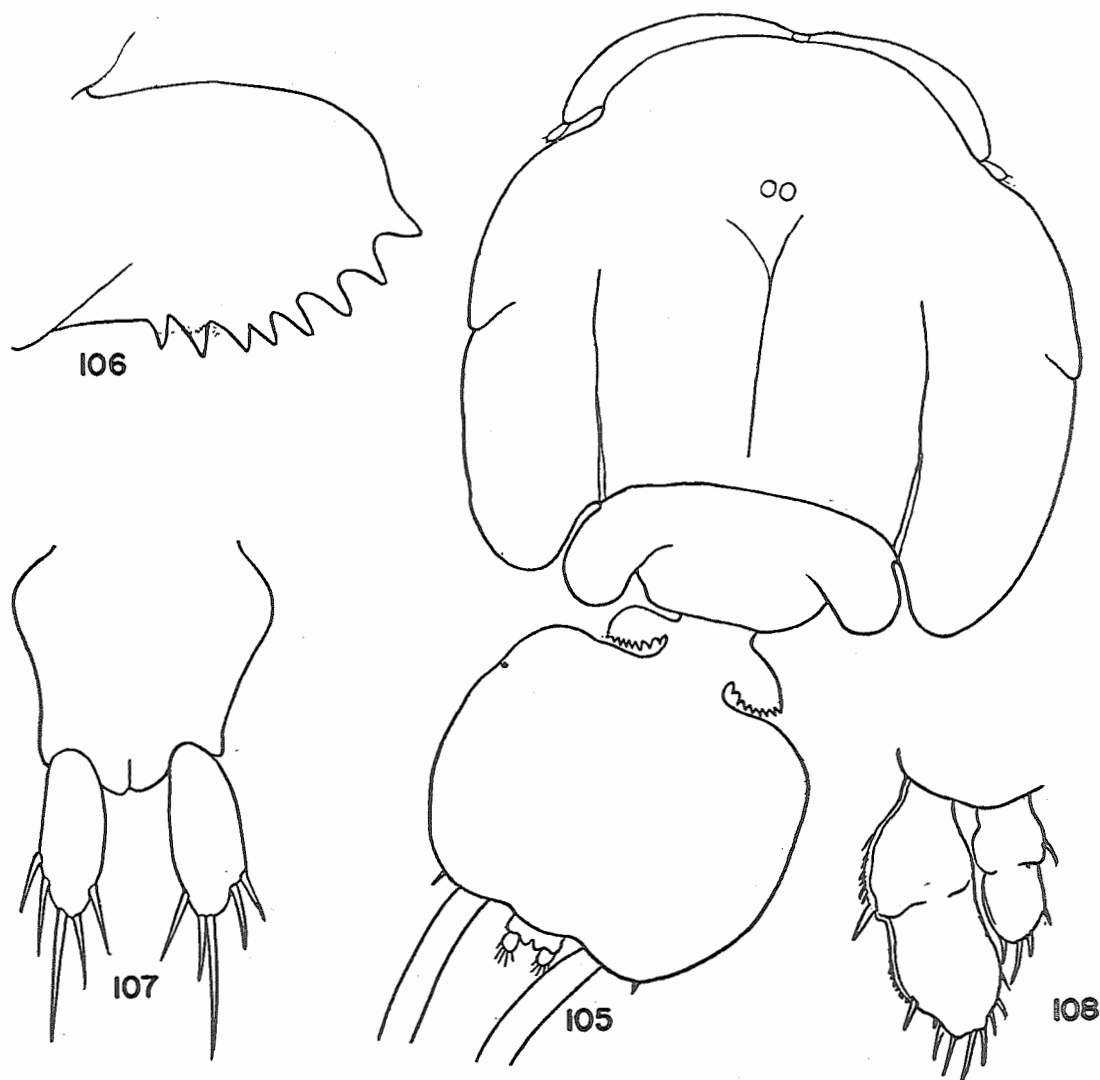


Female (Fig. 104). Cephalothorax as long as wide, about a fourth of the total length. Dorsal plates of free thoracic segment oval, longer than wide, overlapping the genital segment anteriorly. Genital segment sac-like, about as wide as the cephalothorax but not quite as long, with a pair of posterior lobes which are smaller than the dorsal plates of the preceeding 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^A). 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

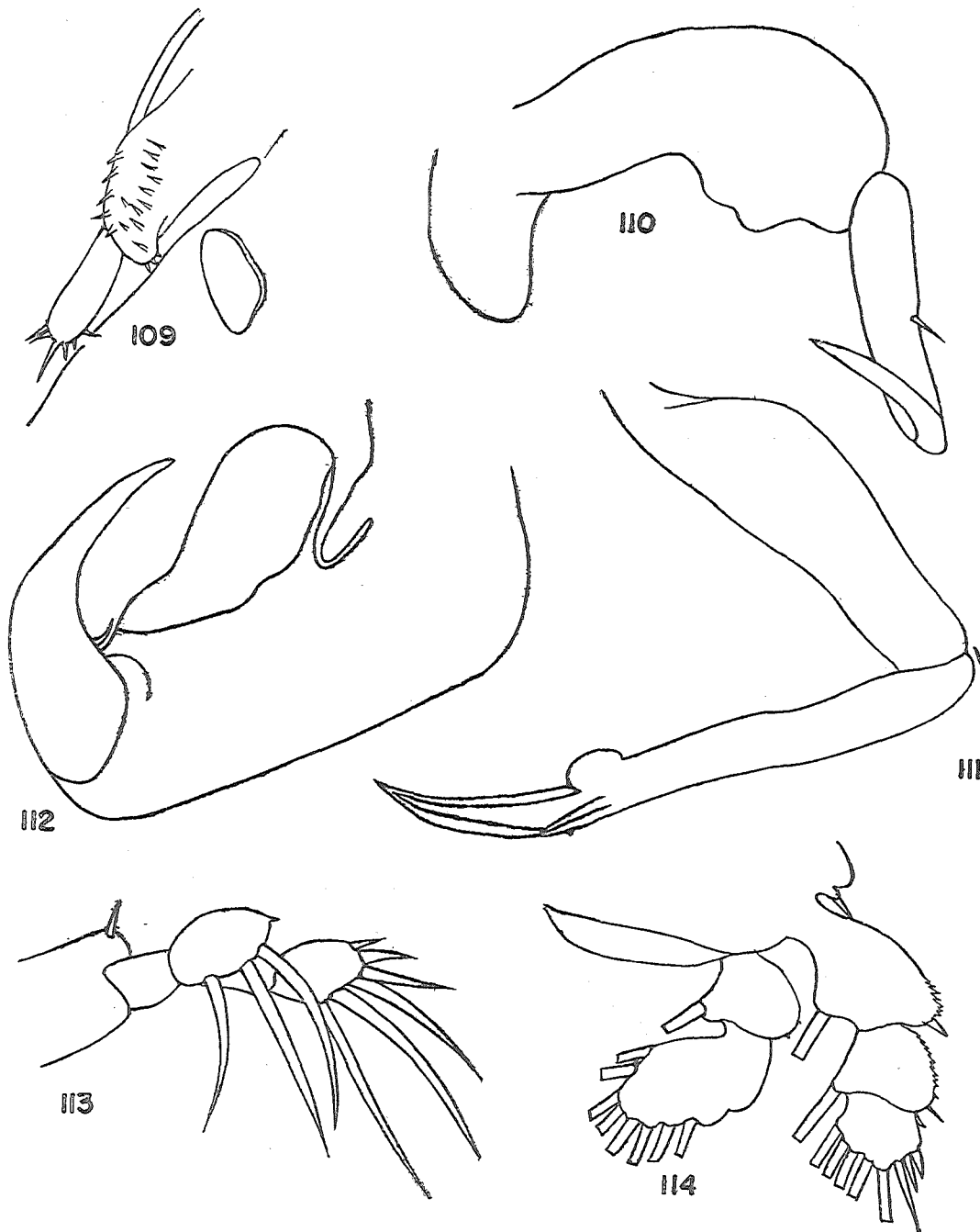
Echthrogaleus pectinatus n. sp.



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.

