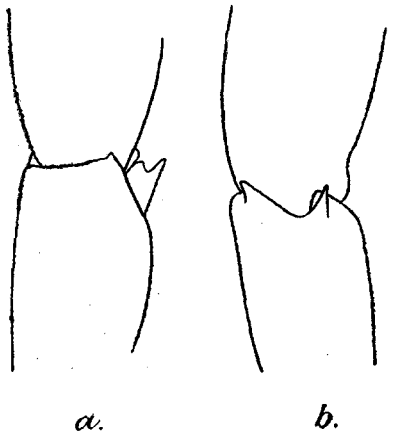
1·1 times as long as the merus, from 7 to 10 times as long as its distal breadth and from 1·4 to 1·7 times as long as the chela; it is proportionately longest and most slender in adult males. The fingers are about equal in length with the palm and are unarmed.

The second peraeopods of adult males (text-fig. 56*b*) extend beyond the antennal scale by the chela, carpus and a portion of the merus and may be as much as 6 times the length of the carapace. They do not show the minute asperities with which the second legs of the two preceding species are covered and there is no tubercle at the distal end of the ischium. The merus bears the usual strong spine at the distal end of the lower border and, in adults, is from 8 to 9 times as long as broad. In all well grown males the merus is very slightly longer than the carpus, from 1·05 to 1·1 times its length; in small males the merus and carpus are equal or the latter is a shade the longer. The carpus is from 6 to 7 times as long as its distal breadth in adults, but in young males is more slender, sometimes as much as 9 times as long as wide. The carpus always bears a conspicuous spine on the inner side of its distal margin and in large males there is in addition a small acute projection or tooth on the upper and inner aspect (text-figs. 57*a*, *b*). The chela is from 1·8 to 2·2 times the length of the carpus in adults, in young specimens 1·5 times or even less. The palm in large specimens is about 6 times as long as wide; in adults it is from 1·8 to 2·1 times as long as the fingers, in young males proportionately shorter, from 1·5 to 1·7 times. The fingers resemble those of *P. agag*; in some specimens they are excavate on their inner margins, in others they meet throughout their length when shut and bear a series of small teeth in their proximal two-thirds.




TEXT-FIG. 57.—*Periclimenes andamanensis*, sp. nov.

*a*. Carpo-propodal articulation of right second peraeopod of male, viewed from above.
*b*. The same, viewed from inner side.

In females (text-fig. 56*c*) the second peraeopods are more slender and proportionately shorter than in adult males. The carpus is equal to or a little longer than the merus and is 8 to 9 times as long as its distal breadth. As in males the carpal spine is conspicuous. The chela is from 1·35 to 1·6 times as long as the carpus, with the palm about 1·4 times the length of the fingers. The fingers have some inconspicuous teeth in the proximal half.

The last three pairs of peraeopods (textfig. 56*d*) are long and slender; the fifth pair reaches to or a little beyond the end of the antennal scale. The merus of the third pair is about 15 to 16 times as long as broad in adults. The propodus bears some slender spinules on its posterior edge and is from 2·7 to 3·6 times as long as the dactylus, proportionately longest in large males. The dactylus is simple and curved, with a few setae on the middle of its anterior margin; it is from 7·5 to 8 times as long as its basal breadth.

The sixth abdominal somite is about 1·7 times the length of the fifth. In the arrangement of the spines the telson resembles that of *P. agag*.

A large male is about 19 mm. in length.

*Periclimenes andamanensis* agrees with *P. proximus* and differs from *P. agag* in the comparatively stout first and second legs and in the greater length of the chela of the second legs, as compared with the carpus, in adults of both sexes. From both species it is distinguished by the presence of the carpal spine. It also differs from *P. proximus* in the greater number of upper rostral teeth, in the proportionate lengths of merus, carpus and chela in the second leg of the adult male and in the rather more slender legs of the last three pairs. Other minor differences will be found on comparison of the two descriptions given above.

| | | | |
|---|---|---|---|
| C 380–1/1. | Port Blair, Andamans, 4–8 fms. | S. Kemp, Feb., 1915; Feb., March, 1921. | Many. |

The specimens were found in Ross Channel in company with *P. agag* and *P. proximus*. The types bear the number C 380/1.

