

SOME NEW SPECIES OF COPEPODS FROM MADRAS COAST.

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In the course of a detailed study of over 250 samples of Madras plankton, 112 species of copepods were identified and it was found that seven were new to science. In the present paper five of these, *Labidocera bengalensis*, *Corissa indica*, *Kelleria rubimaculata*, *Macrochiron* (*Paramacrochiron*) *ornatus*, and *Saphirella enigmatus*, are described fully. The remaining two species will be described in a subsequent paper when the males of those species are obtained.

Family : PONTELLIDAE.

Labidocera bengalensis, sp. nov.

Occurrence.—Both sexes occur in large numbers in the plankton from July to December. The female holotype bearing the No. C3017/1 and the male allotype are deposited in the Zoological Survey of India.

THE FEMALE.

Length.—1.4 mm.

Colour.—The male as well as the female is of a dirty yellow colour. The abdomen is reddish in colour. Red pigment spots are scattered about on the cephalothorax also.

Body (text-fig. 1 *a*).—The anterior end of cephalosome is squared and the dorsal lenses are very prominent. Rostrum is pointed and bent downwards. Lateral hooks are present. The posterior corners of the cephalothorax are rounded. The abdomen is 3-jointed. The genital segment (text-fig. 1 *b*) is slightly swollen on the right side and bears a number of transparent papillae ventrally. Genital opening is paired. The genital segment is as long as the combined length of the next segment and the anal segment. The second abdominal segment is produced posteriorly on the left side. Caudal furca is symmetrical, each ramus bearing five setae and a small bristle (text-fig. 1 *c*). *Appendages*: The *antennule* is 22-jointed, and the joints have the following proportional lengths.

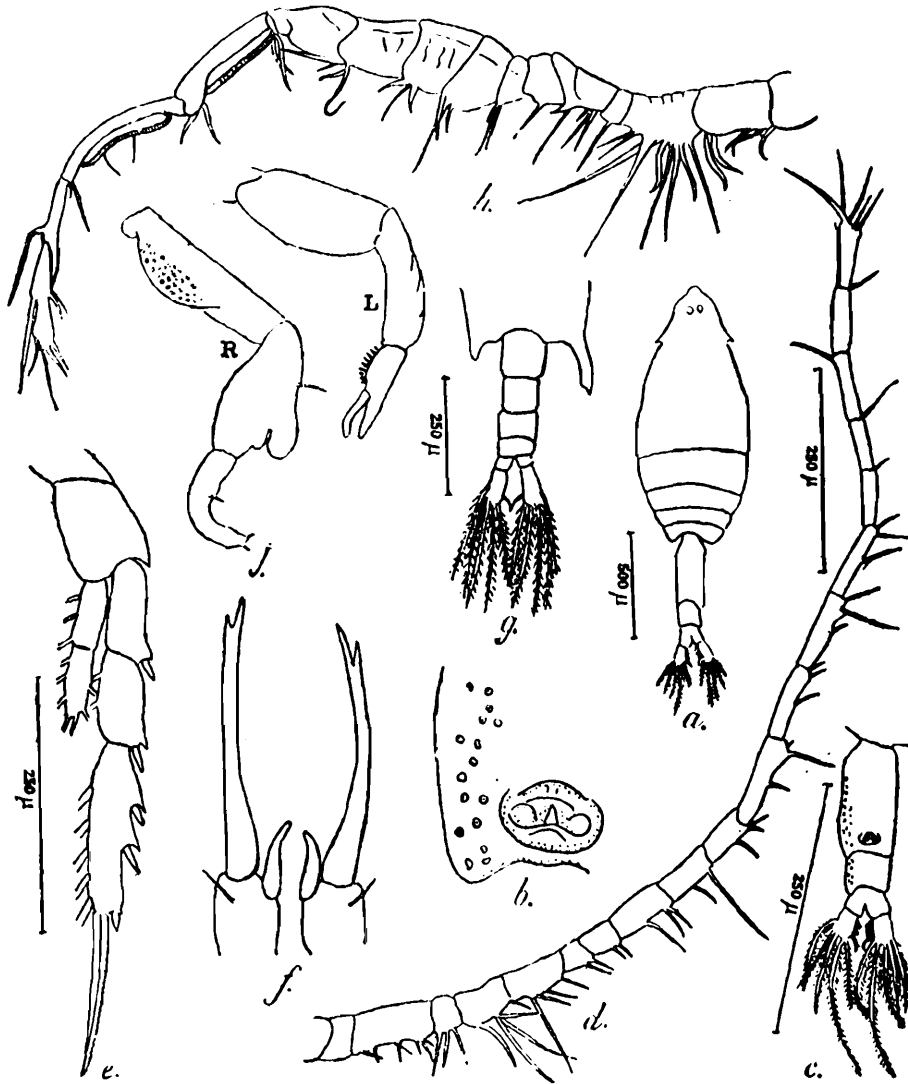
1. 2. 3. 4. 5. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 20. 18. 21. 19.

22. 10. 10. 30. 5. 12. 20. 6. 10. 20. 20. 20. 26. 26. 26. 26. 20. 20. 20.

20. 21.

The joints between three and five are not very clear. The number of setae and their arrangement are as shown in the figure (text-fig. 1 *d*). *Antenna* and *mouth parts* resemble those of other members of the genus. The first four pairs of swimming feet have a three-jointed exopod and

a two-jointed endopod. *The first swimming feet*: the first exopod-joint bears an outer spine, the second an outer spine and two inner setae, while the terminal joint bears three outer lateral spines, a serrate spine and five inner setae. The endopodite is only half as long as the exopodite. The first joint carries three inner setae while the terminal one



TEXT-FIG. 1.—*Labidocera bengalensis*, sp. nov.

a. Female, dorsal view; b. Genital segment, ♀ ventral aspect; c. Abdomen, ♀; d. antennule, ♀; e. First swimming feet, ♀; f. fifth leg, ♀; g. last thoracic segment and abdomen, ♂; h. Right antennule, ♂; j. Fifth leg (R—right; L—left).

carries two outer, three inner, and two apical setae (text-fig. 1 e). The second, third and fourth pairs of swimming feet resemble the first one. *Fifth leg*: consists of a basal joint and one-jointed exopod and endopod. The basipod has a seta on its outer side. The exopod is long, slender, and bifid at the distal end, and is nearly four times longer than the endopod. The endopod is short, and stout with a pointed tip which is slightly bent towards the inner side (text-fig. 1 f). The fifth leg resembles that of *L. brasiliense* Farran (1929, pp. 276-277, Fig 31).

