

INDIAN MYSIDACEA.

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The following report deals with collections of Mysidacea sent to me from the Indian Museum for identification. The greater part of them were collected by Dr. S. W. Kemp in three localities, Kilakarai and Pamban, at the northern end of the Gulf of Manaar and at Port Blair in the Andaman Islands. At the latter place Dr. Kemp made collections at eight different stations and in order to save repetition I give here a list of these stations with full particulars, merely giving the station number under each species.

PORT BLAIR, ANDAMAN ISLANDS.

List of stations at which Mysidacea were obtained.

- St. 3. 19-ii-15. North Bay, *ca.* 1 fm. Muddy sand.
St. 5. 21-ii-15. Brigade Creek, 2-5 fms. Bottom composed of mud with much decaying vegetable matter.
St. 7. 22-ii-15. Off jetty, Ross I., 1½-2 fms. Sand and a little weed.
St. 8. 23-ii—10-iii-15. Between Ross I. and Aberdeen, 2-10 fms. Bottom very varied, principally sand, weed, small living corals, dead coral fragments and sponge.
St. 11. 27-ii-15. Channel N. of Viper I., 1-2 fms. Mud.
St. 13. 1-iii-15. Reef at N. end of Ross I., shore collecting. Dead coral.
St. 19. 7-iii-15. Semiramis Bay and off Perseverance Pt. Fine mud.
St. 21. 11-iii-15. Mid-channel, N. W. of Ross I., 10-12 fms. Muddy sand.
St. 32. Feb., March, 1921. Ross Channel, 2-9 fathoms.

Full particulars of all other localities are given under each species.

Our knowledge of the Mysidacea of Indian waters has until within the last ten years been of the scantiest nature. Wood-Mason, Alcock and Anderson recorded the following deep-sea and bathypelagic species from the collections of the "Investigator":—

<i>Gnathophausia calcarata</i> G. O.	<i>Gnathophausia zoëa</i> Will.-Suhm.
Sars. (= <i>G. bengalensis</i> Wood-Mason.)	(= <i>G. sarsi</i> Wood-Mason.)
	<i>Eucopeia australis</i> Dana.
<i>Gnathophausia gracilis</i> Will.-Suhm. (= <i>G. brevispinis</i> Wood-Mason and Alcock)	<i>Eucopeia sculpticauda</i> Faxon.
	<i>Petalophthalmus armiger</i> Will.-Suhm.

In 1906 I recorded *Siriella paulsoni* Kossman from Ceylon and between 1908 and 1914 I have described six other species of Mysidae from the brackish waters of the coast of India:—

<i>Rhopalophthalmus egregius</i> Han- sen.	<i>Potamomysis assimilis</i> Tatter- sall.
<i>Gastrosaccus muticus</i> Tattersall.	<i>Indomysis annandalei</i> Tatter- sall.
<i>Gastrosaccus simulans</i> Tatter- sall.	<i>Mesopodopsis orientalis</i> (Tatter- sall).

In the course of his report on the Siboga Mysidacea Hansen (1910) records the following species from the Bay of Bengal:—

<i>Siriella gracilis</i> Dana.	<i>Gastrosaccus bengalensis</i> Han- sen.
<i>Siriella aequiremis</i> Hansen.	<i>Pseudanchialina pusilla</i> G. O. Sars.
<i>Hemisiriella parva</i> Hansen.	<i>Pseudanchialina inermis</i> Illig.
<i>Anchialina grossa</i> Hansen.	

Zimmer (1915 (3)) described the Mysidae collected by Dr. Duncker during a voyage from Ceylon to New Guinea. No exact localities are given for the following species, which may or may not have been taken in Indian waters:—

<i>Anchialina frontalis</i> Zimmer.	<i>Leptomysis apiops</i> G. O. Sars?
<i>Anchialina penicillata</i> Zimmer.	<i>Diopromysis perspicillata</i> Zim- mer.
<i>Gastrosaccus bengalensis</i> Han- sen.	<i>Uromysis armata</i> Hansen.
<i>Gastrosaccus dunckeri</i> Zimmer.	<i>Lycomysis pusilla</i> Zimmer.

Of these forms, *Anchialina frontalis* is, in my opinion, a synonym of *A. grossa* Hansen, *Leptomysis apiops* of *L. xenops*, sp. nov., described below, and *Lycomysis pusilla* of *L. spinicauda* Hansen.

Finally Colosi (1920) has recorded *Doxomysis zimmeri* Colosi, from Ceylon.

The total number of species of Mysidacea known from Indian waters is therefore 27.

In the present report I record 38 species of which twelve have been recorded previously from India, sixteen are described as new to science and ten are new to the Indian fauna. These last species are:—

<i>Lophogaster intermedius</i> Han- sen.	<i>Siriella dubia</i> Hansen.
<i>Siriella brevicaudata</i> Paulson.	<i>Anchialina typica</i> (Kröyer).
<i>Siriella quadrispinosa</i> Hansen.	<i>Gastrosaccus pacificus</i> Hansen.
<i>Siriella vulgaris</i> Hansen.	<i>Erythroops minuta</i> Hansen.
<i>Siriella affinis</i> Hansen.	<i>Hypererythroops spinifera</i> (Han- sen.)

The new species described below are:—

<i>Siriella hansenii</i> .	<i>Mysidopsis indica</i> .
<i>Gastrosaccus kempi</i> .	<i>Mysidopsis kempi</i> .
<i>Erythroops nana</i>	<i>Leptomysis xenops</i> .

<i>Afromysis macropsis.</i>	<i>Neomysis hodgarti.</i>
<i>Prionomysis stenolepis</i> (gen. nov.).	<i>Idiomysis inermis</i> (gen. nov.)
<i>Doxomysis anomala.</i>	<i>Heteromysis proxima.</i>
<i>Doxomysis littoralis.</i>	<i>Heteromysis zeylanica.</i>
<i>Neomysis indica.</i>	<i>Heteromysis gymmura.</i>

The total number of species of Indian Mysidacea is therefore brought up to 53 species.

Much remains to be done with the deep-water fauna of Indian waters and many deep-sea species will doubtless be added to the list. Extended knowledge of the distribution of the shallow-water forms is desirable, and when it is remembered that the majority of the species reported here were collected during two short expeditions only, the results, if continuous observation and collection were possible, are distinctly promising.

The failure of earlier expeditions to tropical waters to obtain shallow-water Mysidacea is not due, as one was almost beginning to suspect, to the fact that these forms are absent from tropical waters, but entirely to a lack of knowledge of how to collect them. They are much smaller than the species from temperate and Arctic regions and easily pass through dredges and trawls. They require to be collected by means of special hand-nets made of mosquito netting used vigorously among the weeds on the shores below low-water mark. The results recorded below are a testimony to the successful use of such means by Dr. Kemp.

In examining this collection the most striking fact which presented itself was its strong Mediterranean facies. Out of twenty genera, no fewer than twelve are represented in the fauna of the Mediterranean, and I have frequently had to refer to Sars' work on the Mediterranean Mysidae for the nearest described form to many of the new species noted here. Several of them, indeed, are so closely allied to Mediterranean species that it was only necessary to refer to Sars' work and to tabulate the differences found in the Indian species. These facts will be more clearly brought out by a study of the following list in which are given the Indian forms and their Mediterranean allies:—

Indian species.	Mediterranean species.
<i>Lophogaster intermedius.</i>	<i>L. typicus.</i>
<i>Siriella vulgaris.</i> }	{ <i>S. norvegica.</i>
„ <i>affinis.</i> }	{ <i>S. clausii.</i>
	{ <i>S. jaltensis.</i>
<i>Anchialina typica.</i> }	<i>A. agilis.</i>
„ <i>grossa.</i> }	
<i>Gastrosaccus dunckeri.</i> }	<i>G. sanctus.</i>
„ <i>muticus.</i> }	
„ <i>kempi.</i> }	
„ <i>pacificus.</i> }	<i>G. normani.</i>
„ <i>bengalensis.</i> }	
<i>Erythrops minuta.</i>	<i>Erythrops sei rata.</i>
„ <i>nana.</i>	„ <i>elegans.</i>

Indian species.	Mediterranean species.
<i>Mysidopsis indica</i> .	<i>M. gibbosa</i> .
<i>Leptomysis xenops</i> .	<i>L. apiops</i> .
<i>Mesopodopsis orientalis</i> .	<i>M. slabberi</i> .
<i>Neomysis indica</i> .	<i>N. longicornis</i> .
<i>Potamomysis assimilis</i> .	<i>P. pengoi</i> .
<i>Heteromysis harpax</i> .	<i>H. microps</i> .

The superficial resemblance between the Mysidacean fauna of the two regions is thus seen to be most striking and the fact is further emphasised if actual numbers are considered, for by far the greatest numbers of specimens belong to those species which are related to Mediterranean forms.

My thanks are due to Dr. Annandale for the opportunity of examining and reporting on this collection and to Dr. Kemp for his successful efforts to obtain Mysidae at my request. I am greatly indebted to my wife for the figures illustrating this report.

Suborder LOPHOGASTRIDA.

Family LOPHOGASTRIDAE G. O. Sars.

Genus *Lophogaster* M. Sars.

Lophogaster intermedius Hansen.

Lophogaster intermedius, Hansen, 1910, p. 14, pl. 1, figs. 1a-1e.

Locality.—'Investigator' St. 532: Mergui Archipelago, 62 fathoms, 16-iv-13.

68 specimens, 10-20 mm.

Distribution.—Only known from specimens captured by the 'Siboga' in the waters of the East Indian Archipelago.

Suborder MYSIDA.

Family MYSIDAE Dana.

Subfamily SIRIELLINAE Norman.

Genus *Siriella* Dana.

Siriella hanseni, sp. nov.

Text-figs. 1a-c, 2.

Locality.—Pamban, Gulf of Manaar, from weeds, 0-2 fathoms, February, 1913. Sixty specimens, 4-7 mm. (Types.)

Description.—A *Siriella* belonging to Hansen's group I and allied to *S. quadrispinosa* Hansen and *S. nodosa* Hansen.

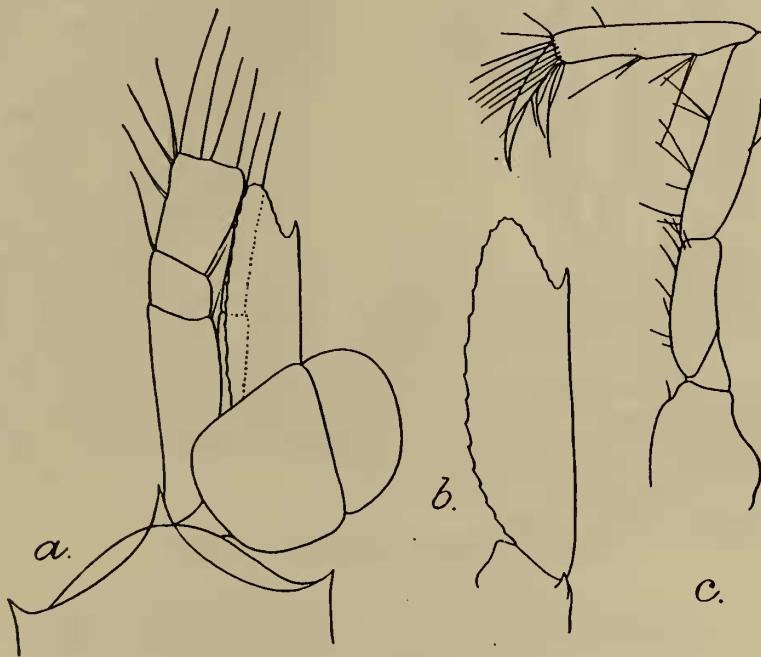
Carapace in both sexes without protuberances or tubercles, hardly at all produced into a frontal plate, anterior margin broadly and evenly rounded, leaving exposed a small spiniform pseudo-rostral process.

Antennal scale subequal in both sexes, reaching the distal end of the antennular peduncle in the female, not quite extending thus far in the male, three and a half times as long as broad, terminal lobe not quite so long as broad, slightly overreaching the terminal spine of the outer margin.

Tarsus of the thoracic legs without a secondary joint.

Pseudobranchial rami of the second to the fourth pleopods of the male spirally twisted, the terminal setae of the fourth pair not modified.

Telson short, not extending to the distal end of the proximal



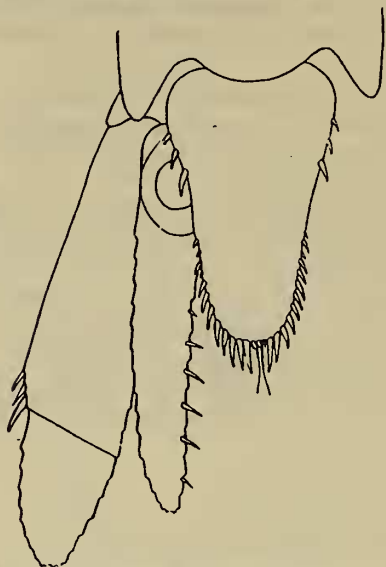
TEXT-FIG. 1.—*Siriella hanseni*, sp. nov.

a, anterior end of female; *b*, antennal scale, *c*, third thoracic limb, endopod. All $\times 65$.

joint of the exopod of the uropods, scarcely one and a half times as long as broad at the base, apex broadly rounded, almost truncate, and armed in the middle line with three equal small spinules and a pair of plumose setae longer than the spines flanking them, three large spines on the lateral margins of the telson at the base, distal portion of the lateral margins armed with about 12 spines gradually increasing towards the apex, the three spines on each side of the apex not much longer than the preceding spines and more or less subequal in size.

Inner uropod shorter than the outer, its inner lower margins with about ten somewhat distantly placed spines without any

small spines between them, extending from the anterior edge of the statocyst almost to the apex.



TEXT-FIG. 2.—*Siriella hanseni*, sp. nov.
Telson and uropods: $\times 65$.

Outer uropod with the proximal joint more than twice as long as the distal, its outer margin with three or four spines at the distal end only; terminal joint one and a quarter times as long as broad.

Remarks.—This species is distinguished by (i) the absence of a rostral projection (ii) the unjointed tarsus of the thoracic limbs and (3) the size and armature of the telson and uropods. It is most closely allied to *S. quadrispinosa* and *S. nodosa*, but the combination of the three characters named will serve to distinguish it from both these species. It also shows many

points of resemblance to *S. brevicaudata* described below, but differs in the relative size and the armature of the telson. Both species agree in the absence of a rostral projection and the unjointed tarsus of the thoracic legs.

Siriella brevicaudata Paulson.

Text-figs. 3a-h, 4a-f.

- Siriella brevicaudata*, Paulson, 1875 (1), p. 30, pl. i, figs. 15-16.
 " " Paulson, 1875 (2), p. 123, pl. xx, figs. 1a-m.
 " " Czerniavsky, 1882, p. 109.
 " " Czerniavsky, 1883, p. 32.

Localities.—Kilakarai and Pamban, Gulf of Manaar, from weeds, 0-2 fathoms, February 12th-25th, 1913. Abundant, adult males and females, 6 mm. long.

Remarks.—The rediscovery of this species, not recorded since Paulson originally described it in 1875 from specimens taken in the Red Sea, is a matter of great interest. Paulson's original description is in Russian and I am obliged to rely on his figures, but these specimens agree so closely with Paulson's figures that I am confident of the correctness of my determination.

In his 'Siboga' report (1910) Hansen arranges the Asiatic species of *Siriella* into four groups, but he does not include *S. brevicaudata* in his list. It belongs to his group I and is specially distinguished in that group by the size and armature of the telson, its chief character being reflected in its specific name.

It seems advisable to give a brief description of the species.

