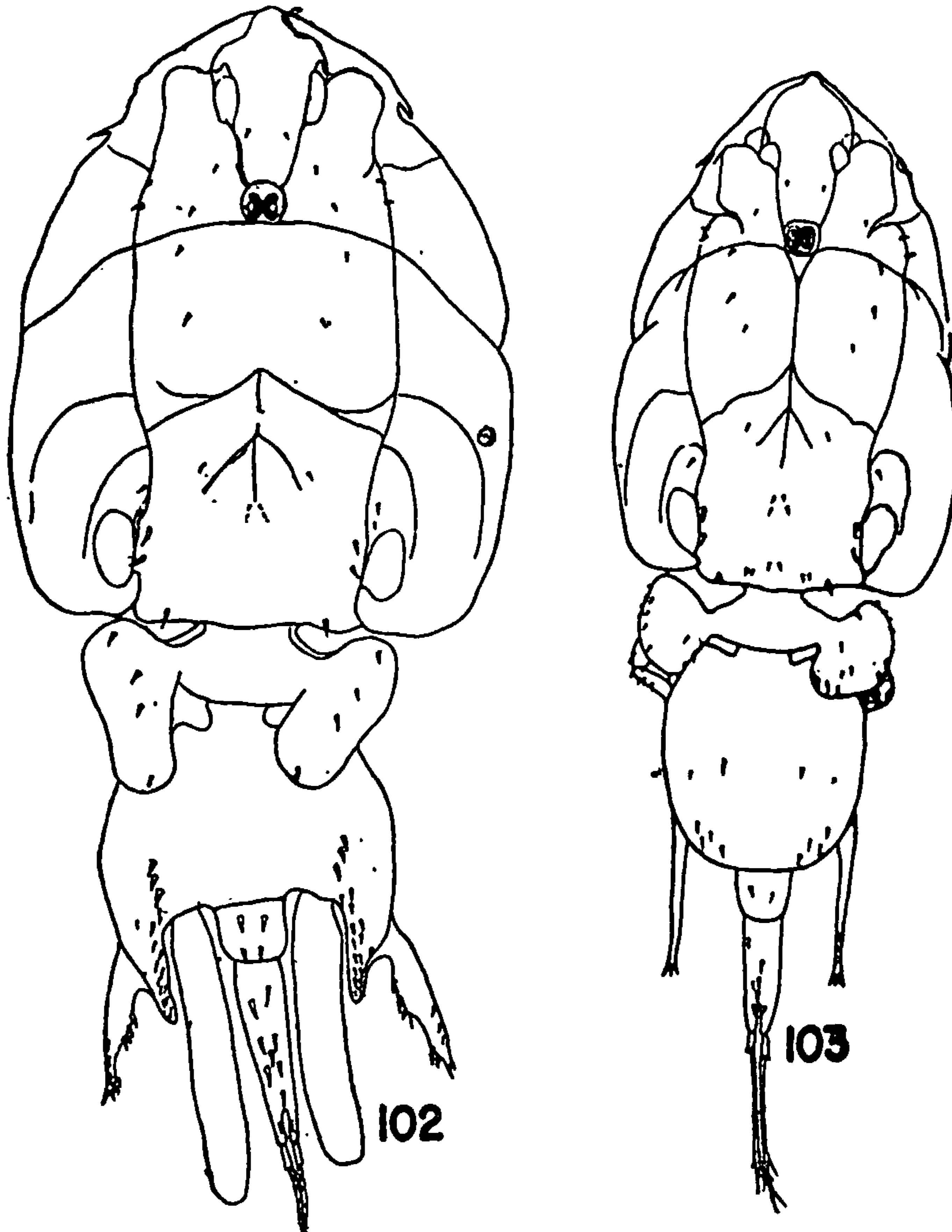
*Caligus longicaudatus* Marukawa, 1925, p. 1243, fig. 2396, and 1947, p. 927, fig. 2654

*Gloiopotes* sp. Yamaguti, 1936a, p. 4, pl. 2, fig. 20, pl. 3, figs. 21-25

*Gloiopotes watsoni* Kirtisinghe, 1934, pp. 167-173, figs. 1-17

*Gloiopotes zeugopteri* Rao, 1951, pp. 248-255, figs. 1-15

*Gloiopotes longicaudatus* Shiino, 1954, p. 284, figs. 1-2; 1958, p. 105; 1959, pp. 348-349 Heegaard, 1962, p. 174, figs. 1-17



Figs. 102, 103. *Gloiopotes longicaudatus* (Marukawa). 102, female; 103, male.

**Occurrence.** On the outer surface of the body of *Histiophorus gladius* (Broussonet) off Hikkaduwa and *Makaira indica* (Cuvier) off Negombo.

**Distribution.** On *Xiphias zeugopteri* off the east coast of South India (Rao); on *Makaira mazara* in the Indian Ocean (Shiino); on *Tetrapturus mitsukurii* and *Xiphias gladius* off the Pacific coast of Japan (Yamaguti, Shiino); on *Marlina zelandica* and *Istiompax australis* in Australian waters (Heegaard).

**Female** (Fig. 102). Cephalothorax about half the entire length, a trifle longer than broad; median lobe a little less than half the width of the cephalothorax, its posterior margin almost straight and in line with the posterior level of the lateral lobes. Free thoracic segment short, bearing kidney-shaped dorsal plates which overlap the genital segment antero-laterally. Genital segment more than half the width of the cephalothorax, joined to the fourth segment by a narrow neck and with slight shoulders and convex lateral margins and bearing prominent postero-lateral lobes whose styli-form processes project obliquely backwards. Abdomen two-segmented, proximal segment short, distal segment much longer and tapering posteriorly. Anal rami about half the length of the distal abdominal segment and broader for the proximal third of their length. Total length 9.5 mm.

*Male* (Fig. 103). Cephalothorax as in female. Dorsal plates of fourth segment somewhat triangular. Genital segment rounded, its styli-form processes extending backwards almost parallel with the abdomen to about half way along the second abdominal segment. Anal rami a little longer than the second abdominal segment. Total length 8.5mm.

*Remarks.* When the Ceylonese specimens were described as a distinct species I was not aware of the Japanese specimens described by Marukawa under the genus *Caligus*. The accounts by Yamaguti and Shiino have shown me that the Ceylonese specimens must also belong to *Gloiopotes longicaudatus* (Marukawa). The specimens from the Australian waters described by Heegaard serve to show the range of variation within this species which infests the swordfish, sailfish and marlins from the Indian and Pacific Oceans and the more southern waters around Australia.

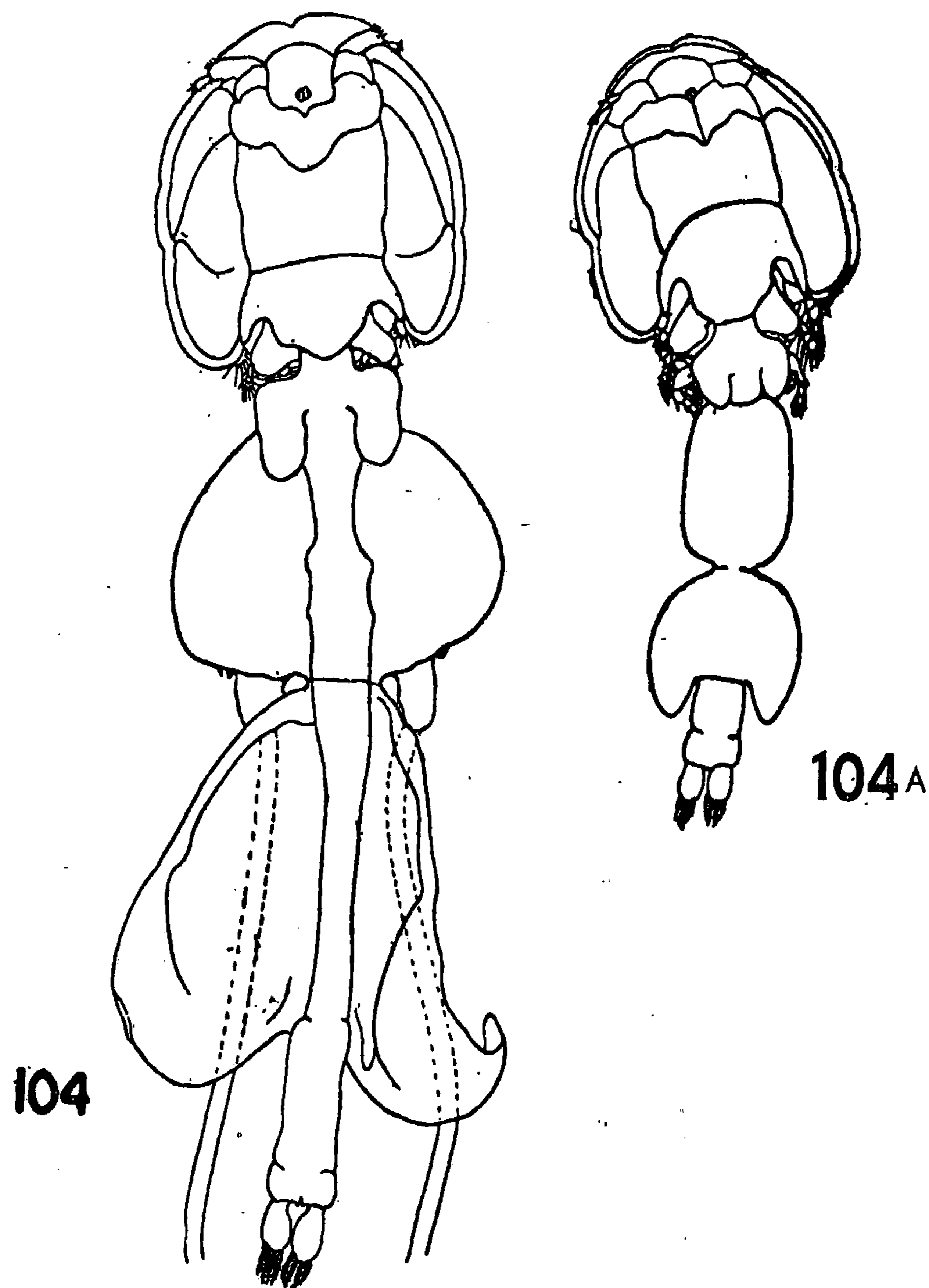
### EURYPHORUS Milne-Edwards

#### *Euryphorus nympha* Steenstrup and Lutken

*Euryphorus nympha* Steenstrup and Lutken, 1861, p. 365, pl. 6, fig. 12; Shiino, 1954, p. 284, figs. 5-6 and 1959, p. 350

*Euryphorus coryphaenae* Kroyer, 1863, p. 161, pl. 10, fig. 4

*Euryphorus nordmanni* (not Milne - Edwards) Kirtisinghe, 1937, pp. 445-448, figs. 74-87



Figs. 104, 104A. *Euryphorus nympha* Steenstrup and Lutken. 104, female; 104A, male.

*Occurrence.* In the branchial chamber of *Coryphaena hippurus* Linn. off Hikkaduwa.

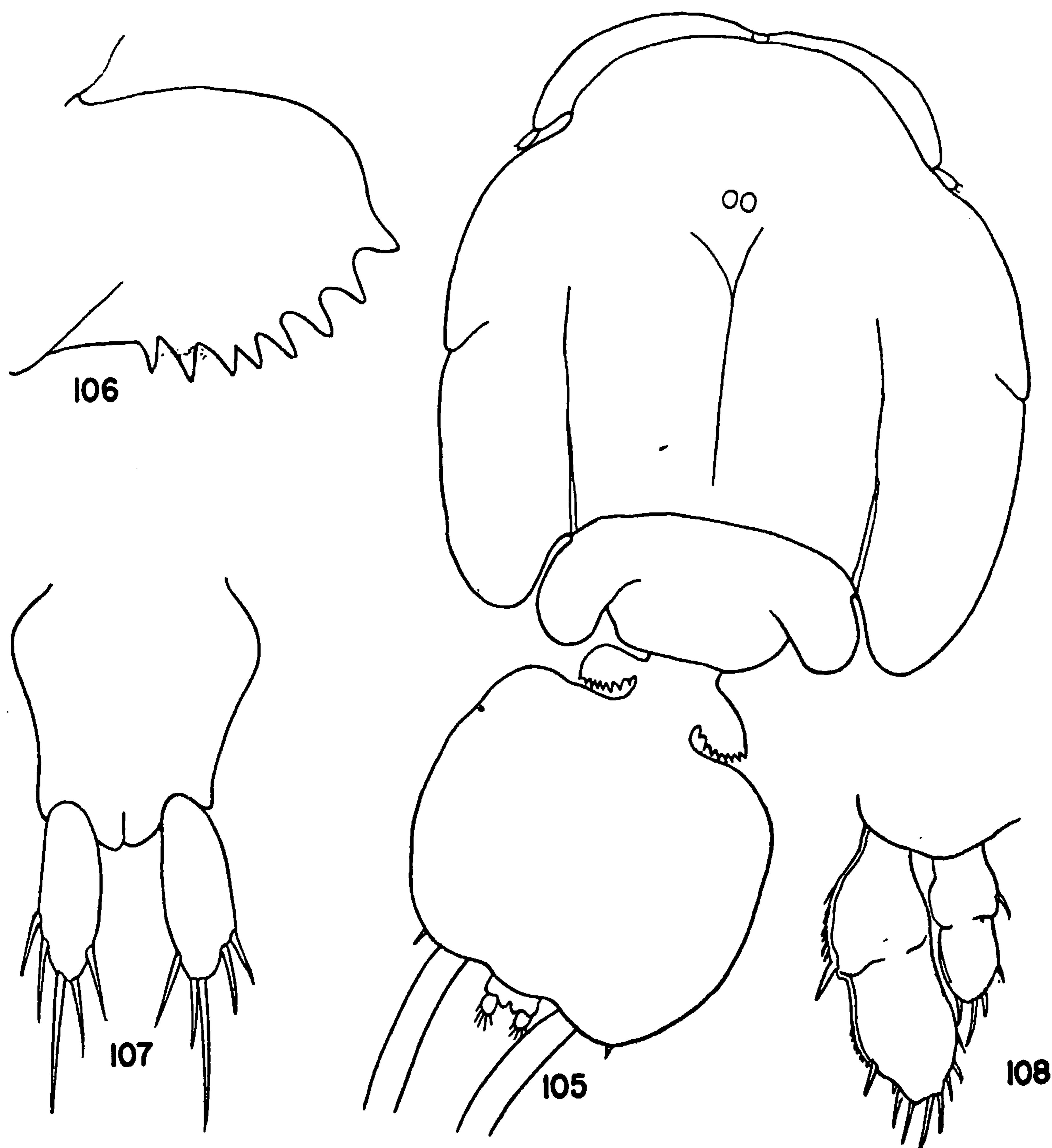
*Distribution.* On *Lampugus punctulatus* in the Atlantic Ocean (Steenstrup and Lutken); on *Coryphaena hippurus* off Japan (Shiino).

*Female* (Fig. 104). Cephalothorax as long as wide, about a fourth of the total length. Dorsal plates of free thoracic segment oval, longer than wide, overlapping the genital segment anteriorly. Genital segment sac-like, about as wide as the cephalothorax but not quite as long, with a pair of posterior lobes which are smaller than the dorsal plates of the preceding segment. Abdomen nearly half the total length, three-segmented, proximal segment longer than the other two combined and its sides produced into wing-like extensions, sometimes inflated. Total length 12 mm.

*Male* (Fig. 104<sup>A</sup>). Cephalothorax nearly a third of the total length. Genital segment oval, without posterior lobes. First abdominal segment wider than the genital segment and with posterolateral lobes. Total length 5.7 mm..

*ECHTHROGALEUS* Steenstrup and Lutken

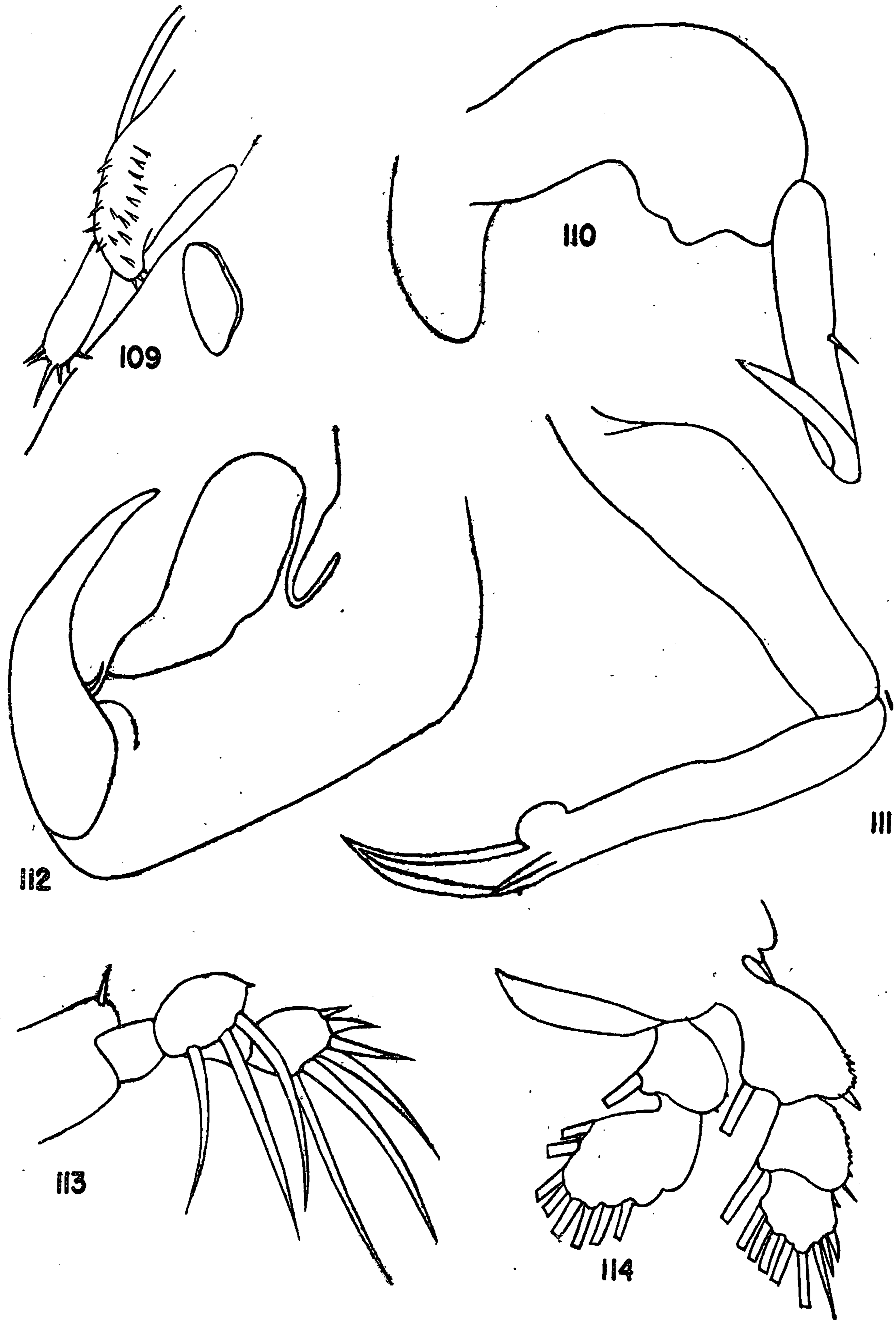
*Echthrogaleus pectinatus* n. sp.



Figs. 105–108. *Echthrogaleus pectinatus* n. sp.. Female. 105, entire animal; 106, dorsal plate on fourth segment; 107, abdomen and anal laminae; 108, fourth legs.

*Occurrence.* Twenty two gravid females were found on the gills and throat of the whale shark *Rhincodon typus* Smith sold in the Colombo market. The specimens were collected and kindly presented by Dr. T. P. Gunewardena.

*Female* (Figs. 105–108). Cephalothorax about as long as wide, a little more than half the entire length; median lobe half the width of the cephalothorax, its hind margin not extending as far as the posterior level of the lateral lobes. Second and third thoracic segments of about equal lengths, incompletely separated from each other, lateral lobes of second segment extending as far back as the posterior level of third segment. Fourth segment narrow, with a pair of dorsal plates whose posterior margins are denticulated, bearing eight short, strong teeth; dorsal plates short, not overlapping the genital segment. Latter roughly rectangular in shape, wider than long, with rounded corners and a short postero-lateral spine on each side. Abdomen of a single segment, anal laminae elongate each lamina with five non-plumose setae of which the median seta is the longest. Terminal claw of



Figs. 109–114. *Echthrogaleus pectinatus* n. sp.. Female. 109, first antenna; 110, second antenna; 111, first maxilliped; 112, second maxilliped; 113, first leg; 114, second leg.

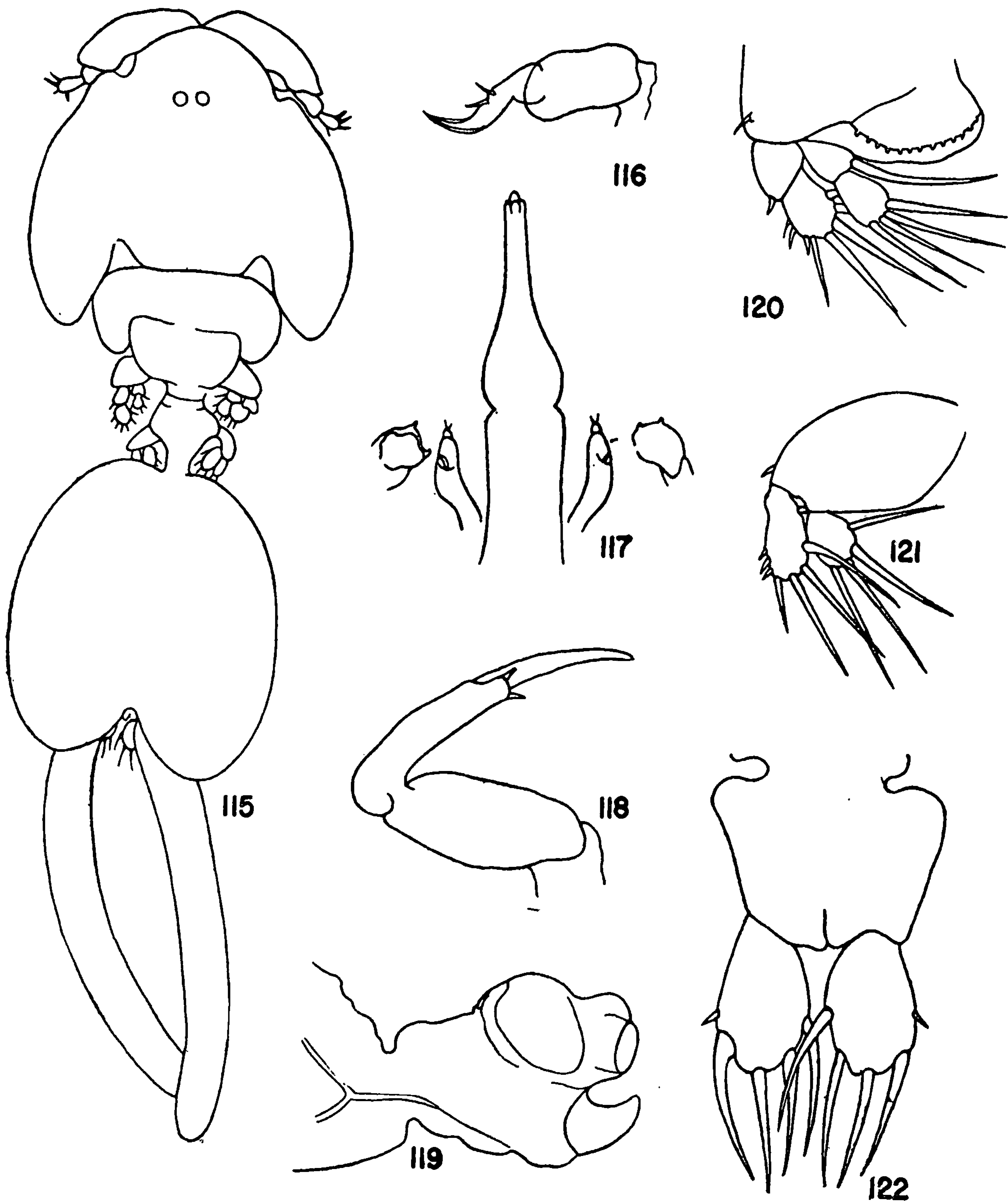
second antenna long and curved with a short spine on its antero-ventral margin. Second maxilla with a pad and a short spine at the base of the terminal claw. Basal joint of maxilliped with a raised adhesion pad and a small seta near the base of the terminal claw. Swimming legs of the usual type in the genus. Total length 6.4 mm..