THE MALE.

Length.—1.18 mm.

Body is slightly smaller than that of the female and is more slender. The right posterior corner of the cephalothorax is produced acutely.

The abdomen is five-jointed. The anal segment is very short being only half as long as the previous segment (text-fig. 1 *g*).

Appendages :—The *antennule* of the right side is geniculate and is composed of 17 articles which have the following proportional lengths :—

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17.

7. 16. 10. 5. 4. 6. 9. 4. 9. 11. 16. 11. 30. 31. 16. 12. 11.

The third joint which is indistinctly divided appears to consist of four fused articles. The sixth joint is again indistinctly divided into two, bringing the total to 21 articles. But only 17 articles are clearly seen. The hinge lies between the thirteenth and fourteenth joint, the inner margins of which are serrate. The inner end of the fifteenth joint is produced into a toothed spinous process which is as long as the succeeding joint. The number of setae and their distribution are shown in the figure (text-fig. 1 *h*). *Antenna*, *mouth parts* and the *first four pairs of swimming feet* are as in the female. *Fifth leg* is prehensile. Its right branch is made up of three segments, a stout basal segment whose outer margin is swollen, a similar second joint whose inner edge is produced and which carries a spine on the inner side and a terminal, stout, claw-like joint which carries four short spines. The left joint (text-fig. 1 *j*, *L.*) appears to be four jointed. The basal joint is stout. The second joint is nearly as long as the first and carries a spine on its outer side ; the third joint whose distal end is produced, bears spinules on the inner side and the terminal joint is slender and claw-like.

Remarks.—The female closely approaches *L. brasiliense* Farran (*loc. cit.*) in the structure of the fifth foot, but differs in having the posterior corners of the cephalothorax rounded, in the asymmetrical genital segment with the tubercles and in the squared anterior end of the cephalosome. The male is closely allied to *L. minuta* Giesbrecht (1892) but differs from it in the structure of the posterior corners of the cephalothorax and fifth legs. Several females and males were found in the Madras as well as Krusadai plankton.

Family : CORYCAEIDAE.

***Corissa indica*, sp. nov.**

The occurrence of the genus *Corissa* Farran at Madras is of considerable interest, because, since the establishment of this genus by Farran (1936) on a solitary female collected from the Great Barrier Reef in Australia it has not so far been recorded from any other locality. In a tow-net collection made at Madras Harbour on the 23rd and 26th July 1948 six females and two males were obtained, which are referable to this genus. As these specimens differ from the description of the female holotype *C. parva* (the genotype of *Corissa*) they are described as a new species *C. indica*. As the number of specimens at my disposal is larger, opportunity has been taken to confirm the character of the genus. The holotype (♀) and the allotype (♂) have been deposited in the Z. S. I. and bear the Regd. No. C 3016/1,

THE FEMALE.

Length.—0.742 mm.

Colour.—The body is transparent and colourless. The 'optic-cup' is deep orange in colour.

Body (text-fig. 2 a).—Resembles *C. parva* in general appearance. The cephalosome bears two prominent corneal lenses at the anterior end, as in *Corycaeus*, but these are not widely separated. There are five thoracic segments which decrease in breadth gradually. The cephalothorax is twice as long as the abdomen. The abdomen is three-jointed. The genital segment bears a seta on each side. The furcal rami are broad and lamellar, carrying three apical setae and one sub-apical lateral seta each, on inner and outer margins (text-fig. 2 b).

Appendages.—The *antennule* (text-fig. 2 c) is five-jointed having the following proportional lengths 1. 2. 3. 4. 5.

11. 18. 19. 10. 15.

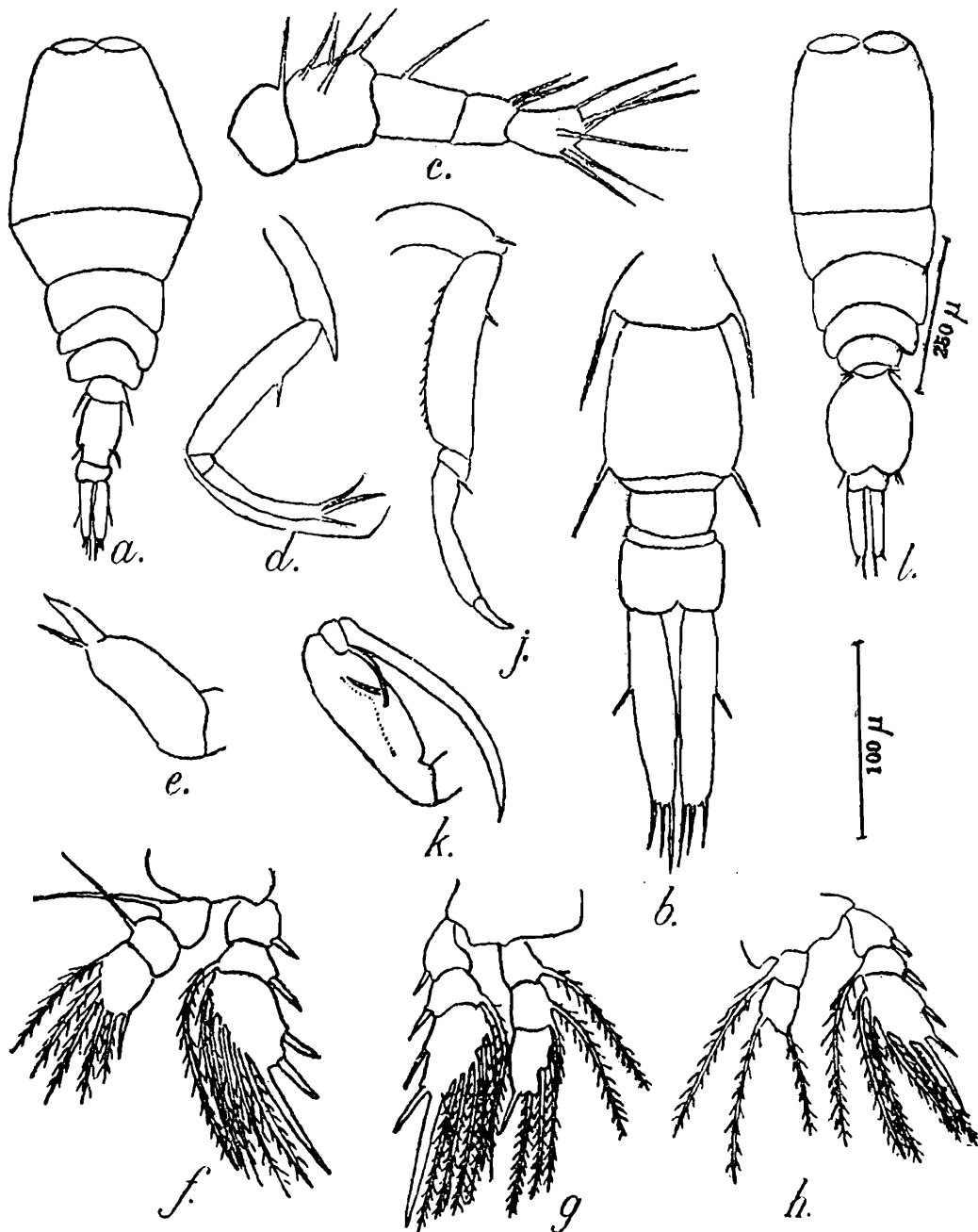
The *antenna* (text-fig. 2 d) is four-jointed. The basal joint bears a spine on the inner side. The second joint is twice as long as the first and carries a short spine about its middle on the inner side. The third joint is very small and devoid of spines and setae, while the terminal joint, which is six times longer than the third, carries two setae and a spine at the apex. *Mouth parts* are as in *C. parva*. The *maxilliped* (text-fig. 2 e), however, differs in structure. It is two-jointed and the swollen second joint carries a stout spine and a seta at the apex. There are four pairs of biramous swimming feet. *First pair of swimming feet* (text-fig. 2 f) the exopodite as well as the endopodite are three-jointed. The first exopodite joint has an outer lateral spine, the second an outer lateral spine and an inner seta, and the terminal two outer lateral spines, a long apical spine and five inner setae. The first and second joints of the endopodite carry a seta each towards the inner side, while the terminal one carries one stout spine and five setae. *Second pair of swimming feet* (text-fig. 2 g) resembles the first one in general structure but differs from it in having two inner setae in the second endopod joint and only three setae and one slender spine in the third endopod joint. The third pair resembles the second one. *Fourth pair of swimming feet* (text-fig. 2 h): the exopodite is three-jointed but the endopodite is only two-jointed. The first exopod joint carries one outer spine, the second joint one outer spine and one inner seta while the terminal joint bears three spines and four inner setae. *Fifth pair of swimming feet* is represented by a single bristle which is long, reaching the end of the genital segment.