Certain additional specimens obtained on muddy ground at the inner end of Port Blair are tentatively referred to *P. andamanensis*, but differ in certain characters which will perhaps prove to possess at least varietal value. Of the nine specimens eight are females and one a young male.

The only points in which these specimens differ from the above description are as follows:—

The rostrum is less shallow and bears as a rule 9 dorsal teeth and 3 ventral.[1] The ovigerous females are larger than any typical *P. andamanensis* that I have seen, with the carpus of the second peraeopods decidedly stouter, from 5·5 to 6 times as long as its distal breadth. The chela also is longer in relation to the carpus, about 1·8 times its length. In the last three legs the dactylus is considerably longer than in typical specimens. In large females the propodus of the third pair is only 2·25 times and in the young male only twice the length of the dactylus. The dactylus is also rather more slender from 8 to 9 times as long as its basal breadth in females, 11 times in the young male.

[1] Of eight specimens one has 8 dorsal teeth, six have 9 and one has 11; seven specimens have 3 ventral teeth and one has 4.

In other respects there is practically no difference between the two sets of specimens. The young male resembles typical specimens of the same size and sex in the proportions of the segments of the second peraeopods. The carpus is about 7 times as long as its distal breadth and is a trifle longer than the merus; the cheła is 1·5 times as long as the carpus. In females the carpus is a little shorter than the merus and, in all the specimens, the carpal spine is conspicuous. The merus of the third leg is 12 to 13 times as long as broad in females, 17 times in the young male.

In the absence of fully developed males it is not possible to identify the specimens with certainty, but the material examined seems to point to the conclusion that the muddy ground at the inner end of Port Blair is inhabited by a special variety of *P. andamanensis*.

The largest female is about 18 mm. in length.

C 382–3/1. Port Blair, Andamans, 3–5 fms. S. Kemp, Feb., March, 1921. Nine.

The specimens were obtained off Viper I. and at the mouth of Brigade Creek on a bottom composed of mud and decaying vegetation.

### Periclimenes (Ancylocaris) suvadivensis Borradaile.

1915. *Periclimenes (Falciger) suvadivensis*, Borradaile, *Ann. Mag. Nat. Hist.* (8) XV, p. 212.

1917. *Periclimenes (Falciger) suvadivensis*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 375, pl. lv, fig. 16.

I have examined the types of this species and find that Borradaile was mistaken in supposing that they do not possess a supraorbital spine. The species thus finds a place in the *P. grandis* section and is extremely closely allied to *P. andamanensis*. Unfortunately I was not able to make a critical comparison of the two forms and the only characters that I can now give for the separation of the two species are that (i) the upper rostral teeth (6 or 7) are less numerous in *P. suvadivensis* than is customary in *P. andamanensis* and (ii) that the carpus of the second peraeopods in adult males is conspicuously longer than the merus in the former species, whereas in the same sex of the latter the merus is longer than the carpus.

The species was described from specimens taken at Suvadiva Atoll in the Maldives.

### Periclimenes (Ancylocaris) ensifrons (Dana).

1852. *Anchistia ensifrons*, Dana, *U. S. Explor. Exped., Crust.* I, p. 580, pl. xxxviii, figs. 1*a–g*.

1899. *Periclimenes ensifrons*, Nobili, *Ann. Mus. civ. Genova* (2) XX, p. 234.

1907. *Periclimenes ensifrons*, Nobili, *Mem. Accad. Sci. Torino* (2) LVII, p. 359.

Nobili (1907) has examined two young specimens of this species from Polynesia and has pointed out that they differ from

those to which de Man and other authors have applied the name in the absence of the spine at the distal end of the carpus of the second peraeopods. In this respect his specimens agree with Dana's description "carpus long, not armed or acute at apex." According to Nobili de Man's specimens probably represent a variety of Dana's species, but with this I am unable to agree.

For *P. ensifrons*, as applied by de Man, Stimpson's name *grandis* may be employed. This species differs from true *P. ensifrons* in possessing the carpal spine on the second legs and also in the proportions of the merus and carpus of the same limb. In *P. ensifrons* the carpus is decidedly longer than the merus (see Dana's figure and Nobili's measurements), whereas in *P. grandis* the merus in males is longer than, and in females equal to or a little longer than the carpus.