Body moderately robust. Carapace short, leaving the last three thoracic segments exposed in the mid-dorsal line, and barely

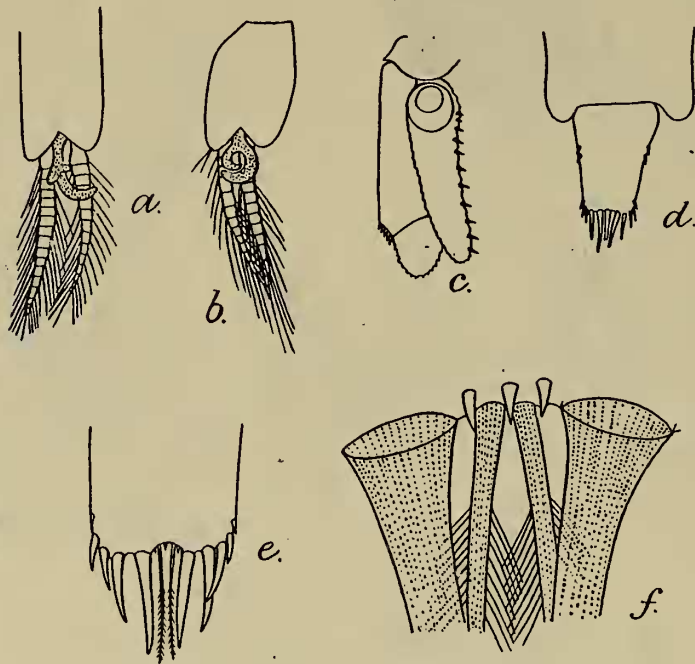


TEXT-FIG. 3.—*Siriella brevicaudata* Paulson.

a, anterior end of female; *b*, antennular peduncle of female; *c*, antennular peduncle of male; *d*, antennal scale and peduncle; *e*, first thoracic limb; *f*, second thoracic limb; *g*, third thoracic limb; *h*, eighth thoracic limb. All $\times 33$.

reaching the penultimate segment laterally. Frontal plate only slightly produced in both sexes as a broadly and evenly rounded semicircular plate with slightly upturned margin and a median

depression in the mid-dorsal line. In the median line of the cephalothorax about midway between the cervical groove and the anterior end of the frontal plate there is a trace of a tubercle, more marked in the female than in the male but much less prominent than Hansen figures in *S. nodosa*. Cervical groove well marked, especially on the posterior margin. Eyes moderately large, pigment black. Antennular peduncle exhibiting sexual differences, the last joint in the male being longer and thicker than in the female and bearing the usual brush of setae. Antennal scale reaching the distal end of the antennular peduncle in the female,



TEXT-FIG. 4.—*Siriella brevicaudata* Paulson.

a, first pleopod of male; *b*, second pleopod of male; *c*, uropods; *d*, telson; *e*, apex of the telson; *f*, apex of the telson from below. *a-d* $\times 33$, *e* $\times 65$, *f* $\times 400$.

falling somewhat short of this in the male, three times as long as broad, terminal lobe about one quarter of the scale in length and as broad as long, outer margin terminating in a strong spine, one prominent spine on the outer distal corner of the joint from which the scale springs. First and second thoracic limbs (gnathopods) stout, with the dactylus remarkably long, robust and strongly curved. Third thoracic limbs much more robust than the remainder due to the expanded merus and carpus. Posterior thoracic limbs much more slender and linear, tarsus unjointed. Telson remarkably short, when in position not extending much

beyond half way down the uropods, one and a half times as long as broad at its base, proximal portion of the lateral margins with two or three spines, apex broadly truncate or even slightly emarginate, its breadth equal to half the total length of the telson; distal portions of the lateral margins and the apex together bearing about five or six pairs of spines, the innermost pair of spines at the apex equal in length to three quarters of the breadth of the apex, the remaining spines grading smaller in size, the fifth and sixth spines quite small. The centre of the apex bearing the usual pair of plumose setae which are longer than the innermost spines, and, hidden in dorsal view but visible under the high power of the microscope ($\frac{1}{2}$) in ventral view, are three very small spinules, corresponding to the three small spines usually present in that position, but greatly reduced in size and at first sight apparently absent. Uropods about twice as long as the telson, the endopod slightly shorter than the exopod, with a row of 10-12 spines along the entire margin, regularly graded in size with no smaller spines between; proximal joint of the exopod about three times as long as the distal, with a group of five spines at the distal end, the rest of the margin naked, distal joint about as long as broad. Pseudobranchial rami of the second to the fourth pairs of the pleopods of the male spirally twisted. Third and fourth pairs of male pleopods with the endopod and exopod subequal in length and having a normal armature of plumose setae, none of which are modified. Length of adult males and females 6 mm.

This species falls into Hansen's group I, characterized by the spirally-twisted pseudobranchial rami of the second to the fourth pleopods of the male and the unmodified nature of the setae on the terminal parts of these pleopods. It is distinguished specially by the very short telson and its peculiar armature of spines and by the very reduced size of the three spinules at its apex between the innermost long pair of spines.

It has been a source of great satisfaction to rediscover Paulson's species and to find that it is a good species which its original discoverer described and illustrated adequately. The species was quite easy to recognise from Paulson's figures, but in view of the rarity of his work I have thought it well to redescribe and figure it here and to indicate its true position in the light of recent work. As far as I can make out Hansen's group I contains at present about 12 species. Of this group *S. thompsoni* and *S. gracilis* differ from the rest in having the endopod of the uropods longer than the exopod. The four species *S. clausii*, *S. jaltensis*, *S. norvegica* and *S. brookii* are distinguished from the remainder in having more than half of the outer margin of the proximal joint of the exopod armed with spines. The remaining species in this group are *S. quadrispinosa*, *S. nodosa*, *S. vulgaris*, *S. affinis*, *S. watasei* and *S. longipes* (the last two doubtfully placed here), and *S. brevicaudata* is most closely allied to the two first-named forms.

Distribution.—Known previously only from the Red Sea.

Siriella quadrispinosa Hansen.

Siriella quadrispinosa, Hansen, 1910, p. 32, pl. ii, figs. 5a-i.

Locality.—Pamban, Gulf of Manaar, from weeds, 0-2 fathoms. February 24th, 1913. Four males and two females; largest male, 7.5 mm., largest female, 5.5 mm.

Remarks.—These specimens are in substantial agreement with Hansen's description and figures. They differ mainly in having the spines on the outer margin of the proximal joint of the exopod of the uropod never more than six in number and confined to the distal third of the margin. In the smaller specimens the inner pair of spines at the apex of the telson is equal in size to the outer pair but in larger specimens these spines are as figured by Hansen.

Distribution.—Hitherto only known from the 'Siboga' specimens taken among the Islands of the East Indies, near Saleyer.

Siriella vulgaris Hansen.

Siriella vulgaris, Hansen, 1910, p. 34, pl. iii, figs. 2a-k.

Locality.—Port Blair; Andaman Islands.

St. 3. Seventeen specimens, 4-7 mm.

St. 11. Seven specimens, 4-7 mm.

St. 13. One male, 7 mm.

St. 19. One male and two females, 6.5-7.5 mm.

St. 21. Two males and one female, 6-7 mm.

St. 32. Two males, fourteen females.

'Investigator' St. 556:—12° 40' N., 98° 26' 30" E, one specimen.

Distribution.—Found at 21 stations in the East Indian Archipelago by the 'Siboga.' Hansen states that it is common near the shores throughout the area explored by the 'Siboga.' It is evidently a common species at Port Blair in the shallow waters down to 12 fathoms.

Siriella affinis Hansen.?

Siriella affinis, Hansen, 1910, p. 35, figs. 3a-i.

Locality.—Kilakarai, Gulf of Manaar, from weeds, 0-2 fathoms, February 1913. Four males and four females, 5-7 mm.

Remarks:—I am doubtful about the identification of these specimens. They belong to Hansen's group I and are closely allied to *S. vulgaris* and *S. affinis*. From the former they are distinguished by the much smaller terminal lobe to the antennal scale and by having only 3-5 spines on the outer uropod. In these respects and indeed in most of their characters they agree with *S. affinis* but they differ as follows: (1) the male specimens agree with the females in the characters of the rostral plate and antennal scale, Hansen described marked difference between the sexes in these characters; (2) the large spines on the lower inner

margin of the inner uropods have smaller spines in between them, so that the spines as a whole are arranged in series of 3-5. Hansen gives no particulars on this point in his text but his figure does not show the intermediate spines. In other respects the specimens agree with *S. affinis* and provisionally I record them under that name.

Distribution.—Known only from the waters of the East Indian Archipelago.

Siriella dubia Hansen.

Text-figs. 5a, b.

Siriella dubia, Hansen, 1910, p. 44, pl. v, figs. 4a-e.

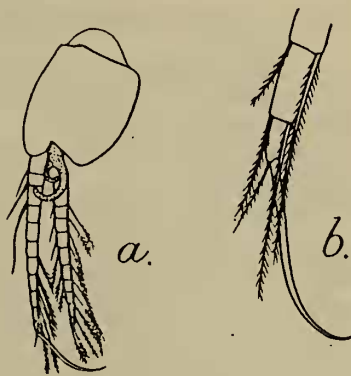
Locality.—Port Blair, Andaman Islands, Station 19. Eight specimens: largest female, 8 mm., largest male, 7.5 mm.

Remarks.—These specimens differ in one important feature from the description and figures of Hansen. There are three small spines, equal in size to one another, between the inner pair of large terminal spines at the apex of the telson, in addition to the usual pair of plumose setae. Hansen particularly emphasizes the absence of these spines in his single specimen but the present specimens are so very closely in agreement with Hansen's description and figures that I can only suppose that the spines were overlooked or broken off in his type.

All the specimens have four spines on the outer margin of the proximal joint of the outer uropod in the positions indicated in Hansen's figure 4d,

with the addition of an extra spine between the two proximal ones of his figure, as mentioned in his text. The serrations on the proximal margin of the outer uropod are in reality the bases of plumose setae, which have become detached. Several of my specimens still retain some of these plumose setae, so evidently the serrations do not indicate the base of broken spines. In the smallest specimen, 4.5 mm. long, the outer and inner uropods are equal in size; there is a progressive difference in size between the two uropods, with an increase in the total length of the animal.

The last joint of the antennular peduncle in the male is longer and stouter than in the female and furnished with the usual brush of setae. In the adult male, therefore, the antennal scale is shorter than the antennular peduncle, whereas in the female it



TEXT-FIG. 5.—*Siriella dubia*, Hansen.

a, fourth pleopod of the male, $\times 33$; b, distal joints of the exopod further enlarged, $\times 100$.

extends to the level of the distal end of that appendage. In young specimens the terminal lobe of the scale is not so long as in fully grown animals.

In the male the pseudobranchial rami of the second to the fourth pleopods are spirally twisted. In the fourth pair of pleopods, the endopod and exopod are about equal in size and the endopod is only slightly modified. The terminal joint bears two setae, a short plumose seta, and a very long stout seta slightly curved and not plumose.

The presence of the three small spines at the apex of the telson brings this species more into line with the normal species of the genus, but the peculiar form of the outer uropod and the unusual shape and spinulation of the telson are unique.

Distribution.—Hansen's single specimen was taken off the coast of Obi Major in the East Indian Archipelago. No other records are known.

Siriella paulsoni Kossmann?

Siriella paulsoni, Tattersall, 1906, p. 160, pl. i, figs. 3-7.

Localities.—Pamban, Gulf of Manaar, exposed reef, from pools. One female, 10 mm.

Kilakarai, Gulf of Manaar, from weeds, 0-2 fathoms. One female, 12 mm.

Remarks.—These specimens belong certainly to the same species as the single female I recorded from Ceylon under this name. In view of the recent advances in our knowledge of this genus I now think it doubtful whether the species is really the same as that described by Kossmann. Certainty on this point can only be obtained when male specimens are available for examination. In the meantime I record the present specimens under *S. paulsoni* to indicate that they are the same as the Ceylon specimen.

Genus *Hemisiriella* Hansen.

Hemisiriella parva Hansen.

Hemisiriella parva, Hansen, 1910, p. 47, pl. vi, figs. 2a-c.

„ „ Colosi, 1918, p. 6.

„ „ Zimmer, 1918, p. 16, text-figs. 5-7.

„ „ Colosi, 1920, p. 236, pl. xviii, figs. 2a.

Locality:—Port Blair, Andaman Islands.

St. 3. One young specimen.

St. 19. Three males and three females, 5-6.5 mm.

St. 21. Seventeen specimens.

Remarks.—These specimens agree rather with Zimmer's description than with Hansen's. Particularly is this so with the form of the eyes which are longer and narrower than Hansen shows them.

Distribution.—Waters of the East Indian Archipelago and Bay of Bengal (Hansen); Bay of Bengal (Colosi); Java (Zimmer). These specimens were all taken in plankton. It is therefore interest-

ing to find it in quite shallow waters, obtained by dredging and in shore-collecting.

Subfamily *RHOPALOPHTHALMINAE* Hansen.

Genus *Rhopalophthalmus* Illig.

Rhopalophthalmus egregius Hansen.

- Rhopalophthalmus egregius*, Hansen, 1910, p. 49, pl. vi, figs. 3a-k, pl. vii, figs. 1a-d.
 " " Nakazawa, 1910, p. 255, pl. viii, figs. 12, 22.
 " " Tattersall, 1915, p. 151.
 " " Colosi, 1918, p. 6.
 " " Colosi, 1920, p. 237, pl. xviii, figs. 3a, b.

Localities.—Port Blair, Andaman Islands.

St. 3. Two specimens.

St. 11. Many specimens.

St. 19. Four specimens.

Off Puri Beach, Orissa, India, 4-4½ fathoms, muddy sand, one male, 15 mm.

Vasco Bay, Mormugao Bay, Portuguese India, sixteen specimens.

Bay N.W. of Nazareth Point, Mormugao Bay, Portuguese India, four specimens.

Chicolna Bay and stream at its southern end, Mormugao Bay, Portuguese India, abundant.

'Investigator' St. 604:—11°17'20"N., 98°29'40"E., five specimens.

'Investigator' St. 556:—12°40'N., 98°26'30"E., two specimens.

Distribution.—East Indian Archipelago (Hansen); Japan (Nakazawa); Chilka Lake, India (Tattersall); Torres Straits and off New Zealand (Colosi). The last two records of Colosi are very interesting and indicate a very wide geographical range in the Indian and Pacific Oceans.

Subfamily *GASTROSACCINAE* Norman.

Genus *Anchialina* Norman.

Anchialina typica (Kröyer).

- Anchialus typicus*, Kröyer, 1861, p. 53, pl. ii, figs. 7a-l.
Anchialina typica, Hansen, 1910, p. 52, pl. vii, figs. 2a-k.
 " " Hansen, 1912, p. 196.
 " " Colosi, 1918, p. 7.
 " " Colosi, 1920, p. 237.

Localities.—Port Blair, Andaman Islands.

St. 3. One male, one female, two young.

St. 8. One male.

St. 19. One female.

St. 21. One male, one female.

Kilakarai, Gulf of Manaar, from weeds, 0-2 fathoms, February, 1913. Two males and two females.

'Investigator' St. 556:—12° 40' N., 98° 26' 30" E., six specimens.

The largest specimen of either sex measured 5 mm.

Distribution.—Hansen (1910 and 1912) has given a synopsis of the known distribution of this species, which is known from the tropical Atlantic, West Indies, Gulf of Siam, East Indian Archipelago and the Hawaiian Islands. The only record subsequent to Hansen's paper is that of a single male from the Caribbean Sea by Colosi (1918 and 1920). Gough's record from the English Channel (*Publ. de Circonstance*, No. 33, 1906, p. 105) is interesting but requires confirmation.

Anchialina grossa Hansen

Text-fig. 6.

Anchialina grossa, Hansen, 1910, p. 54 pl. vii, figs. 3a-u, pl. viii, figs. 1a-d.

Anchialina grossa, Hansen, 1912, p. 196.

„ *frontalis*, Zimmer, 1915 (3), p. 159, text-figs. 1-6.

Locality.—Port Blair, Andaman Islands.

St. 3. Three specimens.

St. 8. Twenty-six specimens.

St. 19. Two specimens.

St. 21. Three specimens.

St. 32. Four males, five females.

Altogether eighteen males and twenty-five females; the largest male 9 mm., largest female 6.5 mm.

Remarks.—The specimens agree closely with Hansen's description and figures. *A. frontalis*, as described by Zimmer, differs from *A. grossa* (1) in the telson which is only two and a half times as long as broad whereas in *A. grossa* it is three times as long as broad; (2) in the antennal scale, which is twice as long as broad as against two and a third in *A. grossa*; and (3) in the proportions of the antennal peduncle. These differences are very small and Zimmer was led to institute his species mainly on the structure of the third pleopod of the male. I give herewith a figure of the distal end of the outer branch of the third pleopod of an immature male of *A. grossa* measuring 8 mm. It differs remarkably from the fully grown



TEXT-FIG. 6.—*Anchialina grossa*, Hansen.

