

Journal of the Marine Biological Association of India

ABBREVIATION : *J. Mar. biol. Ass. India*

VOL. VI

June 1964

No. 1

REPORT ON THE MYSIDACEA IN THE COLLECTIONS OF THE CENTRAL MARINE FISHERIES RESEARCH INSTITUTE, MANDAPAM CAMP, SOUTH INDIA—PART I

By N. KRISHNA PILLAI
Marine Biological Laboratory, Trivandrum-7

INTRODUCTION

THE mysids described here were collected by the Research Vessel *VARUNA*, belonging to the C.M.F.R. Institute, during the course of a series of cruises between the West Coast of India and the Maldivo-Laccadive group of islands in the Arabian Sea. There are nearly 1,000 plankton samples, including vertical and horizontal hauls, made at various levels down to 200 metres. Some of the collections were made with the International Indian Ocean Expedition standard net. But others were made with nets made of mosquito netting and other types of cloths. Mysids are comparatively rare but the collection is important since it adds to our knowledge of the fauna of this virtually unexplored region.

My sincere thanks are due to Dr. S. Jones, Director, C.M.F.R. Institute, Mandapam Camp, South India, for permitting me to study and report on this collection. I have great pleasure to record my gratitude to Dr. O. S. Tattersall for extending to me the privilege of consulting her on taxonomic matters connected with this work.

PROCEDURE

Details of material captured are given along with the description of each species and full details of collection are given as appendix. As the collections were not made with a closing type of net the depth records should not be taken as totally correct.

W. M. Tattersall (1922) gave a list of all the species recorded, till then, from this region. Since then several species have been recorded. I, therefore, give here a complete list of all the species hitherto recorded, including those contained in the present collection. As the present study deals exclusively with the suborder Mysida, lophogastrids are omitted from the list. In preparing this list I have not taken into consideration the difference of opinion regarding the validity of some of the species. Reference to the first record of each species from the present locality is given against each species. By present locality is meant the Bay of Bengal, Arabian Sea and the Indian Ocean north of the equator.

RESUME OF PREVIOUS WORK

The earliest works on the Mysidacea of Indian waters are those of Wood-Mason and Alcock (1891, 1891a), Alcock and Anderson (1894, 1899), and Anderson (1897). They mainly dealt with the lophogastrids collected by the *INVESTIGATOR*. Between the years 1906 and 1922, W. M. Tattersall (1906, 1908, 1911, 1914, 1915 and 1922) made very substantial contributions to our knowledge of the Indian fauna. In his report on the Schizopoda of the Siboga Expedition, Hansen (1910) described a few species collected in Indian waters. During a voyage from Ceylon to New Guinea Dr. Dunker collected mysids from certain unspecified localities in Indian waters. These were described by Zimmer (1915). Colosi (1920) recorded one species from Ceylon. In his John Murray Expedition report W. M. Tattersall (1939) recorded several species. While revising the genus *Rhopalophthalmus*, O. S. Tattersall (1957) created two new species to describe specimens previously described as *R. egregius* Hansen. Nouvel (1954) recorded a new species of *Mesopodopsis* from Ceylon. Finally Pillai (1957, 1961, 1964, 1964a) described a few species collected in the inshore waters of Kerala.

LIST OF SPECIES HITHERTO RECORDED FROM THE INDIAN WATERS*

Suborder Mysida

Family Lepidophthalmidae

* *Keralomysis longipes* Pillai and Mariamma. Pillai and Mariamma 1963.

Family Mysidae

Subfamily Boreomysinae

- * *Boreomysis* sp.
- B. microps* G. O. Sars. Tattersall, W. M. 1939.
- B. spinifera* Coifmann. Tattersall, W. M. 1939.
- B. verrucosa* W. M. Tattersall. Tattersall, W. M. 1939.

Subfamily Siriellinae

- Siriella paulsoni* Kossmann. Tattersall, W. M. 1906.
- S. gracilis* Dana. Hansen 1910.
- S. aequiremis* Hansen. Hansen 1910.
- S. brevicauda* Hansen. Tattersall, W. M. 1922.
- S. quadrispinosa* Hansen. Tattersall, W. M. 1922.
- S. vulgaris* Hansen. Tattersall, W. M. 1922.
- S. affinis* Hansen. Tattersall, W. M. 1922.
- S. dibia* Hansen. Tattersall, W. M. 1922.
- S. hanseni* W. M. Tattersall. Tattersall, W. M. 1922.
- S. thompsoni* (H. M. Edwards). Tattersall, W. M. 1911.
- S. quilonensis* Pillai. Pillai 1961.
- * *S. robusta* n. sp.
- * *S. jonesi* n. sp.
- Hemisirella parva* Hansen. Hansen 1910.

* Those marked with an asterisk are new records.

Subfamily Rhopalophthalminae

- Rhopalophthalmus chilensis* O. S. Tattersall. Tattersall, O. S. 1957.
R. kemp O. S. Tattersall. Tattersall, O. S. 1957.
R. tattersallae Pillai. Pillai 1961.
R. indicus Pillai. Pillai 1961.
 * *R. macropsis* n. sp.

Subfamily Gastrosaccinae

- Gastrosaccus muticus* W. M. Tattersall. Tattersall, W. M. 1915.
G. simulans W. M. Tattersall. Tattersall, W. M. 1915.
G. bengalensis Hansen. Hansen 1910.
G. dunckeri Zimmer. Zimmer 1915.
G. pacificus Hansen. Tattersall, W. M. 1922.
G. kemp W. M. Tattersall. Tattersall, W. M. 1922.
Anchialina typica (Kroyer). Tattersall, W. M. 1922.
A. grossa Hansen. Hansen 1910.
A. frontalis Zimmer. Zimmer 1915.
A. penicillata Zimmer. Zimmer 1915.
 * *A. dentata* n. sp.
Pseudanchialina pusilla (G.O. Sars). Hansen 1910.
P. inermis Illig. Hansen 1910.

Subfamily Mysinae

Tribe Erythropini

- * *Erythrope* sp.
E. minuta Hansen. Tattersall, W. M. 1922.
E. nana W. M. Tattersall. Tattersall, W. M. 1922.
Hypererythrope spinifera (Hansen). Tattersall, W. M. 1922.
Metererythrope indica Hansen. Tattersall, W. M. 1939.
Dactylamblyope murrayi W. M. Tattersall. Tattersall, W. M. 1939.
Synerythrope intermedia Hansen. Tattersall, W. M. 1939.
 * *Pseuderythrope gracilis* Coifmann.
Gibberythrope acanthura (Illig.) Tattersall, W. M. 1939.
G. brevisquamosa (Illig). Tattersall, W. M. 1939.
Euchaetomera typica G. O. Sars. Tattersall, W. M. 1939.
E. tenuis G. O. Sars. Tattersall, W. M. 1939.
E. oculata Hansen. Tattersall, W. M. 1939.
E. glyphidophthalmica Illig. Tattersall, W. M. 1939.
Echinomysis chuni Illig. Tattersall, W. M. 1939.

Tribe Leptomysini

- Leptomysis apiops* G. O. Sars. Zimmer 1915.
L. xenops W. M. Tattersall. Tattersall, W. M. 1922.
Diopromysis perspicillata Zimmer. Zimmer 1915.
Promysis armata (Hansen). Zimmer 1915.
Mysidopsis indica W. M. Tattersall. Tattersall, W. M. 1922

- M. kemp* W. M. Tattersall. Tattersall, W. M. 1922.
Afromysis macropsis W. M. Tattersall. Tattersall, W. M. 1922.
A. dentisinus Pillai. Pillai 1957.
Prionomysis stenolepis W. M. Tattersall. Tattersall, W. M. 1922.
Doxomysis littoralis W. M. Tattersall. Tattersall, W. M. 1922.
D. anomala W. M. Tattersall. Tattersall, W. M. 1922.
D. zimmeri Colosi. Colosi 1920.
D. longiura Pillai. Pillai 1964.
Bathymysis varunae Pillai. Pillai 1964a.
Thalassomysis sewelli W. M. Tattersall. Tattersall, W. M. 1939.

Tribe Mysini

- Potamomysis assimilis* W. M. Tattersall. Tattersall, W. M. 1908.
Indomysis amandalei W. M. Tattersall. Tattersall, W. M. 1914.
Mesopodopsis orientalis (W. M. Tattersall). Tattersall, W. M. 1908.
M. zeylanica Nouvel. Nouvel 1954.
Lycomysis pusilla Zimmer. Zimmer 1915.
L. spinicauda Hansen. Tattersall, W. M. 1922.
L. platycauda Pillai. Pillai 1961.
Acanthomysis indica (W. M. Tattersall). Tattersall, W. M. 1922.
A. hodgarti (W. M. Tattersall). Tattersall, W. M. 1922.
A. pelagica (Pillai). Pillai 1957.
A. anomala Pillai. Pillai 1961.
Idiomysis inermis W. M. Tattersall. Tattersall, W. M. 1922.

Subfamily Heteromysinae

- Heteromysis proxima* W. M. Tattersall. Tattersall, W. M. 1922.
H. zeylanica W. M. Tattersall. Tattersall, W. M. 1922.
H. gymnura W. M. Tattersall. Tattersall, W. M. 1922.
H. macropsis Pillai. Pillai 1961.

DESCRIPTION OF SPECIES

Order Mysidacea

Suborder Mysida

Family Mysidae

Subfamily Boreomysinae

Genus *Boreomysis* G.O. Sars

Boreomysis sp.

Fig. 1

Material. St. 943, 1 damaged immature female.

Description. Body is rather stout, with a slight greenish tint in formalin. The alimentary canal is visible as a greenish dorso-median line. Antero-lateral parts

of the carapace are produced into prominent spine-like processes and the antero-median part forms a broad semicircular frontal lobe with a small triangular rostral process reaching far beyond the base of the eyes. Sixth abdominal segment is long, more than twice as long as the previous segment. Eyes are small, with the peduncle slightly broader than the cornea and dorsally produced as far as the tip of the cornea. Cornea is dark brown in the preserved material.

First segment of the peduncle of the antennule is as long as the rest of the peduncle, third segment has a median distal lobe carrying a spine; basal part of the outer flagellum is swollen. Antennal sympod is produced into a prominent outer spine, the scale is slightly more than four times as long as broad and broadest in the middle, outer distal spine is small and the scale clearly reaches beyond the spine. The antennal peduncle is short and just reaches the middle of the scale, its second segment is

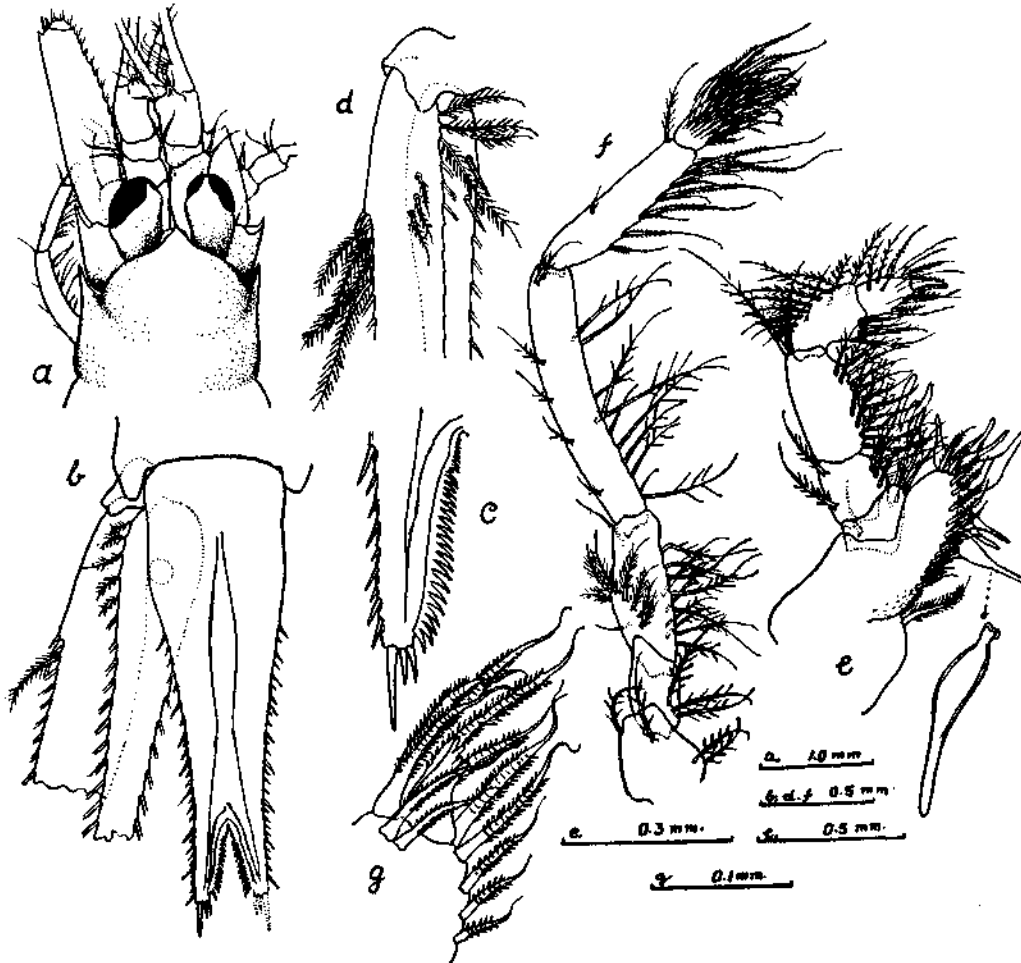


FIG. 1. *Boreomysis* sp.,—(a) anterior part of female; (b) posterior part of female; (c) apical lobe of telson; (d) uropod; (e) first thoracic endopod; (f) second thoracic endopod; (g) same, tip enlarged.

longest. Labrum is irregular in shape and roughly equal in length and breadth. Mandible has a small incisor process, very small lacinia mobilis, a prominent spine row and a stout molar lobe; third segment of the palp is long and well armed. Maxillule and maxilla are as usual in the genus.

First segment of endopod of first thoracic limb has a very large endite, second segment is slightly produced inwards, other segments are comparatively narrow, first three segments carry peculiarly shaped structures, probably some epizoid growths. Carpus and propodus of second thoracic limb are distinct and undivided, latter is only one-fourth the length of the former and carries about twelve long barbed setae. There appears to be a dentate stumpy claw which is masked by the thick matting of hairs. Other limbs were all broken.

Telson is about three and a half times as long as broad and narrows at the proximal one-third, distal two-thirds of the borders are armed with about nine long spines alternating with groups of one to four small spines. Apex of the telsonic lobes is armed with three spines, a long outer spine and two short inner spines. Cleft of telson has a slight proximal bulge but lacks the usual dilatation. Uropods are damaged, the non-setose basal part of the exopod is long and terminates in two unequal spines, endopod has two subsimilar spines.

Length 14.0 mm.

Remarks. This species is characterised by the indistinct series of spines on the lateral borders of the telson, long sixth abdominal segment, absence of dilatation at the base of the telsonic cleft, presence of two spines on each ramus of the uropod and the absence of subchelate second thoracic endopod. Since the specimen is immature and very badly damaged I do not venture to give it a specific name.

Subfamily Siriellinae

Genus *Siriella* Dana

Siriella gracilis Dana

Siriella gracilis Dana, 1852, p. 658; 1855, pl. 44, figs. la-lg, 2a-c; G. O. Sars, 1884, p. 41; 1885, p. 209, pl. 36, figs. 25-28; Hansen, 1910, p. 31; W. M. Tattersall, 1951, p. 62.

Material. St. 1173, 1 male and 2 females. St. 1173, 1 male. St. 1180, 1 female. St. 1181, 1 female. St. 1200, 1 female. St. 1224, 1 female. St. 1231, 9 males and 1 female. St. 1231, 1 female. St. 1243, 4 males. St. 1245, 4 males. St. 1260, 1 female. St. 1260, 1 female. St. 1278, 12 males and 4 females. St. 1292, 1 female. St. 1298, 1 female. St. 1306, 3 females. St. 1329, 3 females. St. 1351, 1 male. St. 1377, 1 male. St. 1397, 2 males. St. 1407, 1 male and 1 female. St. 1409, 1 female. St. 1415, 1 female. St. 1415, 3 females and 3 males. St. 1417, 1 male. St. 1417, 2 males and 2 females. St. 1691, 1 female. St. 1691, 1 male. St. 1694, 1 female. St. 1720, 1 male. St. 1723, 1 female. St. 1724, 3 males. St. 1724, 2 males. St. 1724, 4 males. St. 1725, 1 male and 1 female. St. 1727, 2 males. St. 1734, 1 male. St. 1737, 1 male and 1 female. St. 1738, 3 males and 1 female. St. 1748, 1 male. St. 1750, 1 male. St. 1752, 1 male. St. 1759, 1 female. St.