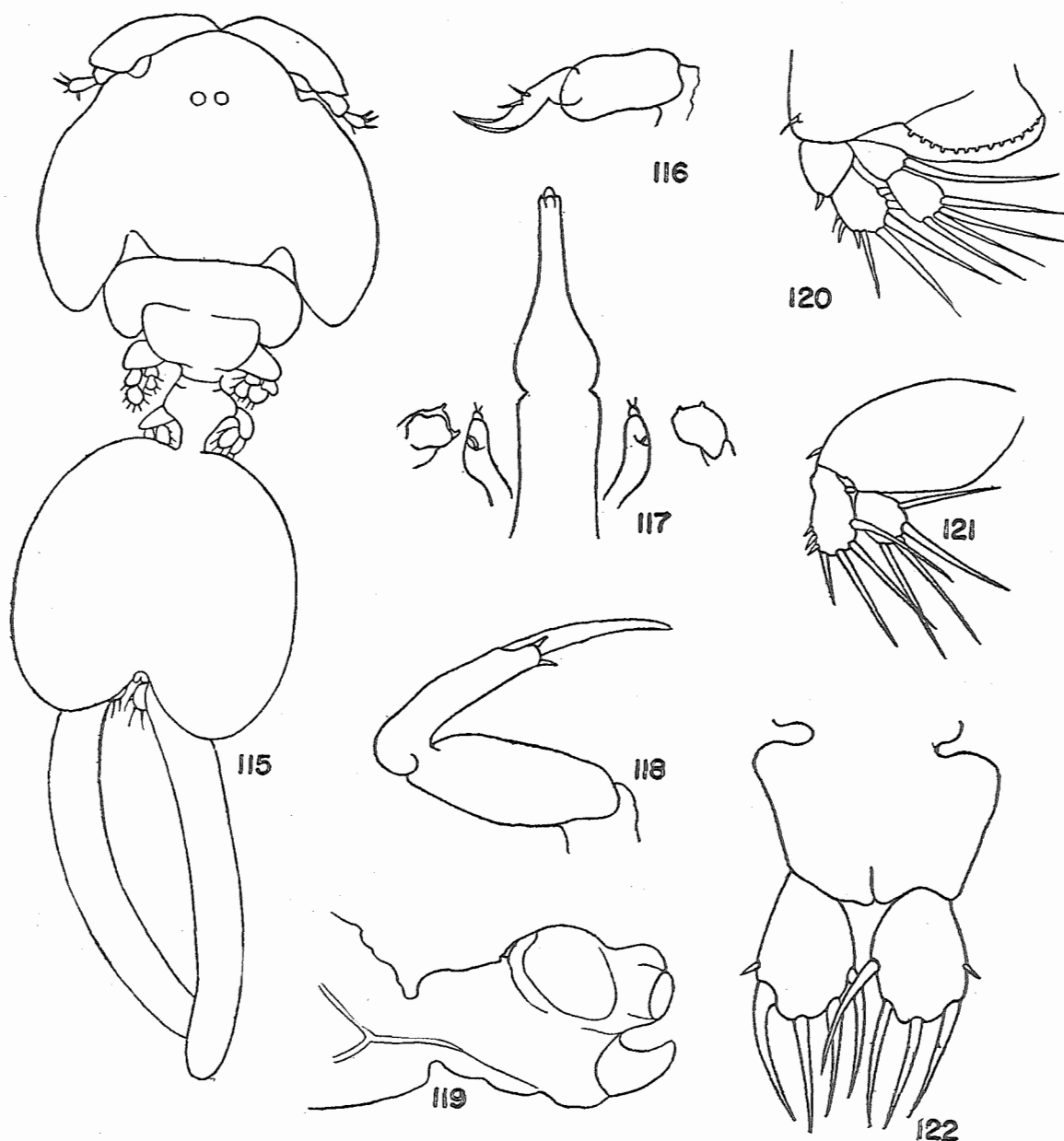
second antenna long and curved with a short spine on its antero-ventral margin. Second maxilla with a pad and a short spine at the base of the terminal claw. Basal joint of maxilliped with a raised adhesion pad and a small seta near the base of the terminal claw. Swimming legs of the usual type in the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

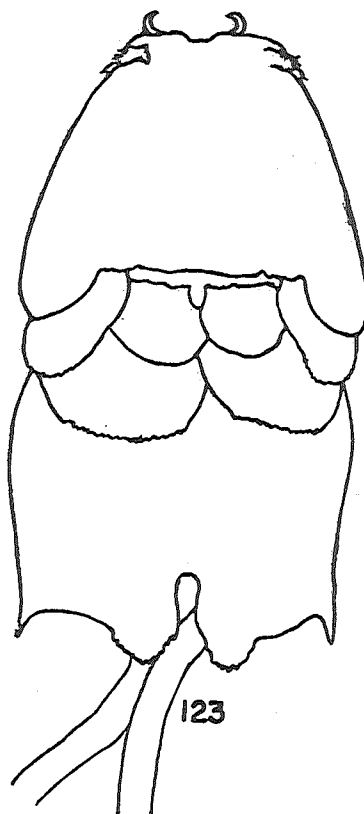


Fig. 123. *Perissopus dentatus* Steenstrup and Lutken. Female.

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 mugilii Shishido, 1898, pp. 120-126.

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

Lernanthropus mugilis (Not 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.)

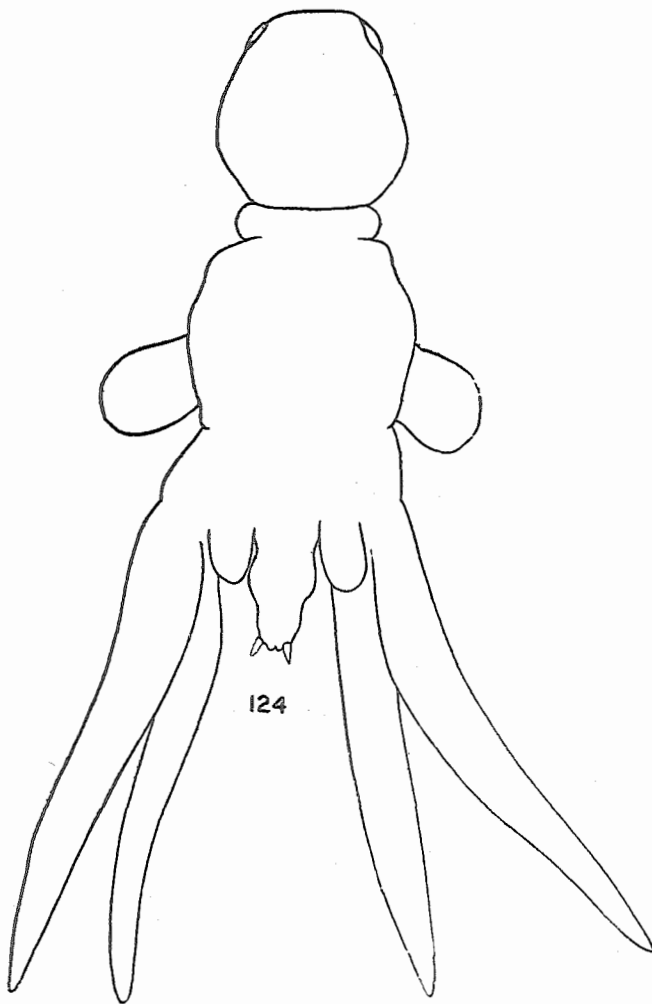


Fig. 124. *Lernanthropus shishidoi* (Shishido) Shiino. Female.

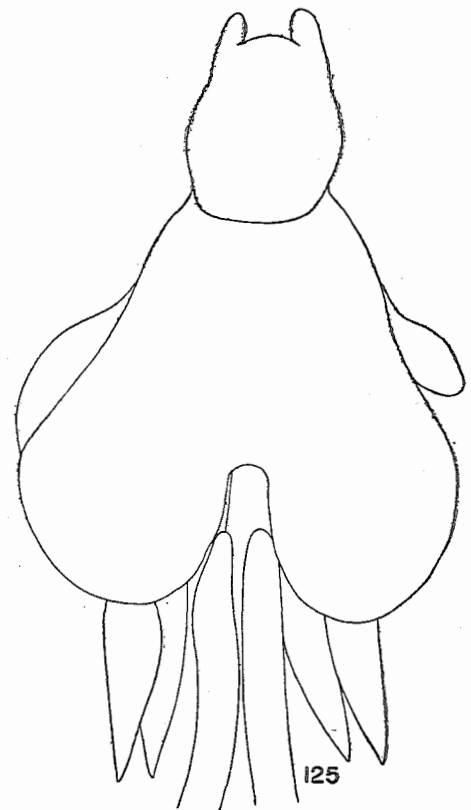
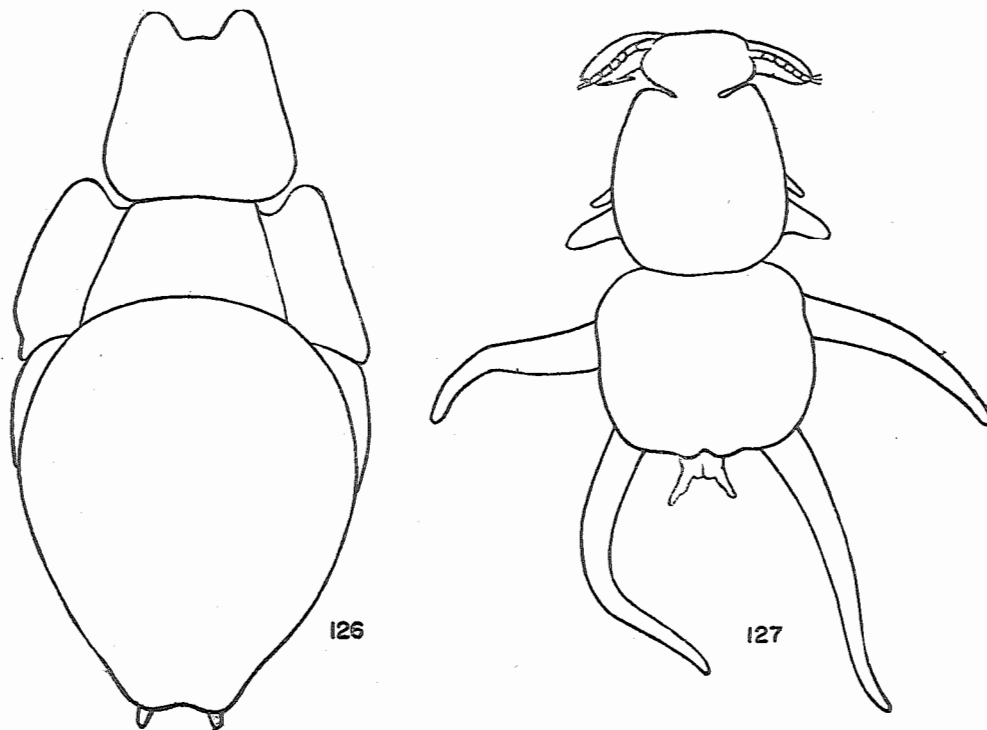