THE MALE.

Size.—0.711 mm. Slightly shorter than the female.

Colour.—Excepting the genital segment which is of a deep orange colour, the male is colourless and transparent.

Body (text-fig. 2 l).—The two corneal lenses at the anterior side are very close to each other. The last thoracic segment is very narrow and it carries three bristles on each side which represent the fifth legs. The abdomen is two-jointed. The genital segment is very swollen and carries a spinous process on each side at the posterior corners. The furcal rami are longer than broad and are provided with two setae each at the tip.



TEXT-FIG. 2.—*Corissa indica*, sp. nov.

a. Female, dorsal view; b. Abdomen, ♀; c. Antennule, ♀; d. Antenna, ♀; e. maxilliped, ♀; f., g. & h. First, second and fourth swimming feet resp., ♀; i. Antenna, ♂; j. Maxilliped, ♂; k. Male, dorsal view.

Appendages.—The *antennule* is as in female. The *antenna* (text-fig. 2 j) is four-jointed as in female, but differs from that of latter in (i) the absence of a spine on the basal joint, (ii) the second joint being setose on the outer side, (iii) the third joint carrying a spine on the inner side

and (iv) the terminal joint having only one claw-like spine. The *mandible* and *maxillae* are as in the female. The *maxilliped* (text fig. 2 k) is two-jointed. The second joint which is very stout carries a row of spinules and is hinged to an apical claw which is longer than the rest of the appendage. *Swimming appendages* are similar to those of female. *Fifth leg* is represented by two bristles.

Remarks.—The following table of comparison between *C. prava*, the *type species* of the genus, and the present form will show that we are dealing with a second species of the genus.

| | <i>Corissa parva</i> Farran. | <i>Corissa indica</i> , sp. nov. |
|-------------------------------------|--|--|
| <i>Length</i> | Female 0.87 mm. | Female 0.742 mm.
Male 0.711 mm. |
| <i>Antennule</i> .. | 5-jointed.
1, 2, 3, 4, 5,

19, 36, 30, 14, 24. | 5-jointed.
1, 2, 3, 4, 5,

11. 18. 19. 10. 15. |
| <i>Antenna</i> | 3rd joint with two short spines on the inner side and the terminal joint with two short spines and a long spine. | 3rd joint without spines or setae. Terminal joint with one claw and two setae. |
| <i>First pair of swimming feet.</i> | Exopod with 1,1,3 outer spines and 0,1,4 inner setae. | Exopod with 1,1,3 outer spines and 0,1,5 inner setae. |
| <i>Second swimming feet</i> | Basipod with outer seta

Endopod with 0,0,2 outer spines and 1,2,4 setae. | Basipod without outer seta.

Endopod 0,0,1 outer spines and 1,2,3 inner setae. |
| <i>3rd swimming feet</i> | Endopod with 0,0,1 outer spines and 1,2,2, inner setae. | Endopod with 0,0,1 outer spines and 1,2,3 inner setae. |

Corrissa indica can be defined as follows:—General shape resembling that of *C. parva*. Length of female 0.747 mm. and of male 0.711 mm. *Antennule* five-jointed. *Antenna* four jointed, the third joint without setae and the terminal joint with a claw and two setae. Exopod of first swimming feet with 1,1,3 outer spines and 0,1,5 inner setae. Endopod of second leg with 0,0,1 outer spines and 1,2,3 inner setae. The male slightly shorter than the female. Genital segment very swollen carrying two setae posteriorly. *Maxilliped* prehensile. Fifth leg represented by two bristles.

Family : LICHOMOLGIDAE.

Sub-family : LICHOMOLINAC (Gurney).

***Kelleria rubimaculata*, sp. nov.**

Occurrence.—Over fifty females and males of this form were collected between July and March. Scrutiny of the structure shows that it belongs to the genus *Kelleria* Gurney which contains only seven species, namely,

Kelleria propinqu (T. Scott), *K. pectinatu* (A. Scott), *K. regalis* Gurney, *K. purpuricincta* Gurney, *K. andamanensis* Sewell, *K. camortensis* Sewell and *K. gurneyi* Sewell. The present form differs from all these seven and hence, is treated as a new species and fully described below. The types bearing the Regd. Nos. C 3020/1 (holotype) and C 3030/1 (paratypes) are deposited in the Zoological Survey of India.