1783, 1 female. St. 1793, 1 male. From an unspecified station near Minicoi there is a very large collection.

Remarks. This is the most abundant species and the collection includes a large number of specimens in various stages of growth and hence show considerable intraspecific variation as is usual in the genus. But the adults are clearly referable to *S. gracilis* Dana. Hansen (1910) observed that this species has never been collected except near the surface. This is probably true of the present collection also since the collections were made generally by vertical hauls from 200-0 metres or by horizontal hauls very near the surface.

Length of male 7.5 mm., of female 5.2 mm.

Distribution. According to W. M. Tattersall (1951) *S. gracilis* is an oceanic species widely distributed in the tropical and subtropical parts of the Pacific and Indian oceans, but has not been recorded from the Atlantic.

***Siriella dubia* Hansen**

Fig. 2

Siriella dubia Hansen, 1910, p. 44, pl. 5, figs. 4a-4e; W. M. Tattersall, 1922, p. 455, figs. 5a-b; 1936, p. 146, f.1; 1951, p. 79.

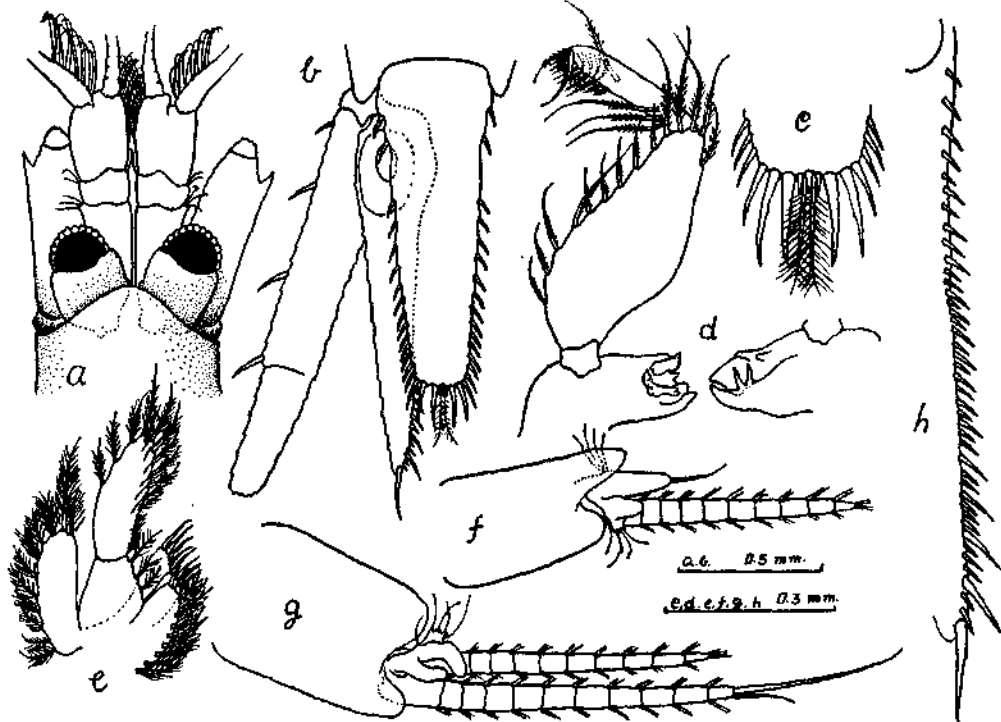


FIG. 2. *Siriella dubia* Hansen—(a) anterior part of male; (b) posterior part of male; (c) tip of telson; (d) mandibles; (e) maxilla; (f) first pleopod of male; (g) fourth pleopod of male.

Material. St. 1766, 2 males; St. 1792, 2 females and 2 juveniles. St. 1793, 1 female.

Remarks. Hansen's original description of this species was based on a single female and was defective in several details. W. M. Tattersall (1922) who had specimens of both sexes, corrected and supplemented the original description. The present study confirms W. M. Tattersall's observations.

As observed by Hansen *S. dubia* is unique in having the outer border of the basal segment of the exopod of the uropod setose and also in having four equidistant long spines spread along the entire border. Among other diagnostic features may be mentioned the broadly rounded apex of the telson which is armed with three pairs of long spines, three small spines and two long feathered setae. Eyes are rather short and the cornea is narrower than the peduncle. First thoracic endopod does not have an endite on the second segment and the second thoracic endopod has a long undivided carpopropodus. Labrum is anteriorly produced into a very long spine. The left mandible has a pincer-like cutting edge which to a large extent resembles that of *Hemisiriella*.

According to W. M. Tattersall (1922) the pseudobranchial lobe of pleopods two to five is spirally twisted. In large apparently mature males in my collection the two lobes of the pseudobranchiae are curved towards each other but not spirally twisted. I am not sure whether this is a sign of immaturity.

Distribution. East Indies, Andaman Islands, Great Barrier Reef and Philippines. According to W. M. Tattersall (1951) it is one of the rarer species of *Siriella*.

Siriella robusta n. sp.

Figs. 3-4

Material. St. 1231, 1 male. St. 1241, 1 female. St. 1243, 1 male. St. 1256, 3 males and 3 females. St. 1306, 2 males. St. 1409, 2 females. St. 1415, 2 males and 3 females. St. 1417, 2 females. St. 1417, 1 female. St. 1703, 1 female. St. 1723, 1 male. St. 1725, 1 male and 1 female.

Description. Body is rather strongly built and stouter in the female than in the male. Carapace is produced in both sexes into a very low triangular apically blunt rostrum very slightly overreaching the base of the eyes stalks. Eyes are large and prominent, with the black globular cornea occupying more than half the total area. Telson is wedge-shaped and nearly four times as long as broad and steadily narrows towards the rounded apex. At the basal one-fourth the telson has a slight waist-like constriction. The lateral borders are nearly throughout spiny, first three spines are large and well spaced, others are arranged in series of two to four spines. Apex of the telson is armed with a pair of long spines, a pair of plumose setae and three small spines.

Antennular peduncle is long and slender. In the female the third segment is short, about half the length of first but in the male the third segment is only slightly shorter than the first. Antennal scale is fairly broad and reaches the tip of the antennular peduncle in the female but stops short of the tip in the male. Labrum is

nearly symmetrical and its anterior spine-like prolongation is comparatively short and stout. Mandibles are very much dissimilar, second segment of the palp is very broad and flattened, third segment is long and cylindrical. Maxillule is of the usual type. Distal segment of the endopod of the maxilla is long.

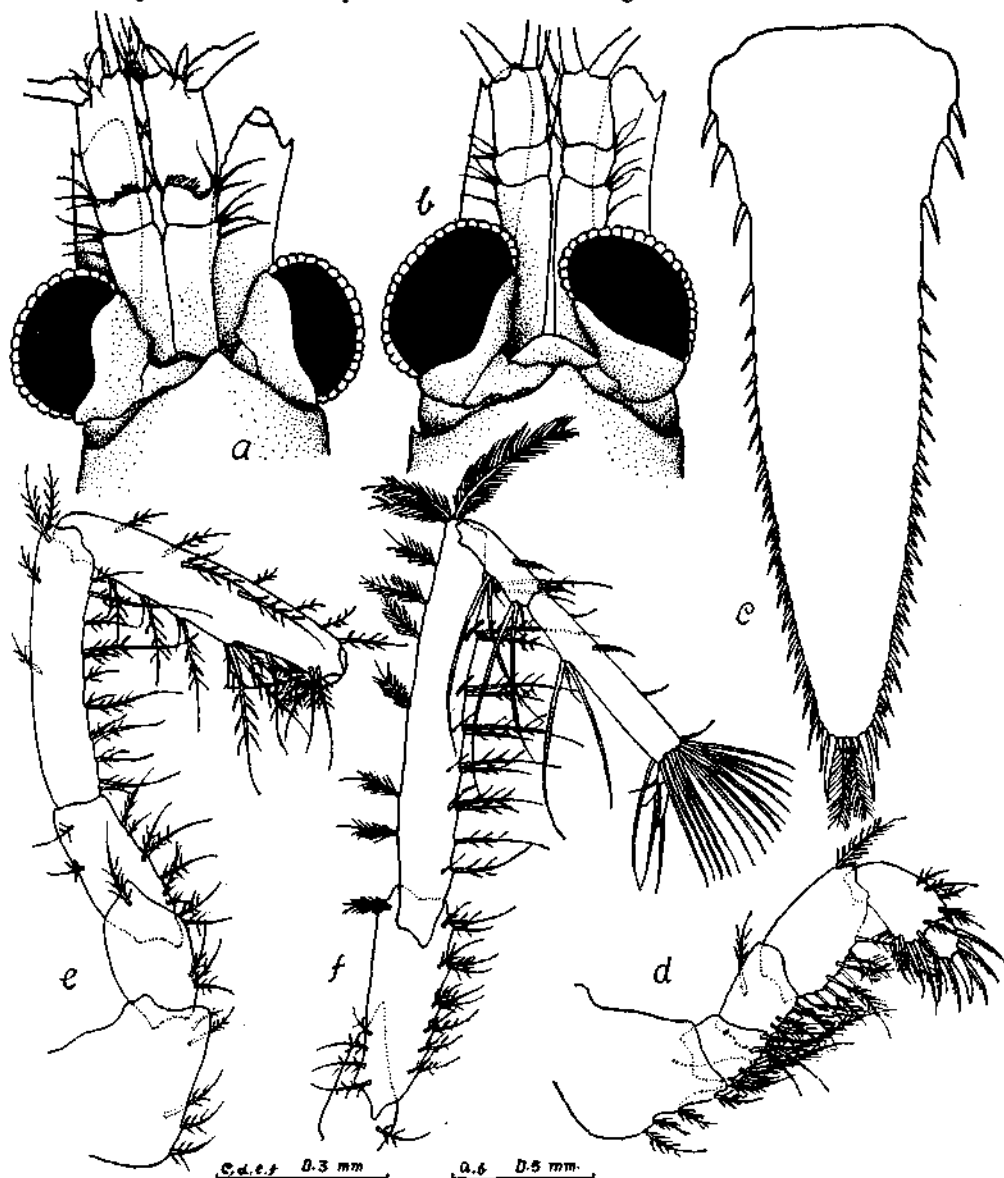


FIG. 3. *Siriella robusta* n.sp.—(a) anterior part of male; (b) same of female; (c) telson; (d) first thoracic endopod; (e) second thoracic endopod; (f) third thoracic endopod.

Endopod of first thoracic limb is fairly stout, second segment has a small endite tipped with two very long setae. Second thoracic endopod is robust, carpus is fused

with the propodus and the distal third of the inner border of the carpopropodus is excavated. The curved dactylus folds against the carpopropodus and forms a subchela, somewhat like that seen in some species of *Boreomysis*. Carpus of thoracic limbs three to eight is separated from the propodus by a distinct partition. The former is less than half as long as the latter and both are armed with unusually long setae which have the same structure as those encircling the dactylus.

The pseudobranchial lobe of pleopods two to five is very small and simply bilobed. Third and fourth pleopods do not have modified setae. Rami of the uropods are subequal in length, exopod very slightly overreaches the endopod and both extend beyond the tip of the telson. More than half of the outer border of the basal segment of the exopod is armed with a row of nine large spines, distal exopod segment is about half as long as the basal. Inner border of the endopod carries a row of closely packed spines arranged in distinct series.

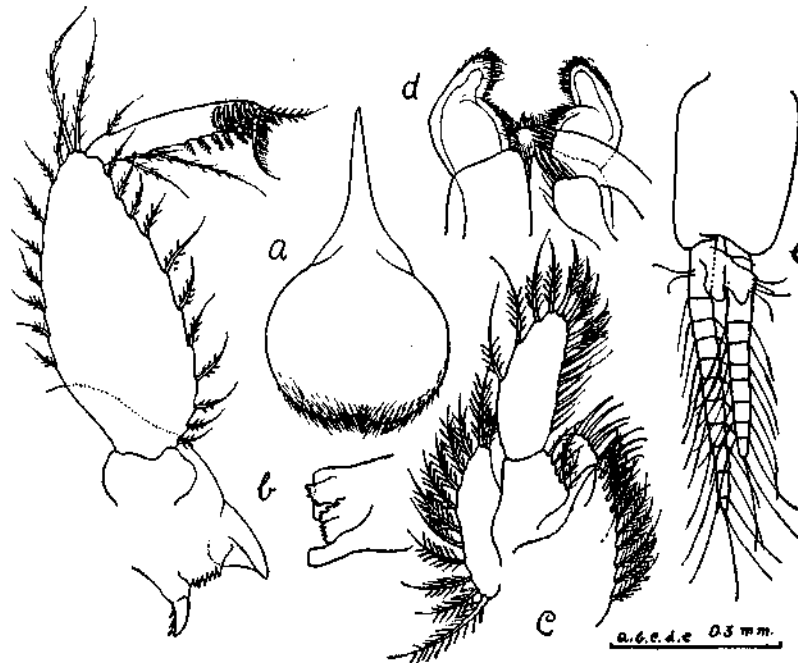


FIG. 4. *Sirlilla robusta* n.sp.—(a) labrum; (b) mandibles; (c) maxilla; (d) paragnaths; (e) fourth pleopod of male.

Length of male 9.4 mm., of female 9.6 mm.

Holotype male, allotype female and fifteen paratypes are kept in the C.M.F.R. Institute, Mandapam Camp, South India.

Remarks. *S. robusta* n. sp. belongs to Hansen's second group to which also belong *S. chierchiae* Coifmann (1937), *S. pacifica* Holmes (1900), *S. rooseweltsi* W. M. Tattersall (1914), *S. panamensis* W. M. Tattersall (1951), *S. paulsoni* Czerniavsky (1882), *S. dollfusi* Nouvel (1944) and *S. tadjourensis* Nouvel (1944). *S. robusta* is closest to *S. paulsoni* as described by Nouvel (1959), in the nature of the spines on

the base of the telson, in the armature of the uropods and in the presence of long setae on the thoracic limbs. But in *S. robusta* the long apical spines of the telson are longer and the second trunk limb is subchelate. In *S. paulsoni* the third and fourth pleopods of the male have modified setae which are absent in *S. robusta*. The same character distinguishes *S. robusta* from all the above mentioned species.

Siriella jonesi n. sp.

Figs. 5-6

Material. St. 1793, 1 adult male.

Description. Cephalothorax is stout but the abdomen steadily narrows backwards so that in the dorsal view the animal looks very much like a *Gastrosaccus*. Carapace is produced into a broadly triangular apically blunt rostrum covering only a very small part of the eye stalks. Sixth abdominal segment is twice as long as the

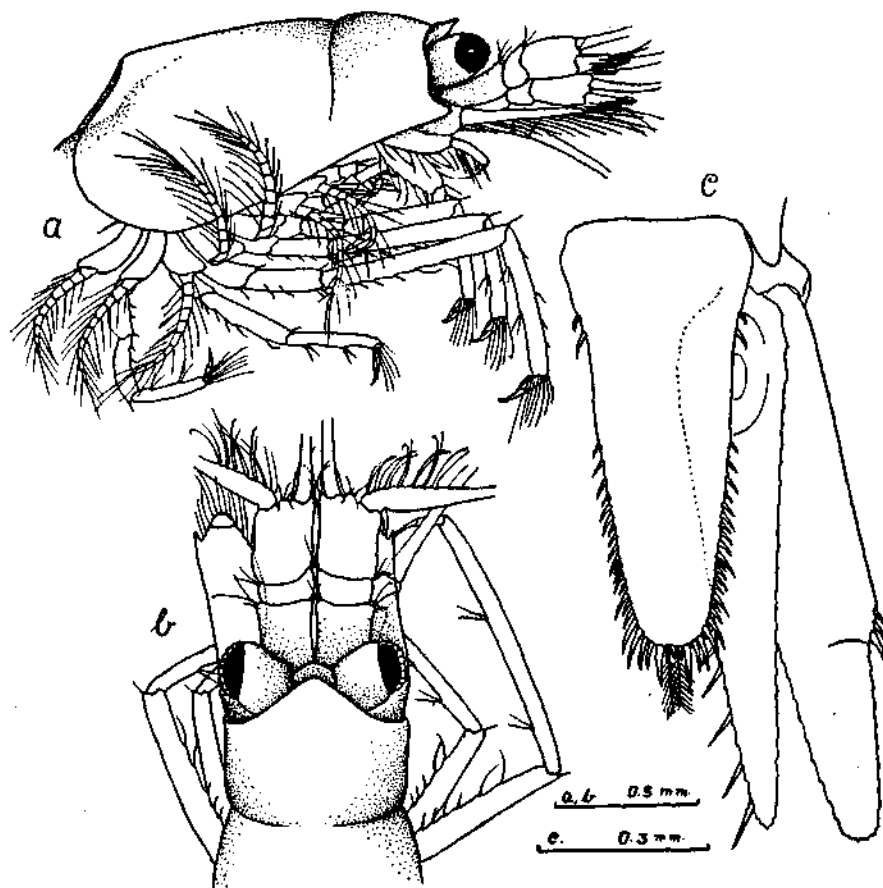


FIG. 5. *Siriella jonesi* n.sp.—(a) anterior part of male, lateral view; (b) same dorsal view; (c) posterior part of male.

fifth segment. Telson is comparatively broad and linguiform, basal quarter of its lateral borders carries a pair of spines, beyond which there is an indistinct waist-like constriction, distal half of the lateral borders is fully armed with sharp spines arranged in series. The last four lateral spines are long. Apex of the telson is armed with a pair of stout spines, three small spines and a pair of plumose setae. Eyes are small and the cornea is narrower than the stalk.