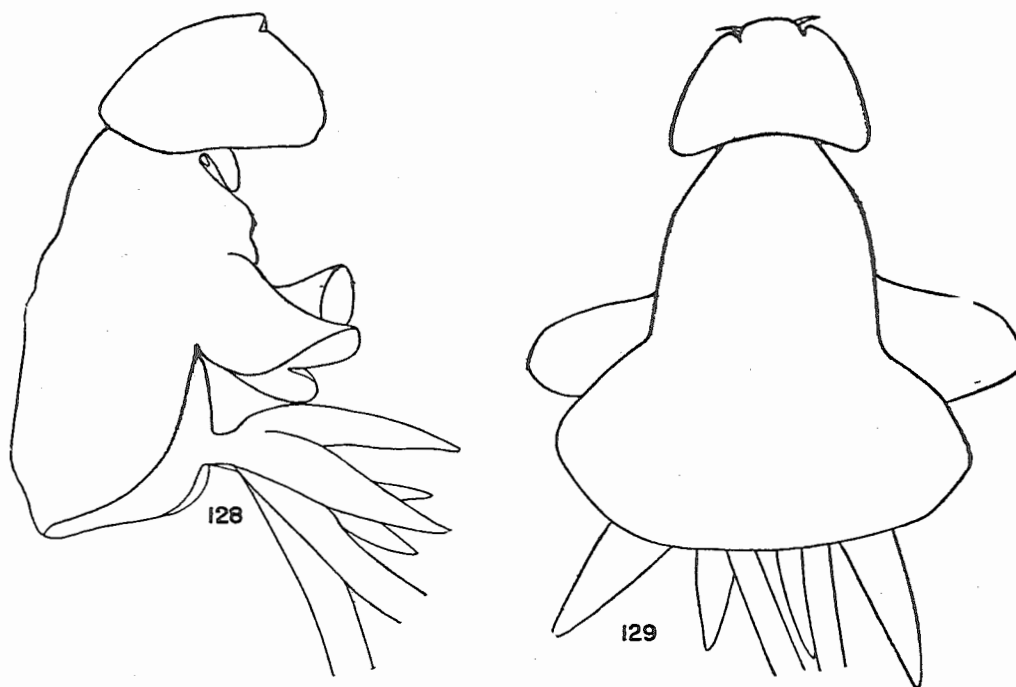
Fig. 125. *Lernanthropus sphyraenae* Yamaguti and Yamasu. Female.

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..

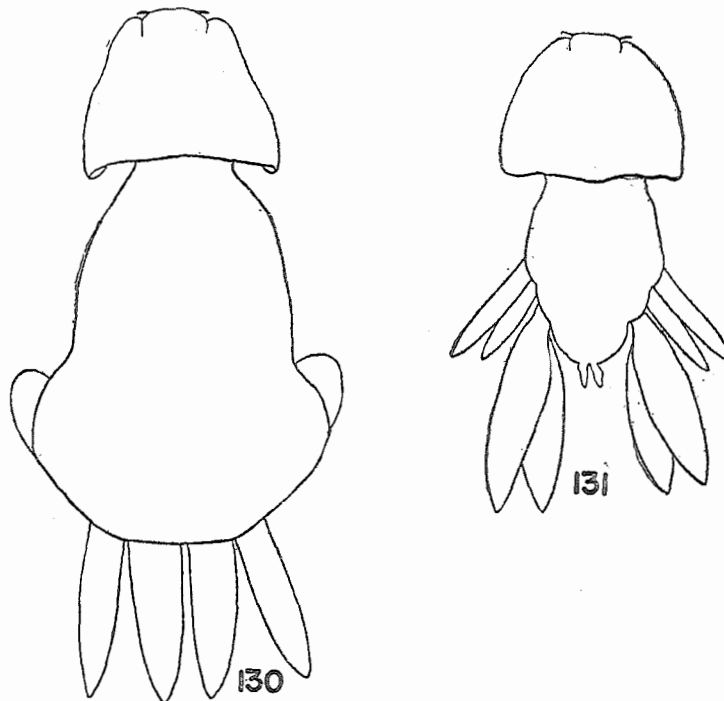
Male. Cephalothorax triangular in dorsal view, the rest of the body roughly cylindrical with lateral constrictions. No dorsal plates. Total length 1.2 mm.. (Male not seen. Description from original authors)

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.

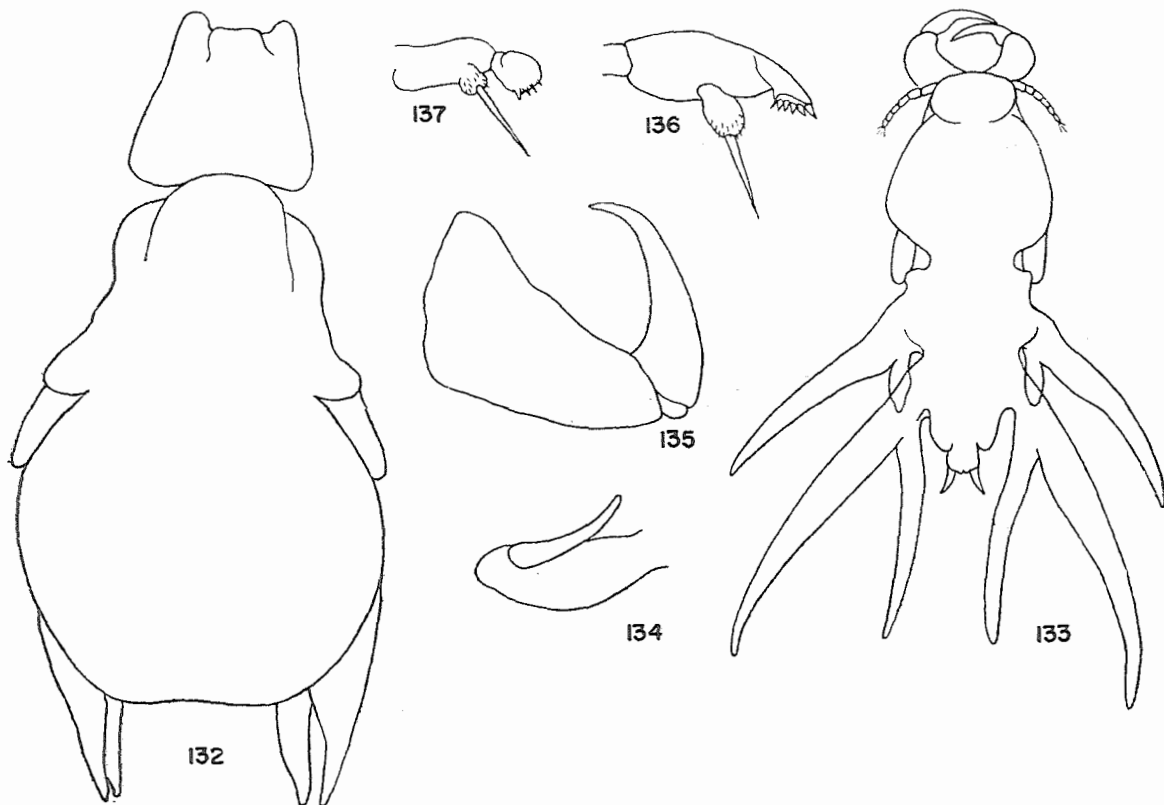
Female (Fig. 130). Cephalothorax roughly triangular with distinct antennal area and sides produced ventrally to form thin flaps. Dorsal plate of a single piece, divisible into anterior and posterior regions due to the presence of shallow marginal sinuses at the level of the third thoracic legs, anterior 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 trifoliatatus (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. sanson* (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).