Distal end of the exopod of the third pleopod of a young male, × 200.

state and agrees very closely with Zimmer's figure of the same appendage in *A. frontalis*. This male specimen does not appear to be quite fully grown. In the proportions of the telson and scale it agrees with *A. grossa*. A study of my specimens of *A. grossa* seems to indicate, however, that Zimmer's male of *A. frontalis* was not fully grown. Hansen (1910) has given a figure of the distal portion of the exopod of the third pleopod of an immature male of *A. grossa* which shows a stage earlier in development to the one I figure here. I suggest, therefore, that *A. frontalis* will prove to be founded on not quite adult males of *A. grossa*.

Distribution.—Waters of the East Indian Archipelago, Bay of Bengal, Gulf of Siam (Hansen, 1910); Gilbert Islands (Hansen, 1912).

Zimmer's specimens of *A. frontalis* were taken during a voyage from Ceylon to the Dampier Straits, New Guinea and therefore in the same waters as *A. grossa*.

Genus *Gastrosaccus* Norman.

Gastrosaccus dunckeri Zimmer.

Gastrosaccus dunckeri, Zimmer, 1915 (3), p. 165, text-figs. 13-18.

Locality.—Off Puri Beach, Orissa, 4-4½ fathoms, 57 specimens.

Remarks.—This species belongs to the same group of species of the genus as *G. sanctus* and is very closely allied to that species. It is distinguished mainly by the remarkably well-developed lobes on the carapace and the shape and armature of the telson. The lobes on the carapace are larger than in any other species of the genus. They extend forward to the centre of the dorsal surface of the carapace and are acutely pointed in shape.

Distribution.—Zimmer's specimens came from the Duncker collection made during a voyage from Ceylon to New Guinea.

Gastrosaccus muticus Tattersall.

Gastrosaccus muticus, Tattersall, 1915, p. 152, text-fig. 1.

Locality.—Off Puri, Orissa, 4-4½ fathoms, muddy sand. Eight adult females, 7 mm.

Several localities in the Matlah River, Gangetic Delta, abundant.

Remarks.—There are no male specimens, but from the form and armature of the telson, which in all the specimens has fourteen spines on its lateral margin, and by the possession of a fringe of six to nine filaments on the posterior median dorsal margin of the carapace, I feel certain that these specimens belong to the same species as that which I have described from the Chilka Lake. No other records are known.

A single mutilated female specimen in this collection from

Kilakarai, Gulf of Manaar, possibly belongs to this species or to *G. simulans*. The telson and uropods are broken so that certainty on this point is impossible.

Gastrosaccus simulans Tattersall.

Gastrosaccus simulans. Tattersall, 1915, p. 155, text-fig. 1c.

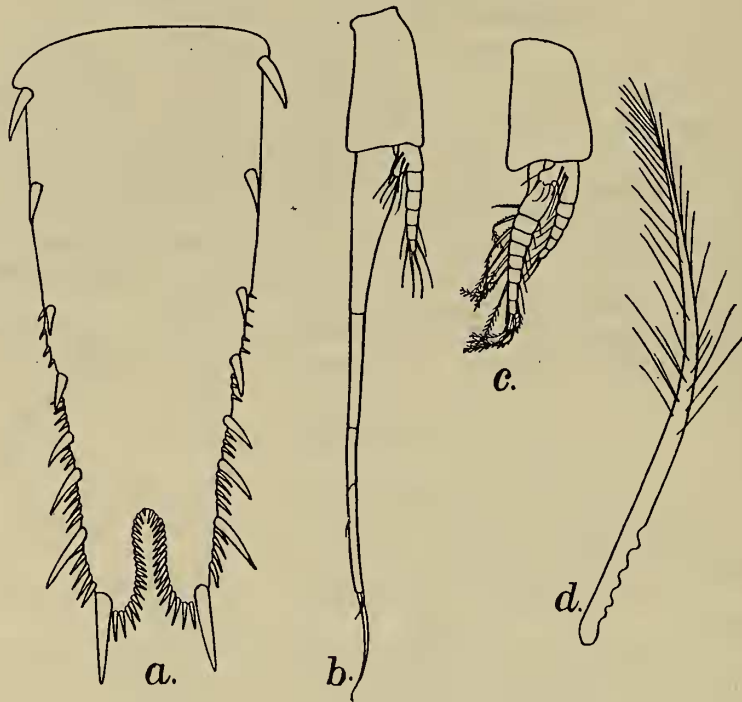
Locality.—Vasco Bay, Mormugao Bay, Portuguese India, one female.

Remarks.—In the absence of male specimens, this example seems to agree well with the species which I described from Puri Beach. No other records are known.

Gastrosaccus kempfi, sp. nov.

Text-figs. 7a-d.

Locality.—Off Puri, Orissa 4-4½ fathoms, 24-iii-16, muddy sand. Two males, 9 mm., one female, 9 mm. (Types.)



TEXT-FIGURE 7.—*Gastrosaccus kempfi*, sp. nov.

a, telson, $\times 65$; b, third pleopod of male, $\times 33$; c, second pleopod of male, $\times 33$, d, one of the setae from the exopod of the second pleopod of the male, further enlarged.

Description.—This new species belongs to the same group of

species as *G. sanctus* and is very closely allied to that species. It will be best to refer to Sars' description and figures of *G. sanctus* (1877) and to point out the differences between the two forms.

G. kempi agrees with *G. sanctus* in general form and in the details of the appendages of the head and thorax but differs in the following points:—

(1) There are no lobes or lappets on the dorsal hinder margin of the carapace.

(2) The antennal scale is slightly more than three times as long as broad, the terminal spine on the outer margin not quite extending as far forward as the apex of the terminal lobe. A suture across the terminal lobe is present.

(3) There are fifteen marginal spines on the outer uropod and fourteen spines on the inner lower margin of the inner uropod.

(4) Telson somewhat less than two and a half times as long as broad, cleft about one eighth of the total length, eight spines on each lateral margin, the terminal spines about one-sixth of the total length of the telson, *about 3-5 small spinules between the spines of the lateral margin from the third to the eighth (terminal) spine*. This last character is unique in the genus.

(5) First, fourth and fifth pleopods of the male exactly as in *G. sanctus*. Second pair with the endopod composed of seven joints, exopod of eight joints, half as long again as the endopod, slightly curved, the proximal joints armed with peculiar plumose setae. Third pair with the endopod six-jointed, not as long as the first joint of the exopod. Latter very elongate, with the terminal spines extending to the base of the telson, four-jointed, the second and fourth joints each longer than the third, fourth joint terminated by a long feathered spine, almost as long as the joint, and a small simple spine.

The form and spinulation of the telson will serve to distinguish this species from any hitherto described. I know of no other species which has subsidiary spinules between the large spines arming the margin of the telson. Otherwise it agrees closely with *G. sanctus* except for the absence of lobes on the carapace and minor details in the number of spines on the telson and uropods.

Gastrosaccus pacificus Hansen.

Text-figs. 8a, b.

Gastrosaccus pacificus, Hansen, 1912, p. 198, pl. 2, figs. 3a-g.

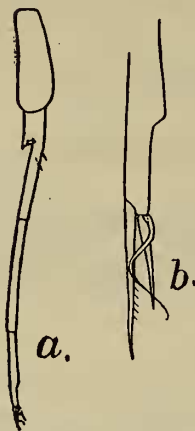
Locality.—Port Blair, Andaman Islands.

St. 3. Five males, four females.

St. 7. Two males, one female.

St. 32. One male.

Remarks.—This species is very closely allied to *G. indicus* and the only real difference indicated by Hansen lies in the structure of the third pleopod of the male. I figure herewith one of these pleopods to indicate its form in these specimens and to complete Hansen's description, since the distal part of the exopod was missing in his specimens. The exopod is three-jointed, the second joint slightly longer than the first and one and a half times as long as the third. The basal joint bears on the outside a sharply pointed triangular process and on the inside two spines (Hansen figures three). The third joint narrows suddenly at about two-thirds of its length and terminates in three setae, one long with a few subsidiary hairs, a second somewhat shorter and smooth and a third slender lash-like seta twisted as shown in the figure. All the specimens showed this peculiar feature.



TEXT-FIG. 8.—*Gastrosaccus pacificus*, Hansen.

a, third pleopod of the male, $\times 33$; *b*, joint of the same, $\times 100$.

Distribution.—Gilbert Islands (Hansen).

Gastrosaccus bengalensis Hansen.

Gastrosaccus bengalensis, Hansen, 1910, p. 58.
 " " Zimmer, 1915 (3), p. 164.
 " " Zimmer, 1918, p. 15.

Locality.—Port Blair, Andaman Islands.

St. 8. Two males.

St. 32. One male.

Distribution.—Bay of Bengal (Hansen); voyage from Ceylon to New Guinea, and off Formosa (Zimmer).

Subfamily MYSINAE.

Tribe ERYTHROPINI.

Genus *Erythrops* G. O. Sars.

Erythrops minuta Hansen.

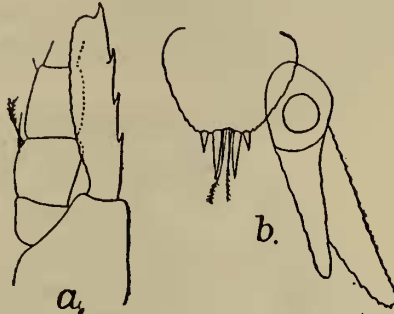
Text-figs. 9*a*, *b*.

Erythrops minuta, Hansen, 1910, p. 63.

Locality.—Kilakarai, Gulf of Manaar, from weeds, 0-2 fathoms, February, 1913. Five males, 3 mm.

Remarks.—These specimens agree with Hansen's description but since the author has not published any figures illustrating this species, I give herewith a figure of the antennal scale and of the telson and uropods to illustrate the salient characters of the species. The distal part of the lateral margins of the telson is minutely serrulate.

Distribution.—Gulf of Siam (Hansen).



TEXT-FIG. 9.—*Erythropus minuta*, Hansen.
a, antennal scale and peduncle; b, telson and uropods. Both $\times 65$.

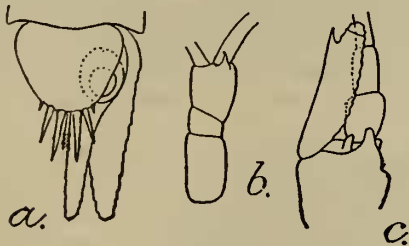
Erythropus nana, sp. nov.

Text-figs. 10 a-c.

Locality.—Port Blair, Andaman Islands, St. 3. Three females, one male, 3 mm. (Types.)

Description.—Frontal plate produced into a short, pointed rostral process. Eyes small, depressed, scarcely broader than the eyestalks. Antennal scale scarcely as long as the antennular peduncle, four times as long as broad, outer margin smooth, terminating in a strong spine distally, beyond which the terminal lobe of the scale projects considerably; terminal lobe longer than broad with a distal articulation. Telson broader than long, posterior margin nearly half as long as the greatest breadth, with three pairs of spines and a median pair of plumose setae; the inner pair of spines longer than the next pair while the outer pair are quite small; the lateral margins of the telson unarmed.

Uropods more than twice as long as the telson, inner and outer branches equal in length, no spines on the lower inner margin of the inner uropod and its inner margin not serrulate.



TEXT-FIG. 10.—*Erythropus nana*, n. sp.
a, telson and uropods; b, antennular peduncle; c, antennal peduncle and scale. All $\times 65$.

The specimens are very mutilated but the remaining appendages do not call for special comment. They agree in the main with those of *Erythropus elegans*, the species to which *E. nana*

is most nearly allied. It differs from this species in the shorter antennal scale, in the armature of the apex of the telson which has an extra pair of spines, and in the equal outer and inner

uropods. It is distinguished from *E. minuta* in having the outer margin of the antennal scale smooth and not serrate, as well as in having an extra pair of spines on the telson.

Genus *Hypererythroptrops* Holt and Tattersall.

Hypererythroptrops spinifera (Hansen).

Text-figs. 11a-i.

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

Locality.—Port Blair, Andaman Islands.

St. 3. Two males, two females.

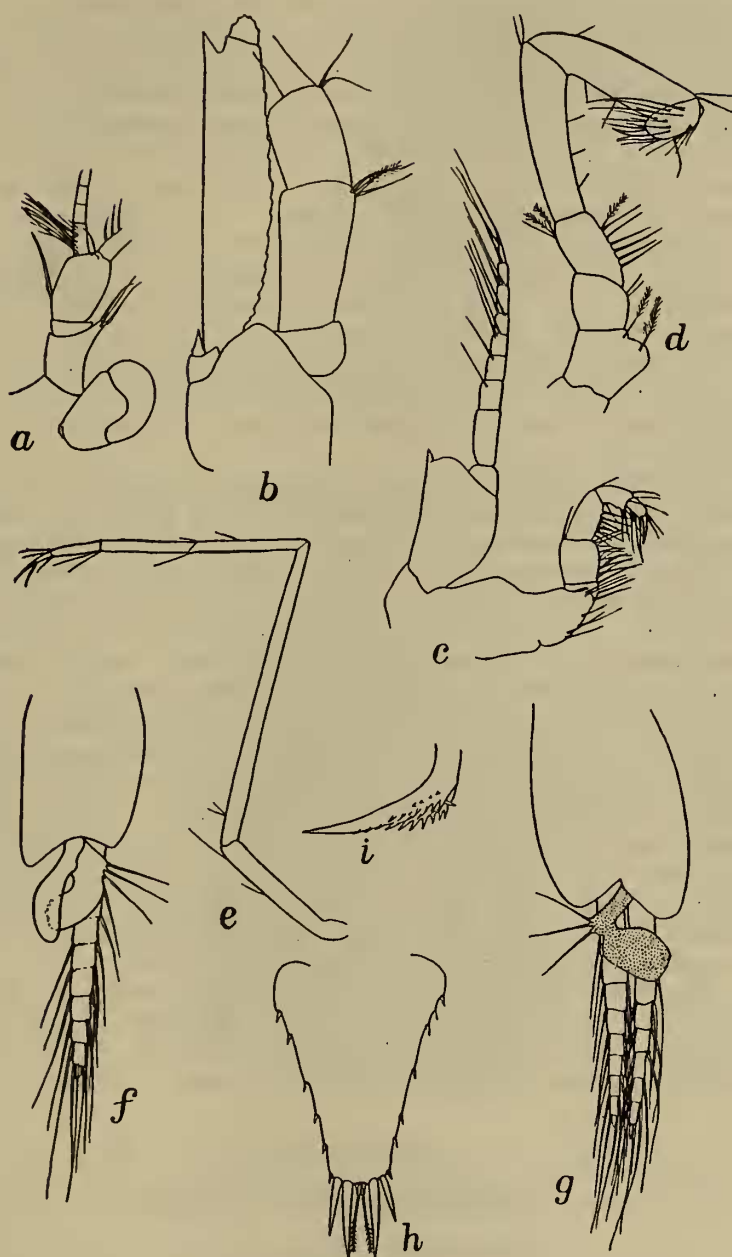
St. 19. Six males, eight females.

Remarks.—These specimens agree very closely with Hansen's description and figures of *Erythroptrops spinifera* except in one point, the number of spines on the lateral margins of the telson. Hansen gives the number as 10-13 and his figure shows them to be arranged at practically regular intervals along the whole margin. In these specimens I find the spines to be fewer and to be more distantly and more irregularly arranged. The figure (text-fig. 11h) shows a typical telson among the Port Blair specimens. But the spines on the telson appear to be very variable in number and seldom the same number on both sides of a single telson. The smallest number of spines on each margin is five and the largest number nine. In only four specimens was the number of spines on each side of the telson the same and frequently the two sides differed by two spines.

The apex of the telson in the Port Blair specimens bears two pairs of long stout spines, the inner pair of which is always longer than the outer pair but the proportion between the lengths of the outer and inner spines varies considerably, in some specimens approaching the condition as figured by Hansen in which the two pairs are nearly equal in size, in other specimens having the proportions shown in my figure in which the outer pair is considerably shorter than the inner pair. Between the latter are a pair of quite small spines and a pair of long plumose setae. Hansen found the setae only in one of his specimens and the spines only in the other.

In other respects these specimens agree so closely with Hansen's species that I feel that they cannot be considered as more than a variety, especially in view of the great variation which they show among themselves. I am content, therefore, to record them under Hansen's name, to point out the differences I have found and to figure the more essential parts for comparison.