First segment of the antennular peduncle is longer than the third. Antennal scale just fails to reach the tip of the antennular peduncle and is about four times as long as broad. Mouth parts were not studied. Thoracic endopods are stout and armed with strong spines and they increase rapidly in length from the third to the fifth so that the fifth leg when bent forwards reaches far beyond the antennular

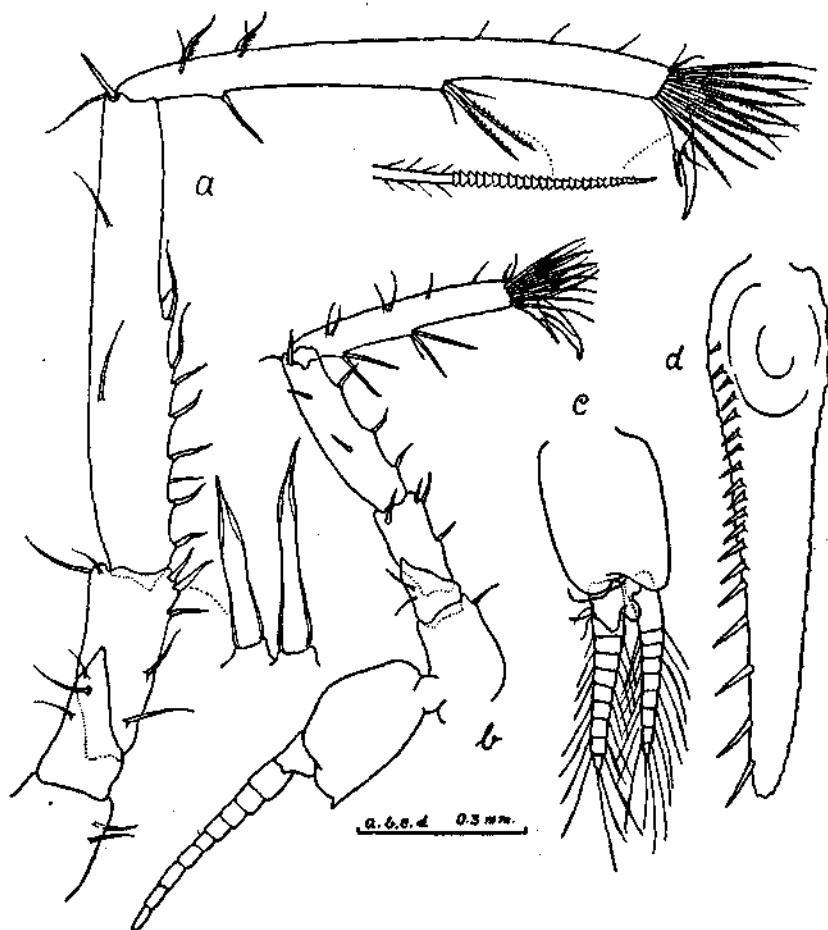


FIG. 6. *Siriella jonesi* n.sp.—(a) fifth thoracic endopod; (b) eighth thoracic endopod; (c) fourth pleopod of male; (d) endopod of uropod.

peduncle. Ischium of the fifth leg carries five spines on the inner side, merus is roughly three times as long as ischium and carries on the proximal half of its inner margin five sharp spines and two spine setae, there is a proximal spine at the outer

distal corner. Carpopropodus is undivided and longer than the merus, at its proximal inner border there is one and slightly in front of the middle two modified setae. The dactylus and claw are prominent and there is the customary circle of modified setae. Basal segment of the exopod has an outer distal spine. Legs six to eight decrease in length progressively but are armed with spines like the fifth leg. The carpopropodus is longer compared to the merus and the claw is stouter.

Pleopods do not have modified setae, endopod of fourth pleopod is nine-segmented and slightly shorter than the nine-segmented exopod. Pseudobranchial lobe is small and simply bilobed. Uropods are about one and a half times as long as telson and the exopod is slightly longer than the endopod and carries three spines on the proximal segment. Inner border of the endopod carries nineteen sharp spines regularly increasing in length from the first to the nineteenth.

Length of male 5.6 mm.

Holotype male is deposited in the C.M.F.R. Institute, Mandapam Camp, South India.

The species is named after Dr. S. Jones, Director, C.M.F.R. Institute.

Remarks. *S. jonesi* n.sp. resembles *S. nodosa* Hansen (1910) in the presence of extremely elongated fifth pair of thoracic limbs, absence of serial arrangement of spines on the endopod of the uropod and in the endopod of the uropod being shorter than the exopod. But judging from the figures published by Hansen the fifth leg of *S. jonesi* is much more massive than in *S. nodosa* and also spiny; spines are apparently absent on the legs of *S. nodosa*. Further, in *S. jonesi* the spines on the lateral borders of the telson are arranged in series but not so in *S. nodosa*. There is difference in the shape of the rostrum and also in the general shape of the body.

Genus *Hemisiriella* Hansen

Hemisiriella parva Hansen

Fig. 7

Hemisiriella parva Hansen, 1910, p. 47, pl. 6, figs. 2a-2e; Zimmer, 1918, p. 16, figs. 5-7; Colosi, 1919, p. 6; 1920, p. 236, pl. 18, fig. 2a; W. M. Tattersall, 1922, p. 456; 1936, p. 147; 1951, p. 80.

Material. St. 1231, 1 female. St. 1691, 1 female. St. 1692, 1 female. St. 1693, 2 females. St. 1694, 1 female. St. 1717, 1 male. St. 1719, 1 male. St. 1727, 2 males. St. 1738, 1 male and 1 female. St. 1750, 2 males and 3 females. St. 1752, 5 males.

Remarks. The specimens in the present collection closely resemble those described by Hansen. Slight differences observed alone are hence pointed out. The spines on the lateral borders of the telson are arranged into three groups. The proximal group consists of two spines, the middle of three spines and the distal also of three spines. The first spine of the middle group is separated from the second spine by a longer interval than the second is from the third. Hansen has shown

these spines equidistant and in his specimens the distal group consists of five spines against three in mine. Of the three pairs of long spines arming the distal border of the telson the middle pair is proportionately longer than in the Siboga material. Hansen has shown five spines on the outer border of the basal segment of the exopod, but there are only three in mine. Probably these characters are subject to growth changes.

According to Hansen the third thoracic endopod has a transverse articulation on the carpopropodus but this is not visible on the succeeding limbs. In my specimens this articulation is visible on all the legs.

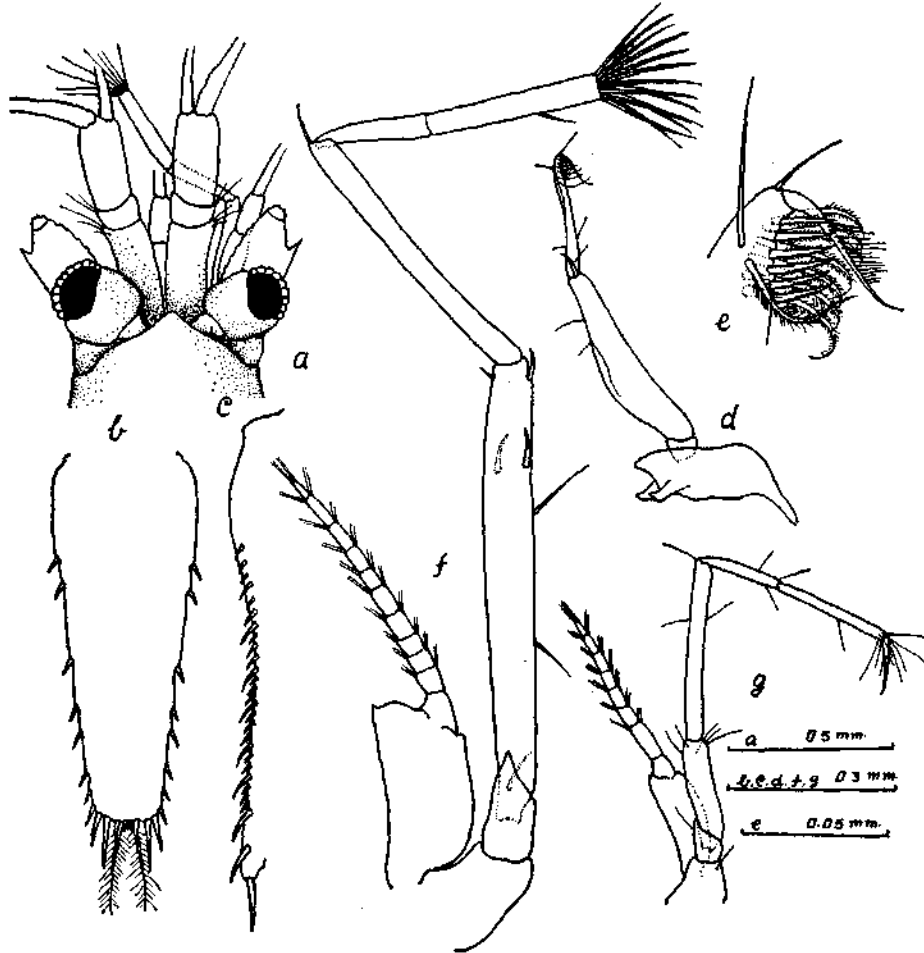


FIG. 7. *Hemisiriella parva* Hansen—(a) anterior part of female; (b) telson; (c) endopod of uropod; (d) mandible; (e) same, tip of palp; (f) third thoracic limb; (g) eighth thoracic limb.

Hemisiriella can be easily distinguished by the enormous size of the endopod of the third thoracic limb which when bent forwards overreaches the antennular peduncle. For the sake of comparison I have illustrated the third and eighth limbs

of the same specimen to the same scale. At the distal part of the ischium of the third limb there are three strong spines, the most distal is easily visible in the lateral view of the animal. The extremely reduced dactylus of the third limb is also very characteristic. The second segment of the mandibular palp has a stout spine on its distal border.

Length of male 5.9 mm., of female 4.8 mm.

Distribution. East Indies, Malaysia, Java, Great Barrier Reef, Philippines and India. According to W. M. Tattersall (1951) it is widely distributed in the tropical waters of the Pacific and Indian ocean.

Subfamily Rhopalophthalminae

Genus *Rhopalophthalmus* Illig

Rhopalophthalmus macropsis n. sp.

Fig. 8

Material. St. 1409, 1 male.

Description. Body is stout and strongly built. Carapace forms a perfectly rounded frontal plate. Post-orbital spines are small and are continued backwards into faint keels. Antero-lateral angles of the carapace are produced into prominent spines and the 'cheeks' are sinuous. Dorsal surface of the carapace has two small tubercles, one behind the cervical sulcus and the other near the hind border. Telson is comparatively narrow, its basal part is laterally drawn out and thence narrows and ends in a perfectly rounded apex. The lateral borders of the telson are armed with twelve pairs of comparatively long spines. First lateral spine is small, but the others rapidly increase in length. Apex of the telson is armed with the usual two pairs of long barbed spines of which the outer pair is clearly longer than the inner. Each spine is armed with bilaterally arranged barbs which progressively get more flattened towards the tip of the spine. Eyes are stout and the cornea is broader than the stalk.

Antennular peduncle is long and rather slender. Basal segment is longer than the rest of the peduncle, third segment is stout but short. Basal part of the outer flagellum is swollen and hirsute. Antennal sympod is armed with four spines, of which the first and second are small, third is long and the fourth slightly shorter than the third. Antennal scale is long and narrow and reaches clearly beyond the antennular peduncle, apical segment of the scale is short and does not reach beyond the outer distal spine. Mouth parts were not studied.

Seventh thoracic limb has a sparsely setose endopod, merus is very long, carpus is distinct from the propodus and the latter is divided into three subsegments, of which the first is subequal to the carpus in length, claw is absent. Exopod is fourteen-segmented and the flat basal segment is blunt at the outer distal angle. Vestigial endopod of the eighth thoracic limb is three-segmented and very long and reaches clearly beyond the basal segment of the exopod, its second segment carries a long spine; the last segment is very small. Endopod of the uropod has a stout spine below the statocyst.

Length of male 7.8 mm.

Holotype male, is deposited in the C.M.F.R. Institute, Mandapam Camp, South India.

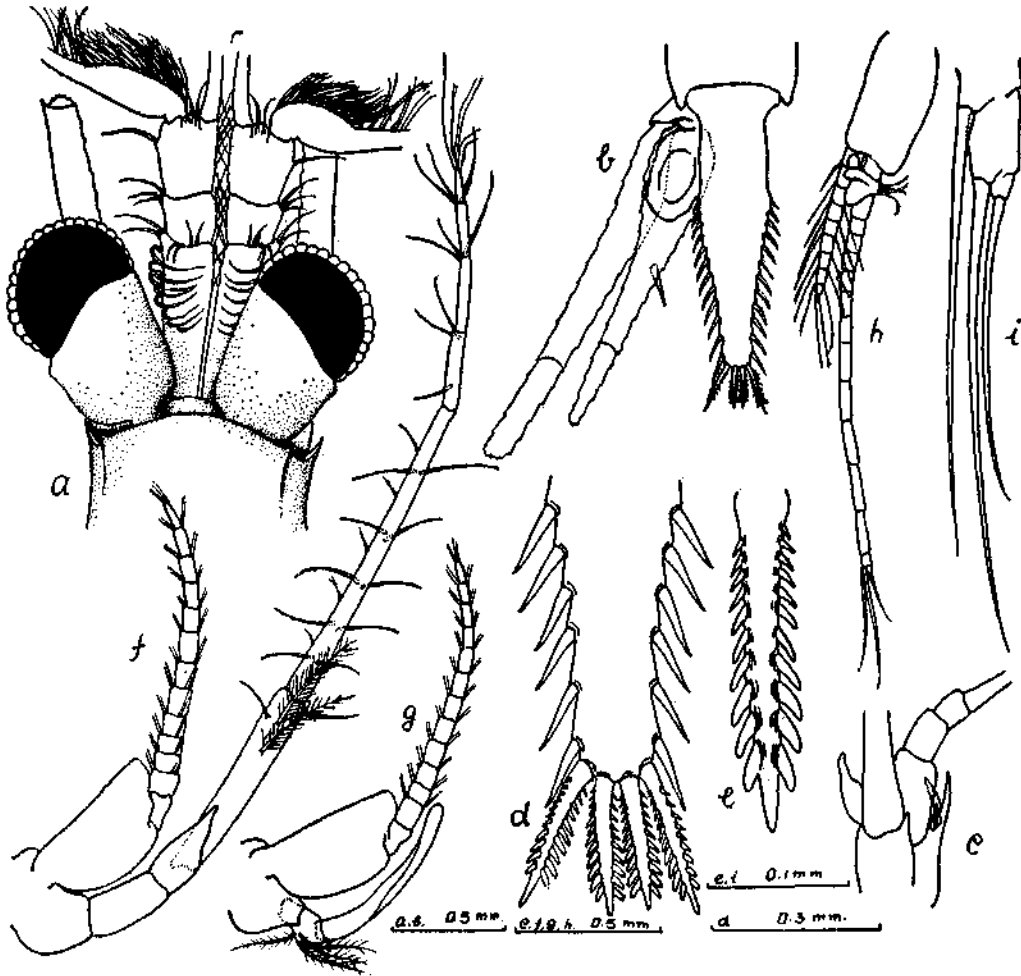


FIG. 8. *Rhopalophthalmus macropsis* n. sp.—(a) anterior part of male; (b) posterior part of male; (c) antennal sympod; (d) tip of telson; (e) apical spine of telson; (f) seventh thoracic limb; (g) eighth thoracic limb.