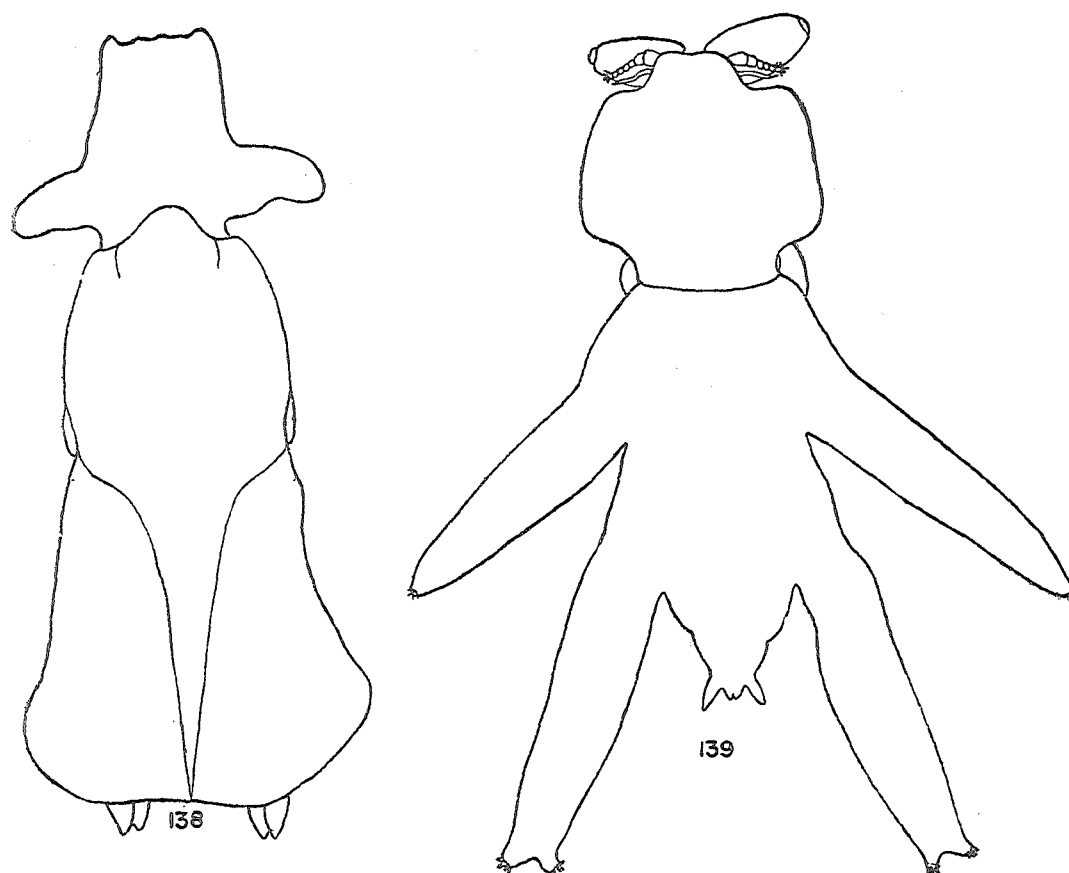
Female (Fig. 132). Cephalothorax a little longer than broad, trapezoidal in dorsal view. Antennal area distinct. Dorsal plate marked off into anterior and posterior portions by a pair of marginal indentations; anterior portion narrow in front flared behind, smaller than the large and round posterior 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.

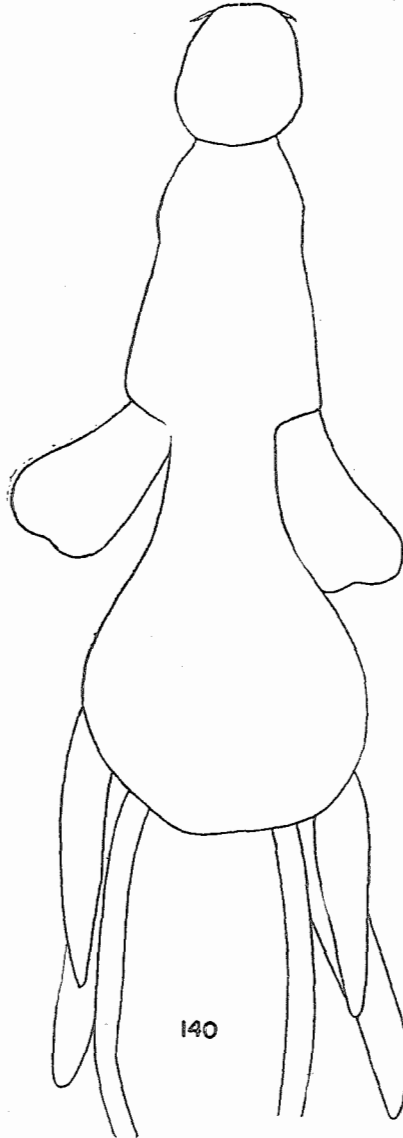


Fig. 140. *Lernanthropus latis* Yamaguti. Female.

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 DICHELESTHUIDAE

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..

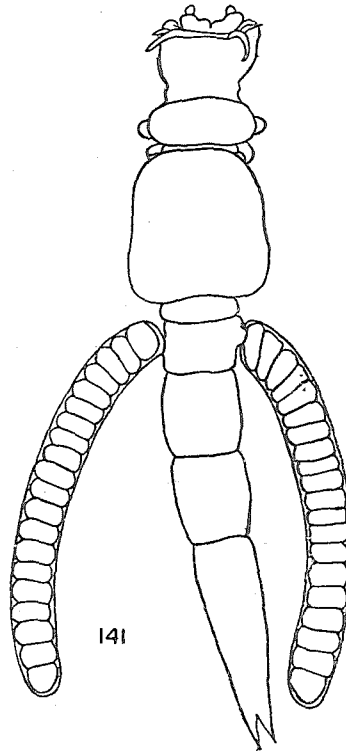


Fig. 141. *Lamproglana chinensis sprostoni* Kirtisinghe. Female.

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

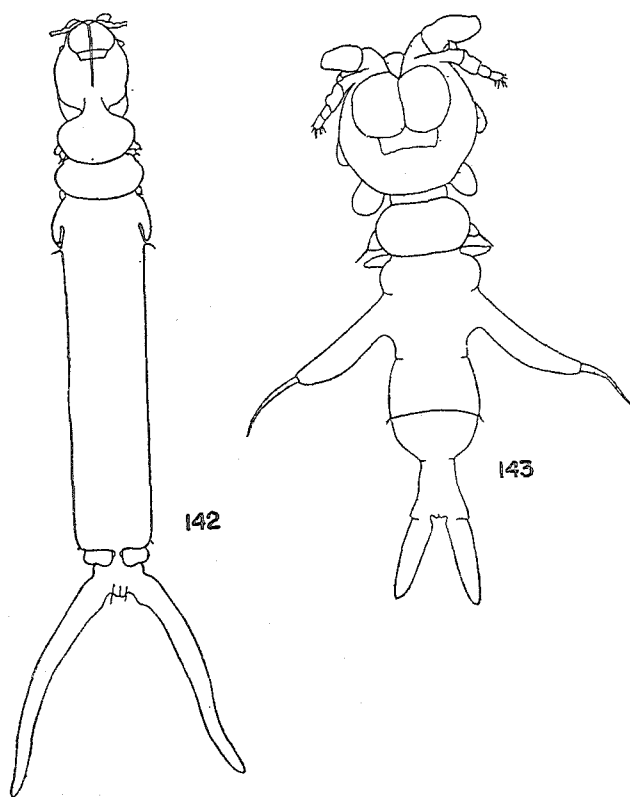
Pseudocycnus appendiculatus Heller, 1865, p. 218, pl. 22, fig. 7; Bassett-Smith, 1898b, p. 368; Brian, 1912, p. 15; Wilson, 1922, p. 75, pl. 12, and 1932, pp. 474-75, fig. 285a; Leigh-Sharpe, 1930, p. 1, pl. 1, figs. 1-4, pl. 2, fig. 1; Kirtisinghe, 1935, pp. 336-39, figs. 10-25; Klinberg, 1942, pp.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

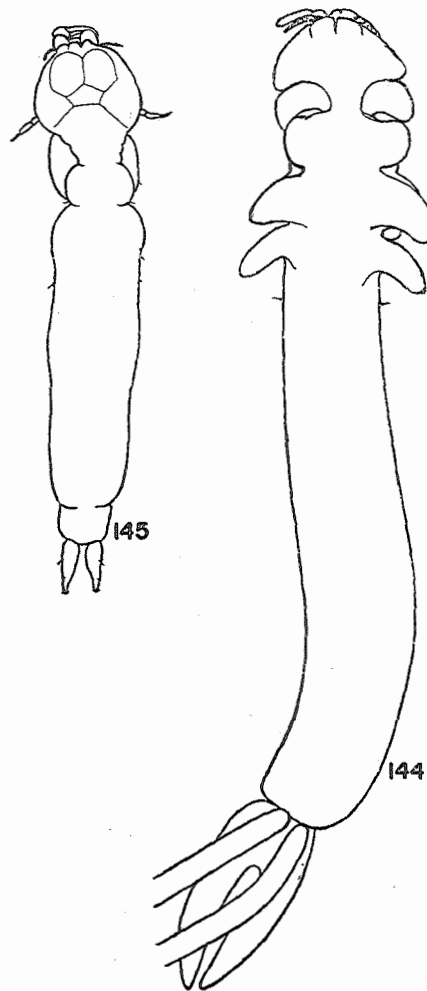
Male (Fig. 143). Cephalothorax almost circular in outline. First thoracic segment forming a narrow neck between head and trunk. Second and third thoracic segments of about equal width but not as wide as the cephalothorax. Fourth segment drawn out laterally into a pair of stout, tapering processes projecting 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 *Cybbium commersoni* (Lacepede) off Ceylon (Kirtisinghe)

Distribution. On the gills of *Cybbium 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..