*Male.* Not known.

*Remarks.* The dorsal plates of the fourth segment are characteristic and distinguish this new species from the few earlier known species in the genus.

*NESIPPUS* Heller

*Nesippus vespa* n. sp.



Figs. 115-122. *Nesippus vespa* n. sp.. Female. 115, entire animal; 116, second antenna; 117, mouth tube and second maxilla; 118, first maxilliped; 119, second maxilliped; 120, first leg; 121, fourth leg; 122, abdomen and anal laminae.

*Occurrence.* Six female specimens were found on the outer surface of the body of *Rhynchobatus* sp. bought in the Colombo market. These were collected and kindly presented by Dr. T. P. Gunawardena.

*Female* (Figs. 115-122). Cephalothorax a little wider than long, much less than half the entire length; frontal margin with well marked indentation; median lobe about a third of the width of the cephalothorax not extending as far as the posterior level of the lateral lobes. Second and third thoracic segments incompletely fused together, clearly separated laterally; posterior corners of the second segment produced into short, backwardly directed lobes along the sides of the third segment. Fourth thoracic segment narrow, without dorsal plates, connected to the genital segment by a slender "waist". Genital segment obcordate, about as long as the cephalothorax, with wide posterior median sinus. The hind end of the abdomen and the anal laminae visible in dorsal view in the posterior sinus of the genital segment. In ventral view, the single-segmented abdomen (Fig. 107) is seen to be trapesoidal in shape, broader anteriorly. The anal laminae are nearly as long as the abdomen, each lamina with four large non-plumose setae and a minute seta on its outer, lateral border. The second antenna (fig. 116) bears two accessory spines on its flanged claw. The second maxilla has a small terminal joint tipped with two minute spines (fig. 117), the basal joint also carries a spine. The second joint of the first maxilliped carries two terminal spines and a flanged claw (fig. 118). The terminal claw of the second maxilliped (fig. 119) is stout and the cup into which it fits is correspondingly large. The four pairs of thoracic legs are as usual in the genus. Total length 3 mm..

*Male.* Not known.

*Remarks.* This new species stands close to *N. crypturus* Heller (1865) and *N. gonosaccus* Heegaard (1943) but can be readily distinguished from them by the comparatively short genital segment. By the absence of dorsal plates on the fourth thoracic segment and by the occurrence of a posterior median indentation of the genital segment these three species form a group contrasted with the group observed by Heegaard (1962) to consist of *N. orientalis* Heller, *N. alatus* Wilson, *N. australis* Heegaard and *N. incisus* Heegaard.

### PERISSOPUS Steenstrup and Lutken

#### *Perissopus dentatus* Steenstrup and Lutken

*Perissopus dentatus* Steenstrup and Lutken, 1861, pp. 393, pl. 12, fig. 25; Oapart, 1953, pp. 662-663; Barnard, 1955, p.

*Chlamys incisus* Van Beneden, 1892, p. 227, pl. 2, figs. 1-10.

*Perissoppus communis* Rathbun, 1887, p. 560, pl. 29, figs. 6 and 7, pl. 30, figs. 1, 6, Wilson 1907, p. 354, pls. 17 and 18; Brian, 1924, p. 33.

*Perissopus communis* var. *stimpsoni* Schuurmans-Stekhoven, 1937, p. 12.

*Perissopus crenatus* Leigh-Sharpe, 1930, pp. 7, pl. 5, figs. 1-4, pl. 4, fig. 2.

*Perissopus manuelensis* Gnanamuthu 1951 b, pp. 9-12, pl., figs. 1-5 and 1951 a, pp. 1252-1255, figs. 45-47.

*Perissopus travencoriensis* Kurian, 1955, pp. 108-113, figs. 19-37.

*Perissopus serratus* Heegaard, 1962, pp. 175-176, figs. 154-161.

*Occurrence.* On the outer surface of the body of *Hemigaleus balfouri* Day and of *Scoliodon* spp. bought in the Colombo market.

*Distribution.* On many species of sharks belonging to different genera on both sides of the Atlantic and in the Indian and Pacific Oceans.

*Female* (Fig. 123). Cephalothorax narrow anteriorly, widest at its posterior angles, less than half the entire length. Dorsal plates of the second thoracic segment oblique, those of the third segment shorter, more rounded and touching, or slightly overlapping each other along the middle line, dorsal plates of the fourth segment also rounded but much larger; all dorsal plates usually with



more or less crenate posterior margins. Genital segment larger than the cephalothorax, with a pair of postero-lateral processes and a pair of posterior lobes with crenate (dentate) hind margins. Abdomen of a single segment, not visible dorsally. Total length 4.9 mm.

*Male.* Not known.

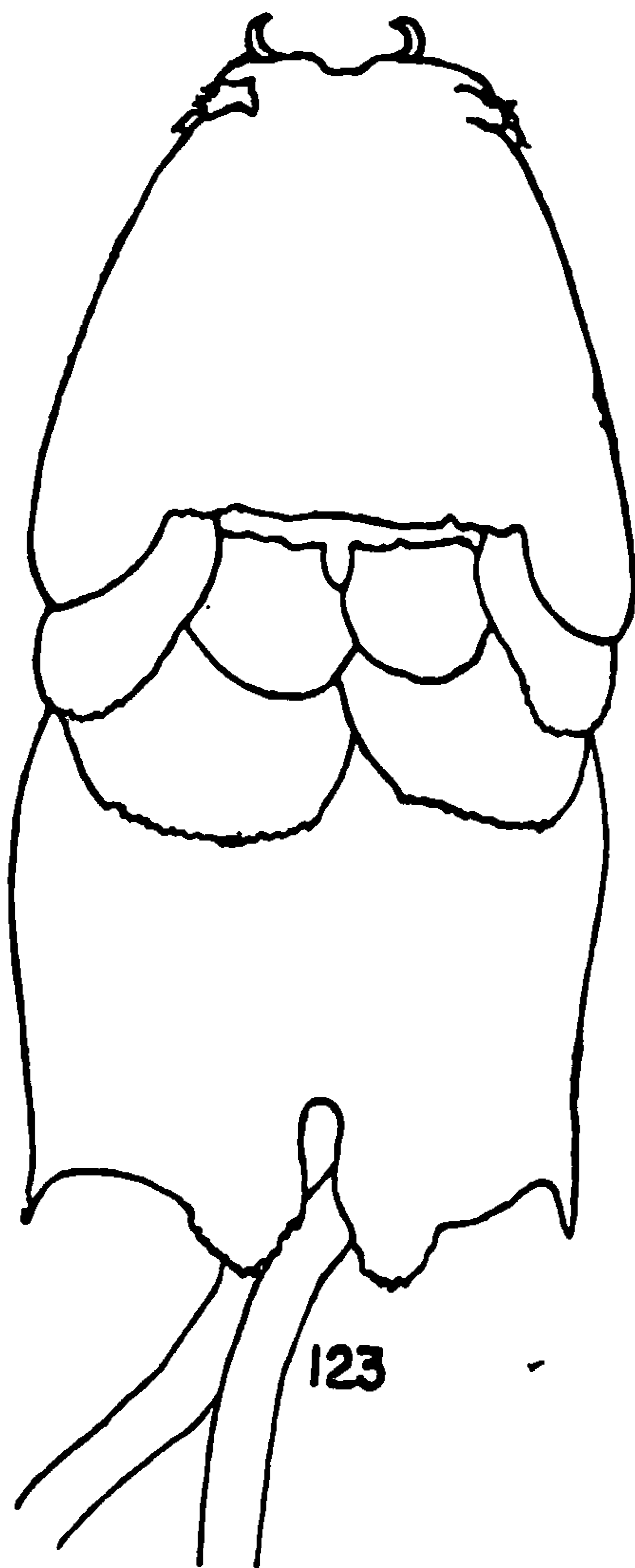


Fig. 123. *Perissopus dentatus* Steenstrup and Lutken. Female.

*Remarks.* Since Capart (1953) found that all the forms of *Perissopus* described under different specific names should be included in the single species *P. dentatus*, two other "new" species *P. manuelensis* Gnanamuthu and *P. travencoriensis* Kurian have been described from the Indian Ocean and another "new" species *P. serratus* Heegaard has been recorded from the Pacific Ocean. Capart's observations regarding the great range of variability in adaptations to many different kinds of hosts apply to these "new" species also. *P. dentatus* is thus found to be distributed throughout the warmer waters of the oceans.

#### Family ANTHOSOMIDAE

#### *LERNANTHROPUS* Blainville

#### *Lernanthropus shishidoi* (Shishido), Shiino

*Lernanthropus muyili* Shishido, 1898, pp. 120-126.

*Lernanthropus nudus* Bassett-Smith, 1898b, pp 368-371, pl. 12, figs. 2-4.

*Lernanthropus mugilis* (Nov Brian) Yamaguti, 1936a, pp. 13-15, pls. 7-8, figs. 79-88, Gussev, 1951, p. 434, fig. 26.

*Lernanthropus shishidoi* Shiino, 1955, pp. 64-68, figs. 6-7.

*Occurrence.* On the gill filaments of *Mugil* sp. bought in the Colombo market.

*Distribution.* On the gills of *Mugil cephalus* off Japan (Shishido, Yamaguti, Shiino); on the gills of *Mugil* sp. off Aden (Bassett-Smith); on the gills of *Mugil so-iuy* from the Soviet Union (Gussev).

*Female* (Fig. 124). Cephalothorax ovate, narrow anteriorly, antennal area further narrowed. Second thoracic segment incompletely marked off, forming a short neck between the cephalothorax and the rest of the body. Third and fourth segments of about the same length and about the same width, their regions being demarcated by a pair of shallow lateral notches. Fourth segment with a pair of small, linguiform dorsal plates which lie on either side of the genital segment, slightly overlapping it but not extending beyond the base of the abdomen. Caudal rami short and tapering, tipped with minute spines. Third legs folded and projecting ventrally at right angles to the long axis of the body. Fourth legs biramous, divided to the base, rami lanceolate and as long as the rest of the animal. Total length (including the fourth legs) 8.9. mm..

*Male.* Cephalothorax and second thoracic segment much the same as in the female. Third and fourth thoracic segments short, widest through the bases of the third legs which are uniramous lamellae. Fourth segment narrower, its legs biramous, twice as long and wide as the third legs. Total length (including fourth legs) 4.5 mm.. (Male not seen. Description according to Shiino.)

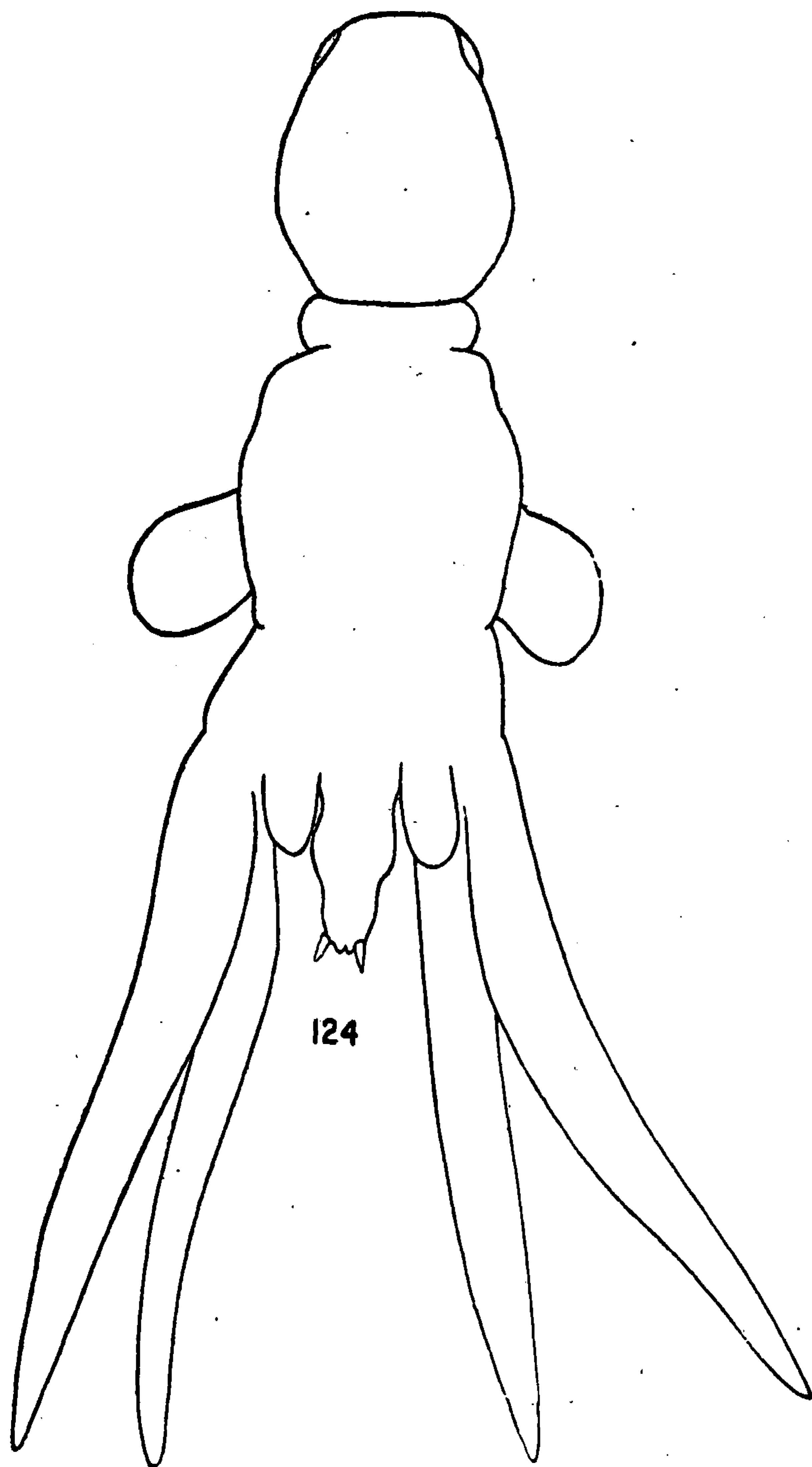


Fig. 124. *Lernanthropus shishidoi* (Shishido) Shiino. Female.

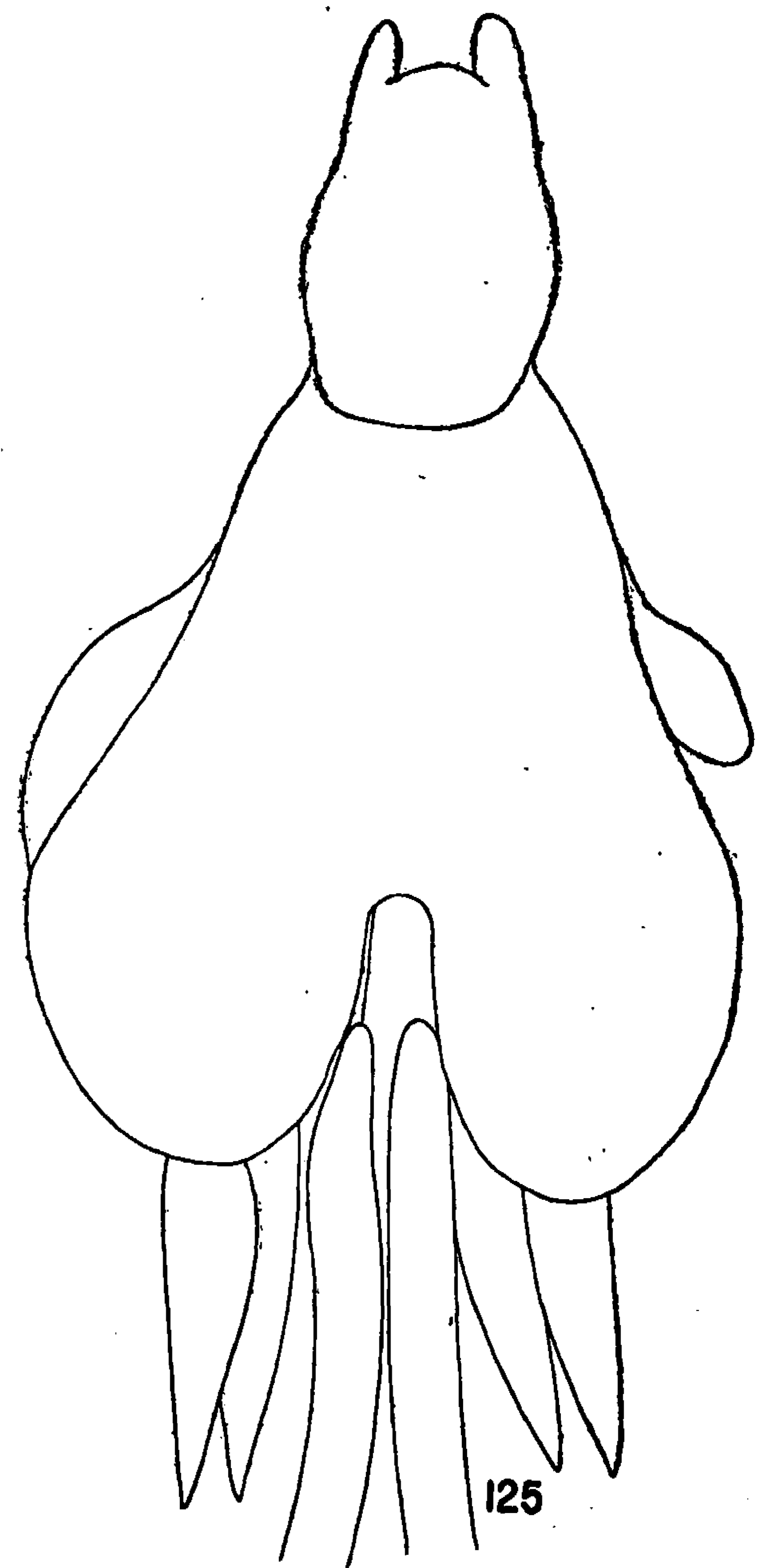
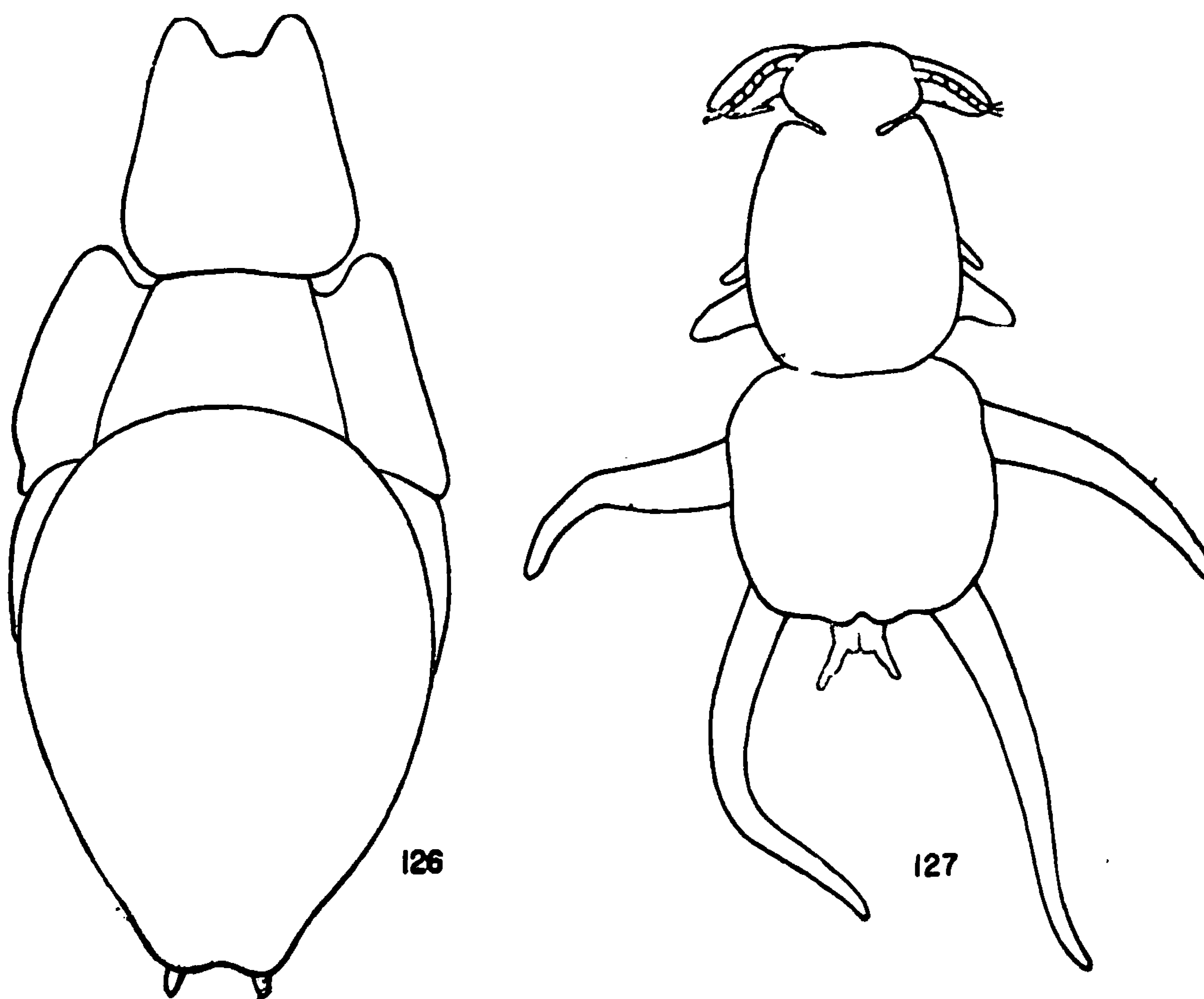


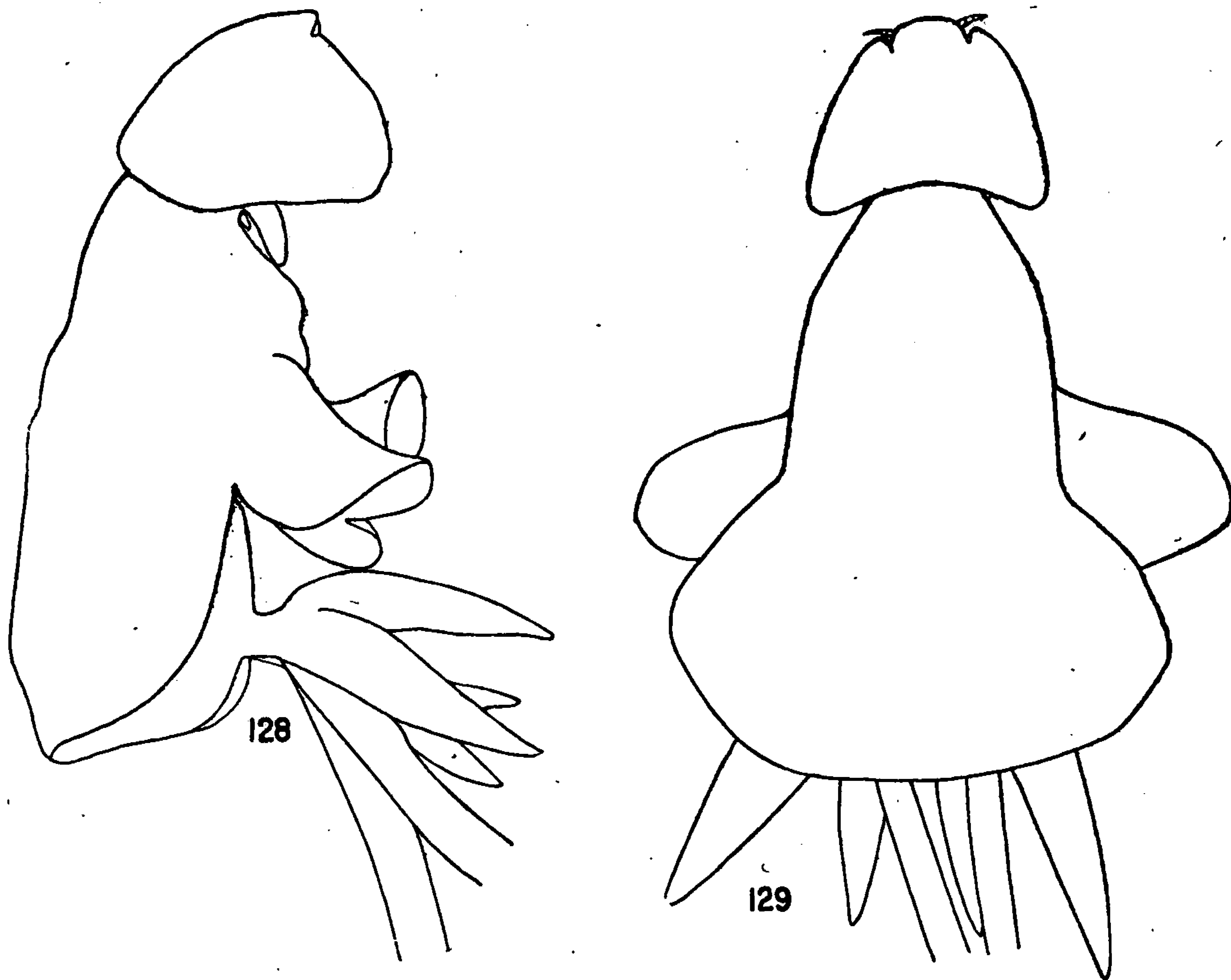
Fig. 125. *Lernanthropus sphyraenae* Yamaguti and Yamasu. Female.