Remarks. *R. macropsis* n.sp. resembles *R. dakini* O. S. Tattersall (1957), *R. terranatalis* O. S. Tattersall (1957), *R. africana* O. S. Tattersall (1957) and *R. longicauda* O. S. Tattersall (1957) in the outer pair of spines arming the apex of the telson being longer than the inner. But in *R. dakini* the antennal sympod has six spines, *R. africana* has only a very small number of spines on the lateral borders of the telson and *R. longicauda* has an altogether different type of telson. The resemblance between *R. terranatalis* and *R. macropsis* is very close but the former has only two spines on the antennal sympod and the vestigial endopod of the eighth thoracic limb is very different. *R. macropsis* is closest to *R. egregius* Hansen

(1910) but in the latter species there are more tarsal segments and the vestigial endopod of the eighth limb is much shorter. The present species differs from all the others in the flat apically rounded barbs arming the apical spines of the telson. Something remotely resembling this is seen only in *R. orientalis* O. S. Tattersall (1957) and in *R. tattersallae* Pillai (1961). In the former the barbs are obliquely truncate and in the latter the outer pair of apical spines are shorter than the inner and the vestigial endopod of the eighth limb is very short.

Subfamily Gastrosaccinae

Genus *Gastrosaccus* Norman

Gastrosaccus dunckeri Zimmer

Fig. 9

Gastrosaccus dunckeri Zimmer, 1915, p. 165, figs. 13-18; W. M. Tattersall, 1922, p. 459; Pillai, 1957, p. 7, figs. III, 1-7; 1961, p. 25, pl. III, figs. K-N.

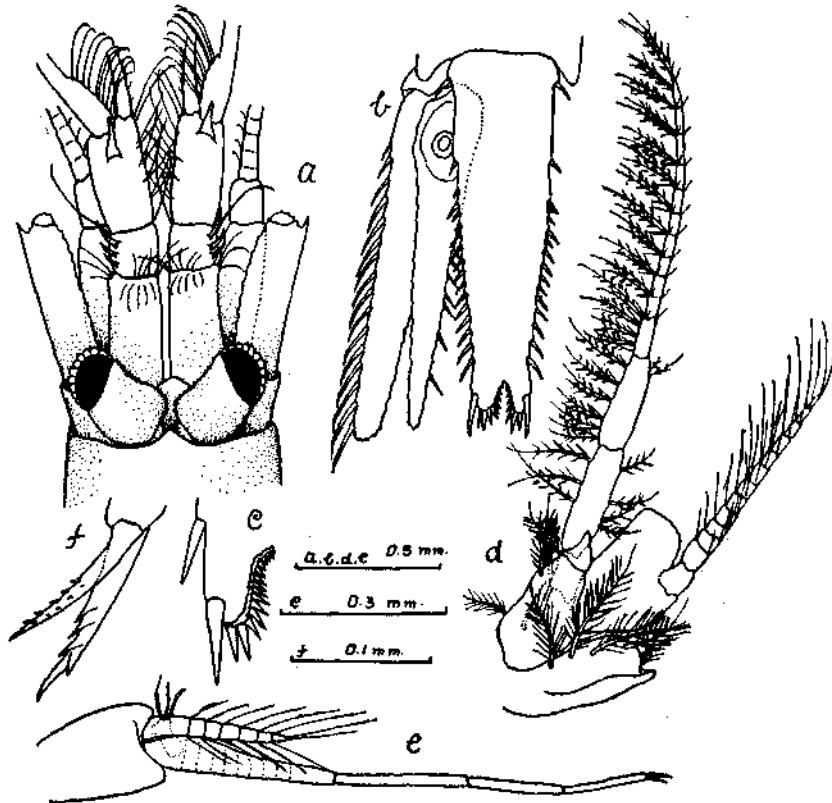


FIG. 9. *Gastrosaccus dunckeri* Zimmer—(a) anterior part of male; (b) posterior part of male; (c) apical lobe of telson; (d) eighth thoracic limb; (e) third pleopod of male; (f) same, tip of exopod.

Material. St. 1314, 1 male. St. 1697, 1 female. St. 1793, 1 male and 2 females. St. 1794, 3 males and 17 females.

Remarks. As observed by W. M. Tattersall (1922) *G. dunckeri* closely resembles *G. sanctus* (van Beneden) particularly in the presence of two large flaps on the hind border of the carapace and also in the structure of the exopod of the third pleopod of the male. But the number of spines on the telson and the uropods is very different in these two species; considerably less in *G. sanctus*. The peculiar bulging of the basal part of the eye stalk appears to be a characteristic feature of *G. dunckeri*.

In my previous notes on this species some importance was given to the shape of the spines arming the apical sinus of the telson. In the specimens collected from the inshore waters of Kerala these spines were long and characteristically bent inwards. But in the specimens collected by VARUNA these spines are short and straight. I had occasion to examine identical specimens collected at Waltair (Bay of Bengal). This being the only difference the present specimens show, I assign them to Zimmer's species.

Length of female 7.2 mm.

Distribution. This species was first recorded by Zimmer from an unspecified locality in Indian waters. Subsequently it was collected in the Bay of Bengal (W. M. Tattersall) and in the Arabian sea (Pillai). As far as the records show this species is confined to the Indian waters.

Genus *Anchialina* Norman and Scott

Anchialina typica (Kroyer)

Fig. 10

Anchialus typicus Kroyer, 1861, p. 53, pl. 2, figs. 7a-1.

Anchialina typica Hansen, 1910, p. 52, pl. 7, figs. 2a-2k; 1912, p. 196; Colosi, 1920, p. 237; W. M. Tattersall, 1922, p. 457; 1951, p. 100; O. S. Tattersall, 1955, p. 89, figs. 15 A-M.

Material. St. 743, 1 female. St. 745, 1 female. St. 954, 1 female. St. 961, 1 male and 1 female. St. 975, 2 males. St. 1162, 1 male. St. 1173, 1 female.

Remarks. This well known and widely distributed species can be easily distinguished from all the others by the very characteristic shape of the exopod of the third pleopod of the male. The exopod is thirteen-segmented and segments six to eleven are produced inwards. The size of these prolongations increases successively from the sixth to the eleventh segment. Each of these modified segments carries a peculiarly shaped seta demarcated into a peduncle and a flagellum. The twelfth segment carries two strong spines and the thirteenth segment three barbed spines. According to O. S. Tattersall (1955) the exopod of the third pleopod of the males captured by the *DISCOVERY* differs from that of Hansen in the setae arming the distal segments being curved instead of being straight. Her figures 15E and F

show that there are other differences also. In the present specimens the exopod is exactly as described by Hansen.

Length of male 4.9 mm., of female 4.6 mm.

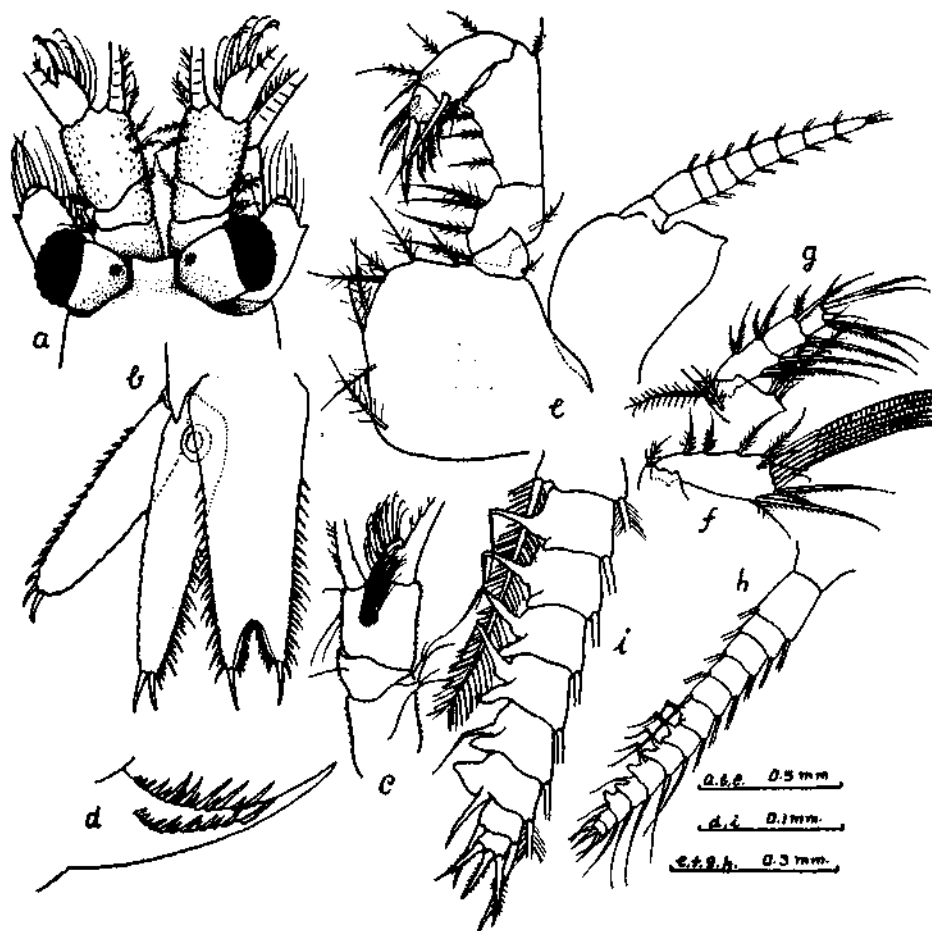


FIG. 10. *Anchialina typica* (Kroyer)—(a) anterior part of male; (b) posterior part of male; (c) antennule of male, ventral view; (d) spine on the antennal sympod; (e) second thoracic endopod of male; (f) third thoracic endopod of male; (g) fourth thoracic endopod of male; (h) exopod of third pleopod of male; (i) same, tip enlarged.

Distribution. Tropical Atlantic, West Indies, Gulf of Siam, East Indies, Philippines, Great Barrier Reef, Hawaii and India.

Anchialina dentata n.sp.

Fig. 11

Material. St. 744, 1 male. St. 748, 1 female. St. 757, 1 female. St. 1706, 1 female. St. 1760, 1 male and 2 females.

Remarks. *A. dentata* n.sp. so closely resembles *A. typica* (Kroyer) that the differences alone are pointed out. The rostrum is produced and moderately long with a minute antero-median point. The apical sinus of the telson is a little less deep and slightly wider. The lateral borders of the telson have a lesser number of spines and the long distal spines carry subsidiary spines. The spines arming the endopod also carry subsidiary spines. The antennal scale is slightly broader than in *A. typica*. The second thoracic limb of the male is very much similar to that of *A. typica* but the distal border of the inner expansion of the merus is cut into about seven sharp teeth. The exopod of the third pleopod of the male is ten-segmented and the last three segments are armed with spines.

The second thoracic endopod of the male of *A. dentata* closely resembles that of *A. agilis* (G. O. Sars). In the latter species the distal border of the expansion of the merus is dentate but there are only one or two broad teeth. *A. agilis* can be distinguished from *A. dentata* also by the acute rostrum and the long spines arming the distal segments of the exopod of the third pleopod of the male.

The *DISCOVERY* specimens assigned by O. S. Tattersall (1955) to *A. typica* show some resemblance to *A. dentata* in the nature of the rostrum and in the structure of

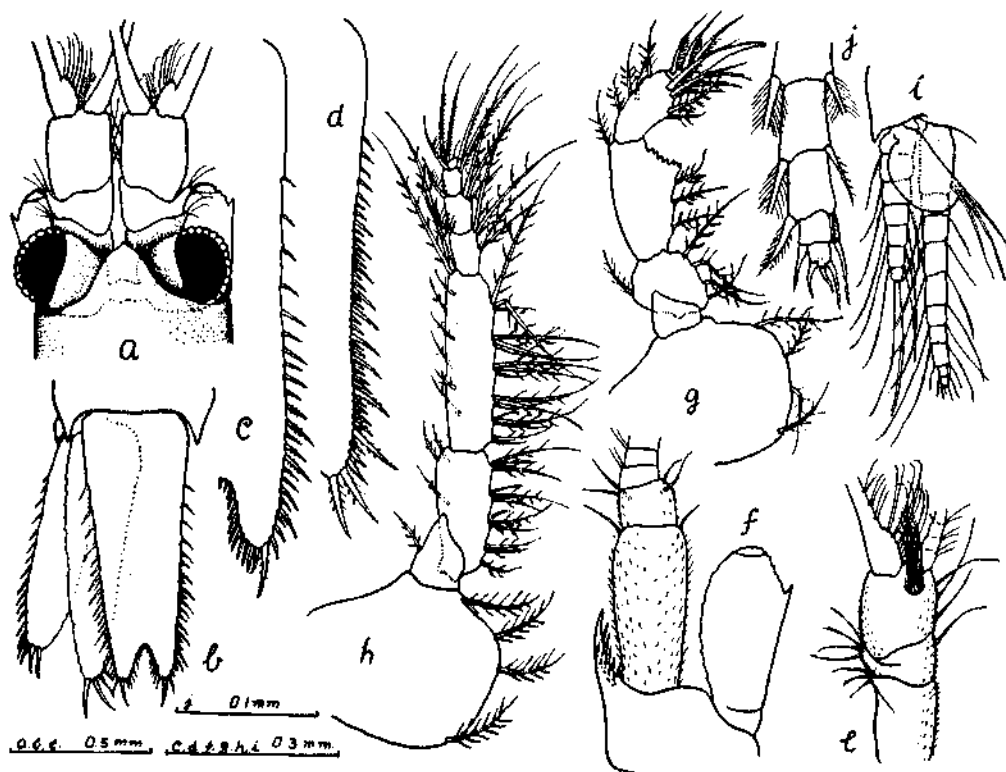


FIG. 11. *Anchialina dentata* n.sp.—(a) anterior part of male; (b) posterior part of male; (c) lateral border of telson; (d) endopod of uropod; (e) antennule, ventral view; (f) antenna; (g) second thoracic endopod of male; (h) fourth thoracic endopod of male; (i) third pleopod of male; (j) same, tip of exopod.

the exopod of the third pleopod of the male. But the second thoracic endopod is different.

Length of female 4.3 mm.

Genus *Pseudanchialina* Hansen

Pseudanchialina pusilla (G. O. Sars)

Fig. 12

Anchialus pusillus G. O. Sars, 1884, p. 200, pl. 35, figs. 19-20.

Pseudanchialina pusilla Hansen, 1910, p. 60, pl. 8, figs. 4a-4c and pl. 9, figs. 1a-1k; Pillai, 1957, p. 9, fig. 4.

Material. St. 1314, 1 female. St. 1693, 1 male. St. 1753, 1 female.