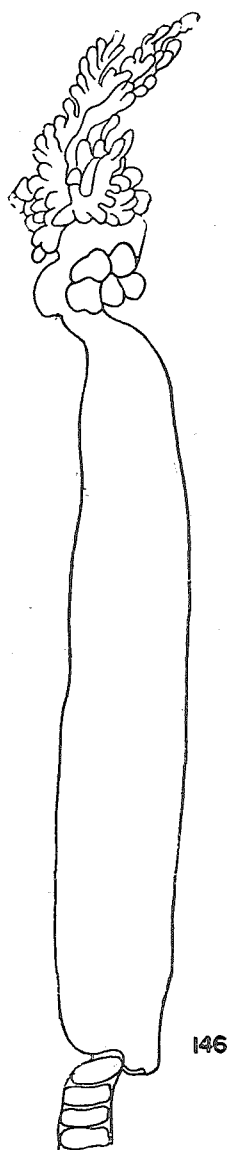
Family LERNAEIDAE

CARDIODECTES Wilson

Cardiodectes anchorellae Brian and Gray

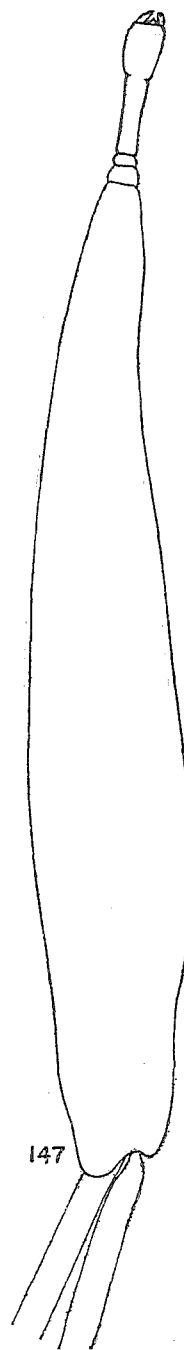
Cardiodectes anchorellae Brian and Gray, 1928, pp. 1-8, pls. 2-5.

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



146

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



147

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

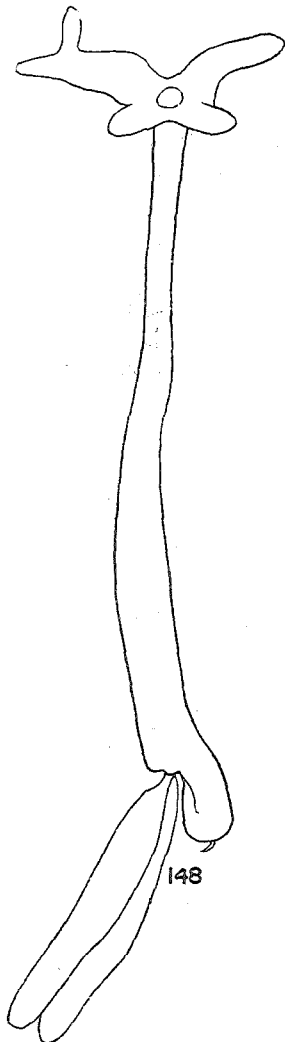


Fig. 148. *Lernaea cyprinacea chakoensis* (Gnanamuthu).
Female.

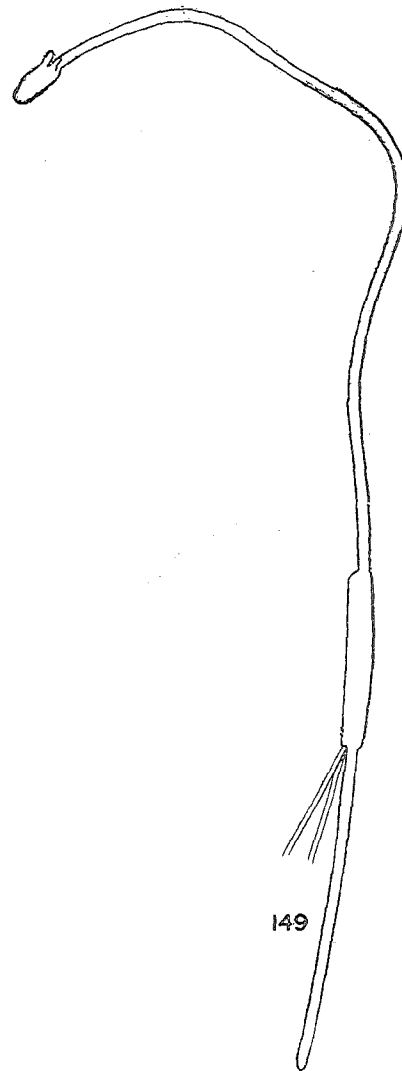


Fig. 149. *Lernaeenicus longiventris* Wilson. Female.

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 postero-lateral. 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.

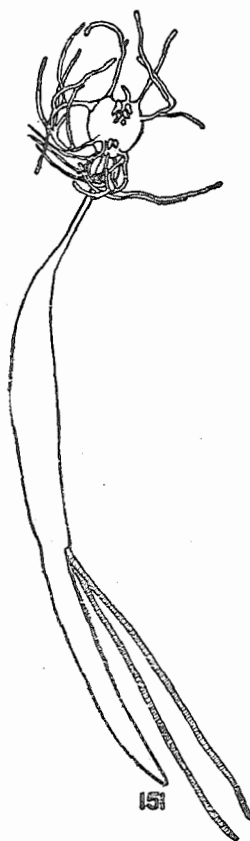


Fig. 151. *Lernaeenicus ramosus* Kirtisinghe. Female.

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.

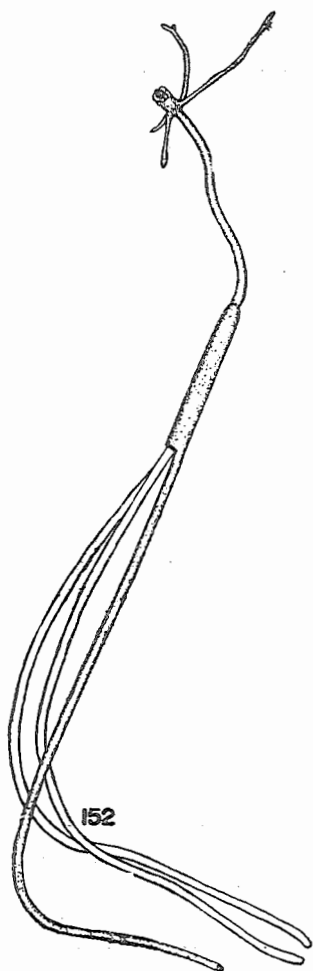


Fig. 152. *Lernaeenicus seeri* Kirtisinghe. Female.

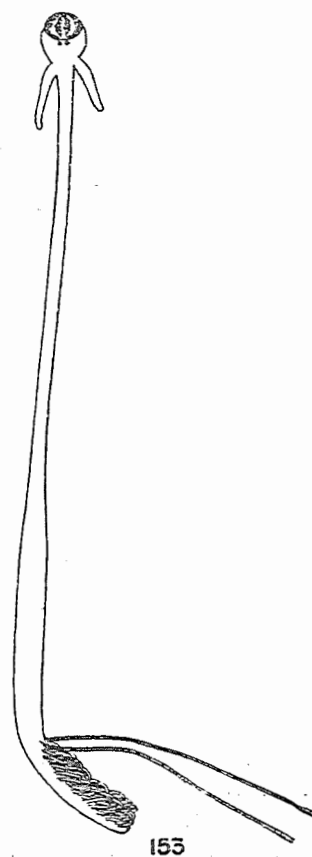


Fig. 153. *Pennella instructa* Wilson. Female.

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.

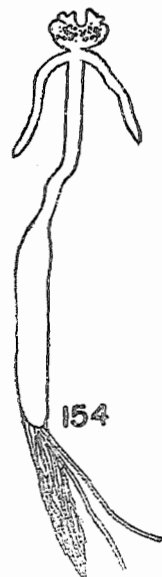


Fig. 154. *Pennella biloba* Kirtisinghe. Female.

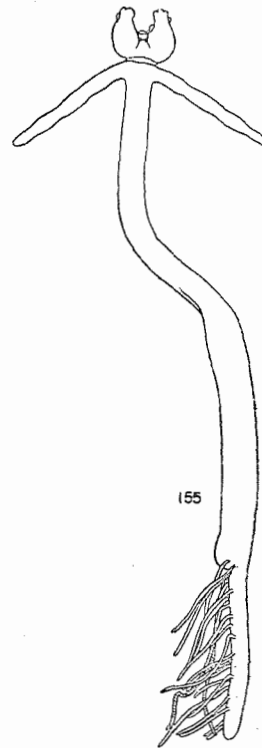


Fig. 155. *Pennella diodontis* Oken. Female.