THE FEMALE.

Length.—0.7 mm.

Colour.—The animal was of a dirty yellow colour with red pigment scattered about the body. The alimentary canal was conspicuous by its blue colour.

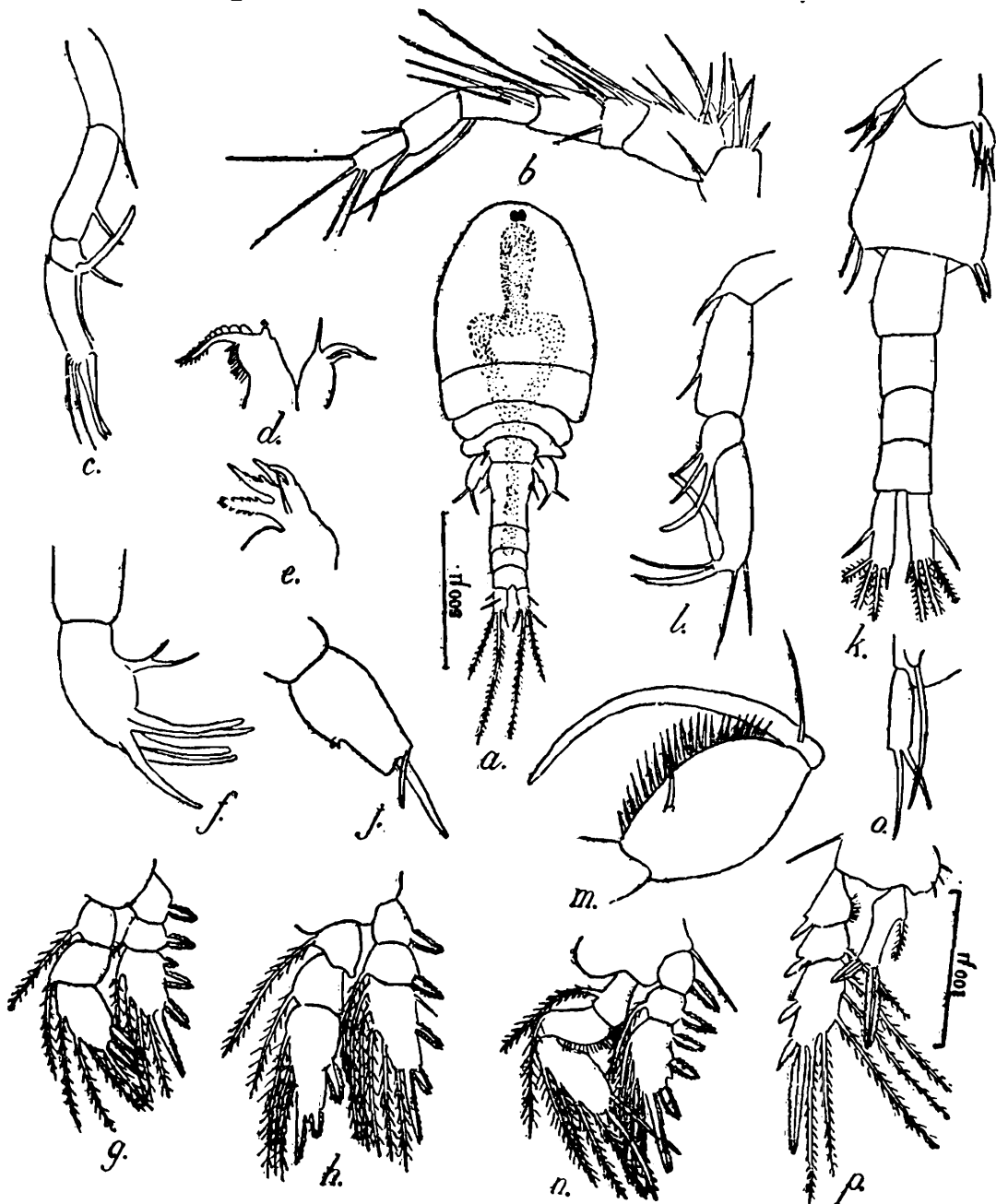
Body (text-fig. 3 a).—The general body shape is cyclopiform. The cephalosome forms more than a third of the total length and is longer than broad. The second, third and fourth thoracic segments appear curved anteriorly with their postero-lateral corners produced into rounded lobes. These three segments decrease in length and breadth gradually. The division between the fifth thoracic segment and the genital segment is marked off by a groove. The abdomen is four-jointed. The genital segment is longer than broad, and is swollen towards the anterior third of the length where two setae are found attached. The caudal rami are longer than broad, there being five setae and a bristle on each ramus.

Appendages.—The *antennule* (text-fig. 3 b) is seven-jointed and the joints have the following proportional lengths 1, 2, 3, 4, 5, 6, 7, The

9, 15, 5, 10, 11, 9, 7

number of setae and their arrangement are as shown in the figure. The *antenna* (text-fig. 3 c) is four-jointed, the joints one, two and four are of nearly the same length, while the third joint is much smaller, being about a fourth in length. The first and second joints bear a seta each towards the inner side while the third joint bears two setae and a claw-like spine, and the fourth joint carries terminally two stout claw-like spines as well as two setae. The *mandible* (text-fig. 3 d) bears a dorsal row of teeth and is produced into a flagellar process. The basal portion of its ventral side is fringed with 'hairs'. The *maxilla* (text-fig. 3 d) is single-jointed with two short spines and a long blunt spine between. The *second maxilla* (text-fig. 3 e) has four processes towards the inner side, of which two are dentate. There is a short spine on the basal joint. The *maxilliped* (text-fig. 3 f) is three-jointed, of which the long, bulbous second joint is not clearly marked off from the third. The second joint bears distally a stout bifid spine and a stout claw-like spine, while the third is distinguished by three stout claws and a seta. In the *first pair of swimming feet* (text-fig. 3 g) the exopodite as well as endopodite are three-jointed. The first exopodite-joint bears a serrate spine towards the outer side, the second joint bears a serrate spine and an inner seta and the third bears three outer lateral serrate spines, a long apical spine which is serrate on the upper side only, and four inner setae. The endopodite is longer than the exopodite, and its

first and second joints carry an inner seta each, while, the terminal one carries two apical serrate spines and five inner setae. In the second pair of swimming feet (text-fig. 3 h) the exopod is three-jointed. The first joint has an outer serrate spine the second has an outer serrate spine and an inner seta while the third joint, which is as long as the first two joints combined, has two outer lateral serrate spines, a naked outer-lateral spine, an apical serrate spine and five inner setae. The endopodite which is slightly longer than the exopodite is also three-jointed. The first and second joints carry an inner seta each, while the third joint carries two outer lateral serrate spines, one apical serrate spine, and three inner setae. The third pair of swimming feet resembles the second pair. In the fourth swimming feet (text-fig 3 p) the exopodite is three-jointed, but the endopodite is made up of a single joint as in all members of this genus. The basipodite is broad and carries a seta towards the outer