*Lernanthropus sphyraenae* Yamaguti and Yamasu*Lernanthropus sphyraenae* Yamaguti and Yamasu, 1959, pp. 126-127, pl. 11, figs. 221-230.**Occurrence.** On the gills of *Sphyraena obtusata* Cuvier bought in the Colombo market.**Distribution.** On the gills of *Sphyraena pinguis* Gunther in Szagami Bay, Japan (Yamaguti and Yamasu).**Female** (Fig. 125). Head ovate, lateral margins turned ventrally and dorsal surface raised into a hump posteriorly. In dorsal view, first thoracic segment fused with the rest of the body which is narrow in front but flaring out behind with a deep median dorsal sinus which leaves the genital segment and abdomen uncovered. Fourth legs divided to their base, rami almost equal in length, reaching well beyond the posterior margin of the dorsal plate. Total length 3.9 mm..**Male.** Not known.*Lernanthropus priacanthi* Kirtisinghe*Lernanthropus priacanthi* Kirtisinghe 1956, pp. 17-18, figs. 9-10Figs. 126, 127. *Lernanthropus priacanthi* Kirtisinghe. 126. female; 127, male.**Occurrence.** On the gill filaments of *Priacanthus hamrur* (Forsk.) off Ceylon.**Distribution.** Not recorded elsewhere.**Female** (Fig. 126). Cephalothorax trapezoidal, narrow in front, with large ventrally produced flaps. Body dorsally convex, covered by a plate divided into anterior and posterior regions by a shallow transverse groove, anterior region short with wing-like lateral expansions, posterior region much longer, ovate, narrowing behind. Third legs flattened into broad laminae parallel with the ventral surface and covering most of it. Laminae of fourth legs broad, covered for the most part by the third legs, and either not projecting beyond the hind margin of dorsal plate or with only the tips of their exopodites extending beyond the hind margin of the dorsal plate. Abdomen concealed. Total length 3.7 mm..

*Male* (Fig 127). The oval antennal area, nearly twice as wide as long, separated from the rest of the cephalothorax by a neck-like constriction. Latter region much longer than wide and longer than the hind body. Genital segment covered by a squarish dorsal plate. Third and fourth legs uniramous, extending freely outwards from the antero-lateral and postero-lateral margins, respectively, of the genital segment. Abdomen with its tapering caudal rami visible in dorsal view. Total length (excluding the fourth legs) 1.8 mm..

*Lernanthropus villiersi* Delamere-Deboutteville and Nunes-Ruivo

*Lernanthropus villiersi* Delamere-Deboutteville and Nunes-Ruivo, 1954, pp. 147-151, Figs. 4-6



Figs. 128, 129. *Lernanthropus villiersi* Delamere-Deboutteville and Nunes-Ruivo. 128, side view and 129, dorsal view of female.

*Occurrence.* On the gill filaments of *Sillago sihama* (Forsk.) bought in the Colombo market.

*Distribution.* On the gills of *Pristipoma bennetti* Lowe and of *P. suillum* Cuv. and Val. from West Africa (Delamere-Deboutteville and Nunes-Ruivo).

*Female* (Figs. 128, 129). Antennal area marked off from the cephalothorax which, in dorsal view, is half-moon shaped in outline. First thoracic segment fused with the rest of the body. Dorsal plate covering the body made up of a narrow anterior portion and a wider but shorter posterior portion. Third legs folded at right angles to the ventral surface of the body. Abdomen not reaching to the posterior margin of the dorsal plate. Fourth legs divided almost to the base, rami flattened, lanceolate, almost of equal lengths and extending well beyond the posterior margin of the dorsal plate. Total length 3 mm..

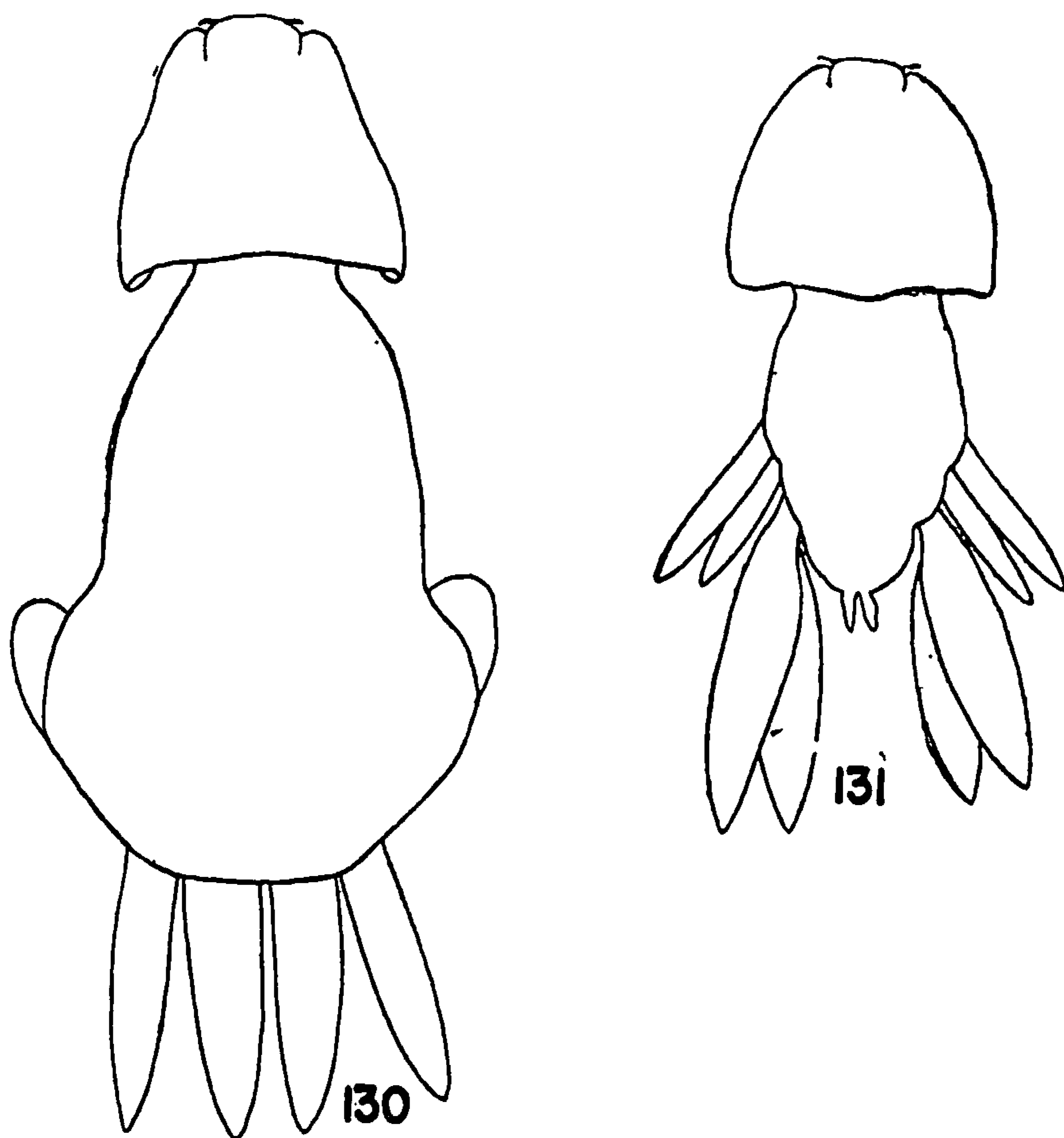
*Male.* Cephalothorax triangular in dorsal view, the rest of the the body roughly cylindrical with lateral constrictions. No dorsal plates. Total length 1.2 mm.. (Male not seen. Description from original authors)

*Remarks.* The females of the Ceylonese forms of this species have a head of a slightly different shape and the posterior portion of the dorsal plate is somewhat wider than in the figures of the West African specimens. The side views, however, of the specimens from the two localities are exactly alike. Details of their appendages are also in complete agreement.

This species bears a close resemblance to *Lernanthropus pristipomoidis* Kirtisinghe but the two species can be distinguished by the fact that in *L. pristipomoidis* the head is comparatively longer and the third legs are placed more posteriorly so that, in dorsal view, they lie at the sides of the wider portion of the dorsal plate. The anterior and posterior portions of the dorsal plate have different proportions. The genital segment and abdomen are more posterior in position. The caudal rami reach to the hind margin of the dorsal plate. The male does not have the "nearly cylindrical" shape described for *L. villiersi*.

*Lernanthropus pristipomoidis* Kirtisinghe

*Lernanthropus pristipomoidis* Kirtisinghe, 1937, pp. 450-452, figs. 99-107



Figs. 130, 131. *Lernanthropus pristipomoidis* Kirtisinghe. 130, female ; 131, male.

**Occurrence.** On the gill filaments of *Pristipomoides typus* Bleeker off Hikkaduwa

**Distribution.** Not recorded elsewhere.

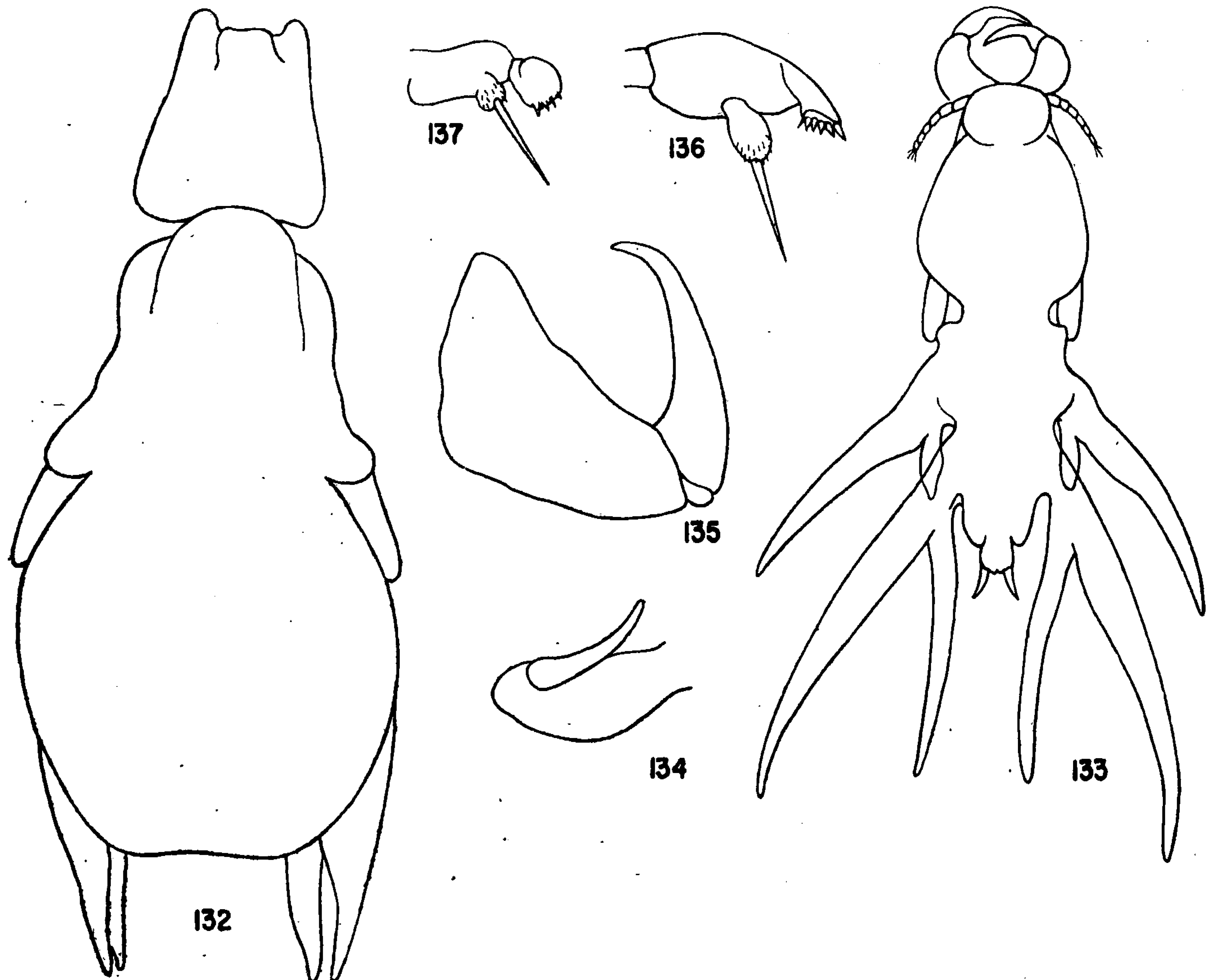
**Female** (Fig. 130). Cephalothorax roughly triangular with distinct antennal area and sides produced ventrally to form thin flaps. Dorsal plate of a single piece, divisible into anterior and posterior regions due to the presence of shallow marginal sinuses at the level of the third thoracic legs, anterior region narrowing in front, posterior region shorter and wider. Genital segment short, with convex sides. Abdomen shorter than genital segment. Caudal rami small, triangular and reaching to within a short distance of the hind margin of the dorsal plate. Third legs folded and projecting ventrally at right angles to the long axis of the body. Fourth legs divided to within a short distance of the base, rami flattened and acuminate, projecting well beyond the posterior margin of the dorsal plate. Total length 4 mm..

**Male** (Fig. 131). Cephalothorax semi-elliptical with scarcely developed ventral flaps. Thorax widest through the third segment. Genital segment short, not clearly separated from abdomen. Caudal rami small, tapering. Third and fourth legs biramous, divided almost to the base, rami, flattened, acuminate, those of the fourth legs twice as large as those of the third. Total length 2.5 mm.

*Lernanthropus giganteus* Kroyer

*Lernanthropus giganteus* Kroyer, 1863, p. 280, pl. 8, fig. 1; Wilson, 1913, p. 227, pl. 33, figs. 148-150 and pl. 35; Delamare-Déboutville and Nunes-Ruivo, 1954, p. 141.

*Lernanthropus trifoliatus* (not Bassett-Smith) Kirtisinghe, 1956, p. 18, fig. 11.



Figs. 132-137. *Lernanthropus giganteus* Kroyer. 132, female; 133-137, male; 133, entire animal; 134, first maxilliped; 135, second maxilliped; 136, first leg; 137, second leg.

**Occurrence.** On the gill filaments of *Caranx ignobilis* (Forsk.) on the Wadge Bank, of *C. sansun* (Forsk.) off Mannar, of *C. melampygus* Cuvier bought in the Colombo market. Specimens from the Wadge Bank and from Mannar were collected and kindly presented by Mr. S. Sivalingam.

**Distribution.** On various *Caranx* spp. in the tropical regions of the Atlantic and Indian Oceans (Delamare-Deboutville and Nunes-Ruivo).

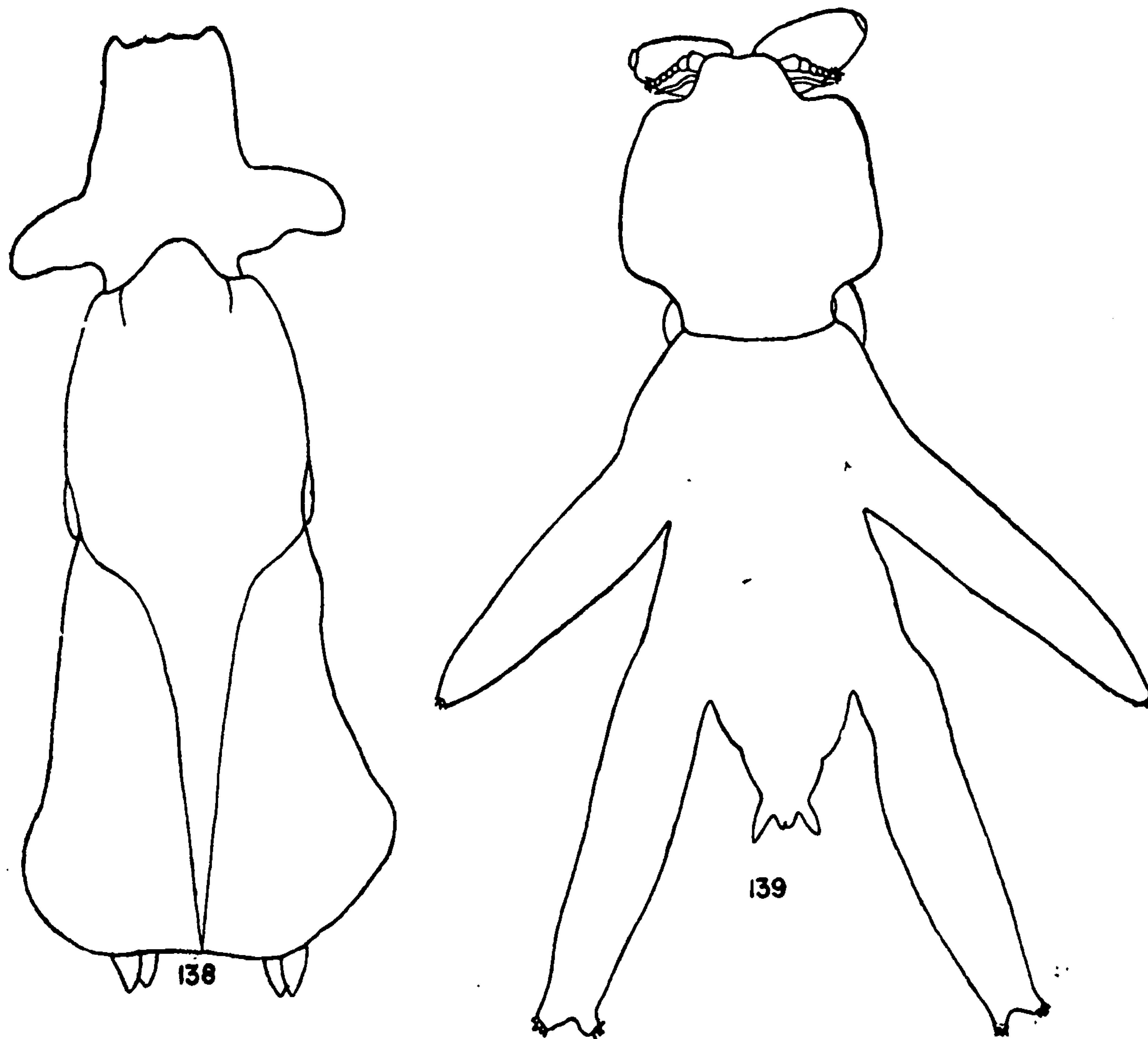
**Female** (Fig. 132). Cephalothorax a little longer than broad, trapezoidal in dorsal view. Antennal area distinct. Dorsal plate marked off into anterior and posterior portions by a pair of marginal indentations; anterior portion narrow in front flared behind, smaller than the large and round posterior portion which completely covers the genital segment and abdomen. Third pair of thoracic legs folded in the usual manner and projecting ventrally almost at right angles to the long axis of the body. Fourth legs divided to their base, rami flattened into broad laminae with pointed tips. Fifth legs also produced into laminae shorter than those of the fourth legs, not projecting as far as the posterior margin of the dorsal plate. Caudal rami lanceolate, stopping short of the ends of the fifth legs. Total length 8 mm..

**Male** (Figs. 133-137). Antennal area a transverse oval. Cephalothorax separated by a neck from the rest of the body which is less wide than the cephalothorax and possesses a pair of "shoulders". Lateral margins of the body slightly constricted between the bases of the third and fourth legs. No dorsal plate. Genital segment short, bowl-shaped. Abdomen short, with a pair of tapering caudal rami. Second antenna with a stout terminal claw. First and second thoracic legs with a long spine

on the endopodite and short spines on the exopodite. Third and fourth legs biramous, divided almost to the base; endopod of third leg very short, exopod long; endopod of fourth leg only a little shorter than the exopod; endopods of both legs directed backwards parallel with the sides of the body while the exopods are directed obliquely backwards. Total length 2 mm..

*Lernanthropus cornutus* Kirtisinghe

*Lernanthropus cornutus* Kirtisinghe, 1937, pp. 448-450. figs. 88-98 Capart, 1953, p. 649.  
Delamare-Deboutteville and Nunes-Ruivo, 1954, p. 141.



Figs. 138, 139. *Lernanthropus cornutus* Kirtisinghe. 138, female; 139, male.

*Occurrence.* On the gill filaments of *Tylosurus leiesurus* (Bleeker) off Hikkaduwa.

*Distribution.* On *Strongylura crocodila* off French West Africa (Capart; Delamare-Deboutteville and Nunes-Ruivo).

*Female* (Fig. 138). Cephalothorax longer than wide, produced behind into a pair of short lateral horns projecting at right angles to the long axis of the body. Sides of cephalothorax produced into ventral flaps of considerable size. Body covered by a dorsal plate divided into anterior and posterior regions by shallow marginal sinuses, anterior portion with convex sides and a dorsal hump, posterior portion longer and widening behind. Abdomen not visible in dorsal view. Third legs folded and extending ventrally at right angles to the long axis of the body. Fourth legs biramous, rami flattened, acuminate, projecting but little beyond the posterior margin of the dorsal plate. Total length 5 mm.

*Male* (Fig. 139.) Cephalothorax about as wide as long with an antennal area and nearly parallel sides, narrowing posteriorly to form a neck connecting with the third thoracic segment. Third and fourth segments as wide as the cephalothorax. Genital segment short, narrower than the fourth segment. Abdomen conical, little longer than the genital segment. Caudal rami short and tapering. Third legs uniramous, long, extending obliquely backwards, tapering and armed terminally with a circlet of minute spines. Fourth legs a little stouter and longer, cylindrical and divided distally into two short stumps tipped with spines. Total length 2.5 mm..

*Lernanthropus latis* Yamaguti

*Lernanthropus latis* Yamaguti, 1954, pp. 389-391, pl. 5, figs. 42-48.