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

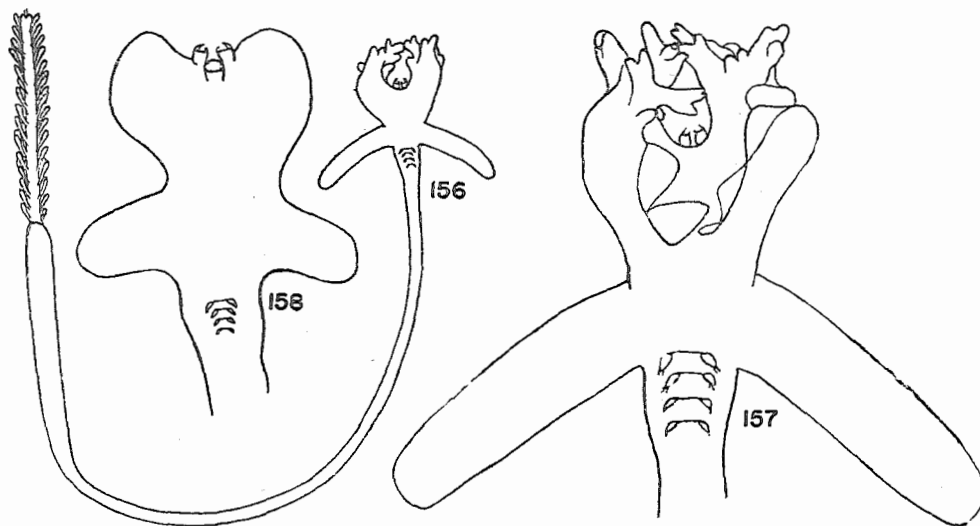
Occurrence. On the body of *Diodon maculifer* Kaup at Colombo.

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.

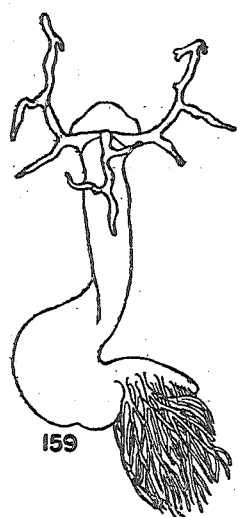


Fig. 159. *Lernaeolophus sultanus* (Nordmann).
Female.



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.

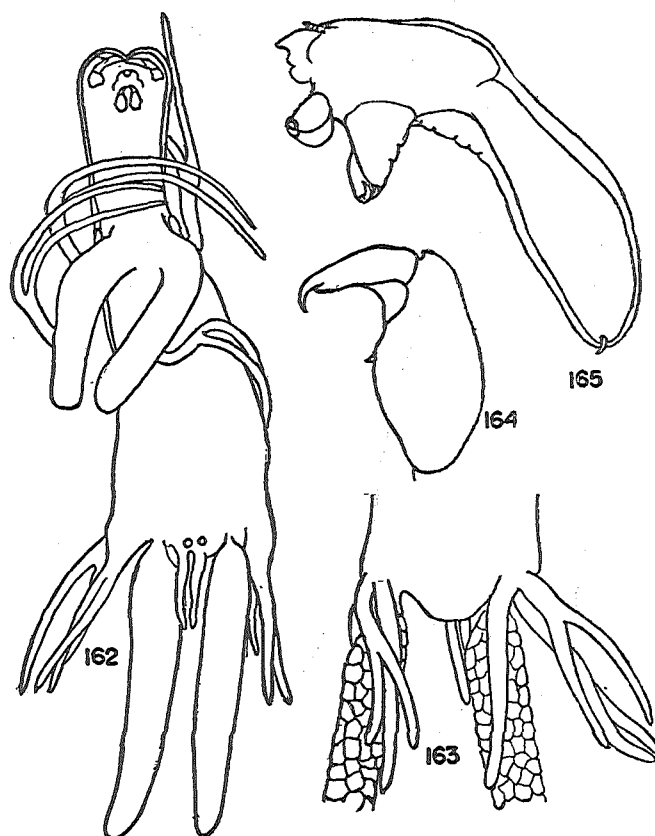
Thysanote appendiculata Wilson, 1915, p. 651 ; Kirtisinghe, 1935, p. 343, figs. 43-46 ; Gnana-muthu, 1950c, p. 259, figs. 1-3 ; Pillai, 1962 a, p. 60, fig. 2.

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.

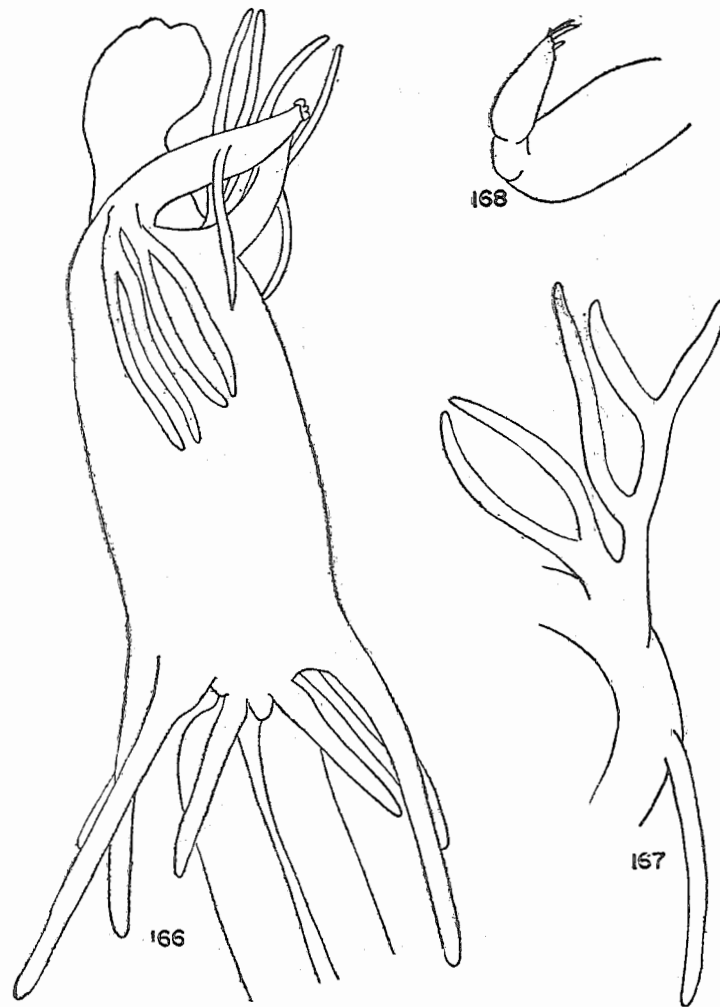
Figs. 162-165. *Thysanote furcata* n. sp.. 162-164, female; 162 ventral view of entire animal; 163, dorsal view of hind end of trunk; 164, second maxilliped; 165, male.

Occurrence. Two females, one with a male attached, were found in the gular groove of a carangid 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.

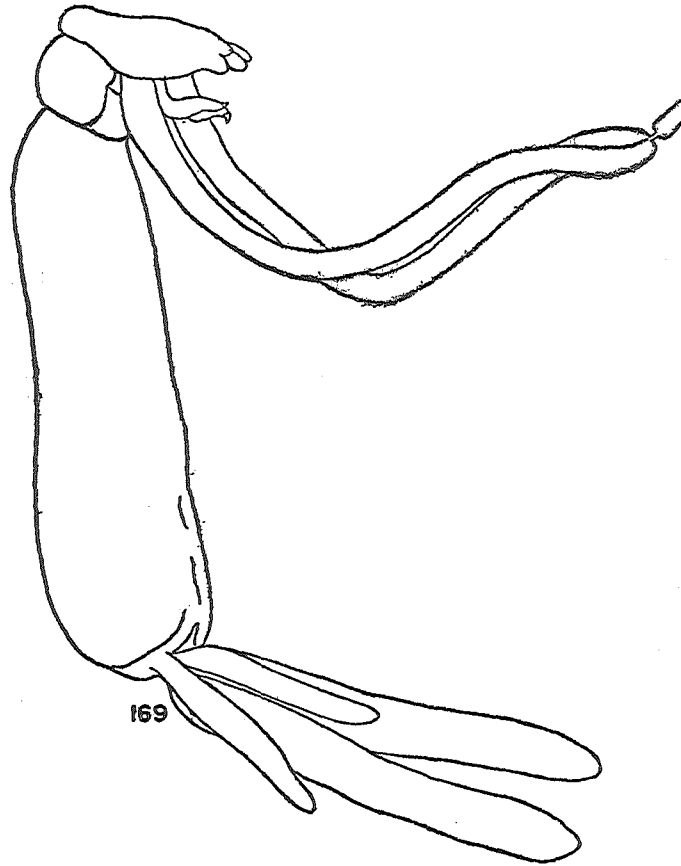
LERNAEOPODA Blainville*Lernaeopoda scoliodontis* n. sp.