Hansen had no mature males at his disposal. The Port Blair specimens include several males and an examination of them shows that the species must be referred to the genus *Hypererythroptrops* Holt and Tattersall (1905). This genus differs from *Erythroptrops* in having the telson much longer in shape with its lateral margins armed



TEXT-FIG. 11.—*Hypererythrops spinifera* (Hansen).

a, antennal peduncle and eye; *b*, antennal scale and peduncle; *c*, first thoracic limb; *d*, endopod of second thoracic limb; *e*, endopod of third thoracic limb; *f*, first pleopod of the male; *g*, second pleopod of the male; *h*, telson; *i*, one of the processes arming the sterna of the thorax of the male. *a* × 30, *b*—*h* × 60.

with spines instead of smooth, and in having the sterna of some of the thoracic and abdominal somites furnished with median processes. In the present species the sterna of the last six thoracic somites are furnished with long sharply pointed forwardly directed processes as shown in the accompanying figure (text-fig. 11*i*), the lower margin of which is furnished with numerous spinous processes. The sterna of the first four abdominal somites are furnished with simple papilliform processes.

The species, *H. spinifera*, therefore agrees absolutely with the characters of the genus *Hypererythrops* as distinguished from *Erythrops* and is closely allied to the type species, *H. serriventer* H. and T. It may, however, be distinguished from the latter by its smaller size, the different form of the antennal scale, which is narrower and has the terminal lobe much less developed than in the type, and by the different shape and spinulation of the telson.

One other feature of the genus *Hypererythrops* must be mentioned. In the pleopods of the male there is a broad flat branchial plate, devoid of setae, at the base of the endopod, which appears to arise from the short setiferous lobe characteristic of the endopod of the pleopods of Mysidae. The form of this branchial plate in *H. spinifera* is shown in (text-figs. 11*f*, *g*.) I have re-examined some specimens of *H. serriventer*, and find that a similar branchial plate, larger in size, is present on the male pleopods. I do not know of a similar development among the Erythropini and it is interesting to note that it is present in the European and the Indian species of this genus. Its presence forms an additional character separating the genus from *Erythrops*. These branchial plates recall the pseudo-branchial processes on the pleopods of the species of *Siriella* and, in point of fact, on the first pleopod of the male of *H. spinifera* the branchial lamella is bilobed as in so many of the species of *Siriella*. But in the remaining pleopods it is a simple broadly expanded plate without setae.

Distribution.—Hansen's specimens were found in the seas of the East Indian Archipelago. The occurrence of this genus, hitherto known only from European waters, in the waters of the Indian Ocean is a matter of great interest.

Tribe LEPTOMYSINI.

Genus *Mysidopsis* G. O. Sars.

Mysidopsis indica, sp. nov.

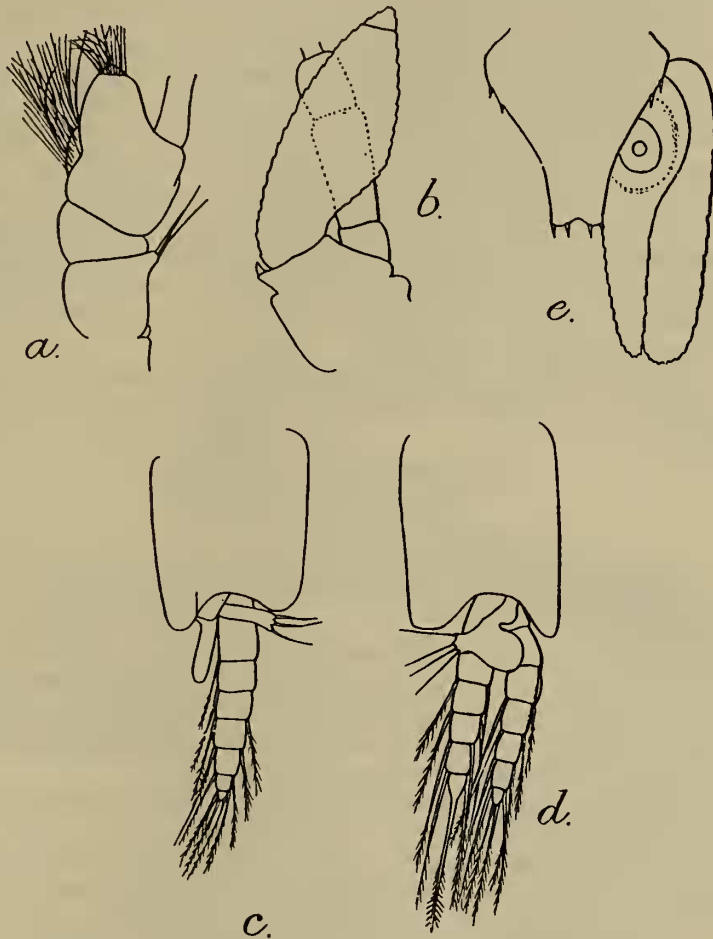
Text-figs. 12*a-e*.

Locality.—Port Blair, Andaman Islands, Station 5. Two males and two females, 4 mm. (Types.)

Description.—Very closely allied to *Mysidopsis gibbosa* G. O. Sars. It will be sufficient to refer to Sars' description of this species (1870-79) and to point out the following differences:—

(1) There are three nodules in the median dorsal line of the carapace, two in the same positions as in *M. gibbosa*, the third one in front of the cervical groove. These nodules are present in both sexes though less marked in the male than in the female.

(2) The frontal plate is more developed than in *M. gibbosa*,



TEXT-FIG. 12.—*Mysidopsis indica*, sp. nov.

a, antennular peduncle of male; *b*, antennal scale; *c*, first pleopod of the male; *d*, fourth pleopod of the male; *e*, telson and uropods. All $\times 65$.

more broadly triangular, longer and completely covering the basal joints of the eye-stalks.

(3) The antennal scale is two and a half times as long as broad, being thus broader than in *M. gibbosa*. It outreaches the antennular peduncle but not to the same extent as in *M. gibbosa*.

(4) Telson shorter than in *M. gibbosa*, not much more than half as long as the uropods, and hardly longer than wide at the base.

The distal part narrows very suddenly and considerably and the apex is only as long as one quarter of the basal width. The apex is very shallowly notched and bears a pair of small spines on each side of the notch. There are no plumose setae. The lateral margins bear two spines at the widest part of the telson but otherwise are naked.

(5) The uropods in the specimen figured have the endopod and exopod of approximately equal length, but there appears to be some variation in this respect since one of the female specimens has the endopod distinctly shorter than the exopod. There is a single spine on the lower inner margin of the endopod in the region of the otocyst. In *M. gibbosa* there are five such spines.

(6) The pleopods of the male agree essentially with those of *M. gibbosa*, except that there is a small branchial plate at the base of the endopod. This lamella-like expansion is broad and flat on the second to the fifth pleopods, but is narrower and more finger-like on the first pleopod. The exopod of the fourth pleopod terminates in a single stout plumose spine.

(7) *M. indica* is smaller than *M. gibbosa*, adult specimens of both sexes measuring only 4 mm., as against 6-7 mm. in the latter species.

Mysidopsis kemp, sp. nov.

Text figs. 13a-g.

Locality.—Kilakarai, Gulf of Manaar, among weeds, 1-2 fathoms, February, 1913. Eleven females and four males, 5-6 mm. (Types.)

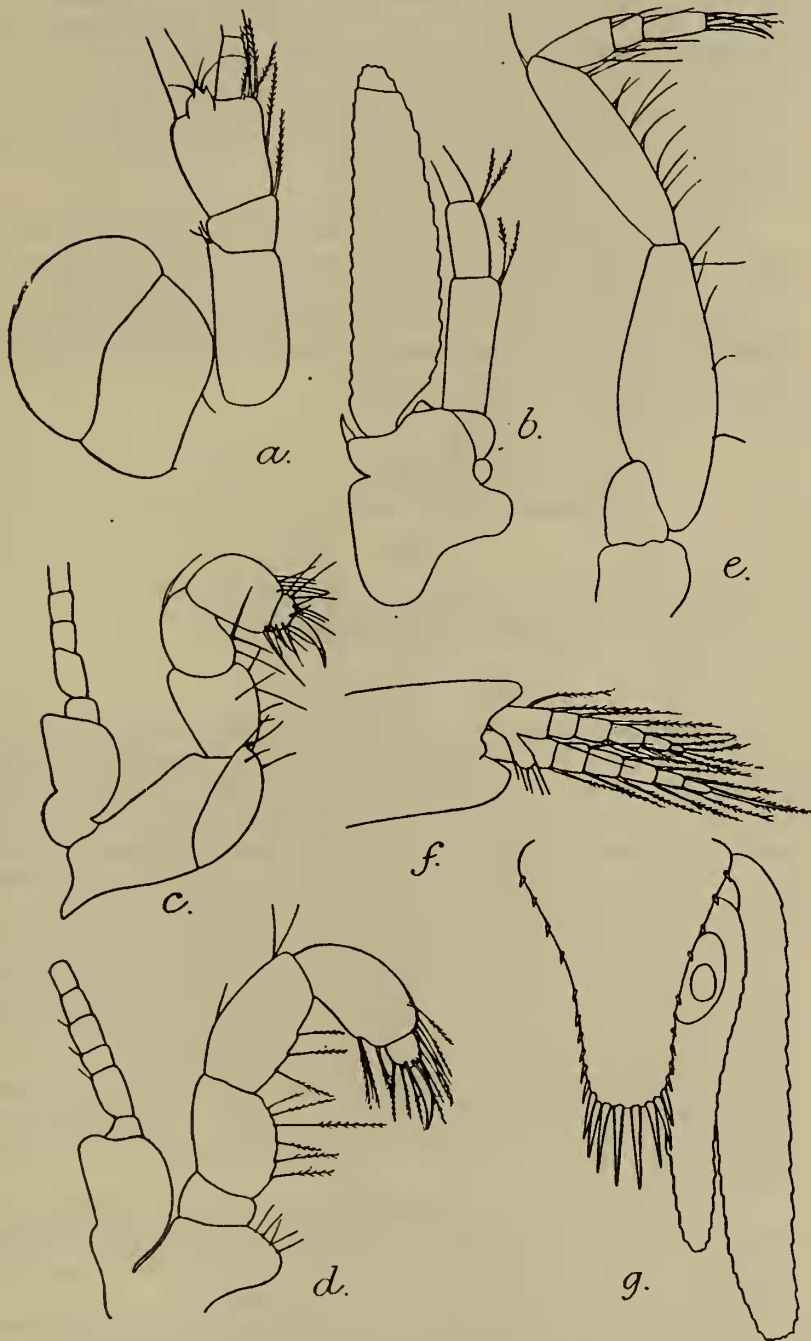
Description.—Carapace leaving the last two thoracic somites exposed dorsally, but laterally covering all but the last somite; produced in front into a short triangular plate with a bluntly pointed apex which does not project forward very much beyond the antero-lateral corners; no tubercles or nodules.

Eyes large, pigment black, cornea as wide as the rest of the eye and occupying half the eye in dorsal view.

Antennal scale narrowly oval in shape, four times as long as broad; setose all round, terminal joint distinct, extending for one-third of its length beyond the antennular peduncle.

Mouth parts and thoracic appendages not differing greatly from those of *M. didelphys*; the inner lobe of the first maxilla has three terminal setae; in the posterior thoracic limbs the merus is about equal in length to the ischium but less expanded, the tarsus is three-jointed, the second joint the smallest; the basal joint of the exopodite has the outer corner rounded and the flagellum is composed of eight to ten joints.

Telson (without terminal spines) as long as the last abdominal somite, one and a quarter times as long as broad at its base, apex quadrate with rounded angles, with four pairs of long stout spines, the inner pair nearly one-third the length of the telson, outermost pair of the four about half as long as the inside pair, lateral mar-



TEXT-FIG. 13.—*Mysidopsis kempi*, sp. nov.

a, antennular peduncle and eye; *b*, antennal scale; *c*, first thoracic limb; *d*, second thoracic limb; *e*, endopod of third thoracic limb; *f*, fourth pleopod of the male; *g*, telson and uropods. All $\times 64$.

gins with about ten spines distributed throughout their length, more distantly placed proximally, nearer together distally, the most distal marginal spine less than half as long as the outer spines of the apex; no plumose setae at the centre of the apex.

Inner uropod half as long again as the telson, with a comb of ten spines on the lower surface in the region of the statocyst but not extending down the inner margin.

Outer uropod nearly twice as long as the telson.

Fourth pleopod of the male of the usual type found in *Mysidopsis*, both rami six-jointed, the outer ramus longer than the inner and terminating in a single, long, stout plumose spine.

Remarks.—This species is a very typical member of the genus *Mysidopsis* but is easily distinguished from all the other species by the shape and armature of the telson.

Genus *Leptomysis* G. O. Sars.

Leptomysis xenops, sp. nov.

Text-figs. 14a-g.

Leptomysis apiops?, Zimmer, 1915 (3), p. 167, fig. 19.

Locality.—Port Blair, Andaman Islands.

St. 5. Two.

St. 11. Abundant. (Types.)

Description.—Agreeing with *Leptomysis apiops* G. O. Sars, except in the form of the telson. The latter is linguiform in shape, one and a half times as long as broad at the base; apex more or less truncate, half as long as the width of the telson at the base, armed with three pairs of stout spines, the innermost pair the longest, equal in length to two-fifths of the length of the telson; between the inner pair of spines are two small spinules about one quarter of the length of the spines; the spines immediately outside the inner pair are about two-thirds of the length of the latter and the outer spines of the apex are slightly less than one half of the length of the inner pair; the lateral margins of the telson bear a single long spine at the point of the greatest width of the telson and from 14-17 spines on the rest of the margin, the proximal ones more distantly placed than the distal, the spines increasing in size in regular sequence towards the apex and not arranged in groups.

For the rest of the characters reference may be made to Sars' figures of *L. apiops* with which this species agrees in all its other characters. I have given figures of the principal appendages of *L. xenops* for comparison.

Zimmer (1915 (2)) has given a new figure of the eye of *L. apiops* to illustrate the elongation of certain facets which leads to the peculiar shape of the eye, from which the species takes its name. The present species has eyes of exactly the same form. In fact it is very closely allied to *L. apiops*, but the latter has about 35

TEXT-FIG. 14.—*Leptomysis xenops*, sp. nov.

a, antennal scale; *b*, antennular peduncle; *c*, endopod of the first thoracic limb; *d*, endopod of the second thoracic limb; *e*, fourth pleopod of the male; *f*, inner uropod; *g*, telson. *a* × 30, *b*—*g* × 60.

spines on each of the lateral margins of the telson and moreover these spines tend to arrange themselves in groups of three to five smaller spines separated by larger spines. There are also differences in the proportions of the spines at the apex of the telson. In *L. apiops* the inner pair of spines is twice as long as the next pair and the spinules between the inner spines are about half as long as the latter.

Zimmer (1915 (3)) has recorded *L. apiops* with a query from the Indian Ocean. It seems probable that the single specimen at his disposal really belonged to the present species. Zimmer does not give the number of spines arming the lateral margins of the telson but the spines at the apex, judging from his figure, agree in their proportions rather with *L. xenops* than with *L. apiops*. The only difference I can see is that the small spinules between the large pair of spines at the apex are about half as long as the spines in Zimmer's specimen and only one quarter as long as the spines in mine.

The species is an abundant one in the neighbourhood of the Andamans, to judge by the large number of the specimens in this collection.

Genus *Afromysis* Zimmer.

Afromysis macropsis, sp. nov.

Text-figs. 15a-g.

Locality.—Off Puri, Orissa, 4-4½ fathoms. One male, 9 mm. (Type.)

Description.—Body smooth, without spinules; carapace produced into a short triangular rostral plate with an obtusely rounded apex; eye long and narrow, recalling the eye of the genus *Mesopodopsis*, more than twice as long as broad, cornea occupying less than the distal half of each eye and not wider than the rest of the eye, pigment black.