Remarks. Since Hansen described this species, it has not been redescribed. Hansen's specimens were not in good condition. The present specimens are clearly

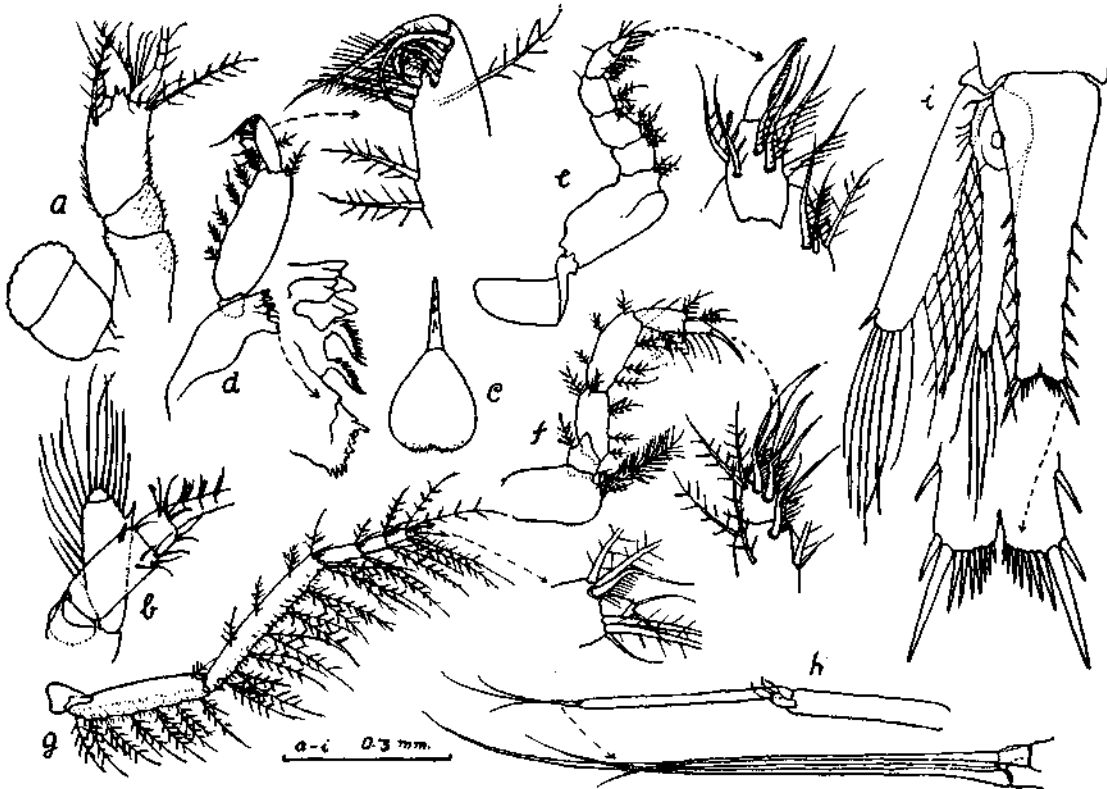


FIG. 12. *Pseudanchialina pusilla* (G. O. Sars)—(a) antennule; (b) antenna; (c) labrum; (d) mandible; (e) first thoracic endopod; (f) second thoracic endopod; (g) eighth thoracic endopod; (h) third pleopod of male; (i) posterior part of body, female.

referable to *P. pusilla* but show some minor variations. The antennular peduncle of the female is spiny and its third segment is clearly the longest. This segment carries a distal median lobe with two spines and a long seta on the inner and outer borders. The antennal sympod is produced into a sharp inner distal spine and the second segment of the antennal peduncle has a similar but smaller spine. The anterior spine like prolongation of the labrum is armed with three equidistant sharp spinules. The dactylus of first and second thoracic endopods is armed with long setae armed with a row of spinules, each limb has a very long slightly curved claw. Thoracic endopods three to eight have long sparsely pectinate setae, there are three tarsal segments and a minute dactylus without a claw. Inner border of the ischium and merus is spiny. The third pleopod of the male is as illustrated by Hansen but the exopod is single-segmented. Hansen has stated that it is two-segmented. The telson clearly overreaches the uropods and is armed with seven pairs of subsimilar lateral spines. Distal border of the telson is bilobed and armed with eight pairs of spines, of which the outer pair is very large. Slight asymmetry in the number and arrangement of the lateral spines of the telson has been observed. In this connection it should be pointed out that one pair of the distal spines of the telson was bifid in the female described earlier (Pillai, 1957, f. IV, 6).

Length of male 2.6 mm., of female 2.6 mm.

Distribution. East Indies, Great Barrier Reef and Bay of Bengal.

Subfamily Mysinae

Tribe Erythropini

Genus *Erythrops* G. O. Sars

Erythrops sp.

Fig. 13

Material. St. 1783, 1 female.

Description. Anterior border of carapace forms a broadly triangular rostrum slightly overlapping the base of the eye stalks, posterior emargination is small and exposes only the last thoracic segment. Eyes are large and dorso-ventrally flattened, the eye stalk is short but broad and the cornea is not wider than the stalk. Abdomen very slightly narrows backwards and the sixth segment is about one and a half times as long as the fifth segment. Telson is triangular and roughly equal in length and breadth, its lateral borders are nearly straight and armed with eight very minute denticles. Distal border of the telson is straight, about a third of the maximum width of the telson and armed with a pair of setae, spines are present but broken off.

Antennular peduncle is short but stout. Its basal segment is comparatively slender and subequal to the rest of the peduncle in length, its outer distal part is produced into an apically setose lobe reaching far beyond the second segment, third segment is stout and swollen. Both second and third segments carry long plumose setae along the inner border. Inner flagellum is short, about twice as long as peduncle and carry long setae, outer flagellum is twice as long as the inner. Antennal sympod

is externally produced into a large spine. The scale is parallel-sided and reaches or slightly overreaches the antennular peduncle, distal half of its outer border carries two sharp spines, apical spine is prominent but the scale reaches only slightly beyond the spine. Antennal peduncle is stout but stops short of the apex of the scale, flagellum is stout. Uropods are nearly twice as long as the short telson, rami are

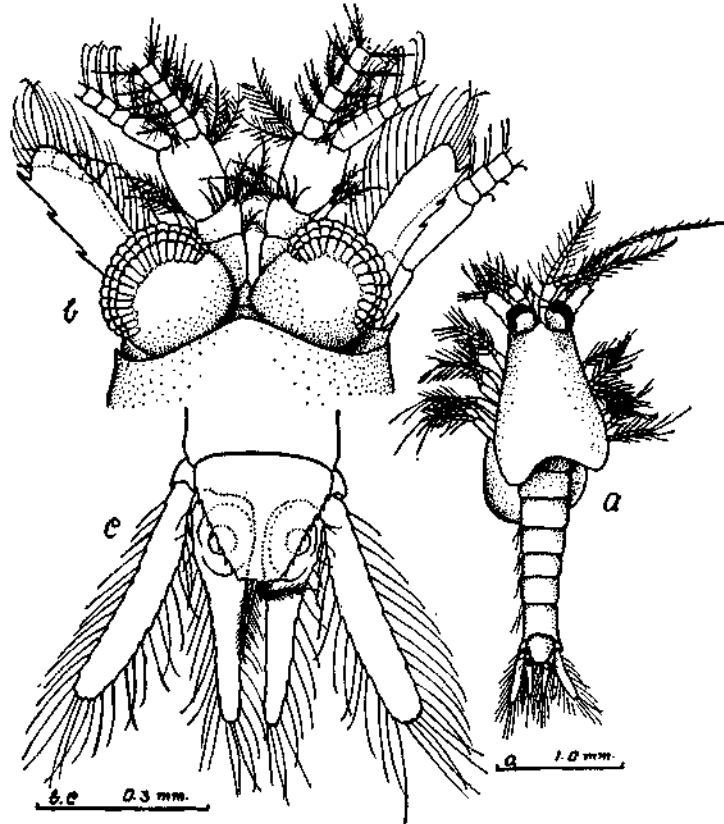


FIG. 13. *Erythrops* sp.—(a) female, dorsal view; (b) anterior part of body; (c) posterior part of body.

subequal in length and setose all along the border. Endopod is tapering and without spines or serrations along the inner border. Mouth parts were not studied. Endopods of all the thoracic limbs were broken.

Length 2.7 mm.

Remarks. The single specimen closely resembles *E. minuta* Hansen (1910) but differs in some important characters. The outer border of the antennal scale has only two spines against three in *E. minuta*. The telson is subequal in length and breadth but broader than long in *E. minuta*. The apical spines of the telson are missing but it appears that there are only two pairs. The lateral border of the telson, though serrated as in *E. minuta*, are straight. According to W. M. Tattersall (1922, f. 9b) in *E. minuta* the exopod of the uropod clearly overreaches the endopod but the

rami are subequal in the present specimen. The single specimen in the present collection is apparently referable to a new species but I consider it not prudent to give it a name at present.

Genus *Hypererythrops* Holt and Tattersall

Hypererythrops spinifera (Hansen)

Fig. 14

Erythrops spinifera Hansen, 1910, p. 62, pl. 9, figs. 3a-3c.

Hypererythrops spinifera W. M. Tattersall, 1922, p. 464, f. 11.

Material. St. 737, 1 damaged female. St. 1093, 1 slightly damaged male.

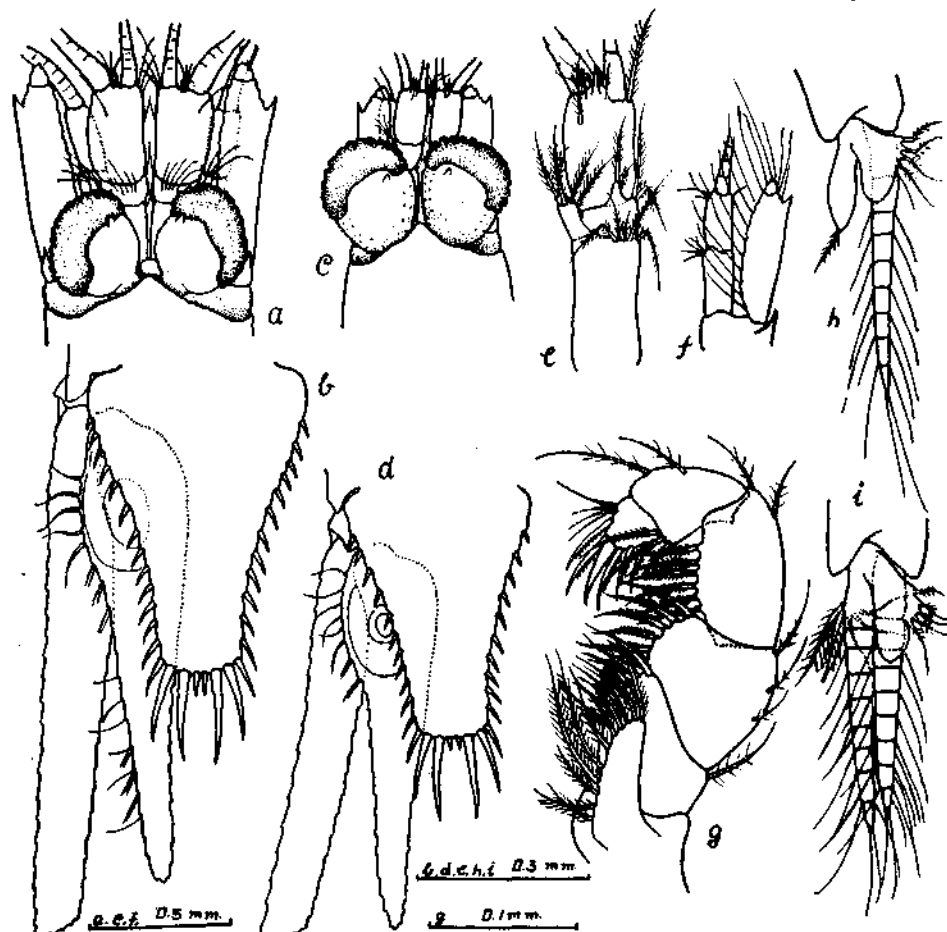


FIG. 14. *Hypererythrops spinifera* (Hansen)—(a) anterior part of male; (b) posterior part of male; (c) anterior part of female; (d) posterior part of female; (e) antennule of female; (f) antenna; (g) first thoracic endopod; (h) first pleopod of male; (i) fourth pleopod of male.

Remarks. The two specimens in my collection show that the additional characters mentioned by Tattersall and Tattersall (1951) are of generic value. The male has strong apically pointed and forwardly bent sternal processes on the thoracic segments exactly as illustrated by W. M. Tattersall (1922, f. 11 i). These processes are, however, absent in the female. In both sexes the eye stalk has a small papilla nearer to the inner border on the dorsal side.

Hansen has described ten to thirteen spines on the lateral borders of the telson and W. M. Tattersall observed that these spines are fewer in number and also irregularly distributed. The female in my collection has eleven spines on one side and twelve on the other and the male has thirteen pairs. In both sexes the spines are regularly arranged and increase successively in length so that the last lateral spine is nearly half the length of the outer terminal spine. The distal border of the telson is slightly convex and carries three pairs of spines. The inner pair is very small and the outer is slightly shorter than the middle pair. In an adult female Hansen found a pair of setae instead of the inner pair of small spines. As in W. M. Tattersall's specimens these setae are absent in mine.

Commenting on the pleopods of the male W. M. Tattersall remarked that similar structures are not known in any other member of the subfamily Mysinae and that they recall the pleopods of species of *Siriella* and also that the branchial lamella is bilobed in the first pleopod. In my specimen the branchial plate of pleopods two to five is exactly as described by W. M. Tattersall but that of the first pleopod is not bilobed. It is similar to what is seen in other species of Erythropini.

Length of male 5.4 mm.

Distribution. West Indies and Bay of Bengal.

Genus *Pseuderythropus* Coifmann

Pseuderythropus gracilis Coifmann

Fig. 15

Pseuderythropus gracilis Coifmann, 1936, p. 83, f. 1; 1937, p. 36, pl. 19, figs. 23 a-c; Nouvel, 1959, p. 234, figs. 119-137.

Material. St. 1692, 1 female. St. 1693, 2 females.

Remarks. Nouvel's description of this species is so complete that I have very little to add. Nouvel has observed twelve to fourteen pairs of spines on the lateral borders of the telson of large specimens and ten pairs in juveniles. In the largest specimen in my collection there are sixteen pairs including the long apical spines on the telson but small specimens have less than ten pairs. Obviously the armature of the telson varies with age. The second segment of the endopod of the first thoracic limb has a prominent endite. Nouvel's figure of this appendage does not show this clearly and no mention of it is made in the text.

This truly graceful species can be easily distinguished by the reddish globular eyes borne on long fully exposed stalks, the virtual absence of a frontal plate for the carapace and the graceful curve of the antennal scale. At the base of the second segment the palp of the mandible is characteristically curved inwards so that the opposite ones almost touch each other along the ventro-median line. The most

diagnostic feature appears to be the enormous size of the statocyst which makes the endopod truly club-shaped.

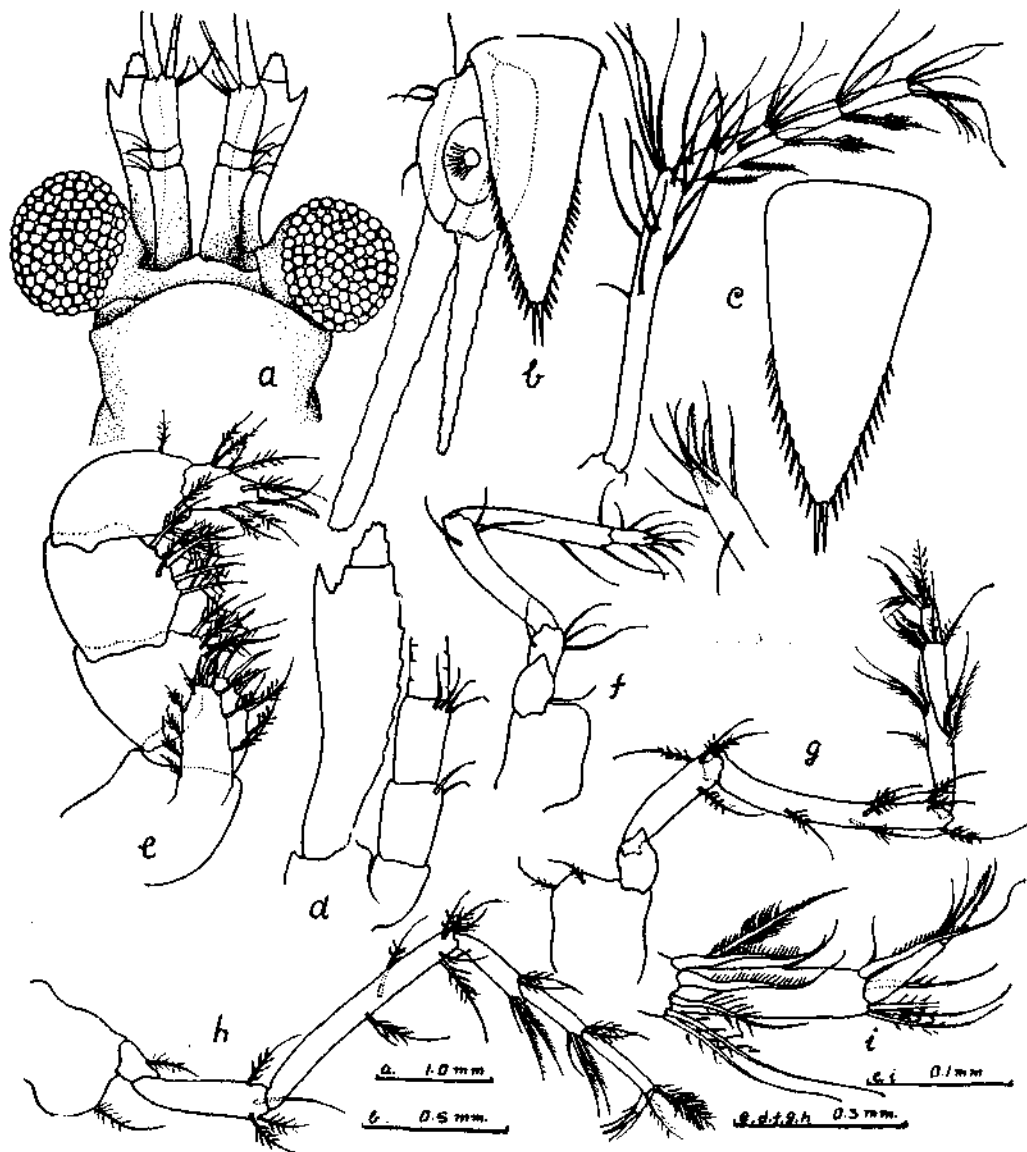


FIG. 15. *Pseuderythropo gracilis* Coifmann.—(a) anterior end of adult female; (b) posterior end of adult female; (c) telson of immature female; (d) antenna; (e) first thoracic endopod; (f) second thoracic endopod; (g) third thoracic endopod; (h) fourth thoracic endopod; (i) tip of eighth thoracic endopod of adult female.