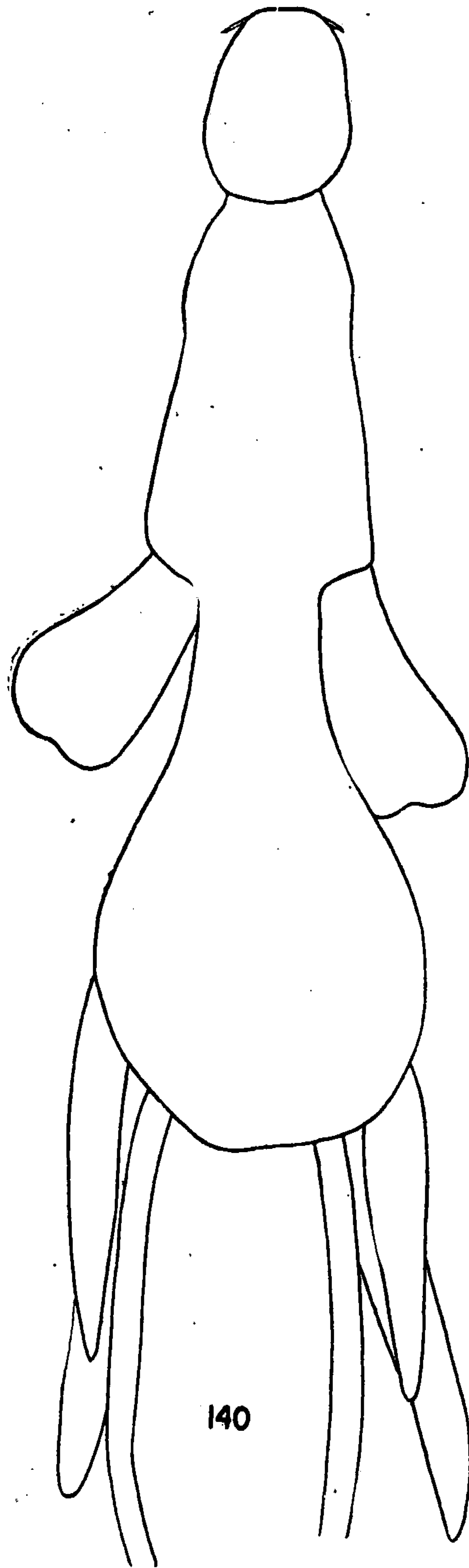


Fig. 140. *Lernanthropus latis* Yamaguti. Female.

*Occurrence.* On the gill filaments of *Lates calcarifer* (Bloch) bought in the Colombo market.

*Distribution.* On the gills of *Lates calcarifer* at Macassar, Celebes (Yamaguti).

*Female* (Fig. 140). Head ovate, longer than wide. First thoracic segment fused with the rest of the body. Dorsal plate long and narrow, divided into anterior and posterior regions by wide bays behind the level of the bases of the third legs so that it can be described as having the shape of a violin.



Third legs extending backwards obliquely to the ventral surface. Fourth legs reaching well beyond the posterior margin of the dorsal plate, their endopodites longer than the exopodites. Abdomen short, cup-shaped. Caudal rami longer than the abdomen. Second antenna with stout conical tooth on inner side of basal joint in addition to the terminal claw. Length (exclusive of fourth legs) 6.5 mm.

*Male.* Cephalothorax more rounded than in female, wider than the rest of the body. First thoracic segment completely fused with the head. Genital segment and abdomen tapering rapidly backward. Caudal rami tapering and directed obliquely backwards. Length 2mm.. (Male not seen. Description from Yamaguti.)

### CAETRODES Wilson

#### *Caetrodes pholas* Wilson

*Caetrodes pholas* Wilson, 1906, p. 203, pl. 4, figs. 48-57.

*Occurrence.* On the gill filaments of *Arothron stellatus* (Bloch) on the Pearl Banks (Wilson).

*Distribution.* Not recorded elsewhere.

*Female.* Head wider than the rest of the body and about two-fifths of the entire length, covered dorsally by a strongly arched carapace which is divided into right and left halves by a median ridge. Posterior margin of carapace prolonged backwards as a thin, flattened plate overlapping the anterior thoracic region. Thoracic segments incompletely separated from one another. Genital segment and abdomen together forming a hemisphere. Abdomen of a single segment with two large, cylindrical caudal rami which are longer than the abdomen. Only the first two pairs of swimming legs, both biramous, rami two-jointed. Total length 1.15 mm.. (Not seen. Description from Wilson.)

*Male.* Not known.

### Family DICHELESTHIDAE

#### HATSCHEKIA Poche

*Hatschekia* sp. Wilson, 1906, p. 205 pl. 5, figs. 58-60.

*Occurrence.* In the stomach of *Scoliodon mulleri* on the Pearl Banks (Wilson).

*Distribution.* Not recorded elsewhere.

*Female.* Head transversely elliptical, one and half times as wide as long, about a fifth of the entire length. First free thoracic segment short, narrower than head. Second thoracic segment longer and wider than the first. Trunk region as wide as the second segment, about half the entire length. Genital segment produced into a pair of postero-lateral lobes on either side of, and as large as, the abdomen. Caudal rami minute. Two pairs of biramous thoracic legs. Total length 1.07 mm.. (Not seen. Description from Wilson.)

*Male.* Not known.

### LAMPROGLENA Nordmann

#### *Lamproglena chinensis sprostoni* new name

*Lamproglena* sp. Kirtisinghe, 1950, p. 86, figs. 52-60.

*Occurrence.* On the gill filaments of *Ophiocephalus striatus* Bloch bought in the Colombo market.

*Distribution.* Subspecies not recorded elsewhere. Species found on *Ophiocephalus argas* in China and Japan (Yu, 1937; Yamaguti, 1939) and on *Channa asiaticus* in the Shanghai region (Sproston, Yin and Hu, 1950).

*Female* (Fig 141). Head separated by lateral constrictions into an anterior region and a slightly shorter and wider posterior region. First thoracic segment free, very short and overlapped by the head. Second to fourth segments fused into a subcylindrical trunk. Fifth segment free, short and as wide as the first thoracic segment. Genital segment of about the same width as the fifth segment but longer. Abdomen of three segments, first and second segment of equal size, third segment about as long as the two anterior segments taken together. Caudal rami with one large and three smaller spine-like setae at the tip, a seta on outer margin and another on dorso-medial side. Total length 3.4 mm.

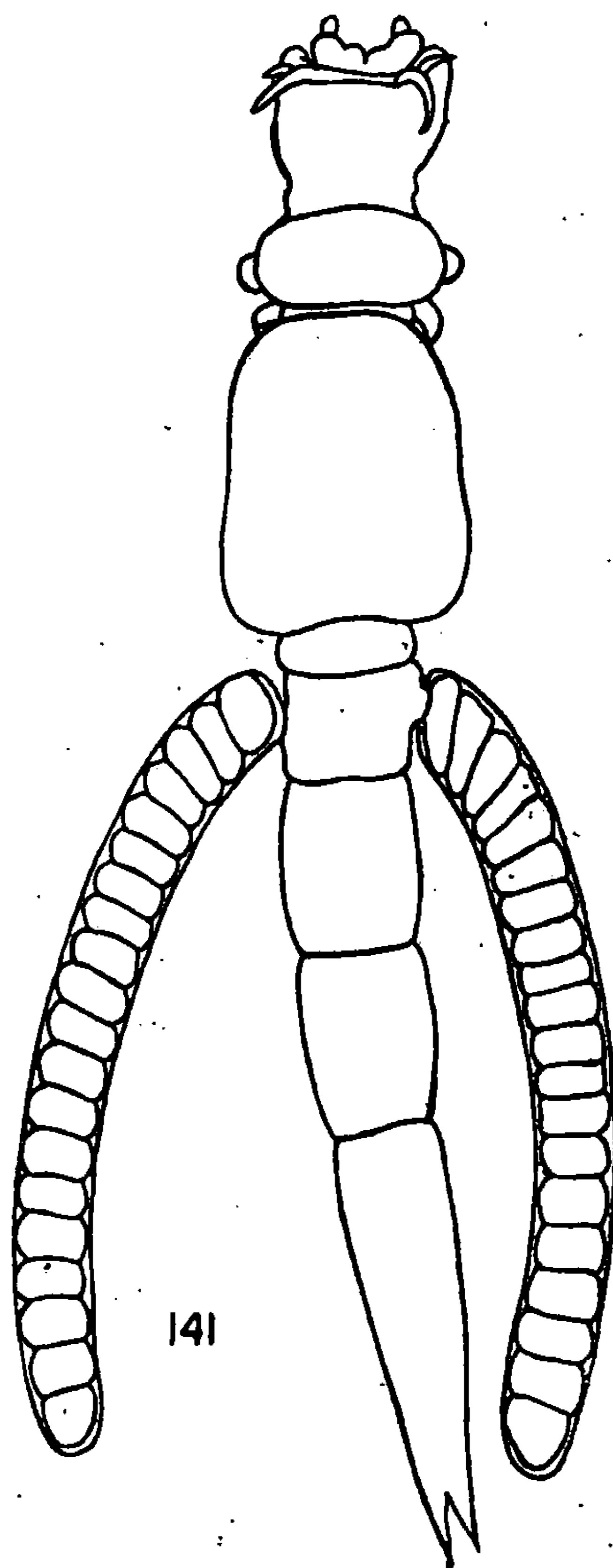


Fig. 141. *Lamproglena chinensis sprostoni* Kirtisinghe. Female.

*Male*. Not known.

*Remarks*. This subspecies was created on the observation of Sproston, Yin and Hu (1950) who have noted that the Ceylonese form varies slightly from the far eastern form.

#### Family PSEUDOCYCNIDAE

#### *PSEUDOCYCNUS* Heller

#### *Pseudocycnus appendiculatus* Heller

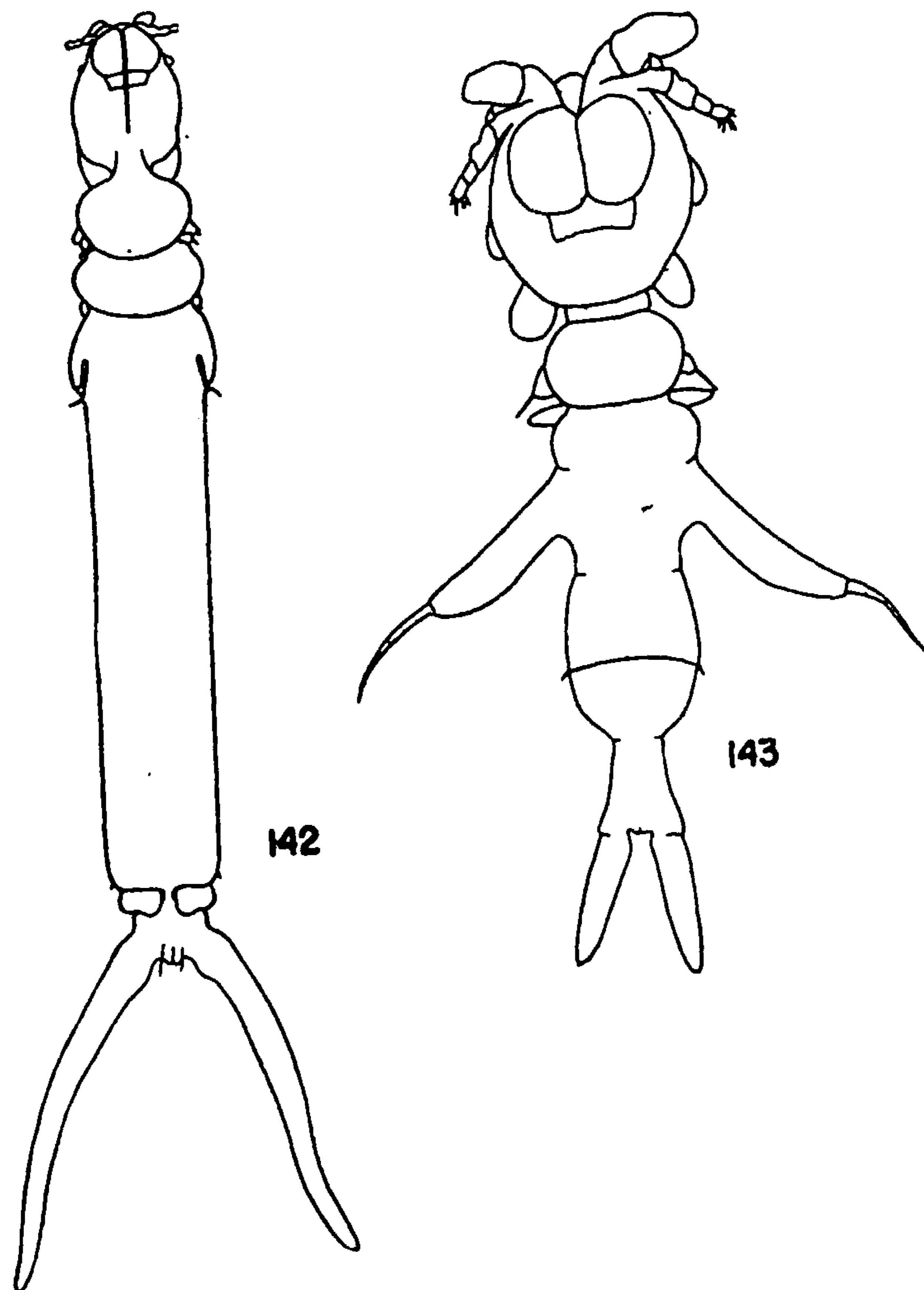
*Pseudocycnus appendiculatus* Heller, 1865, p. 218, pl. 22, fig. 7; Bassett-Smith, 1898b, p. 368; Brian, 1912, p. 15; Wilson, 1922, p. 75, pl. 12, and 1932, pp. 474-75, fig. 285a; Leigh-Sharpe, 1930, p. 1, pl. 1, figs. 1-4, pl. 2, fig. 1; Kirtisinghe, 1935, pp. 336-39, figs. 10-25; Klinberg, 1942, pp. 1-5; Nunes-Ruivo, 1954, p. 20; Shiino, 1959a, pp. 325-33, figs. 24-25.

*Pseudocycnus thynnus* Brandes, 1955, pp. 190-98, pls. 1 and 2.

*Occurrence.* On the gills of *Euthynnus affinis* (Cantor) off Ceylon (Kirtisinghe).

*Distribution.* On the gills of several species of tunnies and bonitos in the Indian Ocean (Bassett-Smith), in the Mediterranean (Richiardi), in the Atlantic (Heller, Brian, Wilson, Klinberg, Nunes-Ruibo, Brandes) and in the Pacific (Shiino).

*Female* (Fig. 142). Cephalothorax ovate, a little longer than wide, narrowing anteriorly. First thoracic segment reduced to a short neck connecting the head with the body. Second and third segments distinct, short, a little wider than the cephalothorax. Fourth segment fused with the remaining body segments to form the long cylindrical trunk which accounts for about four-fifths of the total length (not including the caudal rami). The trunk is broadest at its anterior end due to the lateral bulges of a pair of lobe-like structures enclosed by the general chitinous layer covering the body. A pair of small genital lobes lie posterior to the trunk. Abdomen is not distinctly marked off anteriorly and bears a pair of long, tapering caudal rami, about half as long as the trunk. Total length 11 mm..



Figs. 142, 143. *Pseudocycnus appendiculatus* Heller. 142, female ; 143, male.

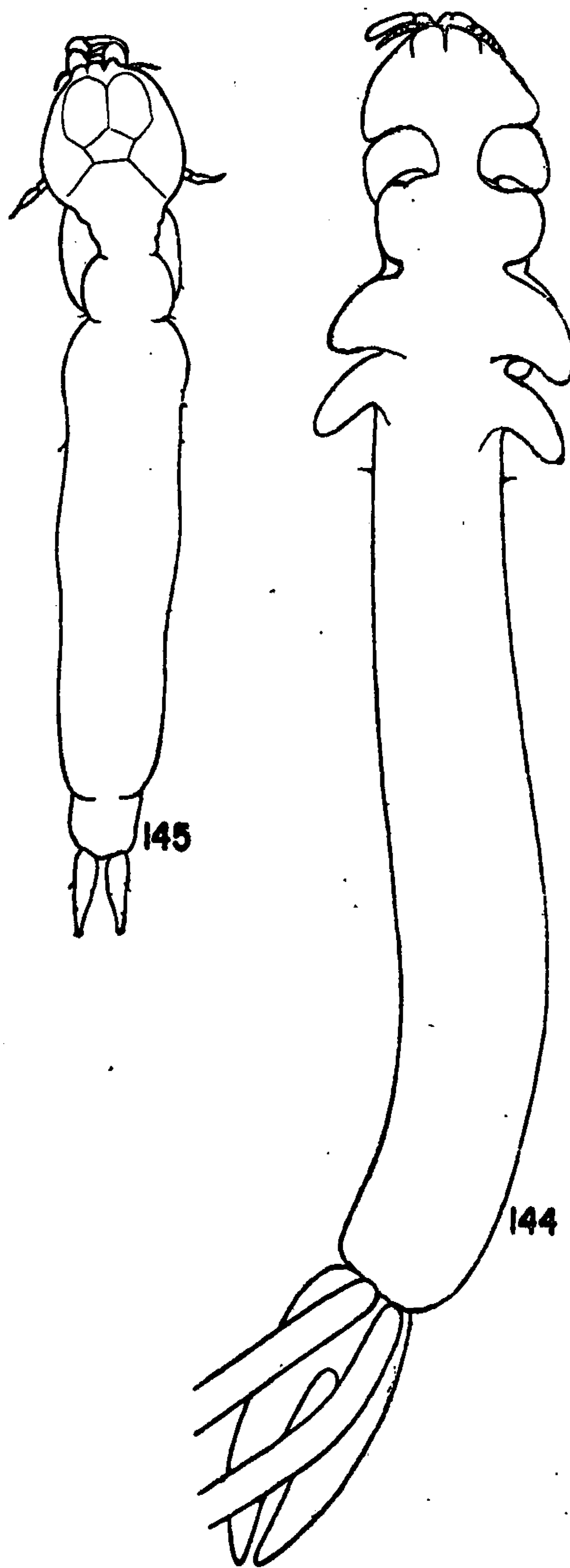
*Male* (Fig. 143). Cephalothorax almost circular in outline. First thoracic segment forming a narrow neck between head and trunk. Second and third thoracic segments of about equal width but not as wide as the cephalothorax. Fourth segment drawn out laterally into a pair of stout, tapering processes projecting obliquely outwards and backwards, each process tipped with a long spine. A pair of minute spines on the lateral margins of the trunk. Genital segment bowl-shaped. Abdomen longer than wide, narrowed anteriorly. Caudal rami tapering, longer than abdomen. Length 3.5 mm..

*Pseudocycnus armatus* (Bassett-Smith)

*Helleria armata* Bassett-Smith, 1898, pp. 10-11, pl. 5, figs. 1 and 2.

*Cybicola armata* Bassett-Smith, 1898b, p. 371 ; Kirtisinghe, 1935, pp. 339-342, figs..

*Pseudocycnus armatus* Kirtisinghe, 1937, pp. 453-456, figs. 1-11 ; Gnanamuthu, 1950 b, pp. 276-282.



Figs. 144, 145. *Pseudocycnus armatus* (Bassett-Smith). 144, female ; 145, male.

**Occurrence.** On the gills of *Cybium commersoni* (Lacepede) off Ceylon (Kirtisinghe)

**Distribution.** On the gills of *Cybium guttatum* at Bombay (Bassett-Smith) and of *C. commersoni* off Madras (Gnanamuthu).

**Female** (Fig. 144). Head semi-elliptical. First thoracic segment forming a narrow neck connecting the head with the second thoracic segment. Second, third and fourth thoracic segments with lateral processes, those of second segment short and rounded, those of third segment more drawn out and those of the fourth segment the longest. Fourth segment fused with the hinder body segments to form the cylindrical trunk. Genital segment indistinct. Abdomen narrow, fused with the genital segment and bearing a pair of tapering caudal rami. Length 8.5 mm..

**Male** (Fig. 145). Head short, nearly circular in outline, connected to the second thoracic segment by a narrow neck formed of the first thoracic segment. Second segment not completely marked off from the first and third segments. Third segment nearly as wide as the head, fused with the succeeding body segments to form the cylindrical trunk. Abdomen narrower than the trunk, the tapering caudal rami a little longer than the abdominal segment. Length 2.6 mm..

Family LERNAEIDAE

CARDIODECTES Wilson

*Cardiodectes anchorellae* Brian and Gray

*Cardiodectes anchorellae* Brian and Gray, 1928, pp. 1-8, pls. 2-5.

*Cardiodectes medusaeus* (not Wilson) Kirtisinghe, 1950, p. 84, figs. 36-39.

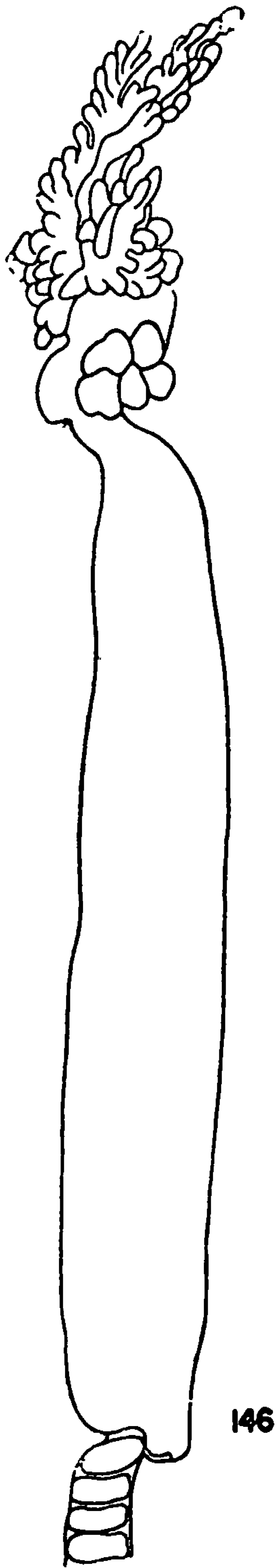


Fig. 146. *Cardiodectes anchorellae* Brian and Gray. Female.

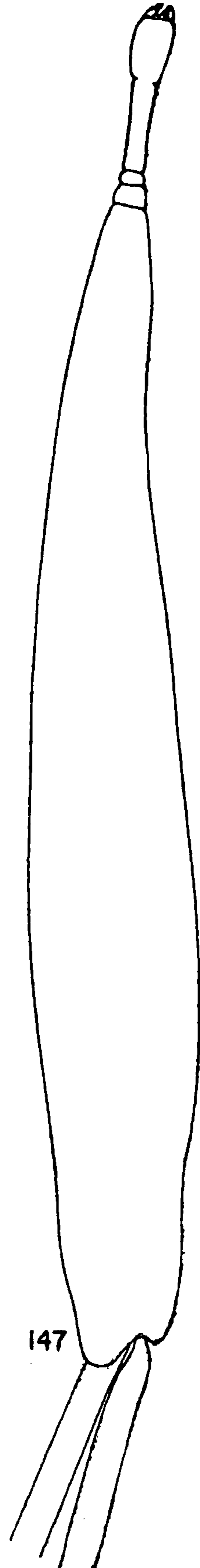


Fig. 147. *Peniculus scomberi* Gnanamuthu. Female.

*Occurrence.* At the base of the caudal fin, less frequently at the base of the anal fin of *Thrissocles hamiltoni* (Gray) bought in the Colombo market.

*Distribution.* On *Stolephorus tri* off Madras (Brian and Gray).

*Female* (Fig. 146). Cephalothorax more or less rectangular in dorsal view. Frontal processes composed of numerous closely packed stalks, branching repeatedly and terminating in short, blunt twigs. Dorso-lateral regions of cephalothorax produced into a group of four or five rounded lobes on each side. Neck short, bent in a sigmoid curve in the dorso-ventral plane having a ventral knob just behind the cephalothorax. Posteriorly, the neck passes quickly into the much wider trunk. The latter is straight and nearly cylindrical, several times longer than the neck. The short abdomen bears a slight posterior indentation. Length 6 mm.