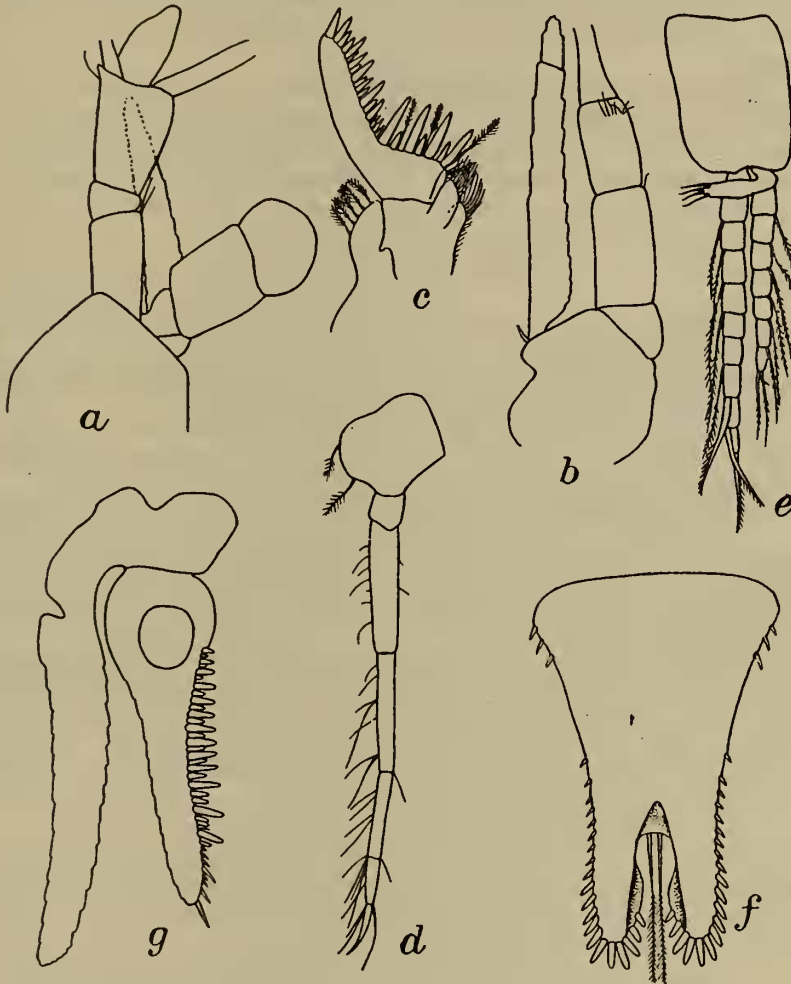
Antennal scale *shorter* than the antennular peduncle, about seven times as long as broad, setose all round, distal articulation well marked, a prominent spine on the outer distal corner of the basal joint.

Posterior thoracic legs rather short and slender, tarsal joint divided by a single transverse articulation.

Telson one and a half times as long as broad at the base, cleft for one-third of its length, cleft wider proximally than distally and unarmed except for two long plumose setae, the lateral margins armed with three spines proximally at the widest part; these are followed by a short unarmed portion of the margin and distally there are about twenty spines; the proximal eight or nine of these spines are normal sharply-pointed short spines; the remainder are blunt spines increasing in size to the apical lobes, the two or three on the inner side of the apical lobes somewhat smaller but of the same type.

Inner uropod one and a half times as long as the telson, its

inner margin armed with a dense row of about 35-40 spines, the proximal 30 of which are bluntly pointed, alternating larger and smaller sizes, nearly always one smaller one between two large ones, but distally there may be two or even three small ones



TEXT-FIG. 15.—*Afromysis macropsis*, sp. nov.

a, anterior end, $\times 33$; *b*, antennal scale, $\times 50$; *c*, second maxilla, $\times 65$; *d*, endopod of fourth thoracic limb, $\times 50$; *e*, fourth pleopod of male; *f*, telson, $\times 50$; *g*, uropods, $\times 50$.

between the large ones; the distal spines are normal and sharply-pointed.

Outer uropod one and three quarter times as long as the telson.

The second maxilla conforms to the type found in *Afromysis hansonii*, with the outer distal corner of the second joint of the palp

very much produced. The fourth pleopod of the male differs from that of the type-species in having the penultimate joint of the exopod of normal size and not unduly elongated. But the only specimen has a look of immaturity about it, since the lobe on the antennule lacks the dense tuft of hairs characteristic of adult males. It is possible therefore that adult males may be found to agree more closely with the type in the form of the fourth pleopods of the male.

Remarks.—This interesting species is a true *Afromysis*, differing from the type-species in the different form of the eye, the more produced rostrum, the longer antennular peduncle and shorter antennal scale and in the different form and armature of the telson.

Genus *Prionomysis*, nov.

Antennal scale long and narrow, setose on both margins, terminal joint distinct.

Terminal joint of the palp of the second maxilla longer than wide, without strong spines on its distal margin.

First thoracic limb with a masticatory lobe on the second joint of the endopod only; tarsal joint of the remaining thoracic limbs with two transverse articulations.

Telson linguiform in shape, cleft at the apex, cleft furnished with a pair of plumose setae but without spines, lateral margins armed throughout their length by spines which increase in length posteriorly and are arranged in a regular saw-like formation on each of the apical lobes.

Inner uropods with a dense row of spines on the inner margin, extending from the statocyst to the apex; outer uropods without a distal joint, and without spines.

Pleopods in the male as in the genus *Leptomysis*. Female with three pairs of incubatory lamellae.

Type:—*Prionomysis stenolepis*, sp. nov.

Remarks.—This genus is most nearly allied to the genus *Leptomysis*. It agrees with that genus in the form of the second maxilla, antennal scale and pleopods of the male, but is distinguished at once by the form of the telson.

At first I was disposed to refer the species to the genus *Afromysis* but the discovery of a second species of the latter, showing the same peculiar form of the palp of the second maxilla as in the type has led me to regard this character as of generic value.

Prionomysis shows considerable resemblances to the genera *Doxomysis* and *Bathymysis*, but again the form of the second maxilla separates it. In *Doxomysis* and *Bathymysis* the terminal joint of the palp of the second maxilla is broader than long, expanded distally and armed with stout spines. In both genera, too, the cleft of the telson is armed with spinules, whereas in *Prionomysis* the cleft is smooth. In *Doxomysis* the masticatory lobes on the endopod of the first thoracic limb are much more

developed than in *Prionomysis*, being present on the second, third and fourth joints and very much larger.

In addition to the form of the second maxilla, *Prionomysis* also differs from *Afromysis* in the less specialized form of the fourth pleopod of the male.

Prionomysis stenolepis, sp. nov.

Text-figs. 16a-j.

Locality.—Port Blair, Andaman Isles, Station 3. Eight females, two males, 8–9 mm. (Types.)

Description.—Carapace produced in front in the form of a triangular plate with acutely pointed somewhat depressed apex which reaches forward almost to the middle of the first joint of the antennular peduncle; antero-lateral corners rounded; last two thoracic somites exposed dorsally.

Eyes large, somewhat flattened, cornea wider than the remainder of the eye, occupying more than one half of the eye in dorsal view, the anterior margin of the eye stalk longer than the posterior; eye at least as long as the first joint of the antennular peduncle.

Antennular peduncle with the first joint longer than the remaining two combined; the last joint in the male with a well-developed hirsute lobe of normal form.

Antennal scale exceedingly long and narrow and curiously twisted, about thirteen times as long as broad, twice as long as the antennular peduncle and four times as long as the antennal peduncle, setose all round, terminal joint distinct though small. Antennal peduncle much shorter than the antennular, second joint longer than the third; mouth-parts agreeing on the whole with those of *Afromysis hansonii* Zimmer, except that the terminal joint of the palp of the second maxilla is not expanded and produced into a narrow process but is normal in shape.

First thoracic limbs robust, masticatory lobe present only on the second joint and not nearly so well developed as in *Afromysis* or *Doxomysis*, nail robust; second thoracic limbs having the nail long and stout; tarsus of the remaining thoracic limbs three-jointed and terminated by a long stout nail; all the posterior thoracic limbs appear to be similar in size and form.

Fourth pleopod of the male with both endopod and exopod six-jointed, but the exopod one quarter longer than the endopod; each of the last three joints bears a stout plumose spine; the fourth pleopod of the male is very like that in the genus *Leptomysis* and not nearly so specialized as in the genus *Afromysis*.

Telson slightly shorter than the last somite of the abdomen and not reaching very much beyond the statocyst of the uropod; lateral parts of the last abdominal somite produced rather acutely at each side of the base of the telson; telson much narrower than the last abdominal somite, not quite twice as long as broad at the base, narrowing gradually for almost three quarters of its length



TEXT-FIG. 16.—*Prionomysis stenolepis*, sp. nov.

a, antennular peduncle and eye, $\times 30$; *b*, rostrum, $\times 30$; *c*, antennal scale, $\times 30$; *d*, endopod of first thoracic limb, $\times 30$; *e*, endopod of second thoracic limb, $\times 30$; *f*, second maxilla, $\times 60$; *g*, third thoracic limb, $\times 30$; *h*, fourth pleopod of the male, $\times 60$; *i*, uropods, $\times 30$; *j*, telson, $\times 60$.

and there widening and terminating in two broad lobes separated by a median wide cleft, about one-fifth of the length of the whole telson; margins of the cleft unarmed except for two long plumose setae at the anterior end; margins armed throughout their entire length with spines; about seventeen small spines on the proximal part of the margin from the base of the telson to the narrowest part; from the narrowest part to the apex of each lobe there are about twenty-five closely packed spines, longer than those on the proximal portion of the margin and increasing in size towards the apex.

Inner uropod about one and a half times as long as the telson with a very prominent spine on the dorsal surface of the statocyst, towards the outside; this spine is very prominent in lateral view; inner margin armed with a dense row of spines throughout its length from the statocyst to the apex, the spines arranged in series of larger and smaller ones, three to four in each series.

Outer uropod twice as long as the telson.

Female with three pairs of incubatory lamellae.

Genus *Diopromysis* Zimmer.

Diopromysis perspicillata Zimmer.

Diopromysis perspicillata, Zimmer, 1915 (3), p. 168, text-figs. 20-22.

Localities.—Port Blair, Andaman Islands.

St. 3. Five females, one male.

St. 11. One male.

Pamban, Gulf of Manaar, from weeds, 0-2 fathoms, February, 1913. Nine females, one male.

Kilakarai, Gulf of Manaar, from weeds, 0-2 fathoms, February, 1913. Nine females, three males.

Remarks.—The largest female measured 5 mm., and the largest male, 3.5 mm. The discovery of male specimens allows of the proper classification of this species. It belongs to the tribe *Leptomysini*. The pleopods of the male agree generally with those of the genus *Leptomysis*. The exopod of the fourth pair is longer than the endopod, composed of six joints, the last one terminating in a single thick plumose spine, equal in length to the last four joints of the exopod, at the base of which is a small smooth spine. The endopod of the fourth pair and the exopods and endopods of the other pleopods are four jointed.

Distribution.—The only known record is of a female taken on a voyage from Ceylon to New Guinea.

Genus *Doxomysis* Hansen.

This genus was established by Hansen (1912) for a species, *D. pelagica*, captured off the Galapagos Islands. Illig, however, in 1906, had described a species, "*Mysis*" *quadrispinosa*, which is clearly referable to this genus, though as Illig had only a single female specimen at his disposal, he did not feel justified in

establishing a new genus for his species. Hansen's species was also represented by a single female and in consequence neither he nor Illig was able to place the genus in its proper place in the classification. Colosi (1920) had more abundant material and was able to establish the fact that the genus belongs to the tribe Leptomysini. He described four new species, *D. hanseni*, *D. zimmeri*, *D. tattersallii* and *D. microps*. These species do not seem to me to be founded on sufficient grounds. I regard *D. zimmeri* as a synonym of the earlier *D. quadrispinosa* (Illig) and I do not think *D. tattersallii* is separated from *D. pelagica* by any characters of specific value. This would leave four species in the genus. They all agree in having the spines arming the telson confined to the distal half of the lateral margins and thereby differ from the new species described below, in which the spines extend throughout the whole length of the lateral margins. All the hitherto described species are pelagic and were taken at the surface in the open sea, in contrast to the species in this collection which is littoral in habit.

The genus is very closely allied to *Bathymysis* Tattersall (1907 and 1911), and to *Afromysis* Zimmer (1916). It differs from the former in the possession of well-developed eyes and from the latter in the form of the second maxilla.

Doxomysis littoralis, sp. nov.

Text-figs. 17a-e.

Localities.—Port Blair, Andaman Islands.

St. 3. Fifteen females, one male, 4 mm.

St. 11. Nine females, one male, 5 mm. (Types.)

St. 19. One male, 4 mm.

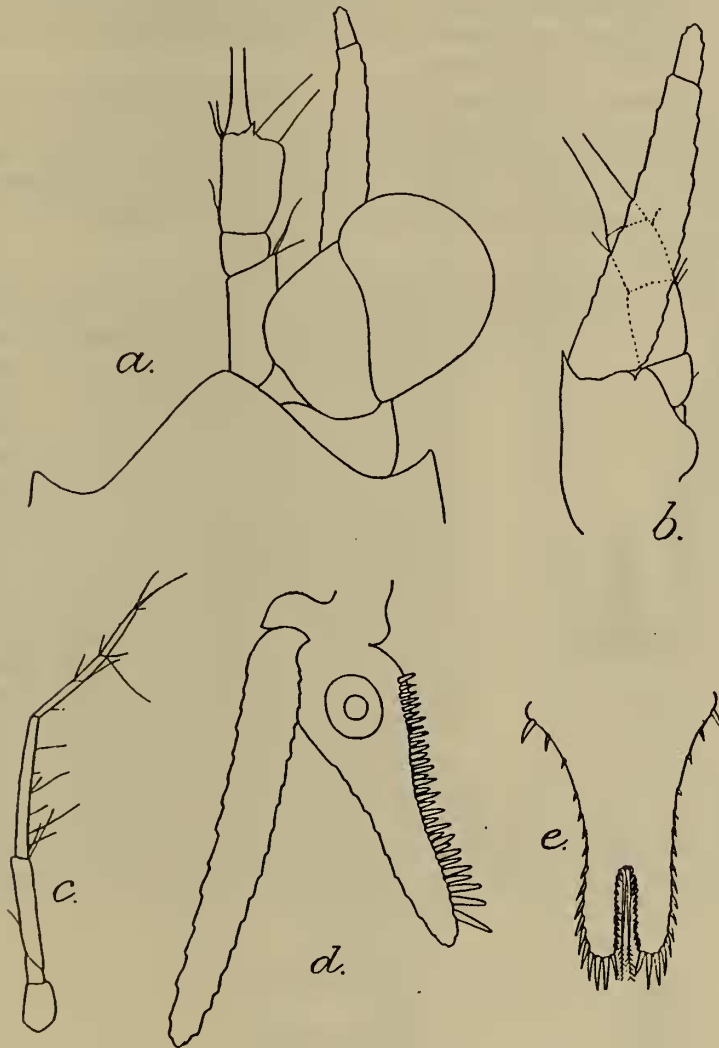
Description.—Body smooth, without spinules; carapace produced into a very short triangular rostral plate with the apex bluntly rounded, not covering the bases of the eyestalks. Eyes of moderate size, cornea more than half as large as the whole eye, slightly wider than the stalk, pigment black.

Antennal scale outreaching the antennular peduncle by one-third of its length, seven times as long as broad, setose all round, terminal joint one-seventh of the total length of the scale, a prominent spine on the outer distal corner of the basal joint.

Thoracic limbs with the endopods long and slender, increasing in length from the fourth to the eighth limbs, tarsus three-jointed, nail distinct.

Telson one and a half times as long as broad at the base, cleft for one-third of its length, cleft wide, rounded at the apex, armed with a pair of plumose setae and fifteen small spinules on each margin, terminal lobes of more or less equal width throughout, with the apex rounded, almost truncate, and armed with four spines, the centre pair of which are subequal in size and slightly longer than each of the lateral ones, the lateral margins armed

with about thirteen spines extending throughout their entire length, the proximal spines more distantly placed than the distal ones, the latter gradually increasing in size to the apical lobes and grading off into the spines which arm them.



TEXT-FIG. 17.—*Doxomysis littoralis*, sp. nov.

a, anterior end, $\times 65$; *b*, antennal scale, $\times 65$; *c*, endopod of eighth thoracic limb, $\times 33$; *d*, uropods, $\times 65$; *e*, telson, $\times 65$.

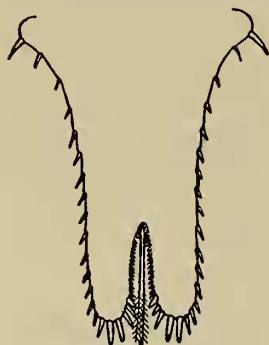
Inner uropods one and a quarter times as long as the telson, the inner margin armed with a row of about thirty-two blunt spines extending from the statocyst to the apex, alternately larger and smaller in size, sometimes distally there may be two or even three smaller spines between a pair of larger ones.