Length of female 7.2 mm.

Distribution. Red Sea.

Genus *Euchaetomera* G. O. Sars***Euchaetomera glyphidophthalmica* Illig**

Fig. 16

Euchaetomera glyphidophthalmica Illig, 1906, p. 201, f. 9; Zimmer, 1914, p. 394, pl. 24, f. 25; 1915, p. 318; Colosi, 1929, p. 417; Illig, 1930, p. 445, figs. 84-87; W. M. Tattersall, 1939, p. 243; O. S. Tattersall, 1955, p. 131.

Material. St. 1179, 1 female. St. 1229, 1 female. St. 1290, 1 male. St. 1306, 1 female and 1 male. St. 1308, 1 male. St. 1421, 1 male. St. 1693, 1 female. St. 1724, 1 male. St. 1763, 1 male.

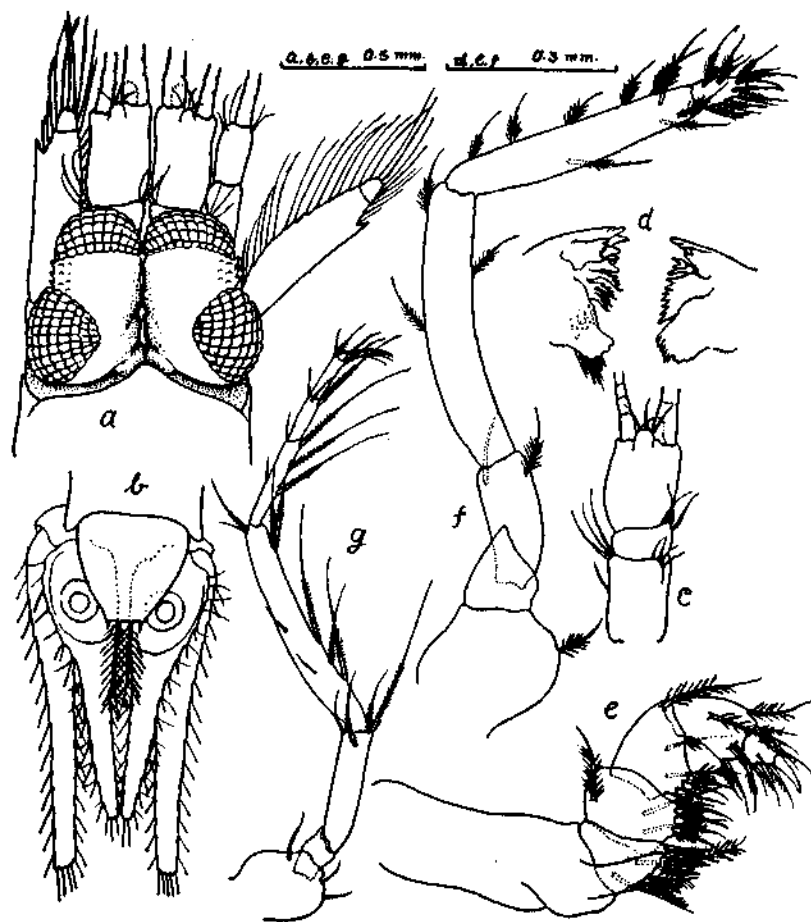


FIG. 16. *Euchaetomera glyphidophthalmica* Illig—(a) anterior part of male; (b) posterior part of male; (c) antennule; (d) mandibles; (e) first thoracic endopod; (f) second thoracic endopod; (g) seventh thoracic endopod.

Remarks. O. S. Tattersall (1955) characterised *E. glyphidophthalmica* Illig as follows: Lateral area of ocelli very much larger than the terminal ones and separated from the latter by a narrow colourless area. Rostrum is small and acutely pointed. Lateral margins of the telson are unarmed and the truncate distal border carries one pair of small spines and a pair of long setae. Illig has stated that the distal border of the telson is armed with two pairs of spines while O. S. Tattersall mentions only one pair. According to Tattersall and Tattersall (1951, p. 274) the lateral borders of the telson are armed with six to seven equally spaced large spines. The females in my collection are large and ovigerous and obviously adults. But there is no trace of spines on the lateral borders of the telson which is in agreement with the later observation of O. S. Tattersall (1955). In view of the great caution that is necessary in the identification of the species of *Euchaetomera* I provisionally assign the present specimens to *E. glyphidophthalmica* and provide illustrations of the more important characters so that someone, more experienced than me, may make a decision.

Length of male 5.0 mm., of female 9.4 mm.

Tribe Leptomysini

Genus *Afromysis* Zimmer

***Afromysis dentisinus* Pillai**

Fig. 17

Afromysis dentisinus Pillai, 1957, p. 11, fig. 6.

Material. St. 697, 1 male. St. 1085, 2 females. St. 1094, 2 males and 2 females. St. 1362, 1 male and 4 females. St. 1364, 1 female. St. 1792, 1 male and 1 female.

Description. Body is long and slender. Carapace is produced into a broad apically rounded rostral process covering only a very small part of the eye stalks. Eyes are elongated, with the cornea slightly broader than the stalk. Telson is wedge-shaped and regularly narrows towards the apex. Lateral borders of the telson have one proximal spine and twelve other spines regularly distributed along the distal half of the border, these spines gradually increase in length towards the apex. The apex of the telson is deeply cleft and each lobe of the cleft carries four stout spines, of which the second from the inner side is the longest. The telsonic lobes are slightly inclined towards each other so that the cleft has concave sides, the sides of the cleft are armed with one pair of denticles in the female and two pairs in the male, placed close to the base of the customary setae.

Antennular peduncle is long, its basal segment is roughly equal to the rest of the peduncle in length, third segment steadily broadens towards the apex, its distal border carries a median spine. Male lobe is comparatively small. In the female the third segment of the antennular peduncle is more slender than in the male. Antennal scale stops short of the apex of the antennular peduncle. Antennal sympod has a small but prominent outer spine. In the female the scale is comparatively longer. The labrum is slightly longer than broad and is produced forwards into a sharp spine. Mandible has strong cutting edge and conspicuously plumose three-segmented palp.

Outer lobe of maxillule has a prominent external hump and three rows of stout distal spines, inner lobe carries three long barbed setae and five small setae. Distal segment of the endopod of maxilla is externally drawn out and its distal border is armed with seventeen strong teeth and about ten barbed spine-setae.

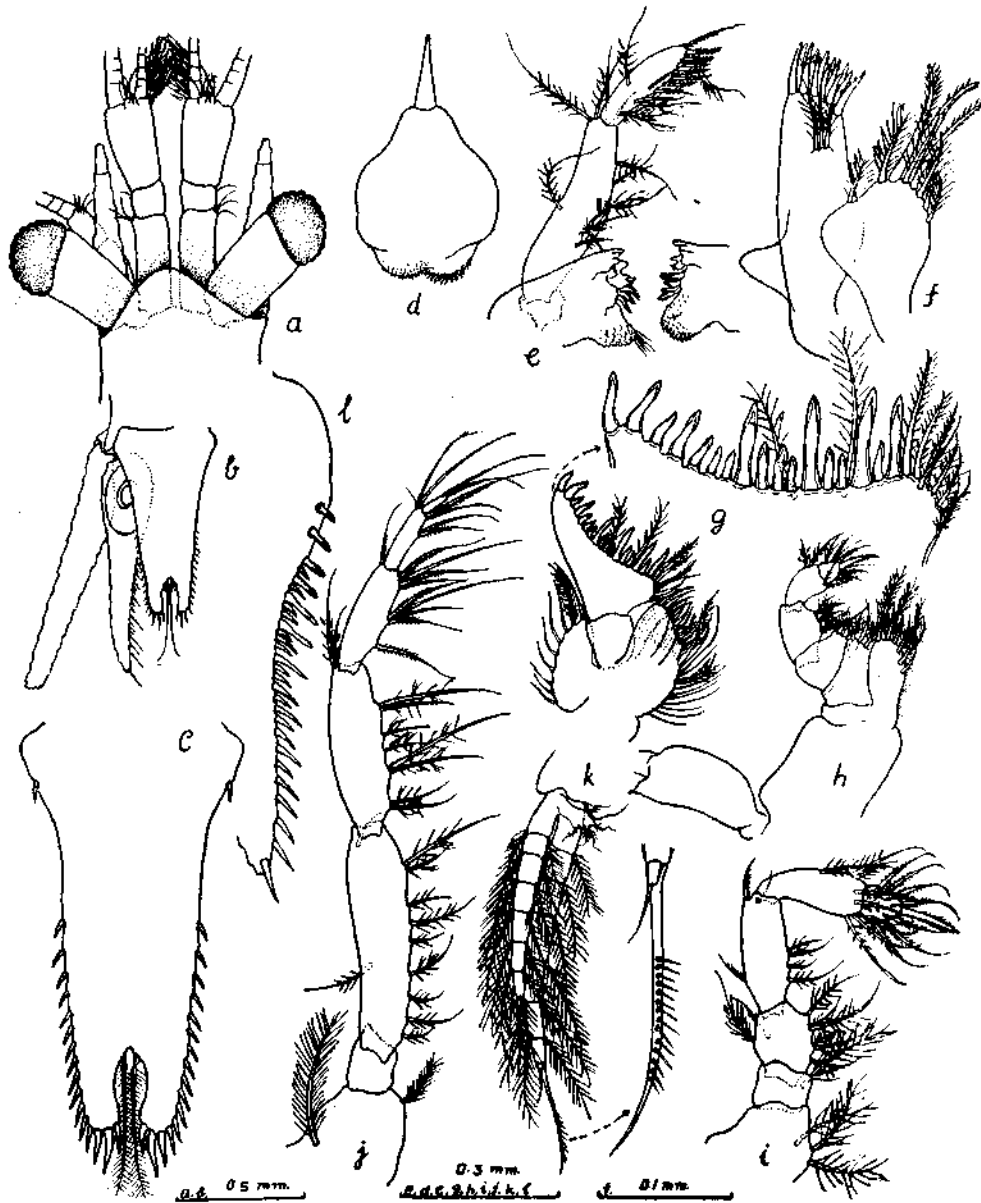


FIG. 17. *Afromysis dentisus* Pillai—(a) anterior part of male; (b) posterior part of male; (c) telson; (d) labrum; (e) mandibles; (f) maxillule; (g) maxilla; (h) first thoracic endopod; (i) second thoracic endopod; (j) third thoracic endopod; (k) fourth pleopod of male; (l) endopod of uropod.

Second segment of endopod of first leg has a large endite and the third segment has a small lobe, fourth segment is fairly broad and the claw is stout. Second thoracic endopod has its dactylus armed with a strong claw and seven barbed spines. Thoracic endopods three to eight are subsimilar and fairly stout, there are two tarsal segments, of which the first is longer and stouter than the second, claw is absent. Fourth pleopod of the male has its exopod longer than the endopod and armed with a long apical spine seta strongly barbed on one side. Exopod of the uropod is nearly one and a half times as long as the telson and the endopod is shorter than the exopod. Inner border of the endopod has a row of closely packed teeth extending from the region of the statocyst to the apex. These spines fall into groups of one to three short ones alternating with long spines, all the spines except about six of the proximal ones are sharp.

Length of male 6.7 mm., of female 4.9 mm.

Remarks. The original description of this species was short and hence a full description is given here. The presence of good specimens of both sexes in the present collection confirms the validity of the species.

Genus *Afromysis* contains six species, *A. hanseni* Zimmer (1916), *A. macropsis* W. M. Tattersall (1922), *A. australiensis* W. M. Tattersall (1940), *A. bainbridgii* O. S. Tattersall (1957), *A. ornata* O. S. Tattersall (1957) and *A. dentisinus* Pillai (1957). *A. dentisinus* closely resembles *A. macropsis* but has stouter thoracic endopods without a distinct claw, the apical sinus of the telson is armed and the spines arming the telson and the endopod of the uropod are mostly pointed.

Genus *Doxomysis* Hansen

Doxomysis longiura Pillai

Fig. 18

Doxomysis sp. W. M. Tattersall, 1922, p. 478, f. 17.

Doxomysis littoralis Pillai, 1957, p. 12, figs. VII, 1-2.

Doxomysis longiura Pillai (in press).

Material. St. 697, 1 female. St. 748, 4 females. St. 757, 2 males and 6 females. St. 759, 1 female. St. 760, 1 female. St. 1037, 2 males and 1 female. St. 1084, 1 female. St. 1740, 3 males and 6 females. St. 1759, 1 male and 4 females. St. 1760, 4 males and 5 females.

Remarks. This rich and well preserved collection confirms my earlier observations regarding this species. I add here some details about the female.

Generally females have a comparatively more spiny body than the males. The spiny appearance is produced by transverse ridges projecting conspicuously on the dorsal side especially in the lateral view of the animal. These ridges are very prominent in the young females and produce a verrucose appearance. As the animal approaches maturity the ridges get more and more flattened and less prominent so that except under high power the body appears smooth. On the sternal side of the

abdominal segments, lateral basal part of the abdomen and on the eye stalks there are small sharp spines.

The females differ from the males in one other important character. In the male the spines arming the apex of the lobes of the telson are pointed like the lateral spines

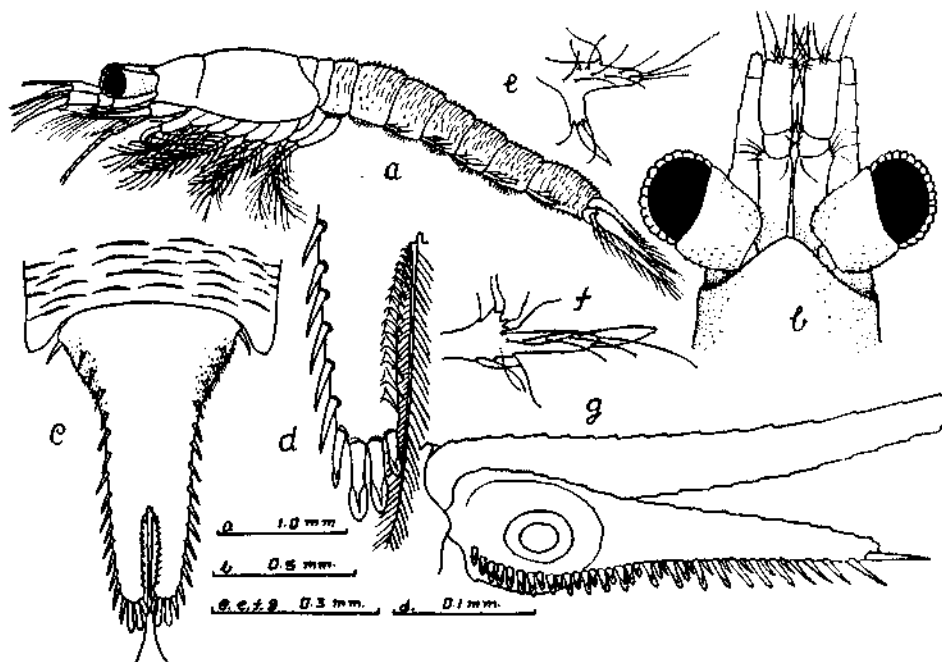


FIG. 18. *Doxomysis longiura* Pillai—(a) female, lateral view; (b) anterior end of female; (c) telson; (d) apical lobe of telson; (e) first pleopod of female; (f) fifth pleopod of female; (g) uropod.

on the telson, but in the female they are highly flattened and apically rounded, having a distinct spatulate appearance. Pleopods of the female are simple unsegmented plates. In the first pair the outer lobe is rather long and much more prominent than that of the fifth pair.