*Male.* Not known.

*Remarks.* In the original description of this parasite, the paper by Brian and Gray gives the name of the host fish as *Anchorella tri*. Obviously this is a printer's error for *Anchoviella tri*. But for this error the name of the parasite would have been the more appropriate one of *Cardiodectes anchoviellae*.

### PENICULUS Nordmann

#### *Peniculus scomberi* Gnanamuthu

*Peniculus scomberi* Gnanamuthu, 1951c, pp. 224-226, fig. 2.

*Occurrence.* Several females attached to the fin rays of *Rastrelliger kanagurta* (Cuvier) and *Gazza minuta* (Bloch) bought in the Colombo market. Collected and kindly presented by Dr. T. P. Gunewardena.

*Distribution.* Attached to the fin rays of *Rastrelliger kanagurta* (= *Scomber microlepidotus*) off Madras (Gnanamuthu).

*Female* (Fig. 147). Cephalothorax oval. Neck longer than, but only about half as wide as, the cephalothorax. First three segments of the neck uniformly cylindrical, fourth segment expanding to twice their width and separated behind by a slight constriction from the trunk. Latter nearly six and a half times as long as its greatest width. Abdomen a slight posterior prominence with three setae on each side of its hind end. Length 11 mm.

*Male.* Not known.

### PENICULISA Wilson

#### *Peniculisa furcata* (Kroyer)

*Peniculus furcatus* Kroyer, 1863; Wilson, 1906, pp. 206-208; pl. 5, figs. 61-66.

*Peniculisa furcata* Wilson, 1917, p. 45; Leigh-sharpe, 1934, p. 28, fig. 26.

*Occurrence.* On *Tetrodon* sp. on the Pearl Banks (Wilson).

*Distribution.* On *Holocanthus* sp. off Mauritius (Kroyer) and on *Ostracion punctatus* off the Dutch East Indies (Leigh-Sharpe).

*Female.* Head elliptical, about twice as long as wide. First three thoracic segments free, narrower than head. Fourth thoracic segment fused with the genital segment to form the trunk of nearly twice the width of the head and twice as long as wide. Postero-lateral corners of genital segment produced into flattened processes, either straight or slightly divergent and nearly as long as the rest of the animal. Abdomen small. Caudal rami papillate, each ramus tipped with three small non-plumose setae. Length 2.35 mm.

*Male.* Head and free thoracic segments as in female. Genital segment relatively longer and narrower, nearly half the entire length. Postero-lateral processes of genital segment, only a third as long as in the female, spatulate, somewhat enlarged at the tips. Abdomen shorter, caudal rami and setae longer than in the female. Length 1.6 mm.. (Not seen. Description from Wilson.)

*LERNAEA* Linn.

*Lernaea cyprinacea chakoensis* (Gnanamuthu)

*Lernaea chakoensis* Gnanamuthu, 1951, pp. 143-147, figs. 1-8



Fig. 148. *Lernaea cyprinacea chakoensis* (Gnanamuthu).  
Female.

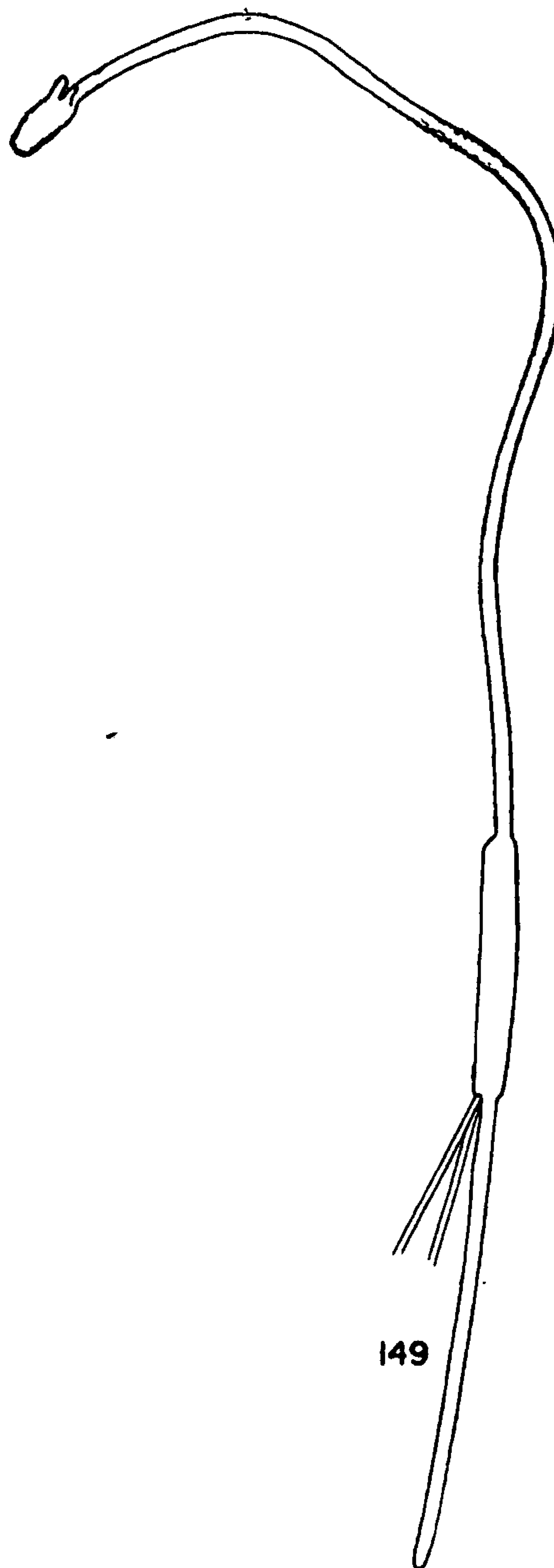


Fig. 149. *Lernaeenicus longiventris* Wilson. Female.

*Occurrence.* On the body of *Osphronemus goramy* Lacepede in fresh water ponds and lakes in Colombo. Collected and kindly presented by Dr. T. P. Gunewardena.

*Distribution.* On the body of *Oryzias rubristigma*, *Gobius griseus*, *Catla catla* and *Osphronemus goramy* at Madras (Gnanamuthu).

*Female* (Fig. 148). Head produced into four horns which are simple in juveniles but branched in adults. Neck slender, passing gradually, behind the third pair of legs into the more thickened trunk. Latter with a pair of pregenital lobes at its hind end. Abdomen a blunt lobe bearing the caudal rami terminally. Length 6.2 mm..

*Male.* Not known.

*Remarks.* Hu (1948) found that *Lernaea cyprinacea* Linn. has evolved into four sub-species in the far eastern region. Gnanamuthu's *L. chakoensis* appears to be still another subspecies of *L. cyprinacea* in the region of India and Ceylon.

### LERNAEENICUS Lesueur

#### *Lernaeenicus longiventris* Wilson

*Lernaeenicus longiventris* Wilson, 1917, p. 66, pl. 7, and 1932, pp. 483-484, fig. 290; Pearse, 1951, p. 364 and 1952, p. 30.

*Occurrence.* On the body of *Caranx ignobilis* (Forsk.) on the Pearl Banks off Ceylon. Collected and kindly presented by Mr. S. Sivalingam. On the body, below the base of the dorsal fin of *Gnathodon speciosus* (Forsk.) bought in the Colombo market.

*Distribution.* On the body of *Coryphaena hippurus* and several other species of host fish from the Atlantic coast of the United States (Wilson, Pearse).

*Female* (Fig. 149). Head produced into three knobs, one posterior and the other two posterolateral. Neck slender and very long. Trunk only about a fourth of the length of the neck, four times as long as wide. Abdomen about half as long as the neck and with a diameter slightly less than that of the neck. Length 40 mm..

*Male.* Not known.



Fig. 150. *Lernaeenicus hemirhamphi* Kirtisinghe. Female.

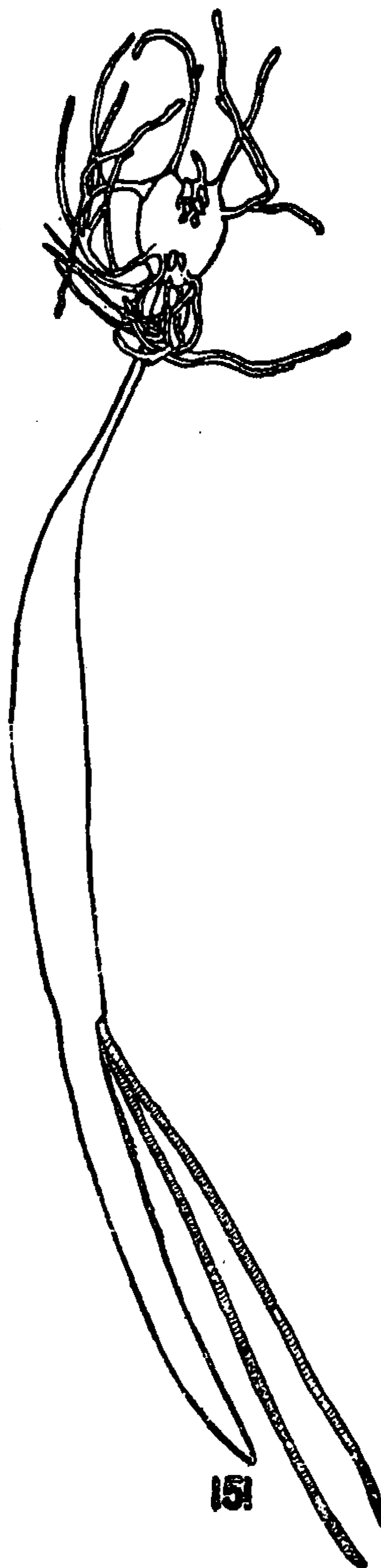


Fig. 151. *Lernaeenicus ramosus* Kirtisinghe. Female.



*Lernaeenicus hemirhamphi* Kirtisinghe

*Lernaeenicus hemirhamphi* Kirtisinghe, 1933, pp. 550-551, figs. 4-7 ; Gnanamuthu, 1953 ; Heegaard, 1962, p. 185, figs. 207-208.

*Occurrence.* On the body of *Hyporhamphus xanthopterus* (Valenciennes) (= *Hemirhamphus xanthopterus* Cuvier and Valenciennes) (Kirtisinghe).

*Distribution.* On the above host fish off Madras (Gnanamuthu) and on *H. intermedius* off South Australia (Heegaard).

*Female* (Fig. 150). Head almost as long as broad, somewhat depressed anteriorly, with a convex front margin and drawn out posteriorly into three short horns, a median horn and two lateral horns, very nearly at right angles to the median horn. Neck long, cylindrical, passing imperceptibly into the trunk which is about three times the neck in diameter. Abdomen cylindrical, about half the length of the trunk and of about the same diameter as the neck. Length 42 mm..

*Male.* Not known.

*Lernaeenicus ramosus* Kirtisinghe

*Lernaeenicus ramosus* Kirtisinghe, 1956, p. 20, figs. 12-14 ; Shiino, 1958a, pp. 84-88, figs. 5-7.

*Occurrence.* On the body of *Epinephelus morrhua* (Valenciennes) off Ceylon (Kirtisinghe).

*Distribution.* On the body of *Epinephelus tsirimenaria* off Japan (Shiino).

*Female* (Fig. 151). Cephalothorax roughly hemispherical, ventral surface flat. Attachment pads in paired groups, one group on each side of the mouth and a pair of pads further back along the ventral surface of the head. Horns in two sets, one set consisting of three pairs of branched horns arising from the anterior, antero-lateral and postero-ventral regions of the head, and the other set consisting of a pair of much branched horns arising from the thorax dorsally and curving backwards and downwards below the base of the neck. Branches of all the horns lie nearly in one plane between the skin and body muscles of the host. Neck narrow, cylindrical, passing imperceptibly into the stouter trunk. Abdomen a little shorter and narrower than the trunk. Length 18. mm..

*Male.* Not known.

*Lernaeenicus seeri* Kirtisinghe

*Lernaeenicus seeri* Kirtisinghe, 1934, pp. 173-175, figs. 18-21.

*Occurrence.* On the body of *Acanthocybium solandri* (Cuvier) off Ceylon (Kirtisinghe).

*Distribution.* Not recorded elsewhere.

*Female* (Fig. 152). Head wider than long connected by a slender stalk to the thorax which anteriorly is of the same diameter as the head but widens posteriorly and bears a pair of chitinous horns on each side, the horns of a pair placed one below the other so that all four horns are in the same transverse plane. Neck inserted nearly at right angles to the thorax, cylindrical, and separated from the

genital segment by a slight constriction. Trunk twice that of the neck in diameter. Abdomen very long, about four and a half times as long as the trunk and of about the same diameter as the neck. Length 99 mm..

*Male.* Not known.



Fig. 152. *Lernaenicus seeri* Kirtisinghe. Female.

Fig. 153. *Pennella instructa* Wilson. Female.

### PENNELLA Oken

#### *Pennella instructa* Wilson

*Pennella instructa* Wilson, 1917, p. 122, pl. 18 and 1932, p. 491, fig. 295 c. Yamaguti, 1939, p. 483, pl. 33, fig. 193. Heegaard, 1962, p. 186.

*Pennella zeylanica* Kirtisinghe, 1932, pp. 137-139, figs. 1-5.

*Occurrence.* On the body of *Histiophorus gladius* (Broussonet) off Ceylon (Kirtisinghe).

*Distribution.* On the common swordfish off the eastern coast of the United States (Wilson), on *Xiphias gladius* off Japan (Yamaguti) and on *Istiompax australis* off the coast of New South Wales, Australia (Heegaard).

*Female* (Fig. 153). Head almost spherical, its anterior end slightly concave, a little inclined downwards. Two sets of pads, inner set surrounding the mouth, enclosed within the larger outer set. A pair of gradually tapering horns. Neck long, of uniform diameter, passing insensibly into the trunk. Trunk much shorter than the neck. Abdomen narrower and shorter than the trunk. Abdominal processes much branched. Length 137 mm..

*Male*. Not known.

*Remarks*. Although I described (Kirtisinghe, 1932) the Ceylonese specimens in a species distinct form *P. instructa* Wilson, having now had the opportunity of examining a larger number of these specimens, I believe they should be included in Wilson's species.

*Pennella biloba* Kirtisinghe

*Pennella biloba* Kirtisinghe, 1933, pp. 548-550, figs. 1-3.

*Occurrence*. On the body of *Makaira indica* (Cuvier) off the west coast of Ceylon, at Hikkaduwa and Negombo. (Kirtisinghe).

*Distribution*. Not recorded elsewhere.

*Female* (Fig. 154). Head twice as broad as long, marked dorsally by two grooves into a median triangular area and two lateral lobes. Anterior end of head inclined ventrally so that the head appears wedge-shaped in side view. Papillae on ventral surface of head in two groups, one group around the mouth, the other more peripheral. Two horns arising from the thorax and directed obliquely backwards. Neck separated from the trunk by a slight constriction. Trunk of a larger diameter but of about the same length as the neck. Abdomen a little longer than half the length of the trunk, abdominal processes short, unbranched, closely packed. Length 32 mm..

*Male*. Not known.

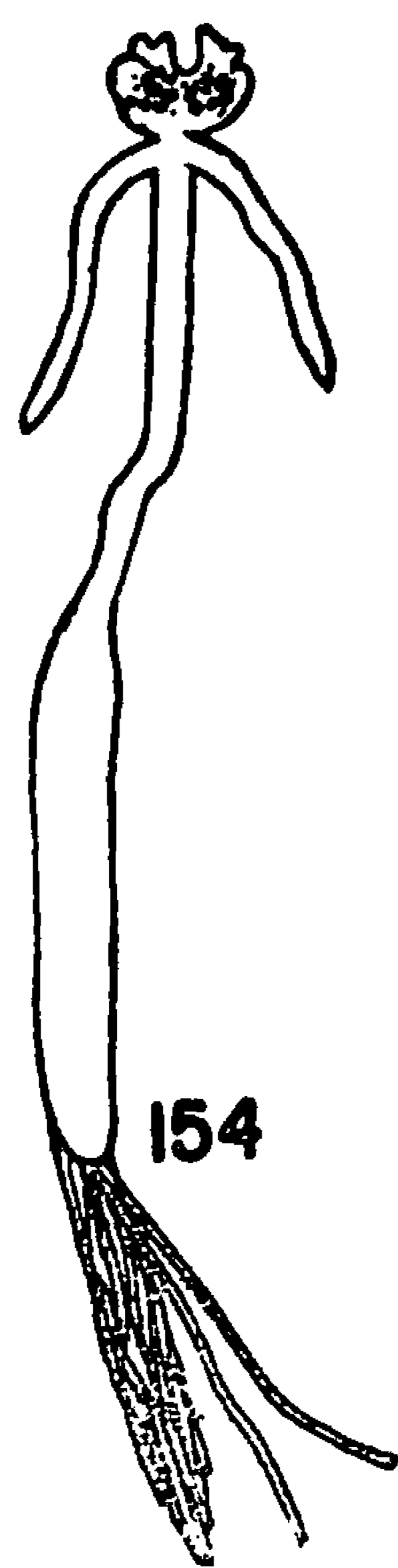


Fig. 154. *Pennella biloba* Kirtisinghe. Female.

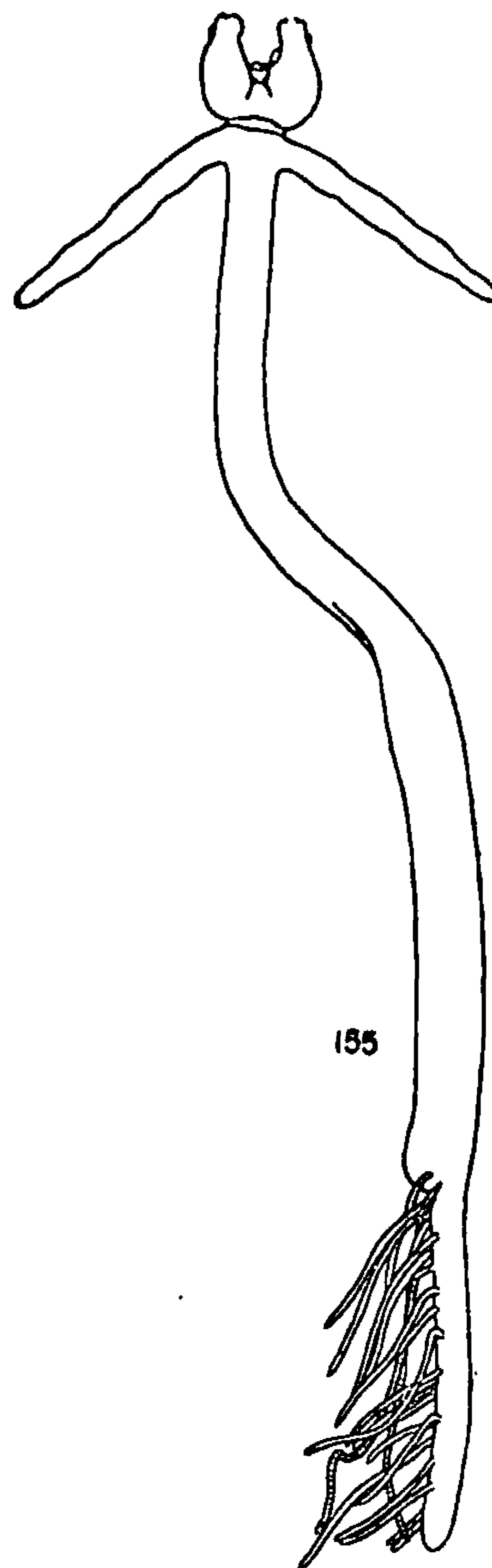


Fig. 155. *Pennella diodontis* Oken. Female.

*Pennella diodontis* Oken

*Pennella diodontis* Oken, 1816, p. 358; Oken, Chamisso and Eysenhardt, 1821, p. 350, pl. 24, fig. 3; Quidor, 1912, p. 205, pl. 1, fig. 2, pl. 2, figs. 19-22 and pl. 4, fig. 38; Kirtisinghe, 1935, pp. 332-334, figs. 1-6.

*Pennella sagitta* (in part) Wilson, 1917, p. 113

*Pennella cervicornis* Heegaard, 1943, pp. 28-30, figs. 79-81

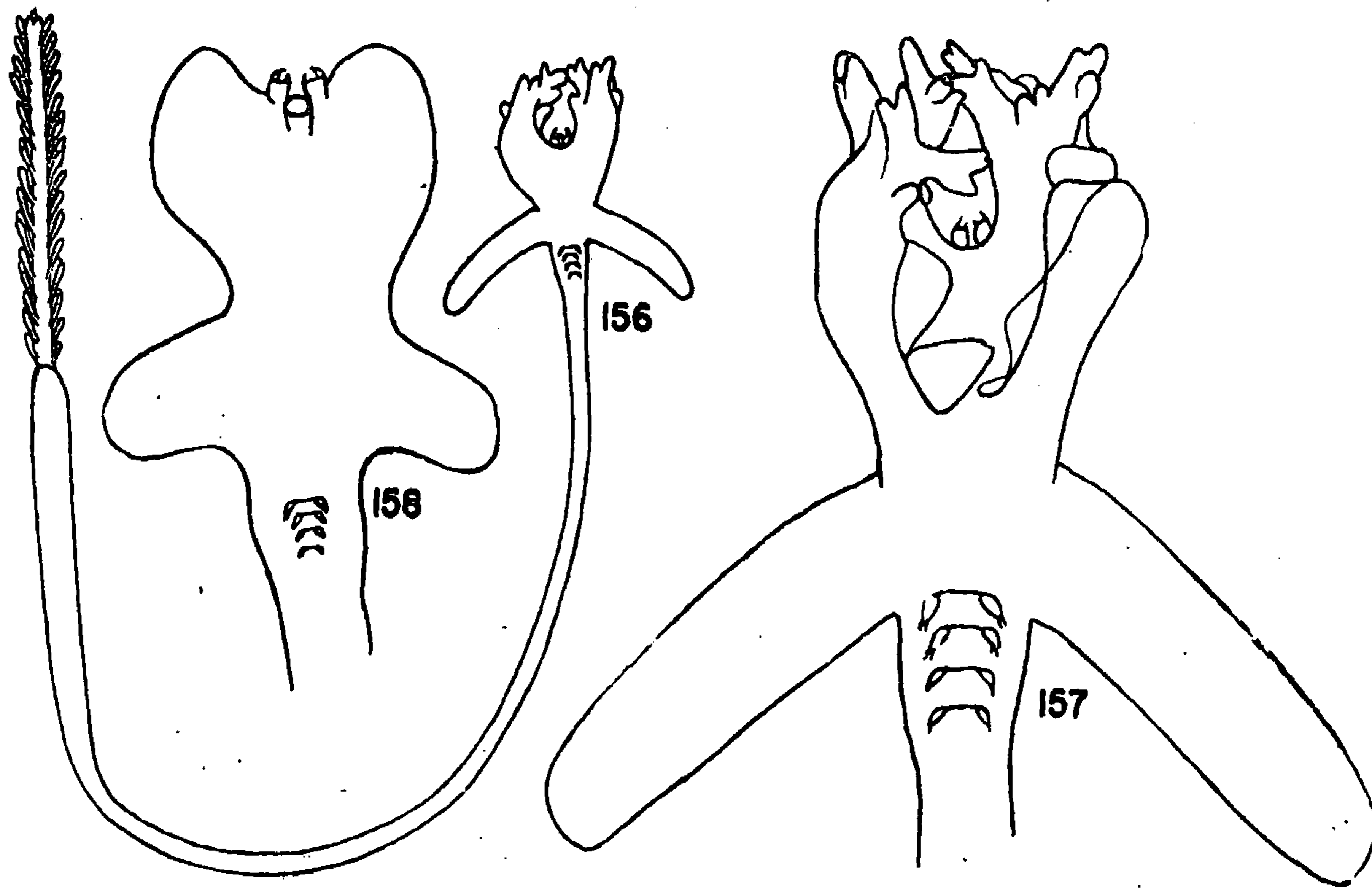
*Occurrence.* On the body of *Diodon maculifer* Kaup at Colombo.