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

Occurrence. Two adult females were obtained from the cloaca of *Scoliodon walbeehmi* (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.

Clavelloopsis dasyaticus Rangnekar, 1957, p. 16, fig. 5.

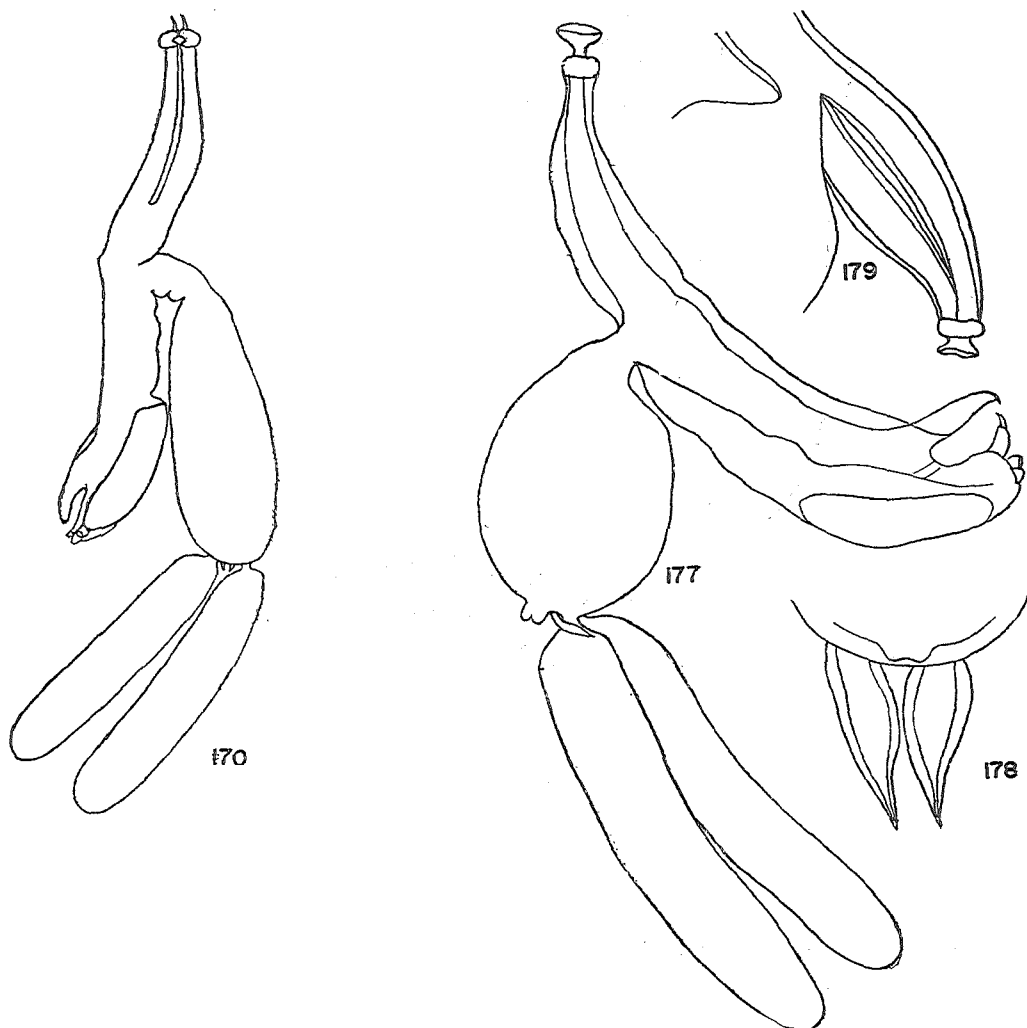


Fig. 170, 177-179. *Charopinus markewitschi* Gussev. Female. 170, 177, entire animal; 178, anal laminae; 179, first maxillipeds.

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.

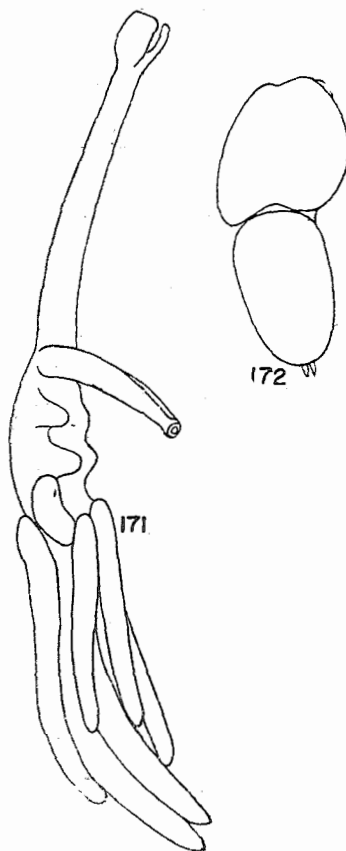
Distribution. On *Raja kenoei* from the U. S. S. R. (Gussev) and Japan (Shiino) ; in the mouth cavity of *Dasyatis ushieii* off Japan (Shiino) ; on the gill filaments of *Dasyatis uarnak* off Bombay (Rangnekar) ; on the body of *Dasyatis imbricatus* off Quilon and Trivandrum (Pillai).

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-Deboutville 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 merlucii Bassett-Smith

Brachiella merlucii 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 *Merlucius 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).

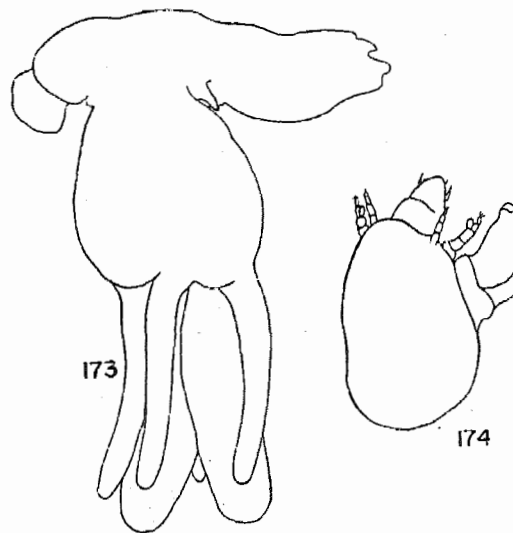
Female. Cephalothorax slightly longer than the trunk, cylindrical, straight or only a little curved, bent back over the trunk but in line with the first maxillipeds. Head squarely truncated anteriorly, carapace indistinct. Trunk depressed, somewhat quadrilateral with rounded corners and a re-entrant 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 6-7 mm; 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 2 mm., 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

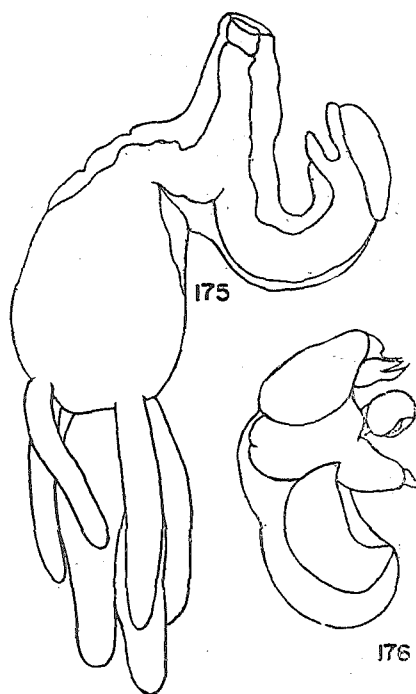
Clavellopsis trichiuri Yamaguti, 1939, p. 562, pl. 52, figs. 182-191.

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)

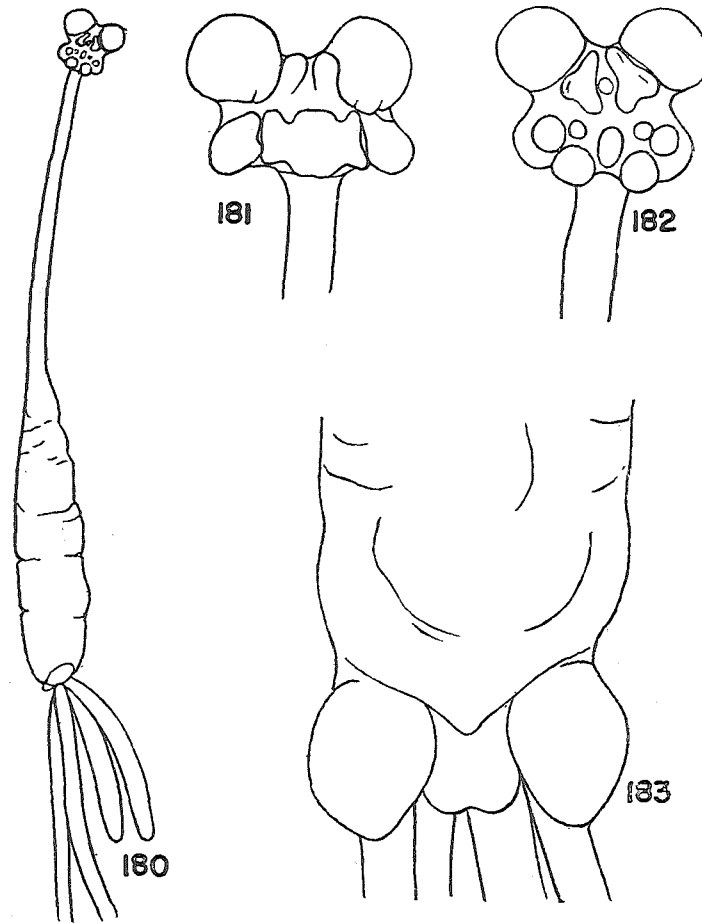
Anchorella lizæ Kroyer, 1863 b, p. 296, pl. 16.