Length of male 6.2 mm., of female 5.9 mm.

Genus *Bathymysis* W. M. Tattersall

Bathymysis varunae Pillai

Fig. 18 A

Bathymysis varunae Pillai 1964a.

Material. St. 1055, 1 female; St. 1196, 1 damaged male.

Remarks. While examining the *VARUNA* collections for hyperiid amphipods I obtained a female mysid 4.0 mm. long from St. 1055. This female is nearly of the same size as the male described earlier and resembles the latter very closely. The

thoracic and abdominal segments are almost fully covered with broken ridges which project prominently giving the body a spiny appearance. The shape of the telson is exactly as in the male and its lateral borders are armed with eight spines on one side

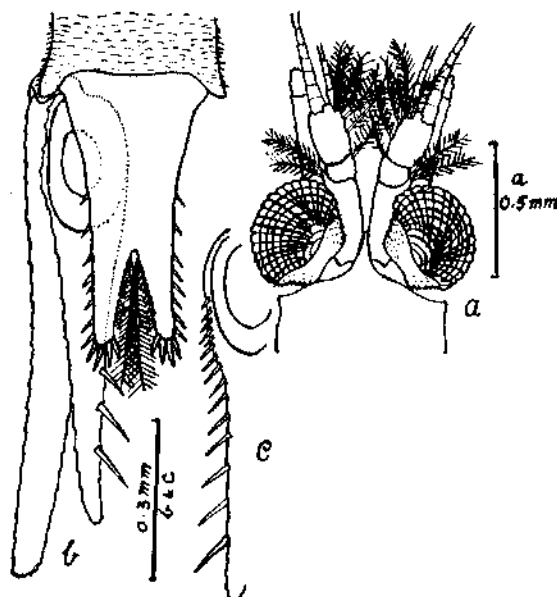


FIG. 18A. *Bathymysis varunae* Pillai—Female : (a) anterior part of the body, dorsal view ; (b) posterior part of the body, dorsal view ; (c) endopod of uropod, ventral view.

and nine on the other. The apices of the telsonic cleft carry four spines instead of three in the male and the telsonic slit is armed with eleven pairs of small spines as against nine pairs in the male; as in the male a short distal part of the border is without spines. The endopod of the uropod is armed with fifteen spines as in the male. However, the carapace is produced antero-medially into a well developed rostrum which is narrow and apically blunt. In view of the fact that in the male the rostrum is a simple triangular process quite different from that of the present female, the identity of the latter cannot be confirmed. In view of the similarity in all other characters the present female is provisionally identified as that of *B. varunae*.

Tribe Mysini

Genus *Lycomysis* Hansen

***Lycomysis platycauda* Pillai**

Figs. 19-20

Lycomysis platycauda Pillai, 1961, p. 30, pl. 5, figs. N-R, pl. 6, figs. A-J.

Material. St. 1766, 2 males.

Description. Body is strongly built. Carapace is produced forwards into a broadly triangular and apically rounded rostrum reaching the middle of the

basal segment of the antennular peduncle and hiding the basal one-third of the eye stalks. Posterior border of the carapace is moderately emarginate. Cervical sulcus is prominent. Abdomen steadily narrows backwards. The whole surface of the body, particularly of the abdomen and the dorsal surface of the carapace in front of the cervical sulcus, is spiny. Eyes are large, slightly longer than broad, eye stalk is spiny and the cornea is narrower than the eye stalk. Telson is elongate-linguiform, broadest at the base. Basal one-fifth of the telson is swollen but is narrowed beyond

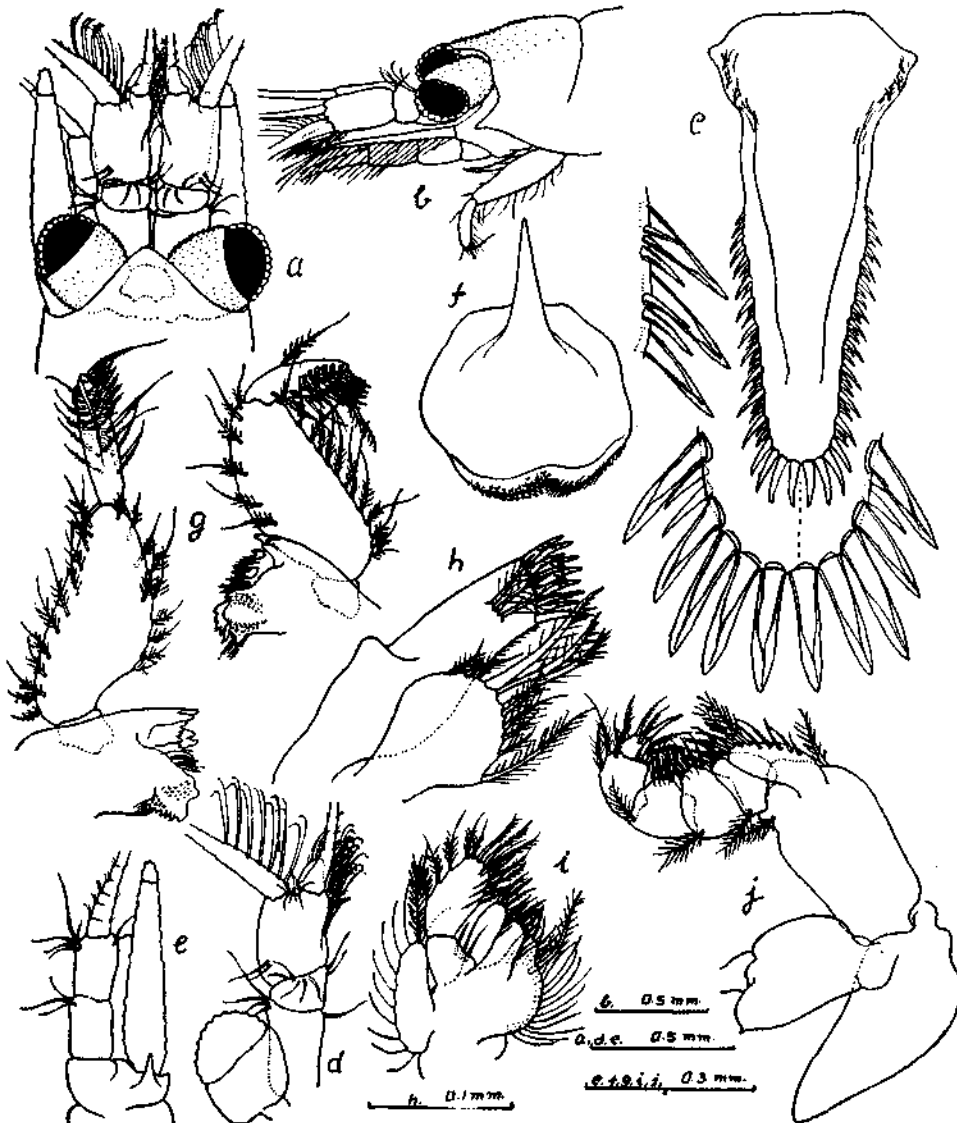


FIG. 19. *Lycomysis platycauda* Pillai—(a) anterior part of male, dorsal view; (b) same, lateral view; (c) telson; (d) antennule; (e) antenna; (f) labrum; (g) mandibles; (h) maxillule; (i) maxilla; (j) first thoracic endopod.

to form a waist before again slightly widening at about the middle where the spinulation of the telson begins. Further on the telson gradually narrows and terminates in a perfectly rounded apex. The basal bulged part of the telson carries three pairs of dorso-lateral spines. Lateral borders are armed with two sets of spines, a dorsal row of fourteen large spines successively increasing in length and a ventral row of about fourteen to fifteen small spines some of which are hidden by the large spines in the dorsal view of the telson. The apex proper of the telson is armed with two pairs of large stout apically blunt spines which are in every way a continuation of the dorsal set of lateral spines.

Basal segment of the antennule is as long as the distal segment, latter is swollen and carries a distal median spine. The male lobe is prominent and hirsute. Antennal sympod is externally produced into a sharp spine. Antennal scale is lanceolate, apically blunt and setose all along the border, its distal segment is longer than broad. The scale slightly overreaches the antennular peduncle. Antennal peduncle is three-segmented and two-thirds as long as the scale, second and third segments are subequal and carry long setae at their inner distal part. Labrum is irregularly circular and symmetrically bilobed at its distal border. Its proximal external part is produced into a long curved spine visible in the lateral view of the animal. The mandibles have strong dissimilar cutting edge, palp is stout and well armed. Inner lobe of the maxillule is flattened and armed with three long barbed spines and about seven pectinate setae, inner border of outer lobe is spinulose and its outer border has a prominent hump. Second segment of the maxilla is expanded and carries a stout spine seta besides a row of plumose setae, endite of third segment is deeply bifid, second segment of endopod is oblong and longer than broad.

Second segment of first thoracic endopod is large and carries a large linear endite; third, fourth and fifth segments are internally produced but do not have distinct endites; the dactylus has a slender but distinct claw and several strongly pectinate spines. Carpopropodus of second thoracic limb is only slightly shorter than the merus, dactylus has several strongly pectinate setae and a slender claw. Thoracic endopods three to eight are subsimilar, carpus is fused with the propodus and subdivided into three tarsal segments. In the third limb a distinct dactylus carrying a claw is present but in the hinder legs the third tarsal segment is very small and the dactylus is very minute, no claw is visible. Pleopods one to three are subsimilar unsegmented plates carrying a row of setae terminating in a very long seta, its inner proximal part carries three setae and each has an outer slightly projecting lobe tipped with four setae. Fourth pleopod is biramous, its exopod is elongated and three-segmented, first segment is very long, second is small and about a tenth of the length of the first, third segment is very small, each of the last two segments carries a long barbed spine-seta. Fifth pleopod is uniramous but longer than the first three. Uropods overreach the telson, exopod is longer than endopod and setose all along its border, endopod is tapering and carries five sharp spines on the ventral side just below the statocyst.

Length of male 6.6 mm.

Remarks. The two males contained in the present collection are clearly referable to *L. platycauda* but I am puzzled by the nature of the mandibular palp. In the female described earlier the second segment of the palp had a serrated crest exactly similar to, but much more conspicuous than, that of *L. spinicauda*. But no trace of this is visible in the two males. It is unlikely that the mandibular palp can

exhibit such extreme sexual dimorphism. But, in view of the close similarity in all the other characters, I refer the present males to *L. platycauda*.

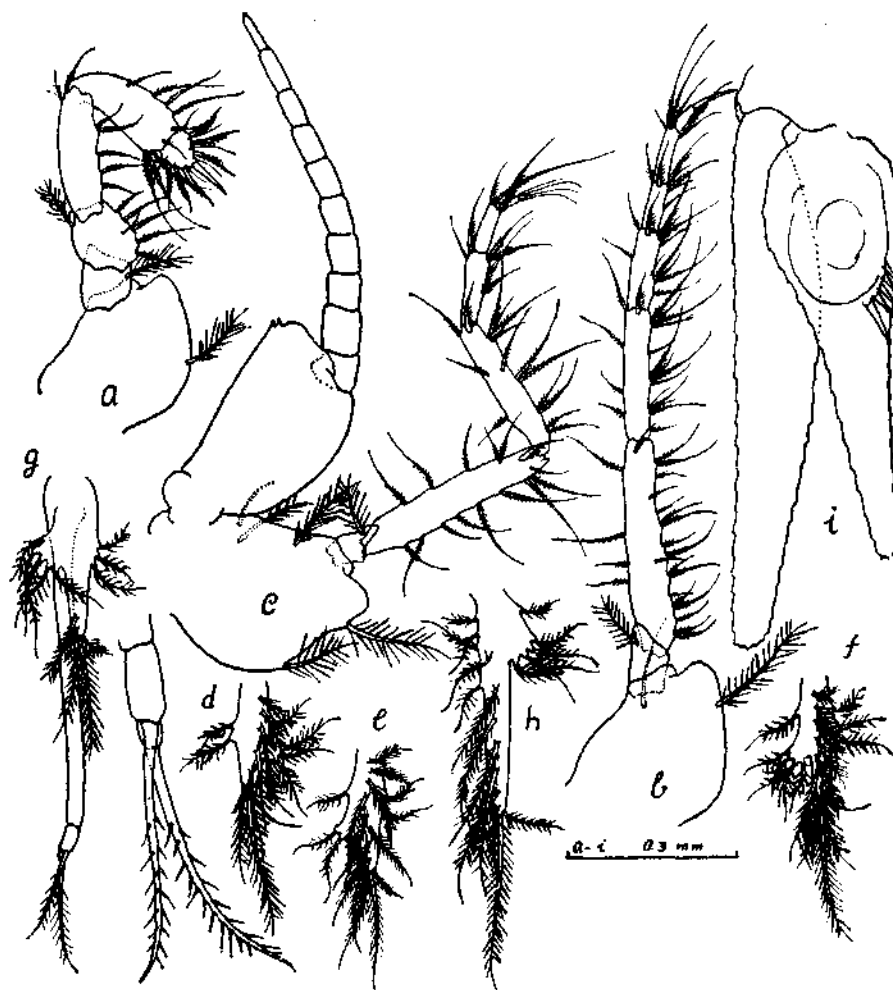


FIG. 20. *Lycomysis platycauda* Pillai—(a) second thoracic endopod; (b) third thoracic endopod; (c) eighth thoracic limb; (d-h) first to fifth pleopods; (i) uropod.

According to Hansen, the double row of spines arming the lateral borders of the telson, the saw-like armature of the mandibular palp, the spine-like anterior prolongation of the labrum and the biramous nature of the male pleopods distinguish *Lycomysis*. Some of these characters have ceased to be of much value. For, in *Acanthomysis trophoprictis* O. S. Tattersall (1957) the mandibular palp is similar to that of *Lycomysis*, and the labrum is produced into a long spine in some species of *Neomysis*, *Acanthomysis* and *Afromysis*. The other two characters are still valid.

Considerable importance was given to the pleopods of the male. Hansen (1910), Zimmer (1915) and Colosi (1916) described the pleopods of *Lycomysis* as

biramous. But W. M. Tattersall (1922) correctly pointed out that though they may appear biramous, when looked under the high power of the microscope they can be seen as simple unjointed plates of the type usual in the females of Mysini, except that the outer lobe is unusually well developed. This is very true of *L. spinicauda* but not applicable to *L. platycauda*. In the latter the pleopods are simple plates with the outer lobe hardly projecting. The fourth pleopod is quite different from that of *L. spinicauda* as illustrated by W. M. Tattersall.

While describing *Acanthomysis trophopristis*, O. S. Tattersall (1957, p. 126) remarked that it shows some superficial resemblance to *Lycomysis* but can be distinguished by the form of the pleopods of the male. Except for the double row of spines arming the telson *L. platycauda* can be easily placed under *Acanthomysis*. The resemblance between *Lycomysis* and *Acanthomysis* is certainly much closer than hitherto believed and *L. platycauda* bridges the gap between the two genera to some extent.

REFERENCES

- ALCOCK, A. AND ANDERSON, A. R. S. 1894. An account of a recent collection of deep sea Crustacea from the Bay of Bengal and Laccadive Sea. *J. Asiat. Soc. Bengal*, **63** : 141-185.
- . 1899. An account of the deep sea Crustacea dredged during the surveying season of 1898. *Ann. Mag. Nat. Hist.*, **7**(3) : 1-27.
- . 1897. An account of the deep sea Crustacea collected during the season of 1896. *J. Asiat. Soc. Bengal*, **64** : 88-106.
- . 1936. Alcuni Misidacei nuovi raccolti dal Prof. L. Sanzo nella crociera della *Ammiraglio Magnaghi* al Mar Rosso. *Boll. Zool. Napoli*, **6** : 83-88.
- . 1937. I Misidacei del Mar Rosso. *R. Com. Talassogr. Ital.*, Mem. 233, 52 pp., 25 pls.
- COLOSI, G. 1916. Nuova diagnosi posizione sistematica di *Lycomysis spinicauda* Hansen. *Mon. Zool. Ital.*, **27** : 193-200.
- . 1919. Nota preliminare sui Misidacei raccolti dalla R. N. Liguria nel 1903-1905. *Bull. Soc. Entom. Ital.*, **49** : 1-11.
- . 1920. Raccolte planctoniche fatte della R. N. Liguria. Pt. 4. Mysidacei. *Publ. Inst. Firenze*, **2** : 229-260.
- . 1929. I Misidacei del Golfo di Napoli. *Publ. Staz. Zool. Napoli*, **9** : 405-441.
- CZERNIAVSKY, V. 1882. Monographia Mysidarum imprimis Imperii Rossici (Fasc. 1). *Trav. Soc. Nat. St. Petersb.*, **12** : 1-170.
- DANA, J. W. 1852. *United States Exploring Expedition during the years 1838-42*. **13** : 1-685.
- . 1855. *United States Exploring Expedition during the years 1838-42*. Atlas. 96 pls.
- HANSEN, H. J. 1910. The Schizopoda of the Siboga Expedition. *Siboga Expeditie.*, **37** : 1-123, 17 pls.
- . 1912. Reports on the Scientific results....Albatross. *Mem. Mus. Comp. Zool. Harvard*, **35** : 175-296, 12 pls.
- HOLMES, S. J. 1900. Synopsis of California stalk eyed Crustaceae. *Occ. Pap. California Acad. Sci.*, **7** : 1-262, 4 pls.
- ILLIG, G. 1906. Bericht über die neuen Schizopodengattungen und-arten der Deutschen Tiefsee-Expedition. 1. Mysidaceen. *Zool. Anz. Leipzig*, **30** : 194-211.