*Distribution.* On *Diodon* sp. in the Bay of Bengal (Heegaard) and in the Antarctic (Quidor)

*Female* (Fig. 155). Head round with a deep concavity in mid-dorsal region at the base of which lie the claw-like second antennae. Branched papillae on the ventral side of the head, those around the mouth small, peripheral papillae larger, the anteriormost pair extending forwards as branched processes. In young specimens this pair is very prominent. A short way behind the head is a pair of unbranched, pointed horns directed obliquely backwards. The cylindrical neck passes imperceptibly into the trunk (genital segment) which has a slightly larger diameter than the neck and is of about the same length as the neck. The shorter abdomen is provided with two rows of slender, unbranched respiratory processes. Total length 14 mm.

*Male.* Not known.

*Remarks.* The figure of *P. cervicornis* Heegaard shows a trunk of an unnatural condition for *Pennella*. This may have been due to the specimen having become bloated with long preservation from as far back as 1863.

*Pennella selaris* n. sp.

Figs. 156-158. *Pennella selaris* n. sp.. Female. 156, entire animal; 157, ventral view of head; 158, ventral view of head of juvenile female.

*Occurrence.* Two female specimens attached along the mid-body on the left side of a *Selar malam* Bleeker of about 4" in length. The host fish with the two parasites *in situ* was obtained in the Colombo market and presented by Dr. T. P. Gunewardena.

*Female* (Fig. 156). The head appears longer than wide due to the projection forwards of the branched papillae on its ventral surface. In both the dorsal and ventral views the chelate second antennae are visible on the concave anterior margin of the head between the papillae of the two sides. A pair of horns arise from the sides of the head and curve backwards in an arc. The horns are longer than the head and bluntly rounded at the tips. The long tubular neck which is only about a mm. in diameter makes up about half the entire length of the animal. The first and second pairs of thoracic

legs are a little closer together than are the second and third and third and fourth pairs which are set at equal distances apart. The first and second pairs are biramous while the third and fourth are uniramous, all the rami consisting of two small joints fringed with setae. The neck passes behind into the slightly wider trunk which is less than half the neck in length. Behind the trunk the abdomen has about the same diameter as the neck. The abdomen is furnished with two rows of lateral processes, there being about twenty pairs of these. Each process is short, unbranched and club-shaped, narrow at the base and bluntly rounded at the tip. The posterior end of the abdomen is slightly indented; from the sides of this indentation arise a pair of fine pointed setae.

*Male.* Not known.

*Remarks.* Of the two specimens one (specimen B) was not fully developed. It was without the ventral papillae of the head and the abdominal processes and the horns were short (fig. 158). The more mature specimen (specimen A) which is made the holotype of this new species (figs. 156, 157) was also still without a pair of egg-strings. Strangely enough, the less mature specimen was the longer. The linear measurements (in mm.) of the two specimens were:—

	Specimen A		Specimen B
Length of head	.. 2.5 ..	..	2.0
Length of neck	.. 13.0 ..	..	16.0
Length of trunk	.. 5.5 ..	..	6.0
Length of abdomen	.. 5.4 ..	..	5.5
Total length	.. 26.4 ..	..	29.5

In his study of the genus *Pennella* as represented by the collection in the British Museum Leigh Sharpe (1928) observed that "the species of *Pennella* fall naturally into two groups:—(A) small forms in which the neck is definitely shorter than the trunk and (B) large forms in which the neck is definitely longer than the trunk." Quite obviously the new species here described is contrary to this observation for it is a small form, less than 30mm. long, in which the neck is definitely longer than the trunk.

Wilson (1917) also divided the genus into small forms of length 50mm. or less and large forms of length 100mm. or more. In the former category he included the four species *P. sagitta* (Linn.), *P. exocoeti* (Holten), *P. liouvillei* Quidor and *P. varians* Steenstrup and Lutken. The present specimens do not belong to any of the above and are therefore described in a new species, *P. selaris*, named after the host fish.

### LERNAEOLOPHUS Heller

#### *Lernaeolophus sultanus* (Nordmann)

*Pennella sultana* Nordmann, 1864, Pl. 5, figs. 12-16; Milne-Edwards, 1840, p. 523

*Lernaeolophus sultanus* Heller, 1865, p. 251, pl. 25, fig. 7; Brian, 1906, p. 91; Wilson 1917, p. 91, pl. 13, and 1932, p. 487, fig. 293; Kirtisinghe, 1935, p. 334, fig. 9; Heegaard, 1962, p. 185-186, fig. 209.

*Occurrence.* On the body of *Histipohorus gladius* (Broussonet) off Ceylon (Kirtisinghe); on the body of *Rastrelliger kanagurta* (Cuvier) bought in the Colombo market (collected by Dr. T. P. Gunewardena).

*Distribution.* On several different kinds of host fish in the Atlantic Ocean (Nordmann, Wilson), in the Mediterranean (Heller, Brian), and off the coast of New South Wales, Australia (Heegaard).

*Female* (Fig. 159). Head hemispherical, flattened on its anterior surface. Cephalothorax bearing three branched horns, one dorsal horn and two lateral horns. Neck cylindrical. Trunk twice as wide as neck. Abdomen with dichotomously branched lateral processes. Length 15. mm..

*Male.* Not known.

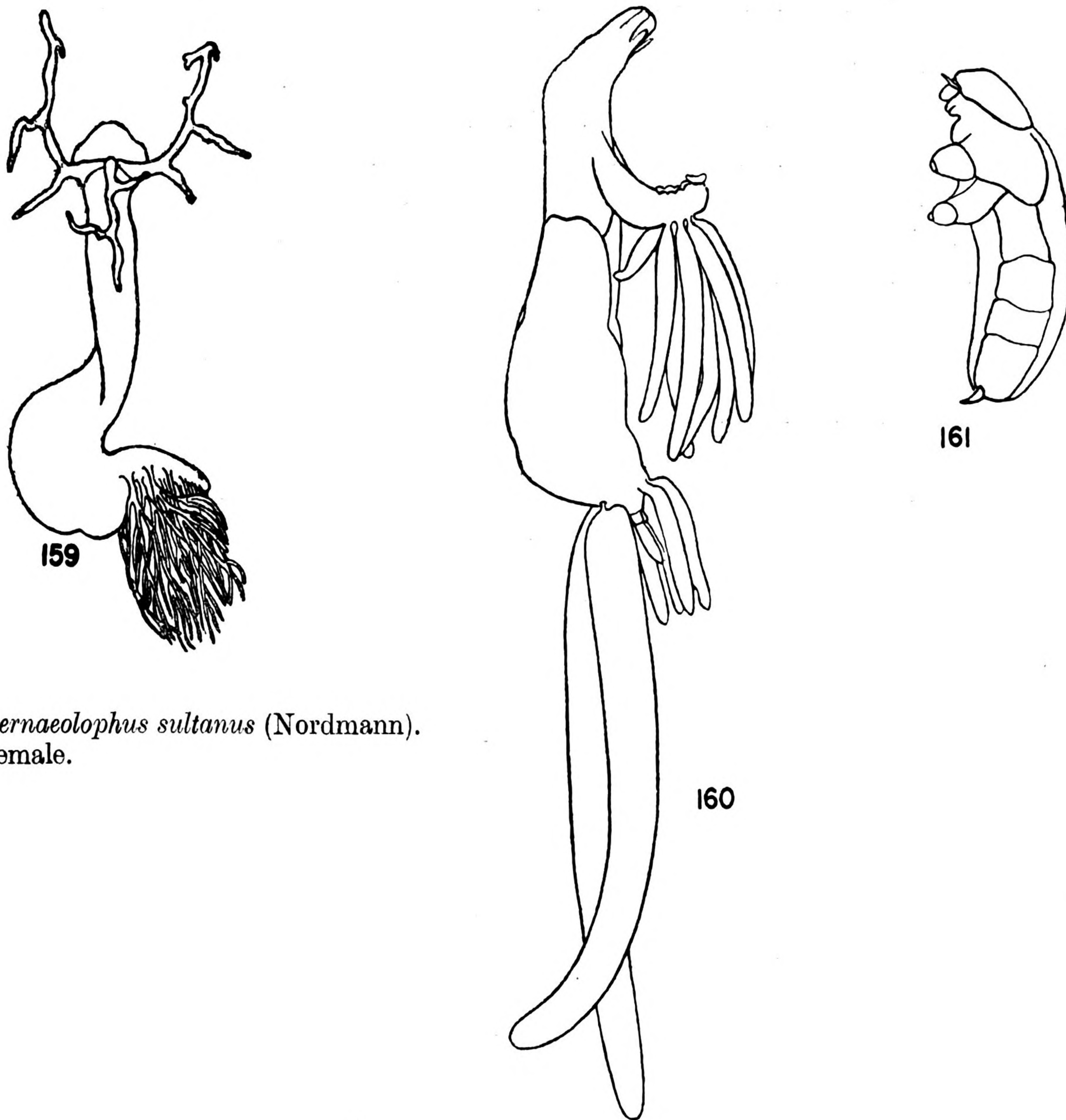


Fig. 159. *Lernaelophus sultanus* (Nordmann).  
Female.

Figs. 160, 161. *Thysanote appendiculata* (Steenstrup and Lutken).  
160, female ; 161, male

### Family LERNAEOPODIDAE

#### *THYSANOTE* Kroyer

##### *Thysanote appendiculata* (Steenstrup and Lutken)

*Brachiella appendiculata* Steenstrup and Lutken 1861.

*Brachiella appendiculosa* (Bassett-Smith), 1898, p. 14, pl. 6, figs. 1-3.

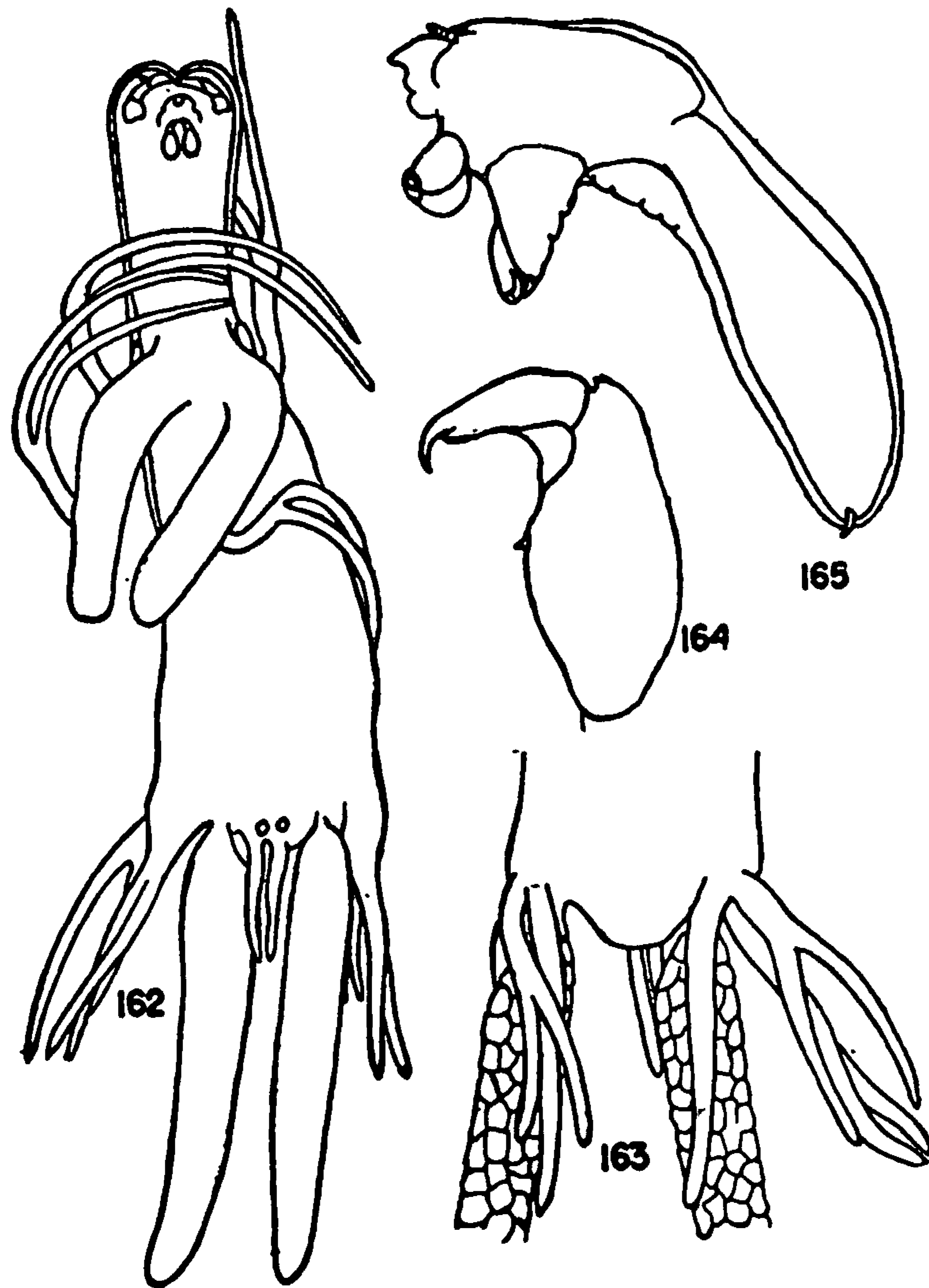
*Thysanote appendiculata* Wilson, 1915, p. 651 ; Kirtisinghe, 1935, p. 343, figs. 43-46 ; Gnanamuthu, 1950c, p. 259, figs. 1-3 ; Pillai, 1962 a, p. 60, fig. 2.

*Occurrence.* On the gills of *Parastromateus niger* (Bloch) off Hikkaduwa (Kirtisinghe).

*Distribution.* On the gills of *P. niger* in the Indian Ocean (Steenstrup and Lutken), off Bombay (Bassett-Smith) and off Madras (Gnanamuthu).

*Female* (Fig. 160). Head with a thin carapace. Neck short. Trunk oval, narrow anteriorly, broad and thick posteriorly, faintly marked by transverse grooves into three segments. Caudal rami cigar-shaped. Four pairs of fimbriate processes arising from the posterior side of the arms (first maxillipeds) and two pairs from the postero-lateral corners of the trunk, ventral to the egg sacs and caudal rami. Length 5.6 mm..

*Male* (Fig. 161). Head with a carapace and forwardly directed first antennae. Body slightly arched dorsally. Trunk separated by grooves into three segments and ending in a pair of caudal rami. Length 1.3 mm..

*Thysanote furcata* n. sp.

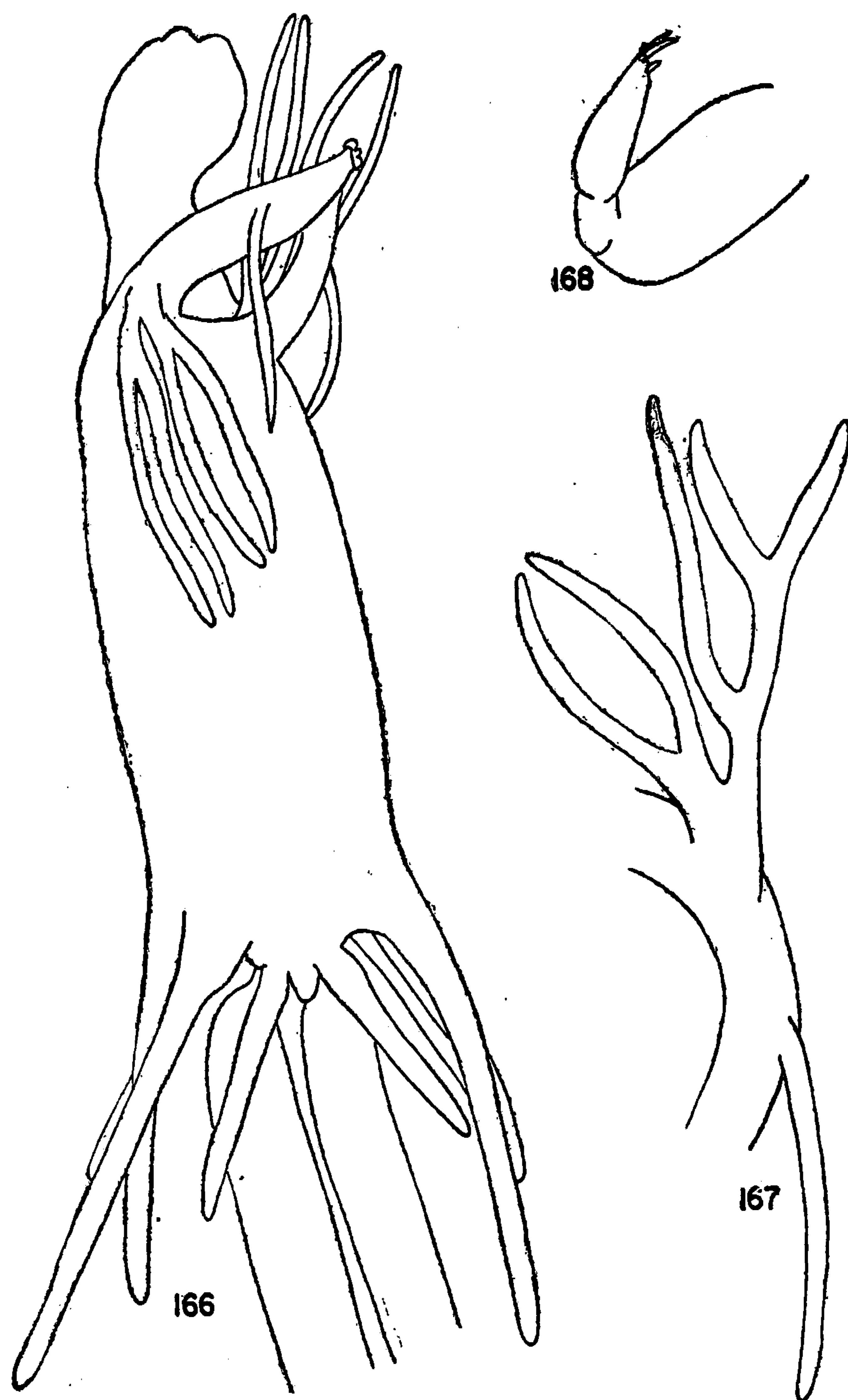
Figs. 162-165. *Thysanote furcata* n. sp.. 162-164, female; 162 ventral view of entire animal; 163, dorsal view of hind end of trunk; 164, second maxilliped; 165, male.

**Occurrence.** Two females, one with a male attached, were found in the gular groove of a caran-gid bought in the Colombo market.

**Female** (Figs. 162-164). Cephalothorax short, dorso-ventrally flattened. Head with a thin carapace. Trunk about twice as long as the cephalothorax, narrow anteriorly, a little wider posteriorly. Arms (first maxillipeds) about as long as the cephalothorax, each arm with two processes arising from its posterior border. Each process becomes bifurcate, the prongs being a little longer than the undivided basal portion. At the hind end of the trunk there is a pair of median ventral processes which are simple. At each postero-lateral corner of the trunk there are three other processes, one ventral and two dorsal. Of these the ventral and the outer dorsal processes are bifurcate like the processes on the arms, while the inner dorsal process is undivided. Length, including the posterior processes, 5.8 mm..

**Male** (Fig. 165). Cephalothorax about two-fifths of the entire length. Trunk fusiform, hardly any trace of segmentation. Caudal rami present. Length 0.6 mm..

**Remarks.** This new species stands close to *Thysanote longimanus* (Wilson) in which the processes arising from the arms and the postero-lateral regions of the trunk are shorter and stouter and rather more complicated in their branching than is their simple division into two in the present species.

*Thysanote heterodactyla* n. sp.

Figs. 166-168. *Thysanote heterodactyla* n. sp.. Female. 166, ventral view of entire animal; 167, digitate processes of first maxilliped; 168, second maxilliped.

*Occurrence.* Two female specimens were attached, one to the dorsal fin and the other to the ventral fin of *Carangoides armatus* (Forsk.) bought in the Colombo market. These two specimens are made the co-types of this new species.

*Female* (Fig. 166). Cephalothorax short, broader in front, narrowing behind, dorso-ventrally flattened and bent slightly ventralwards. Head with a carapace. Trunk stout, cylindrical and much longer than the cephalothorax. First maxillipeds (arms) about as long as the cephalothorax, united distally, each arm with two processes arising from its postero-lateral surface. The proximal process is dichotomously branched (figs. 166, 167) while the distal process is simple, unbranched. Four pairs of unbranched processes arise from the hind end of the trunk. One pair of these are ventral; another pair, the ventro-lateral, are the longest; the third pair are lateral and the fourth pair are dorso-lateral. The large egg-sacs are cylindrical and more than twice as long as the longest pair of posterior processes. Length of cephalothorax 1.6 mm., of trunk (exclusive of the posterior processes) 5 mm..

*Male.* Not known.

*Remarks.* This new species is readily distinguishable because of the nature of the processes on the first maxillipeds and the unbranched posterior processes of the trunk.



## LERNAEOPODA Blainville

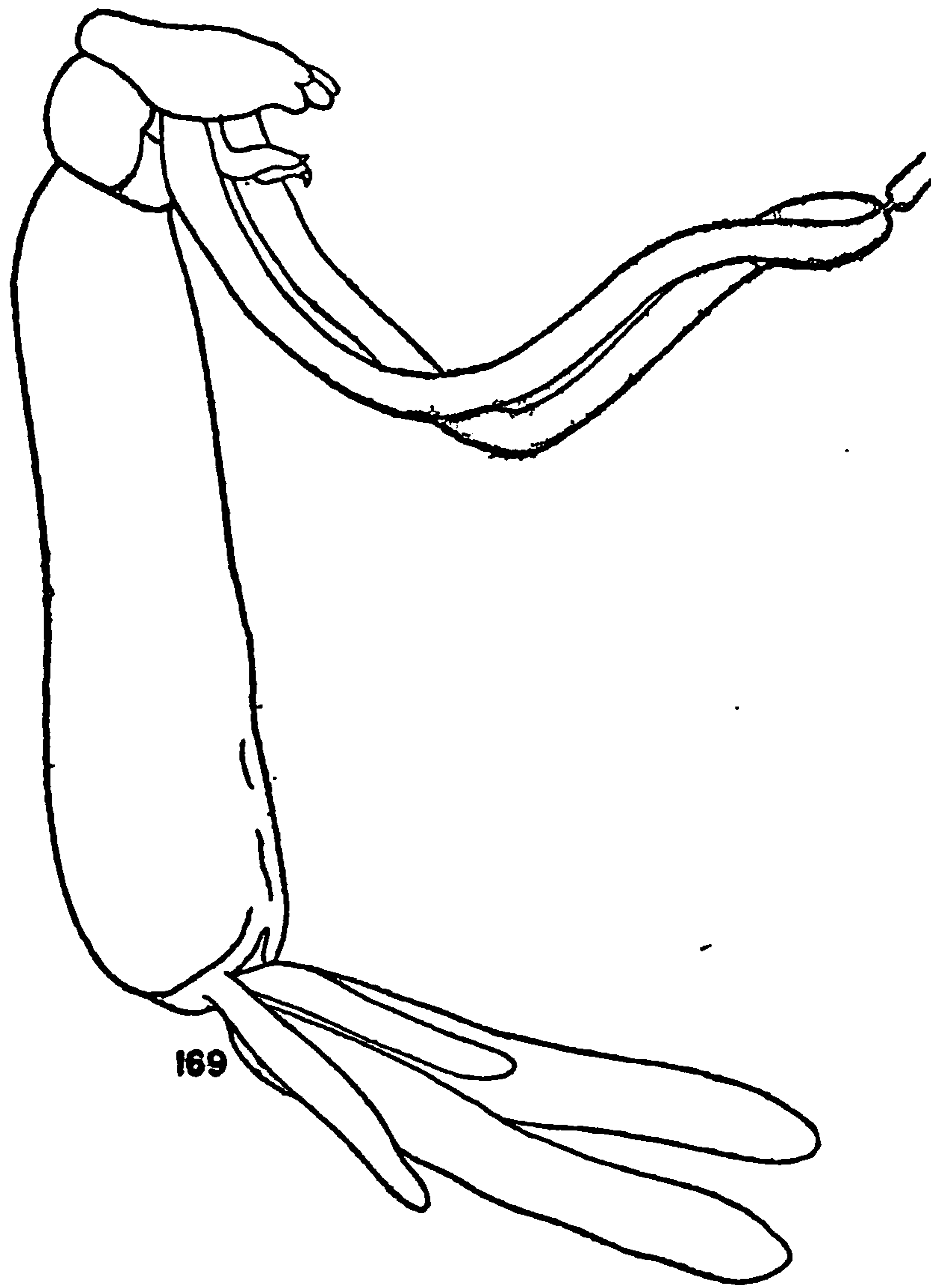
*Lernaeopoda scoliodontis* n. sp.