TEXT-FIG. 3.—*Kelleria rubimaculata*, sp. nov.

a. Female, dorsal view; b. Antennule, ♀; c. Antenna, ♀; d. Mandible and Maxillula, ♀; e. Maxilla, ♀; f. maxilliped, ♀; g. & h. Second and fourth swimming feet resp., ♀; i. Fifth leg ♀; j. Abdomen, ♂; k. antenna, ♂; l. maxilliped, ♂; m. First swimming feet, ♂; n. Fifth leg, ♂.

side and three short spines towards the inner side. The first joint of exopod has its inner margin hirsute and carries an outer-lateral serrate spine, the second joint one outer spine and an inner seta and the third joint two outer lateral serrate spines, one apical serrate spine and five inner setae. The single-jointed endopodite carries an inner plumose seta and two unequal serrate spines at the apex. *Fifth leg* (text-fig. 3 *j*) is single-jointed, broad and laminar, with two naked spines, the outer one being longer than the inner one.

THE MALE.

Length.—0.637 mm. Slightly shorter than the female.

Colour.—As in female.

Body.—Though the general body form is like that of the female, the male can be distinguished easily by the abdomen being five-jointed, the genital segment being very swollen and slightly longer than broad, carrying three setae (text-fig. 3 *k*).

Appendages.—The *antennule* is seven-jointed and resembles that of the female. The *antenna* (text-fig. 3 *l*), which is four-jointed resembles that of the female except for an additional seta on the fourth joint. The *mandible* and *maxillae* are as in the female. The *maxilliped* (text-fig. 3 *m*) is prehensile. It is two-jointed, the second joint being very swollen and fringed with spines towards the inner margin. It bears a long, stout, claw at its proximal end. In the *first swimming feet* (text-fig. 3 *n*) the basipodite carries a seta towards the inner side. The exopodite is three-jointed. The first exopodite-joint carries an outer lateral serrate spine, the second joint an outer lateral spine and an inner seta while the third joint bears three serrate spines and four inner setae. The endopodite, which is also three-jointed, is longer than the exopodite, its first and second joints carry an inner seta each while the third joint bears four inner setae and two serrate spines. The inner margin of the second joint is hirsute. The *second, third and fourth swimming feet* are as in the female. The *fifth leg* (text-fig. 3 *o*) is long and slender with two unequal spines.

Remarks.—The present species resembles *Kelleria regalis* Gurney more closely than the other known species of the genus. However, it differs from the former in several character as shown in the table below :—

| | | <i>Kelleria regalis</i> Gurney. | <i>Kelleria rubimaculata</i> , sp. nov. |
|--------------------|-------|--|---|
| <i>Length</i> | | Female 1.45 mm.
Male 1.35 mm. | Female 0.7 mm.
Male 0.637 mm. |
| <i>1st antenna</i> | | 1. 2. 3. 4. 5. 6. 7.
<hr/> 15. 25. 10. 20. 20. 22. 14. | 1. 2. 3. 4. 5. 6. 7.
<hr/> 9. 15. 5. 10. 11. 9. 7. |
| <i>2nd antenna</i> | | Four-jointed. Third joint with 3 inner setae. Fourth joint with six setae. | Four-jointed. Third joint with two setae and a claw-like spine. Fourth joint with two setae and two claw-like spines. |

Kelleria regalis Gurney. *Kelleria rubimaculata*, sp. nov.

| | | |
|-----------------------------|--|---|
| <i>Mandible</i> | Ventral edge strongly toothed. | Ventral edge not toothed but
hirsute towards the basal
side. |
| <i>1st Maxilla</i> | A simple lappet with three
terminal setae and a hook-
like spine. | A simple lappet with three
spines. |
| <i>2nd Maxilla</i> | With a basal portion and a
two-jointed upper portion.
The second joint bearing
three simple and two large
denticulated spines. | The second joint with naked
spines and two large spines
which are denticulated on
the upper side only. |
| <i>Maxilliped</i> .. | In Female — three-join-
ted. Spines on the 2nd
joint bifid. | In Female — three-join-
ted. Spine on the distal
end of 2nd joint not bifid. |
| <i>1st swimming feet</i> | Basipod with an outer seta.
Third exopod-joint with
four outer lateral spines. | Basipod without an outer
seta. Third exopod joint
with five lateral spines. |
| <i>2nd swimming feet</i> .. | Third exopod-joint with four
spines and five inner setae.
Endopod-third-joint with
three spines. | Third exopod-joint with three
serrate spines and one naked
spine. Endopod-third-joint
with one spine. |
| <i>Fourth leg</i> .. | Basipod with an outer seta. | Basipod with an outer seta
and three inner spines. |

As will be clear, from the table the present species is distinct and different from *K. regalis* and I, therefore, propose to name it as *K. rubimaculata*, sp. nov., because of its distinctive colouration. *K. rubimaculata* may be defined as follows:—*Length*. Female 0.7 mm. and male 0.637 mm. *Antennule* seven-jointed. The third joint of the *antenna* armed with two setae and a claw-like spine. Fourth joint two setae and two claw-like spines, The ventral edge of *mandible* hirsute towards the basal side. *First maxilla* a simple lappet with three spines. *Maxilliped* three-jointed in the female. The spine on the distal end of second joint not bifid. Basipod of *first swimming feet* without an outer-seta. Third exopod joint with five lateral spines. In the *second swimming feet* third exopod-joint with three serrate spines and naked spines. Third joint of the *endopod* with one spine. Basipod of *fourth leg* with an outer seta and three inner spines.

Macrochiron (Paramacrochiron) ornatus, sp. nov.