- ILLIG, G. 1930. Die Schizopoden der Deutschen Tiefsee Expedition. *Wiss. Ergebn. Valdivia*, 22 : 400-625.
- KROYER, H. 1861. Et Bidrag til Kundskab om Krebsdyrfamilien Mysidae. *Naturh. Tidsskr.*, (3) 1 : 1-75, 2 pls.
- NOUVEL, H. 1944. Diagnoses de Mysidacees nouveaux de la mer Rouge et du Golfe d' Aden. *Bull. Soc. Hist. Nat. Toulouse*, 79 : 255-269.
- . 1954. Description d'un Mysidacee nouveaux de Ceylon, *Mesopodopsis zeylanica* n.sp. *Zool. Meded.*, 33 : 33-39.
- . 1959. Mission Robert Ph. Dollfus en Egypte. *Res. Scient.*, No. 29 : 195-240.
- PILLAI, N. K. 1957. Pelagic Crustacea of Travancore. 1. Schizopoda. *Bull. Res. Inst. Univ. Travancore*, 5 : 1-28.
- . 1961. Additions to the Mysidacea of Kerala. *Ibid.*, 8 : 15-35, 6 pls.
- . 1964. On a new mysid from the inshore waters of the Kerala coast. *J. Mar. biol. Assoc. India*, 5 : 258-262.
- . 1964a. Description of a new species of *Bathymysis* with a revised definition of the genus. *Ibid.* 5 : 263-268.
- PILLAI, N. K. AND MARIAMMA, T. 1963. On the discovery of the primitive mysidacean family Lepidomysidae in India. *Curr. Sci. Bangalore*, 32 : 219-220.
- SARS, G. O. 1884. Preliminary notes on the Schizopoda of H.M.S. Challenger Expedition *Forh. Vidensk. Selsk. Christiania*, No. 7 : 1-43.
- . 1885. Report on the Schizopoda collected by H.M.S. Challenger during the 1873-76. *Challenger Reports, Zoology*, 13 : 1-225.
- TATTERSALL, O. S. 1955. Mysidacea. *Discovery Reports*, 28 : 1-190.
- . 1957. Report on a small collection of Mysidacea from the Sierra Leone est. together with a survey of the genus *Rhopalophthalmus* Illig and a description of a new species of *Tenagomysis* from Lagos, Nigeria. *Proc. Zool. Soc. London*, 129 : 81-128.
- TATTERSALL, W. M. 1906. Report on the Leptostraca, Schizopoda and Stomatopoda collected by Prof. Herdmann at Ceylon in 1902. *Ceylon Pearl Oyster Fisheries. Report No. 33* : 157-188.
- . 1908. The fauna of brackish ponds at Port Canning, lower Bengal. XI. Two new mysidae from brackish water in the Ganges delta. *Rec. Ind. Mus.*, 2 : 233-239.
- . 1911. On the Mysidacea and Euphausiacea collected in the Indian Ocean during 1905. *Trans. Linn. Soc. London*, 15 : 119-136.
- . 1914. Further records of Indian brackish water Mysidae with descriptions of a new genus and species. *Rec. Ind. Mus.*, 10 : 75-80.
- . 1915. Fauna of Chilka lake. The Mysidacea of the lake with the description of a species from the coast of Orissa. *Mem. Ind. Mus.*, 5 : 147-161.
- . 1922. Indian Mysidacea. *Rec. Ind. Mus.*, 24 : 445-504.
- . 1936. Great Barrier Reef Expedition 1928-29. Mysidacea and Euphausiacea. *Sci. Rep.*, 5 : 143-176.
- . 1939. The Euphausiacea and Mysidacea of the John Murray Expedition to the Indian Ocean. *Sci. Rep. John Murray Exped.*, 5 : 203-246.
- . 1940. Report on a small collection of Mysidacea from the coastal waters of New South Wales. *Rec. Australian Mus.*, 20 : 327-340.

- TATTERSALL, W. M. 1941. Euphausiacea and Mysidacea collected on the Presidential cruise of 1938. *Smithsonian Misc. Coll.*, **99** : 1-7.
- . 1951. A review of the Mysidacea of the United States. *Bull. U.S. Nat. Mus.*, No. 201 : 1-292.
- . AND TATTERSALL, O. S. 1951. *The British Mysidacea*. Ray Society, London. No. 136 : 1-460.
- WOOD-MASON, J. AND ALCOCK, A. 1891. Notes on the results of the last season's dredging. *Ann. Mag. Nat. Hist.*, (6) **7** : 186-202.
- . 1891a. On the results of deep sea dredging during the season 1890-91. *Ibid.* (6) **8** : 268-286.
- ZIMMER, C. 1914. Die Schizopoden der Deutschen Sudpolar Expedition 1901-3. *Dtsch. Sudpol. Exped.*, **15** : 379-409.
- . 1915. Schizopoden des Hamburger Naturhistorischen (Zoologischen) Museum. *Mitt. Naturh. Mus. Hamb.*, **32** : 152-182.
- . 1916. *Beitrage zur Kenntnis der Meeres fauna Westaficas. Crustacea IV. Cumacea and Schizopoda*. Hamburg, 55-66.
- . 1918. Neue und wenig Mysidaceen des Berliner zoologischen Museums. *Mitt. Zool. Mus. Berl.*, **9** : 13-26.

APPENDIX

VARUNA stations where mysids were collected

S. No.	Station Number	Position		Date	Time in hours	Depth of plankton haul in metres	Depth of station in metres	Type of net used
		Latitude N	Longitude E					
1	697	10° 48'	75° 43'	5-1-1962	03.45	30-0 V	33	½ m net
2	737	11° 28'	74° 49'	1-2-1962	02.40	100-0 V	125	½ m net
3	744	11° 14'	75° 00'	1-2-1962	23.30	95-0 V	100	½ m net
4	745	11° 09'	75° 03'	2-2-1962	00.30	110-0 V	112	½ m net
5	748	11° 07'	75° 22'	2-2-1962	04.00	50-0 V	54	½ m net
6	757	10° 34'	75° 31'	2-2-1962	21.10	60-0 V	62	½ m net
7	759	10° 45'	75° 30'	3-2-1962	02.00	50-0 V	54	½ m net
8	760	10° 38'	75° 45'	3-2-1962	05.55	30-0 V	34	½ m net
9	943	15° 10'	72° 41'	2-4-1962	21.30	100-0 V	980	½ m net
10	954	14° 41'	73° 32'	4-4-1962	21.00	75-0 V	77	½ m net
11	961	16° 42'	72° 28'	12-5-1962	02.25	70-0 V	75	½ m net
12	975	18° 03'	72° 22'	13-5-1962	21.25	35-0 V	40	½ m net
13	1037	07° 50'	77° 16'	13-6-1962	23.15	50-0 V	56	½ m net
14	1084	10° 48'	75° 47'	16-7-1962	01.00	10-0 V	22	½ m net
15	1085	10° 45'	75° 37'	16-7-1962	03.30	25-0 V	42	½ m net
16	1093	11° 05'	75° 09'	17-7-1962	01.30	50-0 V	84	½ m net
17	1094	11° 05'	75° 20'	17-7-1962	03.20	40-0 V	54	½ m net
18	1162	16° 49'	72° 28'	24-8-1962	13.10	75-0 V	85	½ m net
19	1173	15° 11'	73° 13'	26-8-1962	02.30	10-0 V	94	½ m net
20	1173	15° 11'	73° 13'	26-8-1962	02.45	10 H	94	½ m net
21	1179	08° 31'	73° 26'	6-9-1962	20.30	500-0 V	1900	½ m net
22	1180	08° 48'	73° 57'	7-9-1962	03.00	30 H	2540	Mosquito
23	1181	09° 04'	74° 32'	7-9-1962	08.53	45 H	2640	½ m net
24	1196	02° 02'	77° 00'	17-9-1962	23.40	200-0 V	4160	Mosquito
25	1200	00° 00'	77° 00'	18-9-1962	20.50	200-0 V	4510	Mosquito
26	1224	06° 38'	79° 13'	23-9-1962	15.10	200-0 V	2350	½ m net

½ m net Net with ½ metre diameter made of various types of clothes
 Mosquito Net with ½ metre diameter made of mosquito netting
 1 m net International Indian Ocean Expedition standard net with 1 metre diameter
 V. Vertical haul
 H. Horizontal haul

APPENDIX—(Contd.)

VARUNA stations where mysids were collected—(Contd.)

40

S. No.	Station Number	Position		Date	Time in hours	Depth of plankton haul in metres	Depth of station in metres	Type of net used
		Latitude N	Longitude E					
27	1229	08° 00'	74° 00'	4-10-1962	18.40	150 H	2700	Mosquito
28	1231	07° 33'	73° 07'	5-10-1962	03.00	150 H	1780	Mosquito
29	1231	07° 33'	73° 07'	5-10-1962	03.00	100 H	1780	Mosquito
30	1241	03° 59'	71° 07'	7-10-1962	05.45	100 H	4040	Mosquito
31	1243	02° 56'	71° 15'	7-10-1962	14.30	150-0 V	4040	1 m net
32	1245	02° 00'	71° 00'	7-10-1962	01.00	100 H	3840	Mosquito
33	1256	03° 00'	74° 05'	13-10-1962	02.30	150 H	2420	Mosquito
34	1260	05° 00'	74° 00'	15-10-1962	18.00	0 H	2520	Mosquito
35	1260	05° 00'	74° 00'	15-10-1962	18.15	100 H	2520	Mosquito
36	1278	08° 00'	74° 40'	14-11-1962	22.00	0 H	2700	Mosquito
37	1290	08° 00'	70° 40'	16-11-1962	18.00	100 H	3880	Mosquito
38	1292	08° 00'	70° 00'	17-11-1962	01.35	200-0 V	4500	1 m net
39	1298	10° 00'	70° 00'	17-11-1962	23.55	100 H	4420	Mosquito
40	1306	10° 00'	72° 40'	19-11-1962	03.30	200-0 V	1780	1 m net
41	1306	10° 00'	72° 40'	19-11-1962	03.30	0 H	1780	Mosquito
42	1308	10° 00'	73° 20'	19-11-1962	10.30	200-0 V	2080	1 m net
43	1314	10° 00'	75° 20'	20-11-1962	08.00	200-0 V	1760	1 m net
44	1329	11° 22'	73° 46'	28-11-1962	18.35	200-0 V	2050	1 m net
45	1351	12° 53'	72° 00'	1-12-1962	21.15	0 H	1440	Mosquito
46	1362	12° 52'	74° 43'	12-12-1962	19.20	10-0 V	18	1 m net
47	1364	13° 11'	74° 37'	12-12-1962	22.58	10-0 V	18	1 m net
48	1377	14° 00'	72° 00'	14-12-1962	01.45	50-0 V	1600	Mosquito
49	1397	14° 49'	73° 20'	16-12-1962	21.10	0 H	83	Mosquito
50	1407	16° 00'	73° 05'	6-1-1963	19.55	0 H	70	Mosquito
51	1409	16° 00'	72° 43'	6-1-1963	23.05	100-0 V	125	1 m net
52	1409	16° 00'	72° 43'	6-1-1963	23.05	0 H	125	Mosquito
53	1415	16° 00'	70° 40'	7-1-1963	19.40	100 H	3350	Mosquito
54	1415	16° 00'	70° 40'	7-1-1963	19.40	0 H	3350	Mosquito
55	1417	16° 00'	69° 59'	8-1-1963	03.05	200-0 V	3600	1 m net
56	1417	16° 00'	69° 59'	8-1-1963	03.05	0 H	3600	Mosquito
57	1417	16° 00'	69° 59'	8-1-1963	03.05	50 H	3600	Mosquito
58	1421	17° 00'	70° 20'	8-1-1963	18.00	200-0 V	3270	1 m net
59	1691	07° 58'	76° 46'	10-4-1963	12.50	135-0 V	142	1 m net
60	1692	07° 57'	76° 43'	10-4-1963	14.30	100-0 V	190	Mosquito

N. KRISHNA PILLA

APPENDIX—(Contd.)
VARUNA stations where mysids were collected—(Contd.)

S. No.	Station Number	Position		Date	Time in hours	Depth of plankton haul in metres	Depth of station in metres	Type of net used
		Latitude N	Longitude E					
61	1692	07° 57'	76° 43'	10-4-1963	14.30	180.0 V	190	1 m net
62	1693	07° 53'	76° 44'	10-4-1963	16.30	180.0 V	190	1 m net
63	1694	07° 58'	76° 54'	10-4-1963	18.12	60.0 V	63	1 m net
64	1697	08° 04'	77° 30'	11-4-1963	11.20	12.0 V	18	1 m net
65	1703	07° 48'	76° 43'	11-4-1963	20.20	200.0 V	330	1 m net
66	1706	08° 17'	76° 50'	12-4-1963	03.30	50.0 V	60	1 m net
67	1717	08° 41'	76° 15'	18-4-1963	09.55	50.0 V	104	Mosquito
68	1719	08° 30'	75° 58'	18-4-1963	14.35	100.0 V	1100	Mosquito
69	1720	08° 24'	75° 48'	18-4-1963	17.20	200.0 V	1250	1 m net
70	1723	06° 57'	77° 32'	19-4-1963	18.08	30.0 V	2280	Mosquito
71	1724	07° 02'	77° 32'	19-4-1963	21.15	50.0 V	1560	Mosquito
72	1724	07° 02'	77° 32'	19-4-1963	21.15	75.0 V	1560	Mosquito
73	1724	07° 02'	77° 32'	19-4-1963	21.15	200.0 V	1560	1 m net
74	1725	07° 12'	77° 32'	20-4-1963	00.25	200.0 V	280	1 m net
75	1727	07° 32'	77° 32'	20-4-1963	04.30	90.0 V	93	1 m net
76	1734	09° 20'	75° 51'	21-4-1963	08.45	100.0 V	200	Mosquito
77	1737	09° 46'	75° 25'	21-4-1963	20.15	200.0 V	1416	1 m net
78	1738	09° 49'	75° 36'	21-4-1963	22.50	150.0 V	160	1 m net
79	1740	09° 55'	75° 57'	22-4-1963	02.20	30.0 V	40	1 m net
80	1748	12° 29'	73° 46'	25-4-1963	16.45	200.0 V	1720	1 m net
81	1750	11° 43'	74° 09'	26-4-1963	04.10	200.0 V	1250	1 m net
82	1752	11° 48'	74° 29'	26-4-1963	10.25	30 H	250	Mosquito
83	1753	11° 57'	74° 38'	26-4-1963	13.00	75.0 V	90	1 m net
84	1759	11° 07'	75° 21'	27-4-1963	02.00	40.0 V	53	1 m net
85	1760	11° 04'	75° 11'	27-4-1963	03.38	75.0 V	83	1 m net
86	1763	10° 57'	74° 40'	27-4-1963	10.50	100 H	1250	Mosquito
87	1766	20° 00'	72° 15'	7-5-1963	06.00	25.0 V	33	1 m net
88	1783	21° 36'	69° 34'	9-5-1963	03.10	10.0 V	30	1 m net
89	1792	20° 20'	71° 30'	10-5-1963	06.45	15.0 V	28	1 m net
90	1793	20° 20'	72° 00'	10-5-1963	12.02	20.0 V	30	1 m net
91	1794	20° 19'	72° 29'	10-5-1963	14.45	25.0 V	34	1 m net