Outer uropod one and a half times as long as the telson.

Length of adults of both sexes, 5 mm. There is a considerable development of chromatophores on the antennular peduncle, antennal scale and its peduncle, mouth parts and first two pairs of thoracic limbs, brood lamellae, along the whole of the ventral surface of the abdomen, telson and uropods, and, as, at the time of death, these chromatophores were expanded, the preserved animals present a dusky appearance.

Remarks.—This species differs from all the other described species in having the margins of the telson armed throughout their entire length with spines and in the very large number of spines on the inner uropod. Only *D. hanseini*, among the described species, agrees with the present one in having a smooth body devoid of spinules.

Three specimens of a species of *Doxomysis* from Port Blair



TEXT-FIG. 18.—*Doxomysis* sp.

Telson, $\times 65$.

are held over to await further material. They differ from *D. littoralis* in having the whole of the carapace and abdomen covered with fine spinules which even extend to the eyestalks, in the shorter antennal scale which barely outreaches the antennular peduncle, in the slightly different arrangement of the spines on the telson (text-fig. 18) and in the longer uropods, the inner being one and a half and the outer twice as long as the telson. They agree with *D. littoralis* and differ from all the other described species in having the spines on the lateral margins of the telson extending throughout their whole length. The rostral plate is triangular in shape, with the apex bluntly pointed and quite short, while the eyes resemble the smaller eyes of *D. littoralis* rather than the larger eyes of the pelagic species. The specimens are rather damaged and though they appear to represent a new species, it does not seem advisable to give them a name at present.

Doxomysis anomala, sp. nov.

Text-figs. 19a-f.

Localities.—Port Blair, Andaman Islands.

St. 3. One hundred and twenty specimens, up to 5.5 mm. (Types.)

St. 32. One female and two males.

Description.—Body smooth without spinules; carapace short, leaving the last three thoracic somites exposed dorsally, produced in front into a short triangular rostral plate with an obtuse apex, not covering the eyestalks.

Eyes of moderate size, cornea occupying one half of the whole eye and wider than the peduncle, pigment brown.



TEXT-FIG. 19.—*Doxomysis anomala*, sp. nov.

a, anterior end, $\times 65$; *b*, antennal scale, $\times 65$; *c*, endopod of fourth thoracic limb, $\times 65$; *d*, fourth pleopod of male, $\times 65$; *e*, telson, $\times 65$; *f*, uropods, $\times 65$.

Antennal scale extending for about one-third of its length beyond the antennular peduncle, lanceolate in shape, six times a

long as broad, setose all round, terminal joint about one-seventh of the whole scale, a prominent spine on the outer distal corner of the basal joint.

Mouth-parts agreeing with those of the genus *Doxomysis* as described by Hansen except that the exopod of the second maxilla has more setae than Hansen figures though these setae are quite short and feeble; setose lobes well developed on the second, third and fourth joints of the first thoracic legs.

Endopods of the posterior thoracic limbs very slender, tarsus with three joints, the proximal articulation very *oblique*, the distal articulation slightly oblique, nail well developed.

Telson three quarters of the length of the last abdominal somite, one and a half times as long as broad at the base, cleft for one-fifth of its length, cleft armed on each side by six small articulated spines, a pair of plumose setae at the base of the cleft longer than the cleft, lobes at the apex truncate, each armed with three spines, the outer spine stouter and twice as long as the inner pair, lateral margins armed with 7-8 spines, three larger and stouter ones on the proximal portion at the widest part, 4-5 on the distal portion.

Inner uropod one and a half times as long as the telson with row of about 20-25 closely set spines on the inner margin extending from the statocyst almost to the apex.

Outer uropod twice as long as the telson.

Fourth pleopods of the male with the exopod longer than the endopod, the antepenultimate and penultimate joint each bearing a long stout seta feathered at the distal end, the terminal joint with a single short simple seta.

Female with two pairs of incubatory lamellae.

Length of adult specimens of both sexes, 5.5 mm.

Remarks.—Hansen in his monograph of the 'Siboga' Mysidae distinguished the tribe Erythropini from the tribe Leptomysini, among other characters, by the fact that the proximal articulation of the tarsus is oblique. The present species, which from the structure of the second maxilla, antennal scale and pleopods in the male is clearly a member of the Leptomysini, presents the anomalous character of two oblique articulations defining the joints of the tarsus of the thoracic limbs. The proximal articulation is very oblique, quite as oblique as in any of the Erythropini but the distal articulation is only slightly oblique.

Tribe MYSINI.

Genus *Mesopodopsis* Czerniavsky.

Mesopodopsis orientalis (Tattersall).

Macropsis orientalis, Tattersall, 1908, 1914, 1915.

Locality.—Balliaghatta Canal, near Calcutta, in brackish water. Abundant.

Bay N.-W. of Nazareth Point, Mormugao Bay, Portuguese India, nine specimens. Chilcolna Bay and stream at its southern end, Mormugao Bay, Portuguese India, one specimen.

Remarks.—It is unfortunately necessary to alter the name of the genus. The name *Macropsis*, proposed by Sars in 1877, had already been applied by Lewis in 1836 to one of the Hemiptera and the genus must therefore be known by the name proposed as a subgenus by Czerniavsky in 1882.

Genus *Neomysis* Czerniavsky.

Zimmer (1915(1)) has united with the genus *Neomysis* Czerniavsky, the genus *Acanthomysis* Czerniavsky (= *Dasymysis* Holt and Beaumont, *Metamysis* Nakazawa (not Sars), *Orientomysis* Derzhavin) on the grounds that the distinctions between these genera have broken down in the light of the species described by Nakazawa and Derzhavin. In the structure of the pleopods of the male both genera are identical and the differences lie mainly in the antennal scale and in the tarsus of the thoracic legs. In *Neomysis* the antennal scale is very long, with a sharply pointed apex, and the tarsus of the thoracic legs is many jointed. In *Acanthomysis* the antennal scale is short, the apex rounded or truncate, and the tarsus of the legs three-jointed. But *Metamysis mitsukurii* Nakazawa, has the antennal scale of *Acanthomysis* and the tarsus of the thoracic legs six-jointed, i.e. as found in *Neomysis*. Both the species of *Orientomysis* described by Derzhavin have many joints, 4-8, in the tarsus of the thoracic legs, but the antennal scale is short with a rounded apex. On the whole Zimmer appears to be right in uniting these genera. It is difficult to seize upon any constant character separating them. The type of the genus *Acanthomysis* is *A. longicornis* (M. Edw.) from the Mediterranean and the new species I describe below could without difficulty be referred to this genus. It agrees very closely with *A. longicornis* and is only distinguishable by characters which cannot be regarded as of more than specific value. But I have followed Zimmer in his arrangement and described the species under the genus *Neomysis*.

Neomysis indica, sp. nov.

Text-figs. 20a-i.

Localities.—Port Blair, Andaman Islands. Stations 3, 5, 11 and 19. Ten females and 3 males, up to 6.5 mm.

Kilakarai, Gulf of Manaar, from weeds, 0-2 fathoms, February, 1913. Six females and 10 males up to 8 mm. (Types.)

Chilcolna Bay, and stream at its southern end, Mormugao Bay, Portuguese India. One specimen.

Description.—Very closely allied to *Neomysis longicornis* (M.-Edw.). Body, including the eyes, and last pair of brood

TEXT-FIG. 20.—*Neomysis indica*, sp. nov.

a, eye and antennular peduncle, $\times 33$; *b*, rostrum, $\times 33$; *c*, antennal scale, $\times 65$; *d*, fifth thoracic limb, $\times 50$; *e*, fourth pleopod of male, $\times 65$; *f*, fifth pleopod of male, $\times 65$; *g*, uropods, $\times 65$; *h*, telson of adult, $\times 65$; *i*, telson of young, $\times 65$.

lamellae in the female, hispid all over, the spinules thickest on the posterior segment of the abdomen and on the anterior part of the thorax. Fully grown males appear to be much smoother than young males and females.

Carapace produced in front into a short triangular rostral plate with pointed apex.

Eyes large, cornea wider than the rest of the eye, pigment black.

Antennal scale barely outreaching the antennular peduncle, seven times as long as broad, terminal joint about one-tenth of the total length of the scale.

Tarsus of the thoracic limbs three-jointed.

Telson one and a half times as long as the last abdominal somite lanceolate in shape, entire, about twice as long as broad at the base, suddenly narrowing a short distance from the base and gradually narrowing from that point to a bluntly rounded apex, the proximal part of the lateral margins smooth except for three small spines on each side of the widest part of the telson, apex armed with from 6-8 strong spines of equal length with no smaller spines between them, distal part of the lateral margins armed with numerous spines of varying sizes, about seven to nine of these spines much larger than the rest and placed more or less at regular intervals, between them groups of smaller spines, 3-5 in a group, grading in size, the smaller ones anterior and the larger ones posterior. In small specimens the large spines arming the telson are relatively more prominent than in larger specimens and the telsons of both sizes look strikingly different. But I think the difference is entirely due to differences in size and the development of the subsidiary spines.

Inner uropod slightly longer than the telson with a group of five graded spines on the lower inner margin, near the statocyst.

Outer uropod one-seventh longer than the inner. In young specimens the uropods are more equal in size.

Fourth pleopod of the male, with its terminal setae, not reaching as far as the telson, endopod well developed, of normal form, exopod two-jointed, the terminal joint about one-seventh of the length of the proximal joint and bearing two long stout plumose setae about three times as long as the joint itself.

Fifth pleopod of the male much longer than the first, second and third, but of the same form. It is nearly as long as the sixth abdominal somite and the apex bears two specially strong and long plumose setae.

Remarks.—This species is distinguished from *N. longicornis* at once by the armature of the telson. In *N. longicornis* the spines arming the telson are more equal in size and there are not any outstanding spines of much greater length than the rest. In *N. stelleri* Derzhavin (1913) the telson has special spines of outstanding length separating groups of spines, but the spines on the telson extend along the entire margin, whereas in *N. indica* the proximal

portion of the margins of the telson is unarmed. Moreover *N. stelleri* has the tarsus of the thoracic legs six-jointed.

N. indica is the Indian Ocean representative of *N. longicornis* and provides additional evidence of the close similarity of the Mysidacean fauna of the Mediterranean and Indian Ocean, so clearly exemplified by this collection.

Neomysis hodgarti, sp. nov.

Text-figs. 21A-f.

Locality.—Mouth of the Rajang River, Sarawak, Borneo, 1-vii-10. Four males and fifteen females, up to 7 mm. in length, collected by R. Hodgart. (Types.)

Description.—Body smooth, without spinules on either thorax or abdomen. Carapace produced into a short broadly triangular rostral plate with bluntly pointed apex, antero-lateral corners rounded. Eyes reaching to the end of the second joint of the antennular peduncle, normal in shape, pigment black. Antennal scale extending slightly beyond the distal end of the antennular peduncle in the female and level with the male process of the antennules in the male, narrowly oval in shape, setose all round, about five times as long as broad, terminal joint distinct, a strong spine on the outer distal corner of the joint from which the scale springs. Labrum with a very long sharp forwardly directed spine. Tarsus of the thoracic legs composed of five to six joints and terminated by a slender nail. Last segment of the abdomen slightly longer than the fifth. Telson one and a quarter times as long as the last abdominal somite, narrowly linguiform in shape, not quite twice as long as broad at the base, apex entire, without cleft, almost truncate, one-fifth of the width of the telson at the base, bearing four equal stout spines in length about one-eighth of the total length of the telson, distal two-thirds of the lateral margins armed with about 26-28 short, closely set and regularly arranged spines increasing in length towards the apex. Inner uropod about one-sixth longer than the telson plus the terminal spines, with a single spine on the lower surface near the statocyst. Outer uropod one-sixth longer than the inner. First, second, third and fifth pleopods of the male simple unjointed plates as in the female. Fourth pleopod reaching almost to the base of the telson, endopod with well developed side lobe, exopod composed of three joints, first joint very long, three and a half times as long as the second, latter bearing a very long straight simple seta three times as long as the joint, terminal joint very minute with a single short seta at the apex. Length of the largest specimens of both sexes, 7 mm.

Remarks.—This species belongs to the *N. longicornis* group of the genus and is distinguished by the form of the telson with its apical armature of four equal stout spines, the smooth dermis, and the number of joints in the tarsus of the thoracic limbs.

TEXT-FIG. 21.—*Neomysis hodgarti*, sp. nov.

a, antennal scale and peduncle; *b*, endopod of the second thoracic limb; *c*, distal end of the endopod of the third thoracic limb; *d*, telson; *e*, uropods; *f*, fourth pleopod of the male. All $\times 57$.

Genus *Potamomysis* Czerniavsky.

Potamomysis assimilis Tattersall.

Text-fig. 22.

Potamomysis assimilis, Tattersall, 1908, 1914, 1915.

" " Zimmer, 1915 (1), p. 215, fig. 19.

Locality.—Ganges, near Buxar, Bihar, on surface. Several specimens (T. Southwell). " These specimens, captured over 600

miles from the sea, were taken at a point much further inland than any previously recorded." (N. A.).

R. marks.—Zimmer in his revision of the Mysini was unable to place this species and genus because he was of opinion that the male from which I figured the fourth pleopod was not mature. I find that this opinion is correct. Among the present specimens are two or three fully grown males, somewhat larger than I have examined before, and I find that the drawing I gave of the fourth pleopod of the male requires modification. The outer branch is five-jointed not three-jointed as I have described it, the third joint of my previous figure being subdivided into two extra small joints at the distal end. Each of these last three joints bears a single plumose seta at its outer distal end, those on the terminal and penultimate joints about equal in size, while that on the antepenultimate joint is much longer and stouter, and is plumose and not smooth as I had previously described it. Immature specimens have the fourth pleopod as I had previously described it, that is with the two small terminal joints of the outer branch not marked off and the large seta on the third joint smooth and not plumose.



TEXT-FIG. 22.—
Potamomysis
assimilis,
Tattersall.

Fourth pleopod
of the adult male,
× 65.

The fourth pleopod in this species is remarkably like that of the genus *Stilomysis*, but the third pleopod of the latter is two branched whereas in *P. assimilis* it is rudimentary as in the female.

It is now possible to put this genus in its place in Zimmer's key. It should be placed in Group III B in which it will form a separate section, characterised by the large number of joints in the outer branch of the fourth pleopod of the male.

Genus *Idiomysis*, nov.

Body robust and gibbous, in the only specimen, flexed in the curious way shown in text-fig. 23a. Carapace produced in front into a large frontal plate with a broadly rounded apex. Eyes very large, stalks short, pigment golden brown. Antennular peduncle with the male lobe well developed and densely hirsute. Antennal scale very short and broad, the greater part of the outer margin smooth, without setae, no transverse suture distally. Second maxilla with the outer plate very reduced, with only four or five setae. First thoracic limbs with a masticatory lobe on the second joint only. Tarsus of the third fourth, sixth, seventh and eighth thoracic limbs unjointed. Fifth thoracic limbs markedly

longer than any of the others, tarsus two-jointed, nail prominent. Eighth thoracic limbs much reduced in size, shorter than the exopod and slender. Telson a very short broad triangular plate, not covering the statocyst, unarmed. Uropods short, robust, subequal, without spines, statocyst large. First, second, third and fifth pleopods of the male small unjointed plates, fourth pleopod of the male consisting of a basal joint from which the exopod and endopod are imperfectly separated, a small one-jointed endopod and a large exopod, apparently consisting of a single joint terminated by a single long stout seta, as long as the joint and imperfectly annulose at the tip, the whole appendage reaching to the tip of the uropods.

Type:—*Idomysis inermis*, sp. nov.

Remarks.—This curious genus is quite unlike any other Mysid known to me. Its robust gibbous body and the set of the telson and uropods remind one of *Mysidopsis gibbosa*, superficially, but it is widely removed from that species in structure. It belongs to the tribe Mysini and apparently to Zimmer's group III B. It is abundantly characterized by the very short and broad antennal scale and by the short unarmed telson.

Idomysis inermis, sp. nov.

Text-figs. 23a-f, 24a-g.

Locality.—Kilakarai, Gulf of Manaar, among weeds, 0-2 fathoms, February, 1913. One adult male, 4 mm. (Type)

Description.—Body robust, gibbous, abdomen flexed between the third and fourth somites; carapace leaving the last thoracic somite exposed, produced in front into a prominent triangular frontal plate with a broadly rounded apex which reaches forward to the distal end of the first joint of the antennular peduncle.