Occurrence.—Large numbers of this form were collected between August and March in the plankton. The holotype and allotype have been deposited in the Z. S. I. (Regd. No. C 3018/1).

THE FEMALE.

Length.—0.84 mm.

Colour.—When alive, the animal is of a dirty yellow colour with a number of blue patches, on the dorsal side of the body and even on

the swimming feet. These blue patches fade away after preservation in formalin.

Body (text-fig. 4 a).—The cephalosome is broadly ovate and is about twice as long as broad with posterior edge concave. The rostrum is broadly triangular and is bent on the ventral side. The abdomen is four-fifth the length of the cephalothorax. It is four-jointed, the first of which (the genital segment) is as long as the three others put together and is inflated in its anterior half. There are two setae in the genital pore. Each ramus bears a seta externally and three terminal setae of which the second from the inner side is the longest. This seta was never in tact in any of the specimens.

Appendages.—The *antennule* (text-fig. 4 b) is seven-jointed, the joints

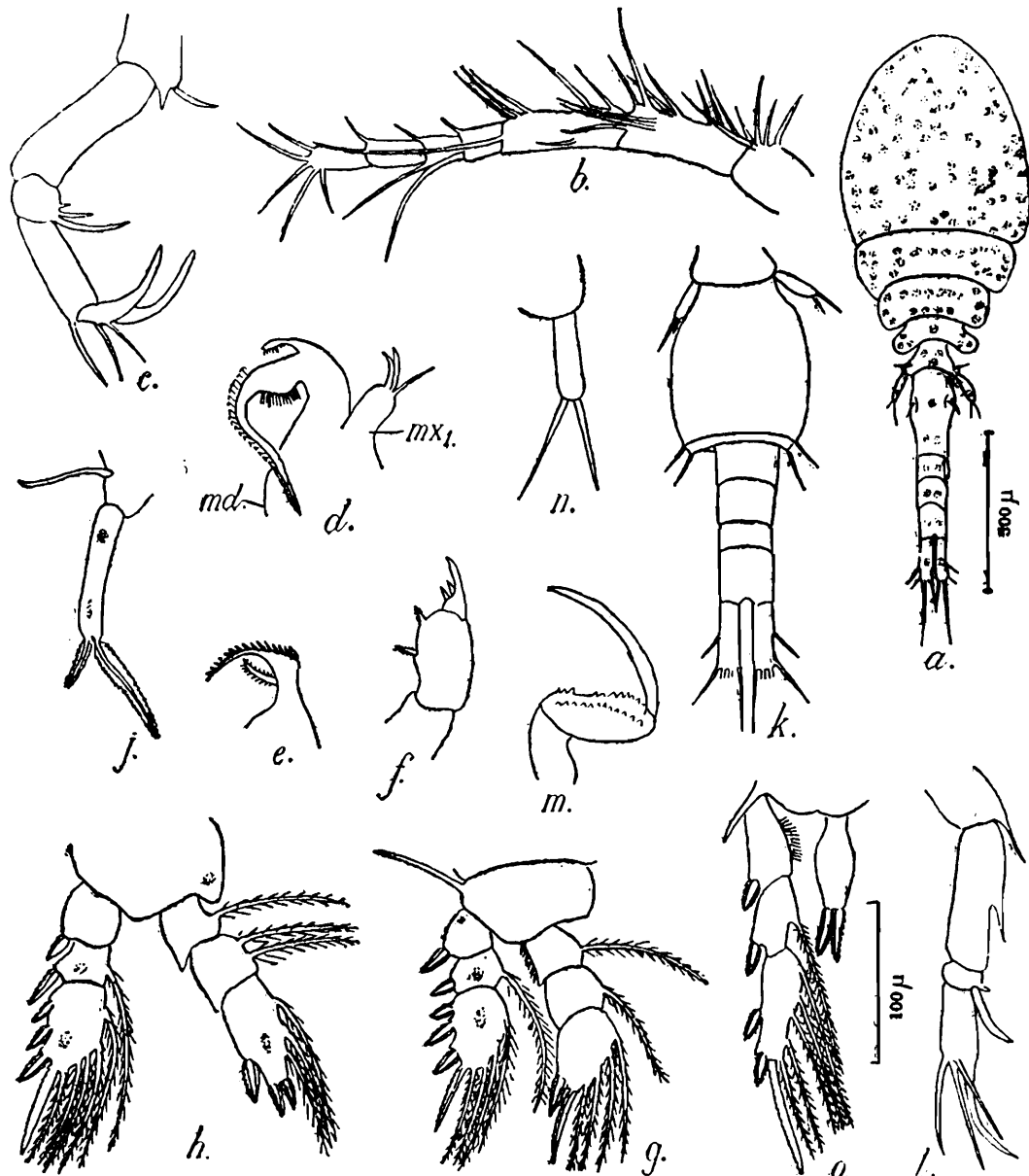
1. 2. 3. 4. 5. 6. 7.

having the following proportional lengths _____ Each

12. 18. 5. 12. 11. 8. 8.

joint bears a large number of setae, arranged as shown in the figure. The *antenna* (text-fig. 4 c) is four-jointed. The basal joint bears two short spines towards the inner side of its distal margin. The second joint is the longest and is devoid of spines and setae. The third joint is the shortest and bears two short spines and a claw towards the inner side. The terminal joint bears three unequal spines and two stout 'claws' which are probably used when this copepod chooses to attach itself on a host. *Mandible* (text-fig. 4d, *md*) consists of a swollen base produced into a long flagellar extension. A short plumose spine on the dorsal side and the patch of hairs on the ventral side mark the base of the flagellar process. The *first maxilla* (text-fig. 4d, *mx 1*) is single-jointed and is armed with three terminal setae. The *second maxilla* (text-fig. 4e) is also flagellar and armed with spinules on the dorsal side. There is a plumose spine at its base on the ventral side. The *maxilliped* (text-fig. 4f), which appears to be prehensile, is three-jointed. The second joint is swollen and bears two plumose spines on its inner edge. The terminal joint is short and claw-like and bears a spine and a short seta towards the inner side. *First swimming feet* (text-fig. 4g) are biramous, both the rami being three-jointed. The basipodite bears a seta towards the outer side. The proximal joint of the exopodite bears on the outside a short, lanceolate spine with serrate edges. The second joint bears a similar spine on the outer edge and a plumose seta on the inner margin. The terminal joint has three such spines, a long, straight spine on the outer edge and four setae on the inner side. The outer edge of the basal joint of the endopodite is hirsute while the inner edge bears a plumose seta, its second joint a seta on the inner side and the third bears two serrate spines and four plumose setae. The *second* (text-fig. 4h) and the *third swimming feet* are similar. The endopod is a little longer than the exopod. The first and second exopod joints are as in the first swimming feet, the third exopodite joint is large, being as long as the first and second joints put together and bears five plumose setae and four serrate spines. The first endopodite-joint bears one, and the second, two, plumose setae on the inner side while the third joint which is far longer, carries three serrate spines, one on the outer side and two terminally and three plumose setae on the inner side.