Fig. 169. *Lernaeopoda scoliodontis* n. sp.. Female.

**Occurrence.** Two adult females were obtained from the cloaca of *Scoliodon walbeekmi* (Bleeker) bought in the Colombo market.

**Female** (Fig. 169). Cephalothorax at about a right angle to the rest of the body. Carapace distinct. Neck short, half the length of the cephalothorax. Trunk elongate, club-shaped, stouter posteriorly and provided with a pair of cylindrical posterior processes which are longer than the cephalothorax. Arms (first maxillipeds) slender, a trifle longer than the neck and trunk taken together and remaining free to their tips where they join to carry an apical bulla. Length of head 1 mm., of neck and trunk 5.5 mm., of posterior processes 1.5 mm..

**Male.** Not known.

**Remarks.** In the shape and comparative size of the trunk and posterior processes this new species somewhat resembles *Lernaeopoda scyllicola* (Leigh-Sharpe) but in the orientation of the cephalothorax and the first maxillipeds it is more like *L. globosa* (Leigh-Sharpe.) However, the latter species has its trunk and posterior processes quite different in shape from these structures in this new species.

*CHAROPINUS* Kroyer*Charopinus markewitschi* Gussev

*Charopinus markewitschi* Gussev, 1951, pp. 436-441, figs. 28-29; Shiino, 1956, pp. 280-283 and 1959, pp. 365-366, fig. 14.

*Charopinus dasyaticus* Pillai, 1962 a, pp. 66-68, fig. 6.

*Clavellopsis dasyaticus* Rangnekar, 1957, p. 16, fig. 5.

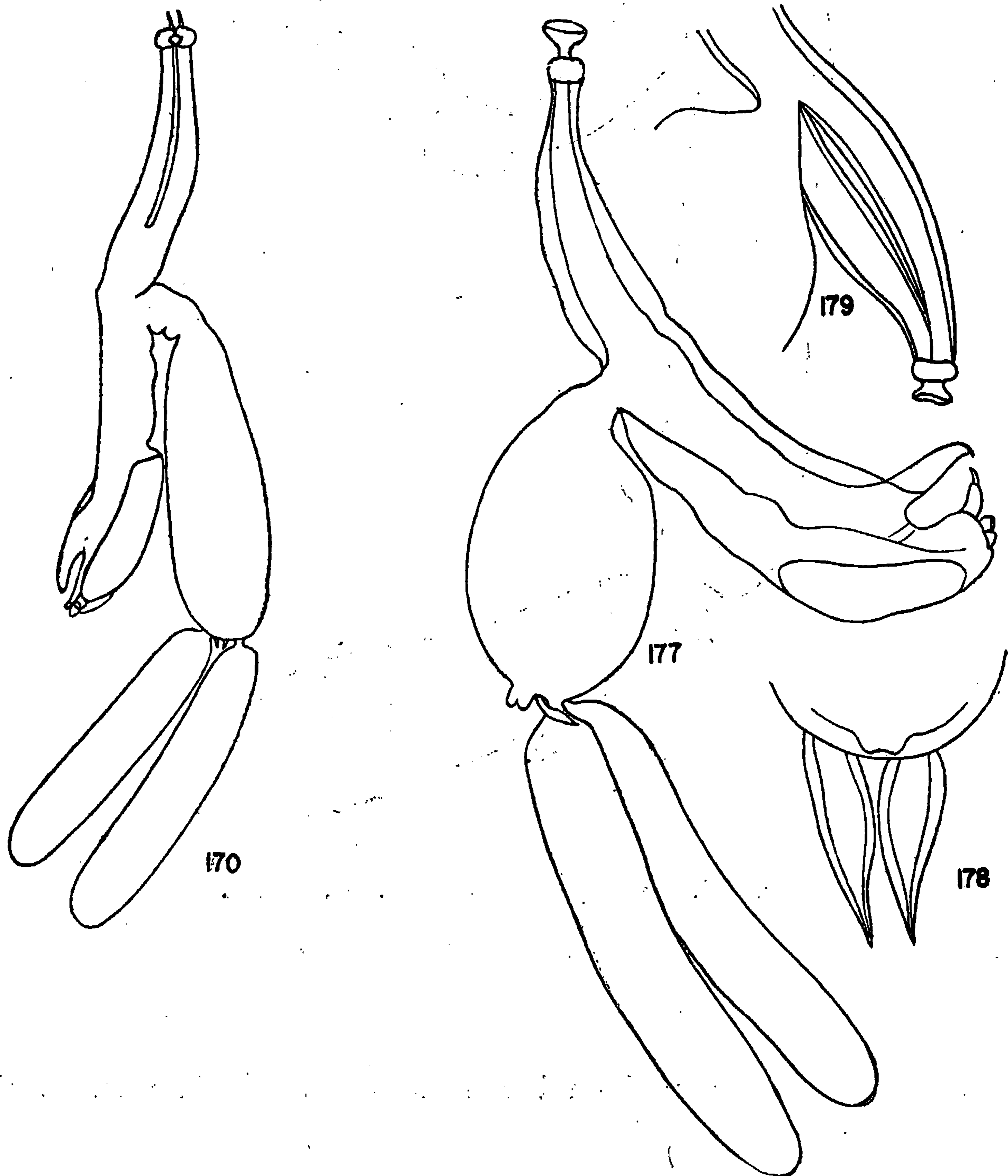


Fig. 170, 177-179. *Charopinus markewitschi* Gussev. Female. 170, 177, entire animal; 178, anal laminae; 179, first maxillipeds.

*Occurrence.* In the nasal cavity of *Himantura uarnak* (= *Dasyatis uarnak*) and in the nasal cavity and on the gills of *Aetomylaeus nichofii* (= *Raja nichofii*) bought in the Colombo market.

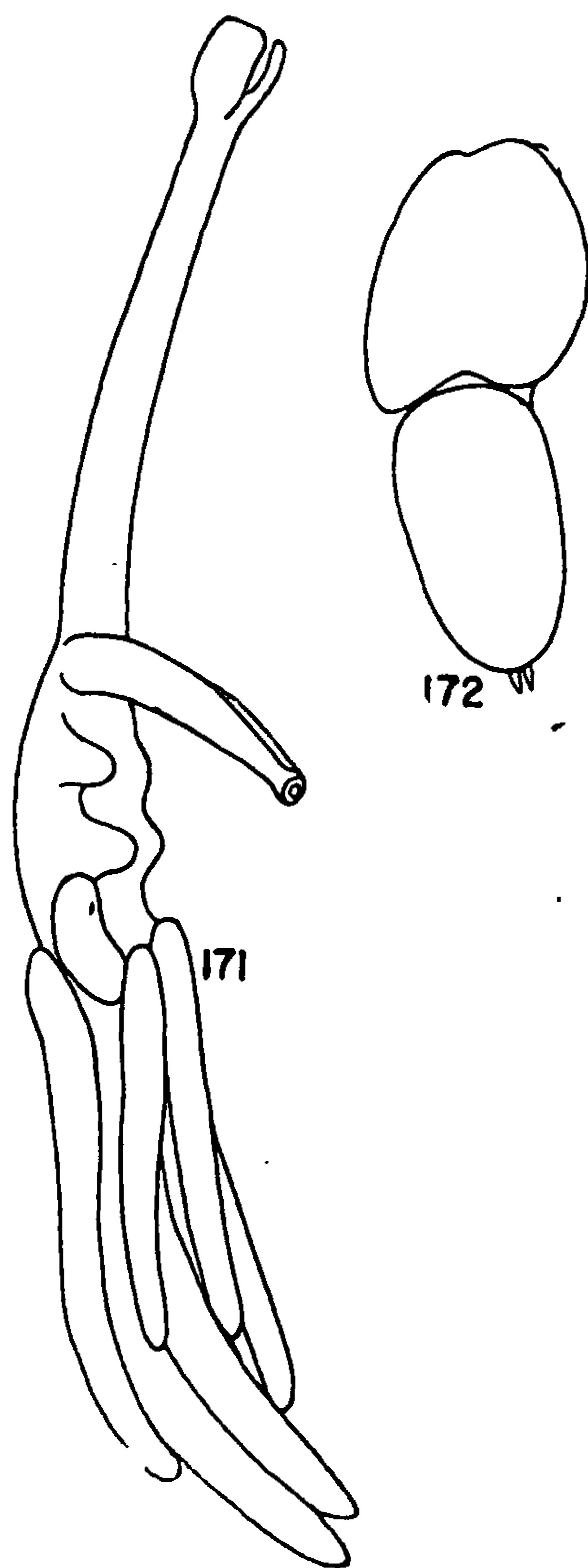
*Distribution.* On *Raja kenojei* from the U. S. S. R. (Gussev) and Japan (Shiino); in the mouth cavity of *Dasyatis ushieii* off Japan (Shiino); on the gill filaments of *Dasyatis uarnak* off Bombay (Rangnekar); on the body of *Dasyatus imbricatus* off Quilon and Trivandrum (Pillai).

*Remarks.* Apparently this species, parasitic on closely related hosts, consists of a number of forms which are variable with respect to the relative lengths of the cephalothorax, the first maxillipeds

and the trunk. Notwithstanding Shiino's observation that his specimens are in strict accord with those of Gussev, his figures of the female show a comparatively longer cephalothorax and a shorter pair of first maxillipeds than in the female figured by Gussev. The foliaceous anal laminae are also longer in the former. The female of *Charopinus dasyaticus* Pillai shows a still longer cephalothorax and a shorter pair of first maxillipeds and *Clavellopsis dasyaticus* Rangnekar seems to carry this tendency still further so that the cephalothorax is now longer than the ovate trunk. Female specimens obtained by me show (figs. 170 and 177) intermediate conditions. The males do not seem to show any significant differences. Pillai remarks that his specimens of *Charopinus dasyaticus* "show a very close resemblance to *C. markewitschi* even in the minute details of the appendages."

*BRACHIELLA* Cuvier

*Brachiella thynni* Cuvier



Figs. 171, 172. *Brachiella thynni* Cuvier. 171, female; 172, male.

*Brachiella thynni* Cuvier, 181, p. 287, pl. 15, fig. 5; Steenstrup and Lutken, 1861, pp. 420-422, pl. 15, fig. 36; Bassett-Smith 1899, p. 502; Brian 1906, pp. 105-106, pl. 9, fig. 1; Scott, T. and A., 1913, pp. 204-205, pl. 64, figs. 4-6; Wilson 1915, pp. 703-705, pl. 25, fig. c, pl. 53, figs. 209-215; Kirtisinghe, 1935, p. 342, figs. 40-41; Bere, 1936, p. 613; Delamare-Debouteville and Nunes-Ruivo, 1954, p. 217; Shiino, 1956, pp. 283-287, figs. 8 and 9; Pillai 1962 a pp. 81-83, figs. 15, 16.

*Occurrence.* Attached to the base of the pectoral fin of *Neothynnus macropterus* (Schlegel) off Ceylon (Kirtisinghe). More recently, Dr. P. Canagaratnam has collected and presented to me specimens of this species found attached to the base of the pectoral fin of *Acanthocybium solandri* (Cuvier) off Negombo.

*Distribution.* On several species of host fish belonging mainly to the Thunnidae and Scomberomoridae from off the British and Belgian Coasts, from the Gulf of Mexico, from the Mediterranean and the Pacific (see Shiino, 1956).

*Female* (Fig. 171). Cephalothorax cylindrical, long and flexible, wider posteriorly. Head with a carapace. Trunk depressed, longer than wide, widening behind and marked by transverse grooves into three segments. Two pairs of lanceolate posterior processes, one pair dorsal to the egg-sacs and the other pair ventral, all the processes nearly of equal length. First maxillipeds relatively short, fused only at the tips. Length including posterior processes up to 30 mm..

*Male* (Fig. 172). Cephalothorax distinct from trunk, with an oblong carapace which is about twice as long as wide, truncate in front, convex behind, and with parallel sides. A narrow waist connecting cephalothorax with trunk. Latter fusiform, indistinctly marked into five segments. A pair of conical caudal rami present. Length 4.6 mm..

### *Brachiella merluccii* Bassett-Smith

*Brachiella merluccii* Bassett-Smith, 1896, p. 14, pl. 6, fig. 1; Brian, 1906, p. 107, pl. 8, fig. 3, Scott, T. and A., 1913, pp. 207-208, pl. 62, figs. 4, 5 and pl. 63, figs. 17-22, Thomson and Scott, 1903; p. 294; van Oorde-de Lint and Schuurmans Stekhoven, 1936, p. 104, fig. 157; Delamare Deboutteville, 1950, p. 308; Nunes-Ruivo, 1954, p. 31.

*Occurrence.* On *Johnius diacanthus* (Lacepede) (= *Sciaena diacanthus* Day) from the Pearl Banks (Thompson and Scott).

*Distribution.* On the gills of *Merluccius vulgaris* in the North Sea, Plymouth and Irish Sea (Scott) and in the Mediterranean (Deboutteville), on *M. esculentus* in the Mediterranean (Brian), and on *M. polii* in the Atlantic and Mediterranean (Nunes-Ruivo).

*Female.* Cephalothorax not clearly marked off from the trunk and curving around and forwards at nearly a right angle to the rest of the body. Genital segment swollen and furnished with two pairs of processes, one pair moderately long arising from the postero-lateral corners of the segment, the other pair longer and springing from the ventral surface in front of the egg-sacs. First maxillipeds very short and enclosed together by a covering but not fused except at the apex. Length 8 mm..

*Male.* Cephalothorax large and distinct from the trunk which is incompletely divided into five segments and furnished at the posterior end with a pair of caudal rami. (Not seen. Description from Scott, T. and A.)

### CLAVELLA Oken

#### *Clavella uncinata* (Muller)

*Lernaea uncinata* Muller, 1776, p. 38, pl. 33, fig. 2.

*Anchorella uncinata* Nordmann, 1832, p. 102, pl. 8, figs. 8-12, pl. 10, figs. 1-5; Thompson and Scott, 1903, p. 294; Scott, T. and A. 1913, pp. 214-215, pl. 65, figs. 2, 3, and 6, and pl. 66, figs. 21-23.

*Clavella uncinata* Wilson, 1915, pp. 680-684, pls. 27, 28 and 49; Hansen, 1923, pp. 59-61, pl. 4, figs. 4a-4e; Gussev, 1951, pp. 445-449, figs. 32-33; Shiino, 1956, pp. 287-291, figs. 10-11.

*Occurrence.* Attached to the folds of the operculum of *Gazza minuta* (Bloch) (= *G. equulaeformis*) on the Pearl Banks off Ceylon (Thompson and Scott).

*Distribution.* Mainly on gadoid fishes but also on several other general of host fish in the North Atlantic, in the Mediterranean, in the North Pacific the west coast of Canada and off Japan and on the west coast of South America (see Shiino, 1956).

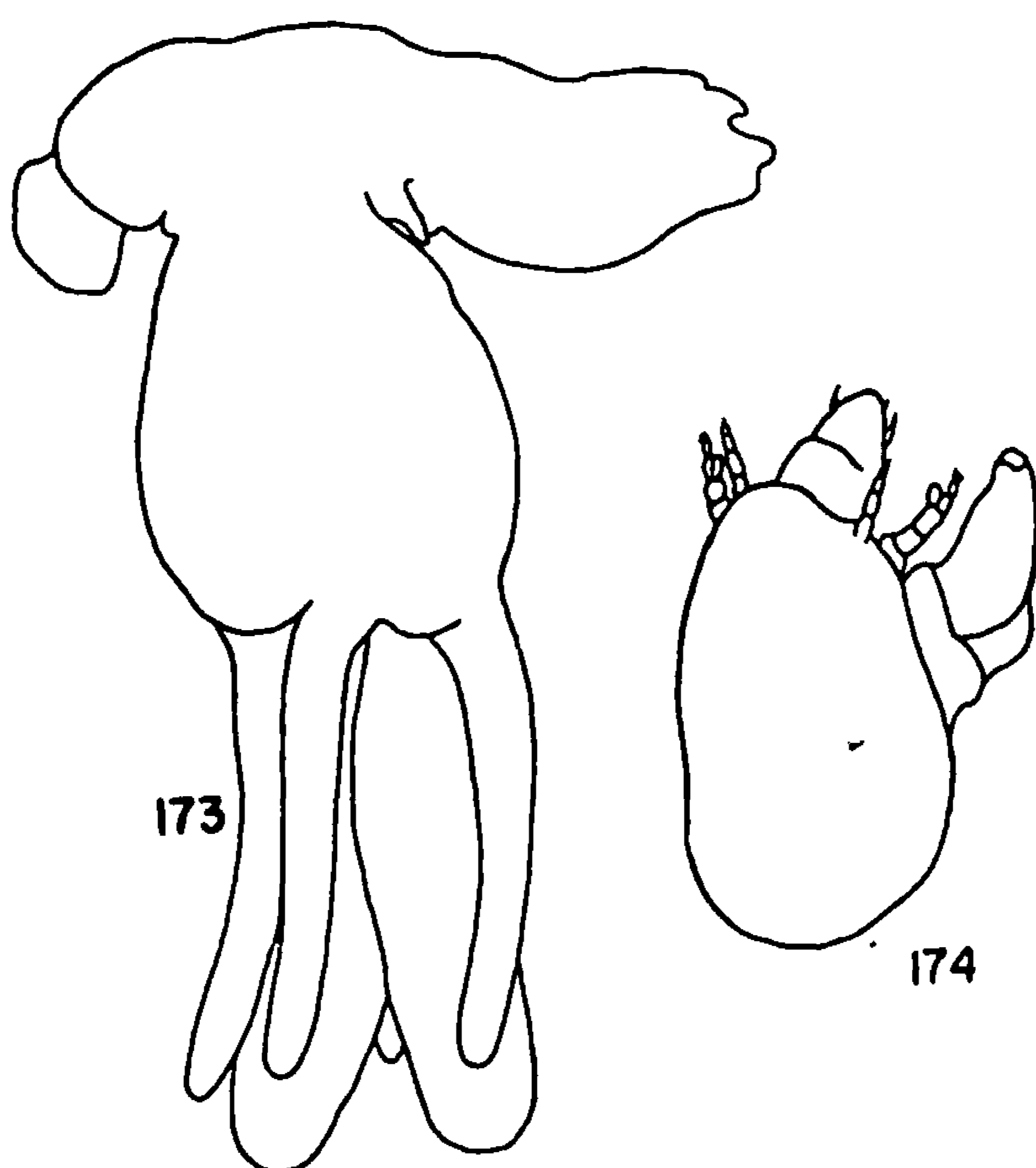
*Female.* Cephalothorax slightly longer than the trunk, cylindrical, straight or only a little curved, bent back over the trunk but in line with the first maxillipeds. Head squarely truncated anteriorly, carapace indistinct. Trunk depressed, somewhat quadrilateral with rounded corners and a re-entrant posterior margin. Genital processes on a level with the ventral surface. First maxillipeds completely fused and reduced so much as often to appear vestigial. Length of cephalothorax 6-7mm ; of trunk 4-6 mm., of ovisacs 6-10 mm..

*Male.* Body ovate, about a third longer than wide, narrowing in front and well rounded posteriorly. Proboscis projecting downwards and forwards. Length 0.45-0.5. (Not seen. Description from other authors.)

### CLAVELLOPSIS Wilson

#### *Clavellopsis appendiculata* Kirtisinghe

*Clavellopsis appendiculata* Kirtisinghe, 1950, pp. 84-85, figs. 40-43; Pillai ; 1962 a, pp. 70-72, figs. 8-9.



Figs. 173, 174. *Clavellopsis appendiculata* Kirtisinghe. 173, female ; 174, male.

*Occurrence.* On the gill arches of *Chirocentrus dorab* (Forsk.) off Ceylon (Kirtisinghe).

*Distribution.* On the gill arches of the same host off Trivandrum (Pillai).

*Female* (Fig. 173). Cephalothorax only a little longer than trunk, in line with the first maxillipeds and at right angles to the trunk. Head depressed, its anterior margin truncate. Trunk pear-shaped, somewhat flattened dorso-ventrally, produced behind into two pairs of processes, one pair dorsal and the other ventral, all four processes of about the same length. A minute genital process sometimes discernible. First maxillipeds completely fused. Length of cephalothorax 2mm., of trunk 1.7 mm. and of posterior processes 1.7 mm.

*Male* (Fig. 174). Body ovate, longer than wide, narrowing forward, well rounded posteriorly, no trace of segmentation. No carapace or caudal rami. Mouth tube and appendages all directed forwards and downwards. Length 0.4 mm..

#### *Clavellopsis trichiuri* Yamaguti

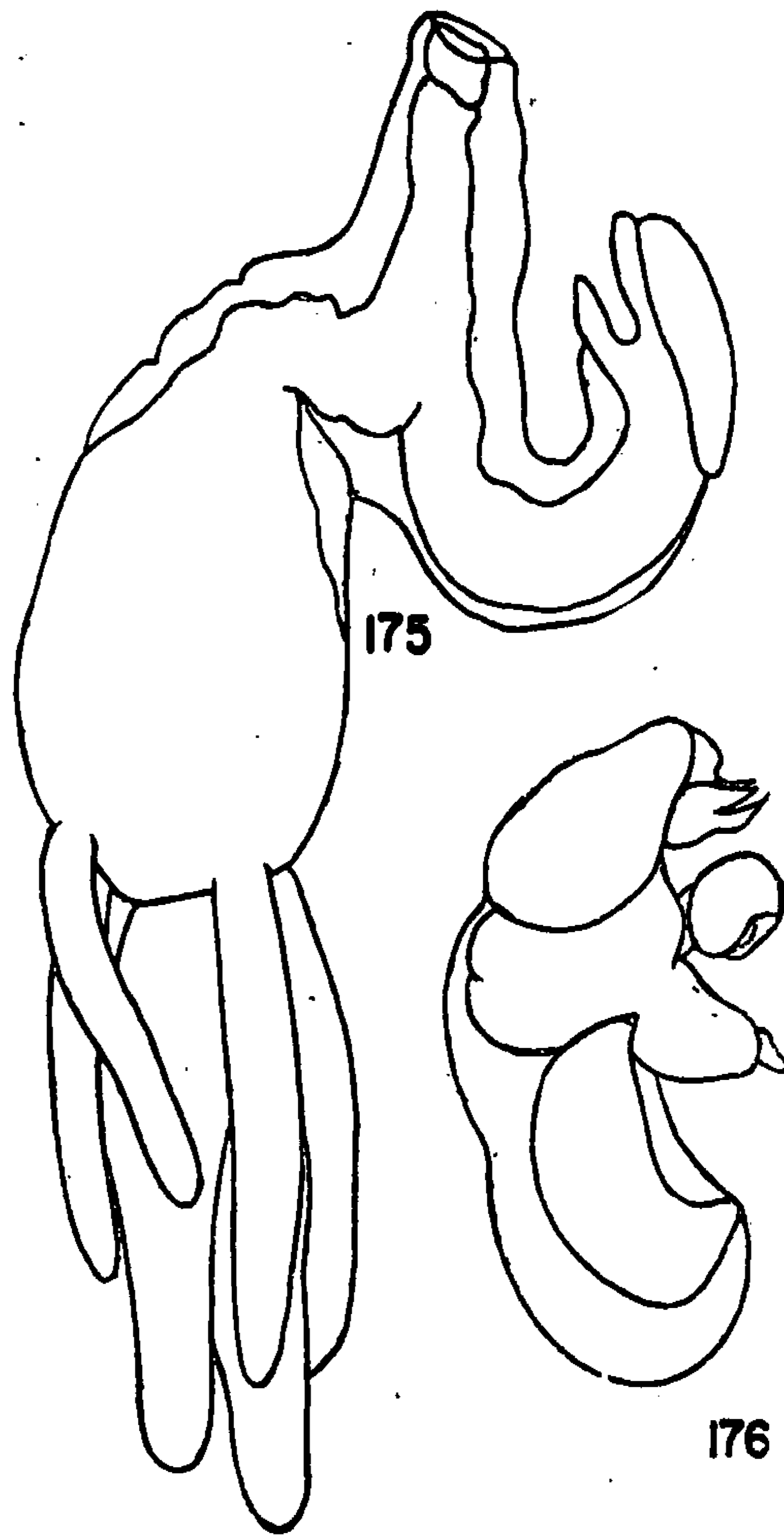
*Clavellopsis trichiuri* Yamaguti, 1939, p. 562, pl. 52, figs. 182-191.