Eyes very large, cornea much broader than the stalk, pigment golden brown.

Antennal scale barely outreaching the short antennular peduncle, very short and broad, one and a half times as long as broad, outer margin without setae and without a prominent distal spine, terminal lobe broader than long, without a suture, no spine on the outer distal corner of the joint from which the scale springs; peduncle of the antenna shorter than the scale and composed of three short broad subequal joints.

Mandible with a well-developed cutting edge and molar process, second joint of the palp broad. First maxilla with the inner plate reduced in size and tipped by four or five feeble setae.

Second maxilla with the outer plate very much reduced in size and feebly armed with five small setae, second joint of the palp linear, not expanded at the apex.

First thoracic limb (first gnathopod) with a masticatory lobe, tipped by two or three setae, on the second joint, no lobes on the third and fourth; nail not more prominent than the other setae arming the distal joint.

Third, fourth, sixth and seventh thoracic limbs of similar structure, tarsus unjointed, equal in length to the merus and to the ischium, nail only distinguishable from the other setae by its swollen base.

Fifth thoracic limb longer than any of the others, merus at



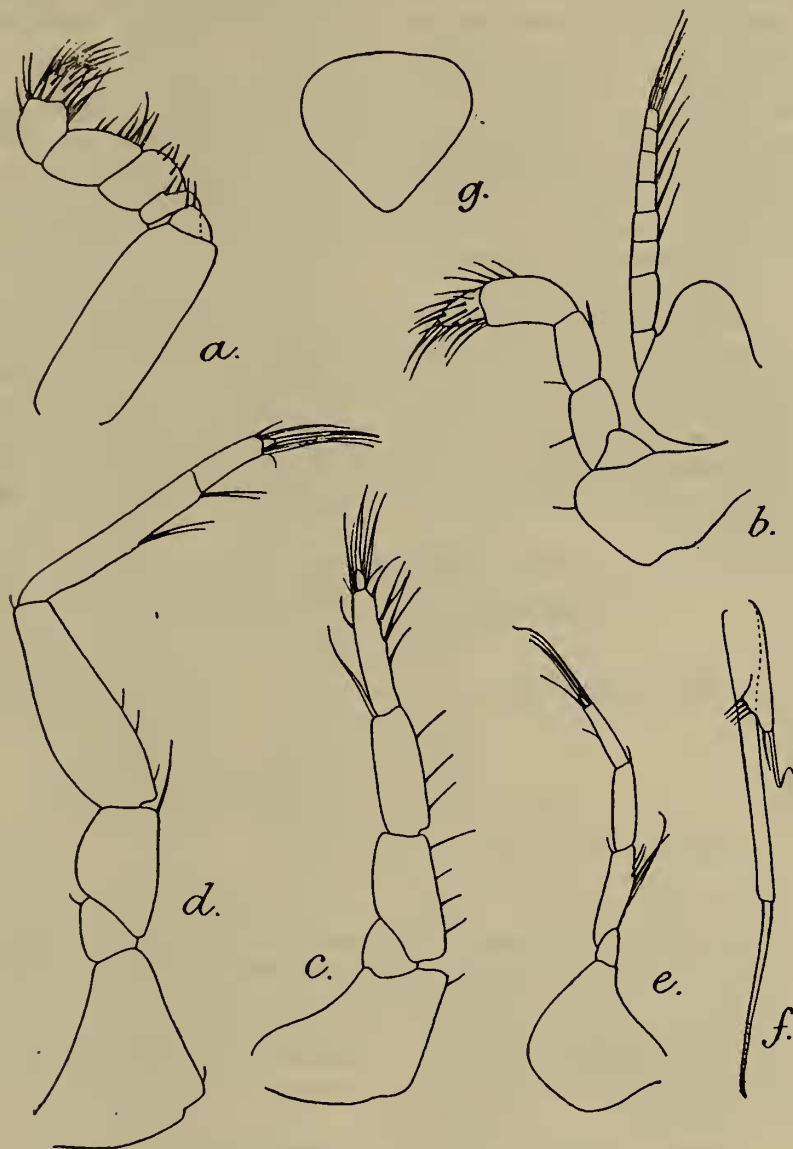
TEXT-FIG. 23.—*Idiomysis inermis*, gen. et sp. nov.

a, lateral view of adult male, $\times 21$; *b*, dorsal view of anterior end, $\times 22$; *c*, antennal scale, $\times 65$; *d*, mandible, $\times 100$; *e*, first maxilla, $\times 100$; *f*, second maxilla, $\times 100$.

least twice as long as the preceding joint, tarsus about one-third longer than the merus but much narrower, two-jointed, the second joint one-third of the length of the first, nail with a swollen base.

Eighth thoracic limb much reduced in size, endopod possessing the full number of joints, shorter than the exopod, joints narrow and feebly armed. Exopods of all the thoracic limbs with

the outer distal corner of the basal joint rounded, flagellum with about ten joints.



TEXT-FIG. 24.—*Idiomysis inermis*, gen. et sp. nov.

a, endopod of first thoracic limb, $\times 65$; *b*, second thoracic limb, $\times 65$; *c*, endopod of third thoracic limb, $\times 65$; *d*, endopod of fifth thoracic limb, $\times 65$; *e*, endopod of eighth thoracic limb, $\times 65$; *f*, fourth pleopod of male, $\times 65$; *g*, telson, $\times 65$.

Telson very short, much shorter than the last abdominal somite and barely extending to and not covering the statocyst; a

broad triangular plate, rather broader than long, apex bluntly rounded and entire; telson quite unarmed.

Inner and outer uropods short broad plates, equal in size, furnished with long setae on both margins, inner uropod without spines on its lower margin, statocyst large.

First, second, third and fifth pleopods of the male simple small unjointed plates, fourth pair with the endopod of normal shape, consisting of a small unjointed plate with terminal setae and a well marked side lobe, imperfectly marked off from the basal joint, exopod consisting of a single long linear joint terminated by a single stout seta, annulose at its tip, the whole exopod extending to the tip of the uropods or slightly beyond. Length of the only specimen, an adult male, 4 mm.

Remarks.—This species shows no very great affinities with any described form. The form of the pleopods of the male clearly shows its place in the tribe Mysini, but the shape of the antennal scale and the very short unarmed telson are quite unlike any member of that tribe. I hope that female specimens will be forthcoming some day so that the sexual differences may be described. It is the most interesting and distinctive species in this collection.

Genus *Lycomysis* Hansen.

Lycomysis spinicauda Hansen .

Text-figs. 25a-c.

- Lycomysis spinicauda*, Hansen, 1910, p. 77, pl. xi, figs. 3a-f, pl. xii, figs. 2a-h.
 ,, ,, Colosi, 1916, p. 194, text-figs. 1a-d.
 ,, ,, Colosi, 1918, p. 10.
 ,, ,, Colosi, 1920, p. 251, pl. xx., figs. 10a-g.
 ,, *pusilla*, Zimmer, 1915, p. 175, figs. 30-37.

Locality —Port Blair, Andaman Isles.

St. 19. One male, 4.5 mm.

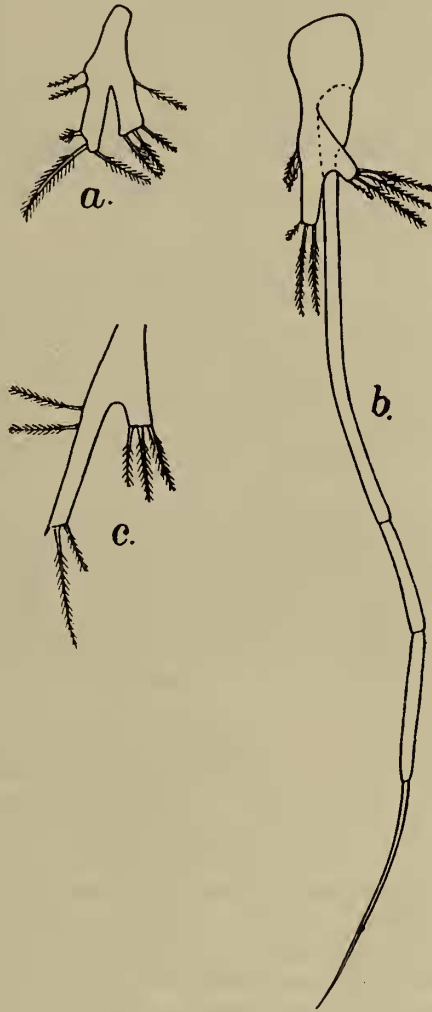
Remarks.—I have no doubt as to the identity of this specimen with the species described by Zimmer. The agreement is, in all points, complete. But I am somewhat puzzled as to the relation of *L. pusilla* to *L. spinicauda* and, after due consideration, I have reached the conclusion that the two species are identical, the supposed differences being due to a difference of interpretation of the structure of the male pleopods, the only character separating the two forms.

Hansen (1910) describing *L. spinicauda* from an immature male says (p. 76), "Pleopods in the male immature specimens small, biramous, with the exopod [endopod] increasing in length backwards, being on the anterior pairs shorter, on the fourth pair somewhat longer, than the exopod, on the fifth pair twice as long as the exopod, but very far from developed" and later (p. 77) "unfortunately the male pleopods are so imperfectly developed in my specimens, that they cannot afford any real help for deciding the systematic position of *Lycomysis*, yet it may be stated that they

show that it cannot be referred to the Mysini, and that the exopod [endopod] of the fifth pair being twice as long as the endopod [exopod] is somewhat anomalous." There is something inconsistent in both these statements and Hansen appears to have got his terms exopod and endopod mixed. I have given in square brackets the term which I think the author intended. At any rate, my interpretation is supported by Hansen himself earlier in the same paper (p. 13) where, when emphasising the supposed anomalous condition of the male pleopods, he states that *Lycomysis* differs from all hitherto known genera "in having the endopod of the posterior pairs of pleopods longer than the exopod and the endopod of the fifth pair longer than that of the fourth."

From these quotations it is clear, I think, that Hansen regarded the pleopods of the male of *Lycomysis* as biramous, and that, in consequence, it could not be referred to the tribe Mysini.

Colosi (1916) gives a new diagnosis of *L. spinicauda* based on a male specimen from the China Sea. He describes the pleopods of the male in the genus as follows "Primo, secondo, terzo e quinto paio con endopodite ed esopodite rudimentali; quarto paio con peduncolo piu lungo che largo, endopodite rudimentale ed esopodite lunghissimo composto di tre articoli, di cui il primo piu lungo degli altri, e terminato da due filamenti (spiniformi?)." In the diagnosis of the species Colosi gives slightly fuller details especially of the fourth pair of pleopods, from an adult male, which have the exopod greatly elongated, three-jointed, the third joint bearing two terminal filaments. Colosi figures the fourth pair of



TEXT-FIG. 25.—*Lycomysis spinicauda*, Hansen.

a, third pleopod of male, $\times 100$; *b*, fourth pleopod of male, $\times 100$; *c*, fifth pleopod of male, $\times 100$.

pleopods but none of the others. His description, however, agrees with that of Hansen, in stating that the first, second, third and fifth pairs of pleopods in the male are *biramous* with exopodite and endopodite. In spite of this anomalous form of the pleopods, Colosi places *Lycomysis spinicauda* in the tribe Mysini of the subfamily Mysinae. But if the descriptions of Hansen and Colosi are correct this position for the species cannot be maintained, for in the Mysini at least the first and second and in most cases the fifth pair of pleopods of the male are simple unjointed plates as in the females of Mysidae generally, without any definite indication of a separate endopod and exopod.

In the meantime Zimmer (1915 (3)) described a second species of *Lycomysis*, *L. pusilla*. It is evident that Zimmer was puzzled by Hansen's description of the pleopods in his species for Zimmer's new species is founded entirely on the characters of the pleopods of the male, the author stating that in all other characters his species was identical with *L. spinicauda*. Zimmer (1915 (3), p. 175) describes the pleopods of the male in *L. pusilla* as follows:—"Die paare 1, 2, 3 und 5 rudimentär, während 4 einene eingliederigen Innen- und stark verlängerten Aussenast besitzt" and later (p. 177) he states that the pleopods 1, 2, 3 and 5 of the male are as in the female. He gives a figure of the first pleopod of the female which shows this appendage as a simple unjointed plate, somewhat bilobed at the apex, each of the lobes bearing setae. His description of the pleopods of the female states that in the first three pairs the two lobes are more or less equal in size, but in the last two pairs the inner lobe is much longer than the outer. The fourth pair of pleopods of the male have an endopodite which corresponds with the female pleopod in shape and a very elongate exopod of three joints terminated by a single long plumose seta.

Zimmer's species is clearly referable to the Tribe Mysini and the present specimen agrees absolutely with his description and figures in the matter of the pleopods of the male.

Colosi (1920) gives some further notes on *L. spinicauda*, Hansen, and compares it with *L. pusilla*, Zimmer. His description of the pleopods of the male of *L. spinicauda* is substantially as in his previous paper and he points out that the two species are distinguished not only by the pleopods but by the characters of the mandibular palp, the terminal joint of which is longer and narrower in *L. pusilla* than in *L. spinicauda* and the teeth on the margin of the second joint less well marked in the former than in the latter. I regard these latter differences between the two species as of no moment and due mainly to the fact that Zimmer's figure is taken from a somewhat more oblique point of view than Colosi's.

But the differences in the pleopods of the male are more puzzling. It is almost inconceivable that two species so essentially alike in all other details that female specimens could not be distinguished one from another, should differ so profoundly in the structure of the male pleopods that adult males should require to

be placed in separate subfamilies at least. I can only suppose that Hausen and Colosi are in error in describing the first, second, third and fifth pleopods in the males of *L. spinicauda* as biramous, with endopodite and exopodite defined. I give herewith a figure of the third, fourth and fifth pleopods of my specimen. The outer lobe (seitenlobus) is remarkably well developed in all the pleopods and in the first three is as long as the inner lobe (hauptteile). Zimmer makes the same observation. In the fourth and fifth pair the inner lobe is much the longer, in the fifth pair longer than in the fourth. At first sight the appendages look biramous and it is only when dissected and examined under the high power of the microscope that they are found to be simple unjointed plates of the type usual in the females of Mysidae except that the outer (side lobe) is unusually well developed. If we suppose the words endopod and exopod in Hausen's statements to be replaced by inner lobe and outer lobe, Hausen's description of *L. spinicauda* applies equally well to *L. pusilla*. In fact, if my suggestion is correct the two species should be united under the name *spinicauda* and it is in this light that I have regarded them here.

Distribution:— *L. pusilla* was recorded by Zimmer from a collection made during a voyage from Ceylon to New Guinea. *L. spinicauda* is known from the waters of the East Indian Archipelago (Hausen) and the China Sea (Colosi). The distribution of the two forms is therefore not inconsistent with their suggested specific identity.

Tribe HETEROMYSINI.

Genus *Heteromysis*, S. I. Smith.

Syn. *Chiromysis* G. O. Sars.

Gnathomysis Bonnier and Pérez.

Through the kindness of Professor C. Pérez, I have been permitted to see a series of unpublished drawings made by the late Dr. Jules Bonnier to illustrate the general form and the structure of the appendages of *Gnathomysis gerlachei* (Bonnier and Pérez, *C. R. Acad. Sci. Paris*, T. 134, p. 117-119, 1902), a preliminary description only of which, without figures, has so far appeared. I have not been able to examine the specimens from which the drawings were made but there is no doubt in my mind, after studying the drawings sent to me by Professor Pérez, that *Gnathomysis gerlachei* is identical with *Chiromysis harpax* Hilgendorf. The genus *Gnathomysis* is therefore a synonym of *Chiromysis* G. O. Sars, which in turn must give way to the earlier *Heteromysis* S. I. Smith.

Heteromysis harpax was described by Hilgendorf in 1879 in very summary fashion. Kossmann (1880) redescribed the species from examples collected in the Red Sea and figured the appendages in some detail. It is difficult to be sure that Kossmann des-

cribed and figured the same species as Hilgendorf, but the form of the third thoracic limb, more especially of its armature and the gap in the series of spines arming the inner margin of the carpus, which is indicated in Hilgendorf's figures and clearly shown by Kossmann, renders it at least probable that both authors were dealing with the same species. The unpublished drawings of Bonnier agree in the greatest detail with Kossmann's figures. The agreement is complete in the figures of the third thoracic limb, even to the peculiar form of the ischium and to the arrangement, number and forms of the spines arming the inner margin of the carpus. In only one respect do Bonnier's and Kossmann's figures differ, namely, in the armature of the telson. Kossmann gives no details in his description and his figure indicates that the lateral margins of the telson are armed distally with five spines, that each apical lobe of the telson bears one long spine and that each side of the cleft bears five spinules. Bonnier's figure shows that the lateral margins of the telson are armed distally with eleven spines, that each lobe of the telson bears two spines, the outer of which is stouter and twice as long as the inner, and that each margin of the cleft is armed with ten spinules.