In the fourth foot (text-fig. 4o) exopodite is three-jointed while the endopodite is single-jointed. The single-jointed endopodite is tipped with two serrate spines and is 'hairy' on the inner side. The first



TEXT-FIG. 4.—*Macrochiron* (*Paramacrochiron*) *ornatus*, sp. nov.

a. Female, dorsal view; b. Antennule, ♀; c. Antenna, ♀; d. Mandible (*Md.*) and Maxillule (*Mx.*) ♀; e. Maxilla, ♀; f. maxilliped, ♀; g., h. & o., First, second and fourth swimming feet resp., ♀; j. Fifth leg, ♀; k. Abdomen, ♂; l. antenna, ♂; m. maxilliped, ♂; n. fifth leg, ♂.

exopod-joint bears an outer spine. The second joint bears a spine on the outer side and a plumose seta on the inner side. The terminal joint bears three serrate spines, of which the terminal one is several times longer than the other two, and five inner setae. *Fifth leg* (text-fig. 4j) is single-jointed, and tipped with two serrate spines of unequal length. There is a seta attached to the part of the body bearing this fifth leg.

THE MALE.

Length.—0.635 mm.

Body.—It resembles that of the female in general shape as well as colour, but is shorter in size. The abdomen (text-fig. 4k) is composed

of five segments. The genital segment is very swollen, more or less barrel-shaped carrying two short spines at the outer marginal end on each side.

Appendages.—The *antennule* is seven-jointed as in female. The second and fourth joints bear two long 'aesthetes' in addition to the setae. The setae are arranged as in the female. The *antenna* (text-fig. 4l) is four-jointed. Its first joint is armed with only one spine. The second joint bears a short spine about the middle of the joint, the third joint a shot spine and a long claw, while the terminal joint bears one claw and three setae. The *mandible* and *maxillae* are as in the female. Of the three joints of the prehensile *maxilliped* (text-fig. 4m), the second joint is swollen and is furnished with a row of spinules on the inner side. The terminal joint is long and a stout claw, hinged to the second joint. First four pairs of swimming feet resemble those of the female. The *fifth* one (text-fig. 4n), however, differs from that of the female in being tipped with two simple setae.

Remarks.—This new species approaches *P. malayense* Sewell (1949) in the structure and armature of the terminal joint of the antenna, and the mandible and the first swimming feet, but differs from it in size, the armature of the furcal ramus, the structure of the 4th endopod and fifth leg. It resembles *P. parvum* (Scott) in the structure of the second maxilla, the maxilliped and the 4th swimming feet but differs in the structure of the antenna, mandible and first maxilla.

Family : CLAUSIIDIDAE.

Saphirella enigmatus, sp. nov.

Since 1894, when Scott established the genus *Saphirella* with the type species *S. abyssicola*, three more species, viz., *S. tropica* Wolfenden (1905), *S. indica* Sewell (1924) and *Saphirella* sp. Gurney (1945) have been described. These four species fall into two size groups and different opinions have been expressed as regards their being either larval immature forms or adult ones or neotonic larvae. The present form, though clearly belonging to this genus, differs from the above mentioned four species, and is, hence, described as new to science. The holotype, bearing the Regd. No. C 3019/1, is deposited in the Zoological Survey of India.

Occurrence.—Over 20 specimens were collected from Madras as well as Krusadai plankton between July and March.

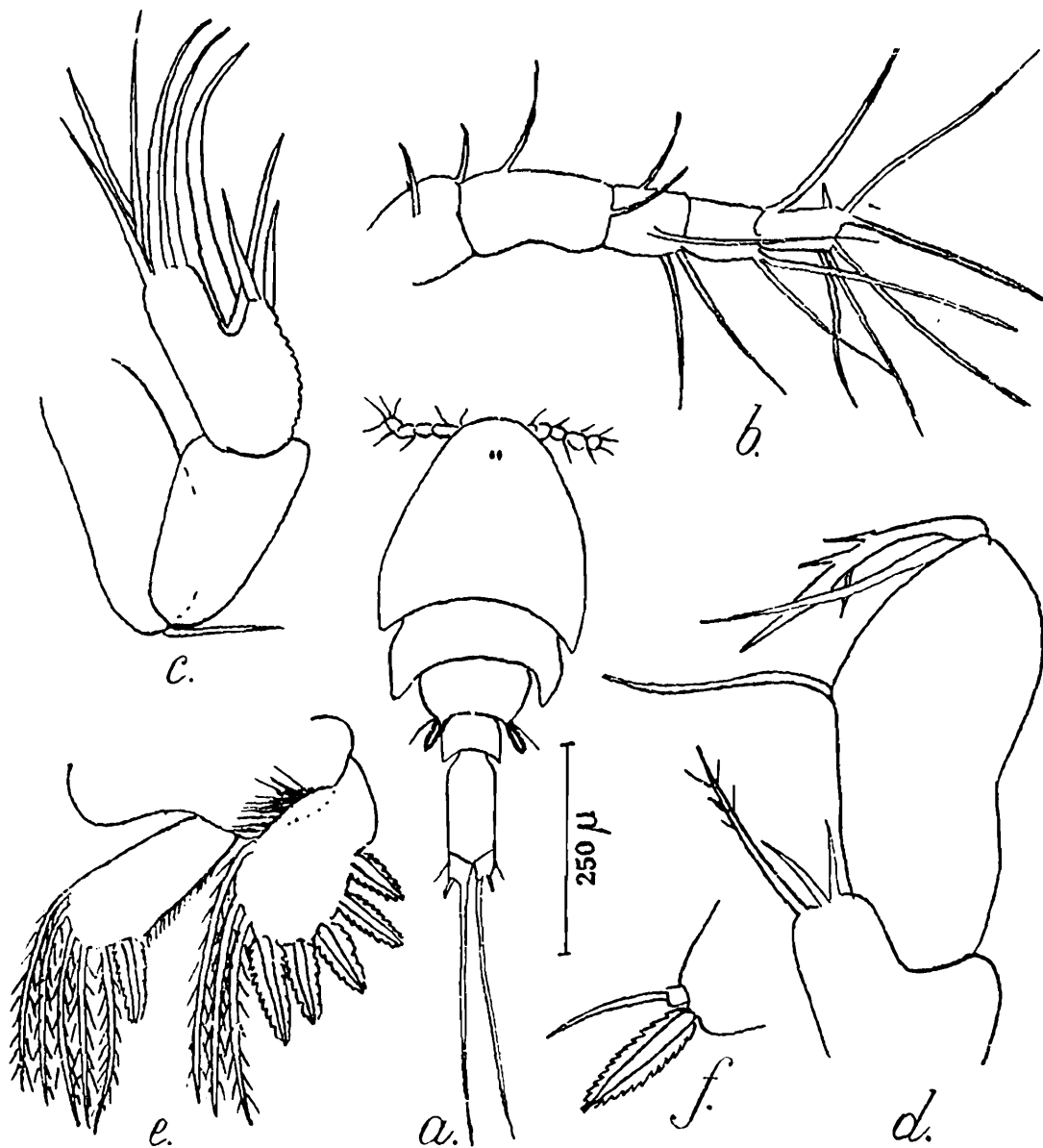
Size.—1.7 mm. long (average length) from the tip of the cephalic plate to the tip of the caudal setae.