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.

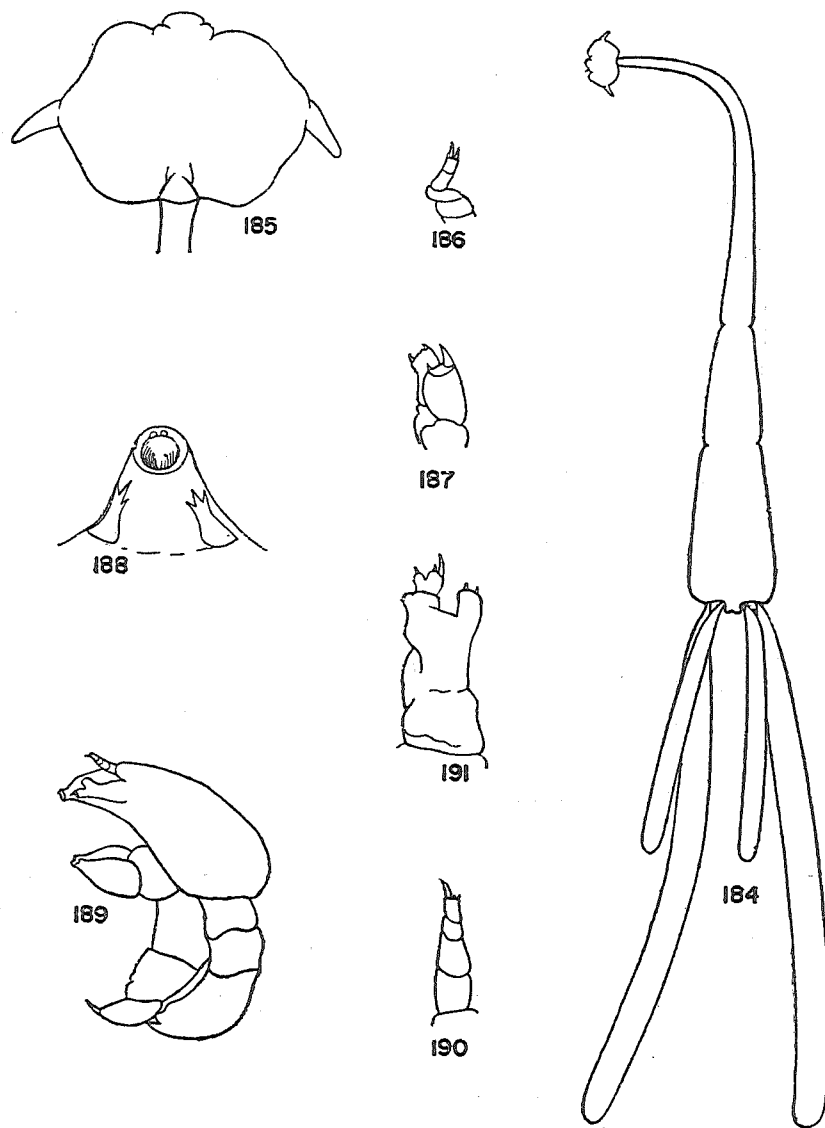
Female (Figs. 180-183). Head transversely elongated, its anterior corners produced into a pair of spherical lobes and its posterior corners produced into a smaller pair of more oval lobes, as seen from the dorsal surface (fig. 181). On the ventral surface of the head (fig. 182), anteriorly there is a 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

Rhincodon typus
Orectolobid shark

Echthrogaleus pectinatus
Dissonus furcatus

Family Carcharinidae

Hemipristis elongatus
Hemigaleus balfouri
Scoliodon walbeehmi
Scoliodon sp.
carcharinid shark

Peon labatus
Perissopus crenatus ; *Trypaphylum hemigalei*
Lernaeopoda scoliodontis
Perissopus dentatus
Alebion megacephalus ; *Pandarus niger* ; *Pseudopandarus gracilis*

Family Rhinobatidae

Rhynchobatus sp.

Nesippus vespa

Family Trygonidae

Himantura uarnak

Charopinus markewitschi

Family Myliobatidae

Aetomylaeus nichofii

Charopinus markewitschi

Family Rhinopteridae

Rhinoptera javanica

Trebius exilis

Family Clupeidae

Pellona ditchela

Naobranchia lizae

Family Engraulidae

Thrissocles hamiltoni

Cardiodectes anchorellae

Family Chirocentridae

Chirocentrus dorab

Clavellopsis appendiculata ; *Caligus longicaudus*

Family Tachysuridae

Arius acutirostris

Hermilius longicornis ; *Lepeophtheirus longipalpus* ;
Caligus arii ; *Caligus dakari*

Family Belonidae

Tylosurus strongylurus
Tylosurus leiurus

Caligodes laciniatus
Lernanthropus cornutus ; *Bomolochus unicirrus*

Family Hemirhamphidae

Hyporhamphus zanthopterus
Hemirhamphus far

Lernaeenicus hemirhamphi
Bomolochus scomberesocis

Family Centriscidae

Centriscus scutatus

Bomolochus unicirrus

Family Sphyraenidae

Sphyraena obtusata
Sphyraena jello
Sphyraena sp.

Lernanthropus sphyraenae ; *Caligus clavatus* ;
Bomolochus scomberesocis
Midias lobodes

Family Mugilidae

Mugil sp.

Lernanthropus shishidoi

Family Polynemidae

Eleutheronema tetradactylum

Parapetalus hirsutus

Family Ophiocephalidae

Ophiocephalus striatus

Lamproglana chinensis sprostoni

Family Latidae

Lernanthropus latis ; *Caligus diaphanus*

Family Serranidae

Promicrops lanceolatus
Epinephelus morrhua

Lepeophtheirus gonistii ; *Argulus nativus*
Lernaeenicus ramosus

Family Theraponidae

Autisthes puta

Caligus diaphanus

Family Priacanthidae

Priacanthus hamrur

Lernanthropus priacanthi

Family Sillaginidae

Sillago sihama

Lernanthropus villiersi

Family Carangidae

Alectis indica
Selaroides leptolepis
Selar mate
Selar malam
Caranx melampygus
Caranx ignobilis
Carangoides armatus
Carangid spp.
Chorinemus sp.

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 ; *Tuxophorus wilsoni* ; *Caligus epinepheli*

Family Rachycentridae

Rachycentron canadus

Parapetalus occidentalis

Family Coryphaenidae

Coryphaena hippurus

Euryphorus nympa ; *Caligus productus*

Family Lutianidae

Pristipomoides typus
Lutianus sp.

Lernanthropus pristipomoidis ; *Caligus curtus*
Anuretes perplexus ; *Lepeophtheirus rotundiventris*

Family Leiognathidae

Gazza minuta

Peniculus scomberi ; *Clavella uncinata*

Family Plectorhynchidae

Gaterin lineatus

Caligus acutus

Family Sciaenidae

Johnius diacanthus

Caligus benedeni ; *Brachiella merluccii*

Family Sparidae

Rhabdosargus sarba

Caligus cossackii

Family Platacidae

Platax teira

Eirgos plataxus

Family Trichiuridae

Trichiurus savala

Caligus longicervicis ; *Brachiella trichiuri*

Family Scombridae

Rastrelliger kanagurta

Peniculus scomberi ; *Lernaeolophus sultanus*

Family Thunnidae

Katsuwonus pelamis
Euthynnus affinis
Neothynnus macropterus

Caligus productus ; *Caligus coryphaenae*
Pseudocycnus appendiculatus ; *Caligus productus*
Caligus robustus ; *Brachiella thynni*

Family Scomberomoridae

Acanthocybium solandri
Cybium commersoni

Lernaeenicus seeri ; *Brachiella thynni*
Caligus infestans ; *Caligus cybii* ; *Tuxophorus cybii* ;
Pseudocycnus armatus

Family Histiophoridae

*Histiophorus gladius**Makaira indica**Gloiopotes longicaudatus* ; *Pennella instructa* ;*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 puncticeps**Cynoglossus brachycephalus**Cynoglossus macrolepidotus**Acanthochondria cynoglottidis**Acanthochondria cynoglottidis**Acanthochondria cornuta*

Family Diodontidae

*Diodon maculifer**Pennella diodontis*

Family Tetraodontidae

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

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