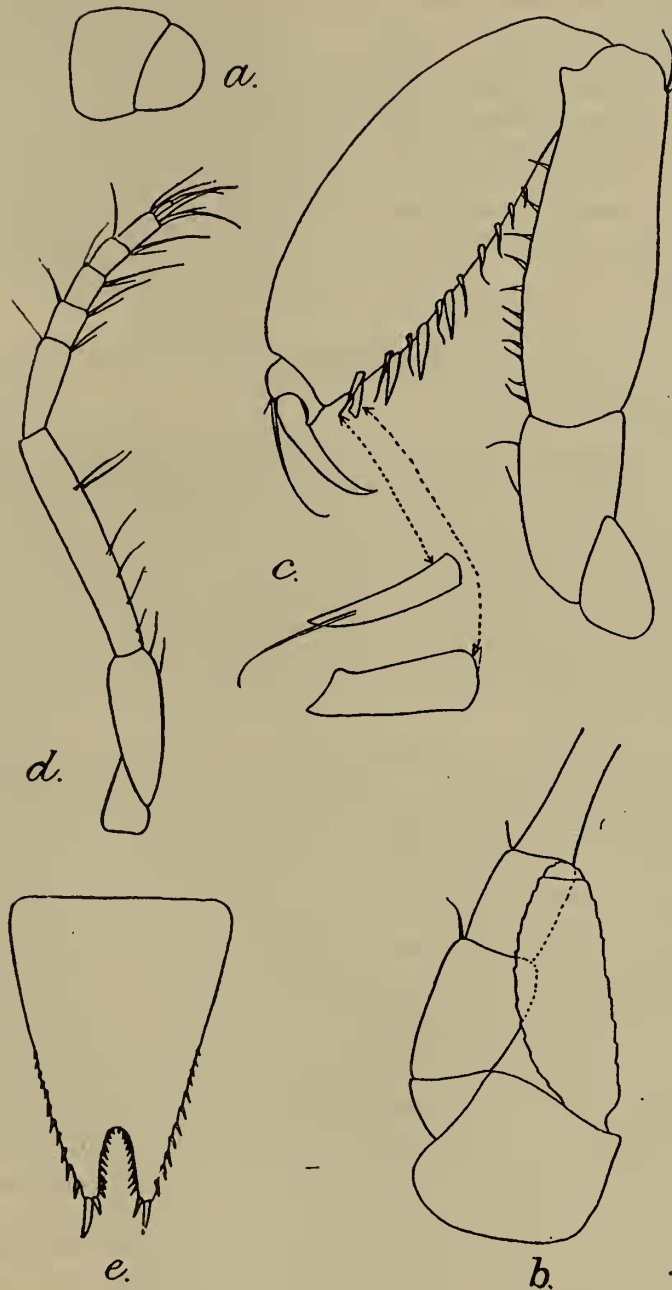
I conclude therefore, that *Gnathomysis gerlachei* Bonnier and Pérez must be considered undoubtedly as a synonym of *Heteromysis harpax* Kossmann, which is almost certainly the same as *H. harpax* Hilgendorf.

Heteromysis proxima, sp. nov.

Text-figs. 26a-e.

Locality:—From pools on exposed reef at Pamban, Gulf of Manaar. One male and one female, 6-7 mm. (Types.)

Description:—Eye small, longer than wide, without finger-like process, cornea occupying less than half of the eye in dorsal view and narrower than the rest of the eye. Antennal scale equal in length to the antennal peduncle and shorter than the antennular peduncle, three times as long as broad, setose all round, terminal joint present. Third thoracic limb with the endopod massive and stoutly built, ischium with the inner distal corner not produced into an acute process, merus three times as long as broad with a prominent blunt process at the distal end of the inner margin, carpus stouter and longer than the merus, about two and a half times as long as broad, inner margin armed with spines of three kinds (1) stout simple spines, three or four in number on the distal part of the margin, (2) stout spines with a truncate apex, one or two in number at the distal end, and (3) slender spines bearing a single seta inserted some way from the tip, extending all along the margin in two double rows of eight or nine spines, between which the other spines are situated; penultimate joint small with an acute process at the distal end of the inner margin; nail long and strongly curved, one-third of



TEXT-FIG. 26.—*Heteromysis proxima*, sp. nov.
 a, eye, $\times 50$; b, antennal scale, $\times 65$; c, endopod of third thoracic limb of male, $\times 65$; d, endopod of fourth thoracic limb, $\times 65$; e, telson, $\times 65$.

the length of the carpus. Tarsus of the remaining thoracic limbs five-jointed, at least equal to the merus which is one and a half times as long as the ischium; nail small and setiform. Telson slightly longer than the last abdominal somite, not quite one and a half times as long as broad at the base, cleft for one quarter of its length, the cleft armed on each side by ten coarse teeth, apex about one quarter of the breadth at the base, each lobe at the apex armed with an inner small spine and an outer larger and stouter spine which is twice as long as the small spine and about one-eighth of the length of the telson, lateral margins straight, distal half armed with 10-12 spines, proximal half of the margins smooth, without spines.

Inner uropod slightly longer than the telson plus the terminal spine at the apex, a single spine on the lower inner margin near the statocyst.

Outer uropod about one quarter as long again as the telson.

Remarks:—Of the three Indian species of *Heteromysis* here recorded, this species approaches most closely to *H. harpax* (Hilgendorf). I was inclined at first to regard my specimens as belonging to Hilgendorf's species, but after an examination of the unpublished drawings of Bonnier, illustrating the structure of *Gnathomysis gerlachei* which I regard as identical with *H. harpax*, I have decided that the Ceylon specimens represent a distinct species differing mainly in the form and armature of the third thoracic limbs.

In *H. harpax* as figured by Kossmann and also by Bonnier among his unpublished drawings, the ischium of the third thoracic limbs has the inner distal corner produced and acute and the distal margin minutely toothed or serrate. The carpus is armed on its inner margin with a group of four spines distally and two spines proximally, with a distinct gap, unarmed, between the two sets of spines. The distal spines are truncate at the apex and microscopically toothed. The proximal spines are bluntly pointed and bear two or three small blunt teeth. The inner distal angle of the propodus is bluntly produced.

In *H. proxima* the ischium of the third thoracic limbs is not produced at its inner distal angle and the distal margin is not serrate. The carpus has the inner margin armed with two rows of eight or nine peculiar spines with a seta inserted near the tip, extending in a continuous line, without gap, along the greater part of the margin. Between these two rows of peculiar spines, on the distal part of the margin, are three or four stouter, blunter spines and at the extreme distal angle one or two stout spines with a truncate apex. The inner angle of the propodus is more acutely produced than in *H. harpax*.

The close agreement between Kossmann's and Bonnier's drawings of the third thoracic limbs of the specimens they examined is strong evidence of the identity of these specimens and also of the probability that the Indian specimens represent a distinct species. The differences I have noted are not sexual,

since both Kossmann's and Bonnier's figures were drawn from an adult male and my own figure is likewise drawn from an appendage belonging to that sex.

In other respects *H. proxima* agrees closely with *H. harpax* and with *H. microps* from the Mediterranean. All three agree in having small eyes with processes, in having only one spine on the inner uropods, in having only the distal half of the margins of the telson armed with spines and in the number of joints in the tarsus of the thoracic limbs. The form and armature of the third thoracic limbs is, however, quite distinct in all three.

Heteromysis zeylanica, sp. nov.

Text-figs. 27a-c.

Locality.—From pools on exposed reef at Pamban, Gulf of Manaar. One male, 5 mm.

Kilakarai, Gulf of Manaar, from weeds, 1-2 fathoms. One male, 5 mm., two immature. (Types.)

Description.—Eye small, longer than broad, a short pointed process on the upper distal border overhanging the cornea, latter occupying less than one half of the eye in dorsal view and narrower than the rest of the eyes.

Antennal scale slightly shorter than the antennal peduncle and considerably shorter than the antennular peduncle, three and a half times as long as broad, setose all round, terminal joint present.

Third thoracic limb with the endopod moderately stout, merus three times as long as broad without process at the distal end of the inner margin, carpus robust, shorter than the merus, twice as long as broad, inner margin armed with four or five spines each with an inserted seta, penultimate joint small without process, nail strongly curved about half as long as the carpus.

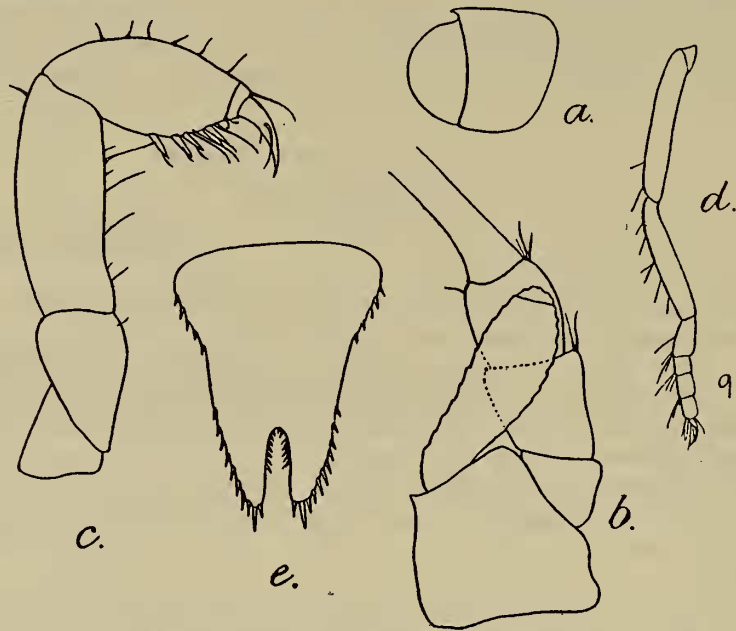
Remaining thoracic limbs having the endopods moderately stout with the tarsus four-jointed, merus equal to the ischium and longer than the tarsus, nail setiform and curved. Telson about as long as the last somite of the abdomen, one and a quarter times as long as broad at the base, cleft for rather more than one quarter of its length, the proximal half of each margin of the cleft armed with seven teeth, distal half of each margin of the cleft smooth, apex rather less than one quarter of the breadth of the telson at its base, each lobe of the apex furnished with two spines, the inner about half as long as the outer which is about one seventh of the length of the telson, lateral margins lightly concave the proximal portion with five spines at the widest part, the central portion smooth, the distal portion with about eight or nine spines arranged at more or less regular intervals, the interval between the last marginal spine and the large apical spine not greater than that between the other distal marginal spines.

Inner uropods about one quarter as long again as the telson

plus the terminal spines, inner lower margin armed with about eleven stout spines from the statocyst to just short of the apex, the spines increasing in size distally.

Outer uropod about half as long again as the telson.

Remarks.—This species belongs to that group of species characterised by the presence of a distinct process on the eye.



TEXT-FIG. 27.—*Heteromysis zeylanica*, sp. nov.

a, eye, $\times 50$; *b*, antennal scale, $\times 65$; *c*, endopod of third thoracic limb, $\times 65$; *d*, endopod of fourth thoracic limb, $\times 65$; *e*, telson, $\times 65$.

H. odontops Walker is the type of this group. It is distinguished from *H. harpax* by this character, by the telson having spines on the proximal wide part of its margins, by the details of the armature of the cleft and by the row of stout spines on the inner margin of the inner uropod, as well as by the less robust form of the third thoracic limb.

Heteromysis gymnura, sp. nov.

Text-figs. 28a-e.

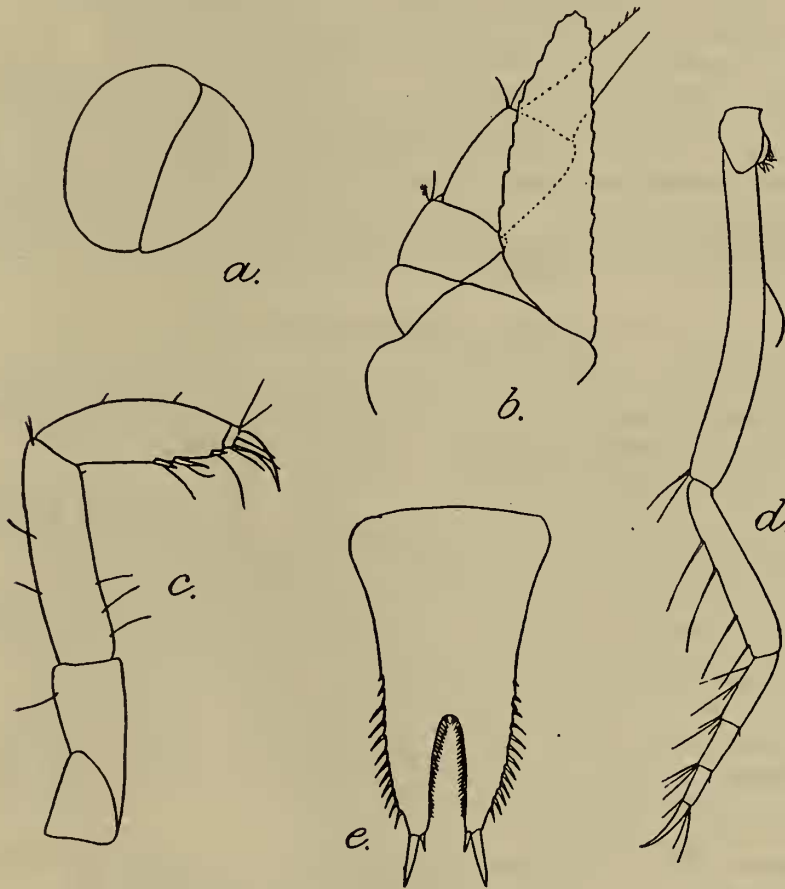
Locality.—Kilakarai, Gulf of Manaar, among weeds, 1-2 fathoms. Five males and two females, 4-6 mm. (Types.)

Description.—Eye large, at least as wide as long in dorsal view, no finger-like process, cornea occupying more than half the eye in dorsal view and wider than the rest of the eye.

Antennal scale longer than the antennal peduncle and equal in length to the antennular peduncle, three and a half times as long as broad, no terminal joint.

Third thoracic limb less robustly built than in the other two species, merus nearly four times as long as broad without distal process, carpus shorter than the merus, three times as long as broad, the inner margin armed distally with three rather stout simple spines, penultimate joint short without inner process, nail strongly curved, about one third of the length of the carpus.

Remaining thoracic limbs slender with the tarsus composed



TEXT-FIG. 28.—*Heteromysis gymnura*, sp. nov.

a. eye, $\times 50$; *b.* antennal scale, $\times 65$; *c.* endopod of third thoracic limb, $\times 65$; *d.* endopod of fourth thoracic limb, $\times 65$; *e.* telson, $\times 65$.

of three joints terminated by a distinct nail, merus almost equal to the tarsus and nail together, ischium one and a half times as long as the merus.

Telson slightly longer than the last abdominal somite, one and three quarter times as long as broad at the base, cleft for more than one third of its length, the margins of the cleft armed throughout with about 25 closely set teeth, apex one quarter of the base of

the telson in width, each lobe armed with two spines, the outer three times as long as the inner and equal to one sixth of the telson in length, lateral margins lightly concave, proximal portion smooth, distal portion armed with 12-15 spines increasing in length distally, the interval between the last marginal spine and the larger spine on the apical lobe greater than the interval between any other pair of marginal spines.

Inner uropod equal in length to the telson plus the long terminal spine, without any spines on its lower inner margin.

Outer uropod one-third as long again as the telson.

Remarks.—This species is much less specialized than the other two. The eyes are much larger, the antennal scale proportionately longer and the third thoracic limb much less robustly built. The posterior thoracic limbs are noteworthy for their slender build, for the great length of the ischium and for the distinct nail and few joints in the tarsus. The inner uropods are without spines, a character which marks this species as distinct from all other described species of the genus.

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