Colour.—Of a dark yellow colour and appeared very robust.

Body.—(text-fig. 5 a).—The cephalosome is elliptical with its posterolateral corners produced acutely. The second thoracic segment is broader than long and has acute hind corner. The third segment which is about half as wide as the previous segment, carries a dagger-shaped spine and a seta on each side of its posterior margin (text-fig. 5 f). The next segment is narrower, leading to the still narrower abdomen.

Appendages.—The *antennule* (text-fig. 5 *b*) is five-jointed, the proportionate lengths of the joints being ———— There is no aesthete
1. 2. 3. 4. 5.
4. 6. 3. 2. 3.

such as Sewell (1924) and Gurney (1945) found in the third and fourth joints. The antenna (text-fig. 5 *c*) is three-jointed as in other species. The basal joint is the longest and bears a marginal seta, the second joint is slightly smaller and devoid of any spine or seta while the third joint has a serrate inner margin and is bilobed, the inner lobe carrying three spines and a long, stout, curved seta and the outer one carrying five long setae. All the mouth parts resemble those of *S. tropica* except the *maxilliped* (text-fig. 5 *d*) which is two-jointed, the basal joint carrying two small spines and a long plumose spine towards the inner margin, and the second joint bearing a long spine in the middle and two long, stout and scarcely plumose setae towards the upper part. *Swimming*



TEXT-FIG. 5.—*Saphirella enigmatus*, sp. nov.

a. Dorsal view ; *b.* Antennule ; *c.* Antenna ; *d.* Maxilliped ; *e.* First swimming feet ; *f.* Spine on the posterior corner of the third thoracic segment.

feet (text-fig. 5 e) : The laminate rami of the only two pairs of swimming feet present are unsegmented. The exopodite bears two apical and three sub-apical dagger-shaped spines and three inner setae. The inner margin of the exopodite is hirsute. The endopodite has its outer margin fringed with hairs and carries a dagger-shaped spine and five inner setae.

Taxonomic discussion.—A careful study of more than twenty specimens undoubtedly proved that this form is referable to *Saphirella* T. Scott, a genus which was provisionally created by Scott in 1894 to accommodate *S. abyssicola*. In 1905 Wolfenden added another species *S. tropica* from the Laccadives and Maldives. In 1924, Sewell, who described yet another species *S. indica*, felt that *Giardella* Canu (1886) and *Paurocope* Brady (1895) must be assigned a place in this genus. Nicholls (1944), however, rejected the suggestion to include *Paurocope robusta* in *Saphirella*. He also suggested that *Saphirella tropica* is only a juvenile stage of *Hemicyclops* sp. as the two agree in the structure of mouth appendages. Gurney (1945) felt that the name *Saphirella* should be restricted to the large form (measuring above 1 mm.). According to this definition the genus *Saphirella* will include only *S. abyssicola*, *S. tropica* and two specimens recorded by Gurney from Samoa as *Saphirella* sp. Sewell (1949. p. 66), who described *S. nicobarica* from Nicobar Is., states that “ the known species of this genus *Saphirella* fall into two groups according to the length of the furcal rami.” In the first group, the furcal remus is short, e.g., *S. abyssicola* and *S. tropica*, and in the second group it is nearly one-third of the length of the abdominal segment, e.g., *S. indica*, *S. nicobarica*. The present form, *S. enigmatus*, sp. nov. falls into the first group.

It is hoped that a careful and comparative examination of the specimens belonging to all these species may yet reveal diagnostic features, more reliable than merely a distinction based on size. So far as the present form is concerned it falls into *Saphirella* as defined by Gurney and is distinct from *S. abyssicola* T. Scott, *S. tropica* Wolfenden as well as the Samoan form described by Gurney. Hence it is described as a new species. It can be defined as follows : Body very robust. Length 1.5 mm. to 1.8 mm. *Antennule* five-jointed. The outer edge of the terminal joint of the *antenna* serrate, carrying two spines and two setae. The basal joint of the *maxilliped* with two spines and a seta. The endopodite of *swimming feet* with one apical dagger-shaped spine, and five sub-apical setae.

Remarks.—The present form is also of interest from the point of view of its maturity. While Scott (1912), Brady (1905) and Wolfenden (1905) considered *Saphirella* to be an adult male later workers like Sewell (1924), Nicholls (1944) and Gurney (1945) consider this to be an immature form. According to Gurney (*loc. cit.*) this “ must belong to an adult genus not yet discovered or must be a persistent larval form comparable to the giant larval forms of Decapods ” The second assumption is difficult to accept, as he himself points out later, since the larva is still in the first copepodite stage and is confined to the inshore waters unlike the Decapod larvae which live in the open sea.

ACKNOWLEDGMENTS.

It is with great pleasure that the author takes this opportunity to express his grateful thanks to Dr. C. P. Gnanamuthu, Director, Zoology Laboratory, Madras University for the guidance and help throughout the course of this work and to Col. R. B. Seymour Sewell, F. R. S. of Cambridge for his helpful criticisms and suggestions. To the Syndicate of the Madras University, the author is very thankful for the award of a studentship during the tenure of which the present work was carried out.

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