*Brachiella gulosa* (not Wilson) Kirtisinghe, 1950, p. 84.

*Brachiella trichiuri* Gnanamuthu, 1951 a, pp. 13-15, figs. 1-4 ; Pillai, 1962 a, pp. 83-85, fig. 17

*Occurrence.* In the mouth cavity of *Trichiurus savala* Cuvier off Ceylon (Kirtisinghe).

*Distribution.* In the mouth cavity of *Trichiurus haumela* off Madras, South India (Gnanamuthu) and of *T. savala* off Trivandrum (Pillai); on the palate of *Trichiurus japonicus* from Toyama Bay, Japan (Yamaguti).



Figs. 175-176. *Clavellopsis trichiuri* Yamaguti. 175, female; 176, male.

*Female* (Fig. 175). Cephalothorax cylindrical, curved backwards in a semi-circle. Head enlarged, with a distinct carapace. Trunk sac-like, narrow anteriorly and broad posteriorly. A small, spherical genital process and two pairs of posterior processes of which the dorsal pair is the longer and as long as the trunk. First maxillipeds not quite as long as the cephalothorax, almost completely fused. Length of cephalothorax 1.6 mm., of trunk 2 mm., of posterior processes 1.8-2 mm..

*Male* (Fig. 176). Cephalothorax separated from the trunk by a waist. Head with a carapace. Trunk oval; no trace of segmentation. Caudal rami not present. Length 0.4 mm..

#### NAOBRANCHIA Hess

##### *Naobranchia lizæ* (Kroyer)

*Anchorella lizæ* Kroyer, 1863 b, p. 296, pl. 16.

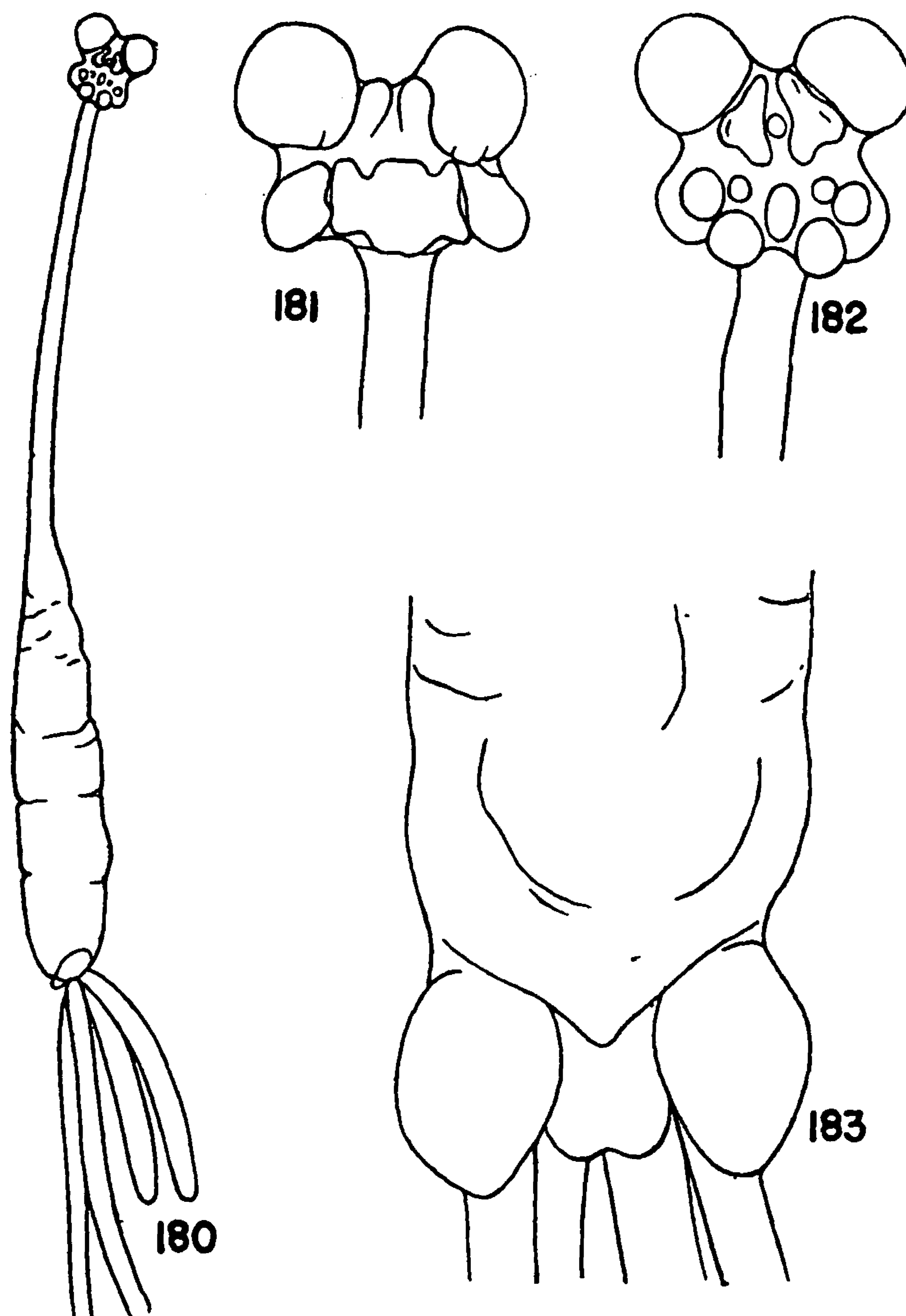
*Naobranchia lizæ* Wilson, 1935, p. 344; Pearse, 1952, p. 33; Kirtisinghe, 1956, p. 20.

*Occurrence.* On the gill filaments of *Pellona ditchela* Valenciennes (= *Pellona hævenii* Bleeker) bought in the Colombo market (Kirtisinghe).

*Distribution.* On *Ogcocephalus cubifrons* from the dry Tortugas (Wilson); on *Mugil cephalus*, *Chilomycterus schæpfi* and *Ogcocephalus vespertilio* from the Texas Coast (Pearse).

## Family SPHYRIIDAE

## PAEON Wilson

*Pæon lobatus* n. sp.

Figs. 180-183. *Pæon lobatus* n. sp.. Female. 180, entire animal; 181, dorsal view of head; 182, ventral view of head; 183, dorsal view of hind end of trunk.

**Occurrence.** Three adult female specimens were obtained from the wall of the branchial cavity of *Hemipristis elongatus* (Klunzinger) bought in the Colombo market. Two of the specimens were incomplete; the single complete specimen is made the holotype of this new species. The specimens were collected and kindly presented by Dr. T. P. Gunewardena.

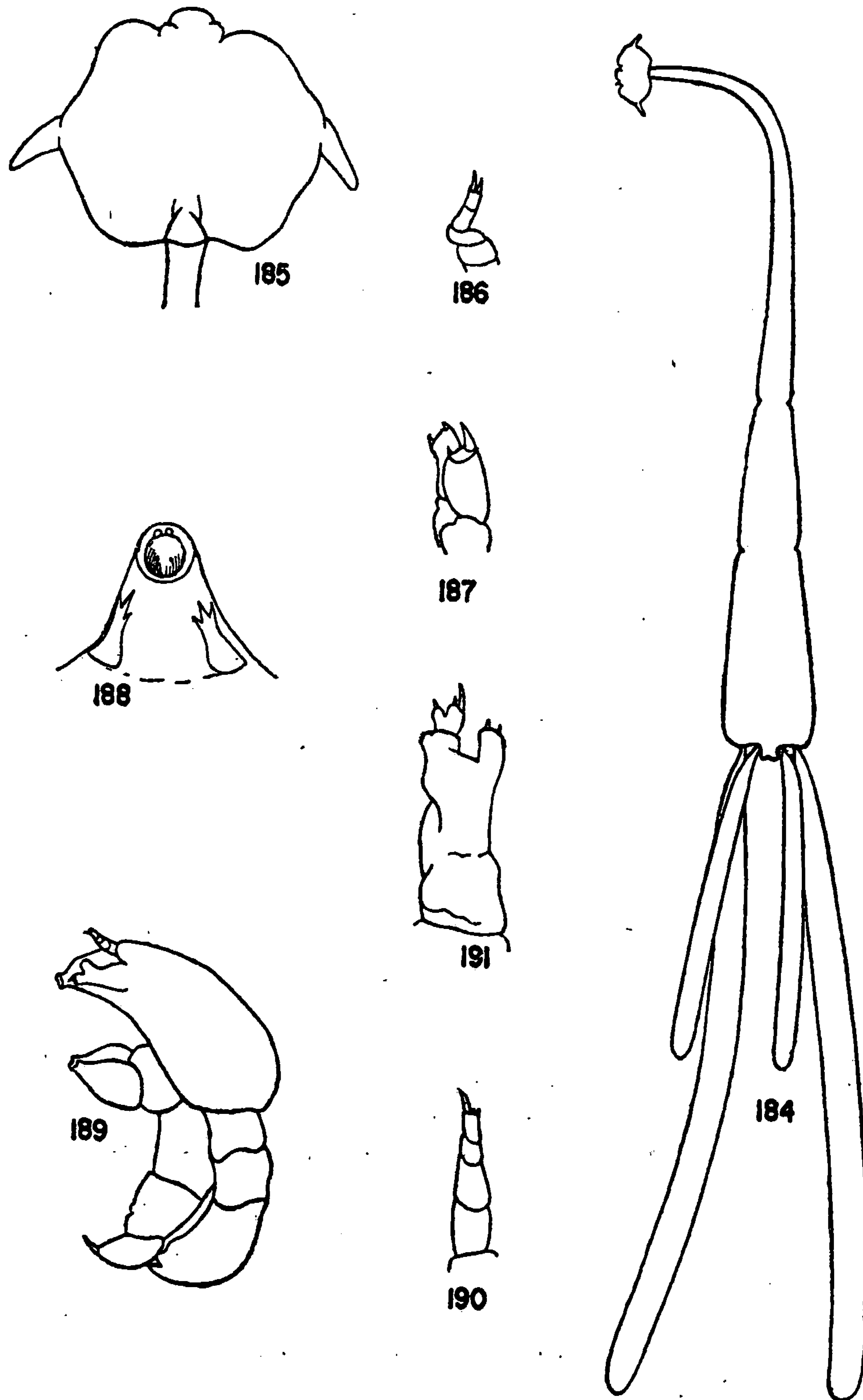
**Female** (Figs. 180-183). Head transversely elongated, its anterior corners produced into a pair of spherical lobes and its posterior corners produced into a smaller pair of more oval lobes, as seen from the dorsal surface (fig. 181). On the ventral surface of the head (fig. 182), anteriorly there is a pair of triangular swellings at the sides of the mouth; posterior to this on the middle line there is an oval swelling on each side of which there are three more rounded swellings. The neck is smooth and cylindrical, passing almost imperceptibly into the club-shaped trunk which is faintly divided into three segments by two slight constrictions on its surface which is marked by numerous wrinkles as well. The trunk bears a pair of short postero-lateral genital lobes in addition to the usual pair of cylindrical posterior processes. There is also a short abdomen with a slightly indented posterior margin (fig. 183). The egg-sacs are well formed, their diameter being about two-thirds that of the posterior processes. Length of head 2.8 mm., of neck 14 mm., of trunk 12.5 mm., of posterior processes 9 mm..

**Male.** Not known.

*Remarks.* The genus *Pæon* has up to now consisted of the species *P. versicolor*, *P. ferox* and *P. elongatus* described by Wilson and of the species *P. vaissieri* and *P. sp.* described by Delamare-Deboutteville and Nunes-Ruivo (1954). This new species is clearly different from the five species known earlier. It is named from its possession of a pair of genital lobes not mentioned for the other species.

*TRYPAPHYLUM* Richiardi

*Trypaphylum hemigalei* n. sp.



Figs. 184-191. *Trypaphylum hemigalei* n. sp.. 184-188, female; 184, entire female; 185, dorsal view of head; 186, first antenna; 187, second antenna; 188, mouth cone; 189-191, male; 189 entire animal; 190, first antenna; 191, second antenna.

*Occurrence.* Attached to the gill arches of *Hemigaleus balfouri* Day bought in the Colombo market. Numerous female specimens, one of them bearing a male, were obtained from these small sharks which attain a length of about 2½ feet.



*Female* (Figs. 184–188). Head transversely elliptical (more nearly hexagonal), about one and a half times as wide as long and provided on each side with a short, unbranched horn projecting obliquely backwards. Anterior margin of head separable into a median and two lateral lobes. Head swollen, slightly depressed at its posterior median region, dorsally to the place where it is connected to the tubular neck (thorax). Neck very slender at its commencement but gradually increasing in diameter as it passes backwards to be continued as the trunk, the junction between the two marked by a slight constriction. Trunk about as long as the neck and, in its turn, marked by a slight constriction into nearly equal anterior and posterior regions. Trunk together with the hinder part of the neck presenting the appearance of a bobbin. Trunk bears a small, median, posterior lobe with a slightly indented hind margin. From the sides of this lobe arise a pair of cylindrical posterior processes, only a little shorter than the trunk. Egg sacs, when these are fully developed, may be twice as long as the posterior processes and of a diameter one and a half times that of the posterior processes. First antenna small, indistinctly 4-jointed, first and second joints stouter than the two remaining joints with an elbow bend between the second and third joints; terminal joint tipped with two spines of which the inner spine is the longer. Second antenna biramous, exopod bearing two small terminal spines widely apart from each other with a faintly serrate margin between them; endopod bearing a terminal chela. Rim of mouth cone provided with hair-like processes and tips of mandibles showing at anterior margin of rim. First maxillae, as far as could be made out, three-pronged, inner prong the shortest, each prong tipped with a spine. Basal joints of the maxilliped quite large, occupying a considerable area of the ventral surface of the cephalothorax but their chelae could not be observed as they had been broken off. Length of head 1.3 mm. of neck and trunk 13 mm., of posterior processes 6 mm..

*Male* (Figs. 189–191). Cephalothorax conical, without a carapace. Trunk cylindrical, not quite as long as cephalothorax, arched dorsally; distinct grooves marking off two equal anterior trunk segments and an unsegmented posterior trunk region equal in length to the two anterior segments combined. Abdomen not clearly marked off, with short, pointed caudal rami, each ramus with a small spine on its dorsal surface. Antennae and proboscis projecting forward. First antenna 4-jointed, terminal joint tipped with a longer inner spine and two minute outer spines. Second antenna biramous, exopod with rounded apex and two minute spines set rather widely apart, endopod with terminal joint carrying three spines the most dorsal of them stouter than the others and curved. Second maxillae short stout claws projecting downwards and forwards below the cephalothorax. Maxillipeds 3-jointed, slightly longer than the trunk and abdomen combined and extending backwards below the trunk. Total length 1.2 mm..

*Remarks.* The genus *Trypaphylum* Richiardi has up to now remained monotypic since it was created in 1878 to include the species *Lerneonema musteli* van Beneden, 1851. This second species described above, while extending the distribution of the genus from the Atlantic to the Indian Ocean, makes it possible to provide, for the first time, a complete figure of the female of the genus, the only extant figure (Scott, T. and A, 1913) being that of a headless specimen.

The female of *T. musteli* (van Beneden) is 45 mm. long and its head is round. The female of *T. hemigalei* is only about half that size being 21 mm. long and its head is transversely elliptical, not round. Unfortunately, no record of the size of the male *T. musteli* is available but it differs from the male of this new species in details of the appendages and in the length of the 2nd maxilliped relative to the length of the trunk and abdomen; in *T. musteli* the 2nd maxilliped of the male is a little shorter than the trunk and abdomen combined, while in the male of *T. hemigalei* the 2nd maxilliped is slightly longer than the trunk and abdomen combined.

## LIST OF HOST FISHES AND THEIR COPEPOD PARASITES

Family Orectolobidae	
<i>Rhincodon typus</i>	<i>Echthrogaleus pectinatus</i>
Orectolobid shark	<i>Dissonus furcatus</i>
Family Carcharinidae	
<i>Hemipristis elongatus</i>	<i>Peon labatus</i>
<i>Hemigaleus balfouri</i>	<i>Perissopus crenatus</i> ; <i>Trypaphylum hemigalei</i>
<i>Scoliodon walbeehmi</i>	<i>Lernaeopoda scoliodontis</i>
<i>Scoliodon</i> sp.	<i>Perissopus dentatus</i>
carcharinid shark	<i>Alebion megacephalus</i> ; <i>Pandarus niger</i> ; <i>Pseudopandarus gracilis</i>
Family Rhinobatidae	
<i>Rhynchobatus</i> sp.	<i>Nesippus vespa</i>
Family Trygonidae	
<i>Himantura uarnak</i>	<i>Charopinus markewitschi</i>
Family Myliobatidae	
<i>Aetomylaeus nichofii</i>	<i>Charopinus markewitschi</i>
Family Rhinopteridae	
<i>Rhinoptera javanica</i>	<i>Trebius exilis</i>
Family Clupeidae	
<i>Pellona ditohela</i>	<i>Naobranchia lizae</i>
Family Engraulidae	
<i>Thrissocles hamiltoni</i>	<i>Cardiodectes anchorellae</i>
Family Chirocentridae	
<i>Chirocentrus dorab</i>	<i>Clavellopsis appendiculata</i> ; <i>Caligus longicaudus</i>
Family Tachysuridae	
<i>Arius acutirostris</i>	<i>Hermilius longicornis</i> ; <i>Lepeophtheirus longipalpus</i> ; <i>Caligus arii</i> ; <i>Caligus dakari</i>
Family Belonidae	
<i>Tylosurus strongylurus</i>	<i>Caligodes laciniatus</i>
<i>Tylosurus leiurus</i>	<i>Lernanthropus cornutus</i> ; <i>Bomolochus unicirrus</i>
Family Hemirhamphidae	
<i>Hyporhamphus zanthopterus</i>	<i>Lernaeenicus hemirhamphi</i>
<i>Hemirhamphus far</i>	<i>Bomolochus scomberesocis</i>
Family Centriscidae	
<i>Centriscus scutatus</i>	<i>Bomolochus unicirrus</i>
Family Sphyraenidae	
<i>Sphyraena obtusata</i>	<i>Lernanthropus sphyraenae</i> ; <i>Caligus clavatus</i> ;
<i>Sphyraena jello</i>	<i>Bomolochus scomberesocis</i>
<i>Sphyraena</i> sp.	<i>Midias lobodes</i>
Family Mugilidae	
<i>Mugil</i> sp.	<i>Lernanthropus shishidoi</i>
Family Polynemidae	
<i>Eleutheronema tetradactylum</i>	<i>Parapetalus hirsutus</i>
Family Ophiocephalidae	
<i>Ophiocephalus striatus</i>	<i>Lamproglena chinensis sprostoni</i>
Family Latidae	
	<i>Lernanthropus latis</i> ; <i>Caligus diaphanus</i>

- Family Serranidae  
*Promicrops lanceolatus*  
*Epinephelus morrhua*
- Family Theraponidae  
*Autistes puta*
- Family Priacanthidae  
*Priacanthus hamrur*
- Family Sillaginidae  
*Sillago sihama*
- Family Carangidae  
*Alectis indica*  
*Selaroides leptolepis*  
*Selar mate*  
*Selar malam*  
*Caranx melampygus*  
*Caranx ignobilis*  
*Carangoides armatus*  
*Carangid spp.*  
*Chorinemus sp.*
- Family Rachycentridae  
*Rachycentron canadus*
- Family Coryphaenidae  
*Coryphaena hippurus*
- Family Lutianidae  
*Pristipomoides typus*  
*Lutianus sp.*
- Family Leiognathidae  
*Gazza minuta*
- Family Plectorhynchidae  
*Gaterin lineatus*
- Family Sciaenidae  
*Johnius diacanthus*
- Family Sparidae  
*Rhabdosargus sarba*
- Family Platacidae  
*Platax teira*
- Family Trichiuridae  
*Trichiurus savala*
- Family Scombridae  
*Rastrelliger kanagurta*
- Family Thunnidae  
*Katsuwonus pelamis*  
*Euthynnus affinis*  
*Neothynnus macropterus*
- Family Scomberomoridae  
*Acanthocybium solandri*  
*Cybium commersoni*
- Lepeophtheirus gonistii* ; *Argulus nativus*  
*Lernaeenicus ramosus*
- Caligus diaphanus*
- Lernanthropus priacanthi*
- Lernanthropus villiersi*
- Caligus constrictus*  
*Bomolochus scomberesocis*  
*Caligus robustus*  
*Pennella selaris*  
*Caligus platurus* ; *Caligus robustus* ; *Parechetus constrictus*  
*Lernanthropus giganteus* ; *Lernaeenicus longiventris*  
*Thysanote heterodactyla*  
*Caligus confusus* ; *Caligus tenax* ; *Thysanote furcata*  
*Lepeophtheirus spinifer* ; *Tuzophorus wilsoni* ; *Caligus epinepheli*
- Parapetalus occidentalis*
- Euryphorus nympa* ; *Caligus productus*
- Lernanthropus pristipomoidis* ; *Caligus outius*  
*Anuretes perplexus* ; *Lepeophtheirus rotundiventris*
- Peniculus scomberi* ; *Clavella uncinata*
- Caligus acutus*
- Caligus benedeni* ; *Brachiella merluccii*
- Caligus cossackii*
- Eirgos plataxus*
- Caligus longicervicis* ; *Brachiella trichiuri*
- Peniculus scomberi* ; *Lernaeolophus sultanus*
- Caligus productus* ; *Caligus coryphaenae*  
*Pseudocycnus appendiculatus* ; *Caligus productus*  
*Caligus robustus* ; *Brachiella thynni*
- Lernaeenicus seeri* ; *Brachiella thynni*  
*Caligus infestans* ; *Caligus cybii* ; *Tuzophorus cybii* ;  
*Pseudocycnus armatus*

## Family Histiophoridae

*Histiophorus gladius**Gloiopotes longicaudatus* ; *Pennella instructa* ;*Makaira indica**Lernaeolophus sultanus**Gloiopotes longicaudatus* ; *Pennella biloba*

## Family Stromateidae

*Parastromateus niger**Bomolochus megaceros* ; *Synestius caliginus* ;*Thysanote appendiculata*

## Family Anabantidae

*Osphronemus goramy**Lernaea cyprinacea chakoensis*

## Family Psettodidae

*Psettodes erumei**Chondracanthus alatus*

## Family Cynoglossidae

*Cynoglossus purdiceps**Acanthochondria cynoglottidis**Cynoglossus brachycephalus**Acanthochondria cynoglottidis**Cynoglossus macrolepidotus**Acanthochondria cornuta*

## Family Diodontidae

*Diodon maculifer**Pennella diodontis*

## Family Tetraodontidae

*Arothron stellatus**Lepeophtheirus brachyurus* ; *Caetrodes pholas**Tetraodon* sp.*Peniculisa furcata*

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