*P. ensifrons* was described from the Straits of Balabac, North of Borneo and is recorded by Nobili from Beagle Bay, New Guinea and from the lagoons of Amanu and Fakahina in Polynesia. There does not appear to be any evidence that it occurs in the western part of the Indo-Pacific region.

### Periclimenes (Ancylocaris) grandis (Stimpson).

(Plate VII, fig. 10.)

1860. *Anchistia grandis*, Stimpson, *Proc. Acad. Sci. Philadelphia*, p. 39.
1887. *Anchistia ensifrons*, de Man, *Arch. Naturgesch.* LIII, i, p. 545.
1887. *Anchistia ensifrons*, Müller, *Verh. naturf. Ges. Basel* VIII, p. 471.
1894. *Anchistia ensifrons*, Ortmann, *Jenaisch. Denkschr.* VIII, p. 16.
1902. *Periclimenes ensifrons*, de Man, *Abhandl. Senck. naturf. Ges.* XXV, p. 826.
1905. *Periclimenes vitiensis*, Pearson, *Ceylon Pearl Oyster Rep.* IV, p. 78.
1905. *Periclimenes ensifrons*, Lenz, *Abhandl. Senck. naturf. Ges.* XXVII, p. 80.
1906. *Periclimenes ensifrons*, Nobili, *Ann. Sci. nat., Zool.* (9) IV, p. 49.
1915. *Periclimenes ensifrons*, Balss, *Denk. math.-naturw. Kl. K. Akad. Wien* XCI, p. 26.

The rostrum reaches to or a little beyond the end of the antennal scale. In lateral view it is deep, more so in females than in males; it is straight at the base but in its distal half is directed upwards, the upper margin being thus slightly concave. The dorsal teeth are from 6 to 10 in number,[1] nearly always 7 or 8. The posterior tooth stands on the carapace and is separated from the next by a rather wide interval; the second is placed above or a little behind the posterior limit of the orbit; the foremost is very close to the apex and often gives it a bifid appearance. In the precise distribution of the teeth there is, as usual, some variation; frequently, and especially in males, four teeth are placed rather close together above the eye, one or two near the apex and one midway between the two groups. On the lower border there are from

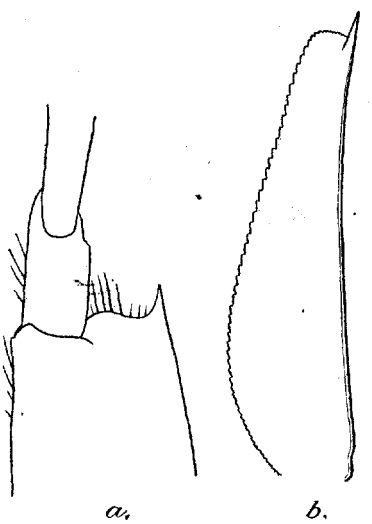
[1] Of eighty-four specimens one has 6 dorsal teeth, forty have 7, thirty-nine have 8, three have 9 and one has 10.

2 to 5 teeth,[1] usually 2 or 3; these teeth are large and the foremost is always placed behind the most anterior of those on the upper border.

Supra-orbital, antennal and hepatic spines are present; the hepatic is placed rather close behind the antennal, but on a lower level. The lower limit of the orbit is defined by a blunt angulation of the frontal margin.

The eyes are stout. The cornea is hemispherical and wider than the stalk; in life it is traversed by two concentric bands of dark pigment and these may frequently be seen in preserved material. The ocular spot is distinct and confluent with the cornea.

The lateral process of the antennule is short, not reaching the middle of the basal segment. The spine at the distal end of the outer border of this segment is stout, but does not reach to the middle of the second segment; the margin between the spine and the articulation is strongly sinuous (text-fig. 58*a*). The two distal segments are slender. The outer antennular flagellum is cleft for only a very short distance, the fused basal portion comprising 10 to 13 segments. In both sexes the total length of the outer ramus is considerably less than that of the peduncle. The antennal scale (text-fig. 58*b*) is narrow at the apex and is from 3·9 to 4·3 times as long as broad in adults; in young specimens it is more slender, sometimes as much as 5 times as long as broad. The outer margin is concave and ends in a spine which projects far beyond the end of the lamella.




TEXT-FIG. 58.—*Periclimenes grandis* (Stimpson).
*a*. Part of antennular peduncle.
*b*. Antennal scale.

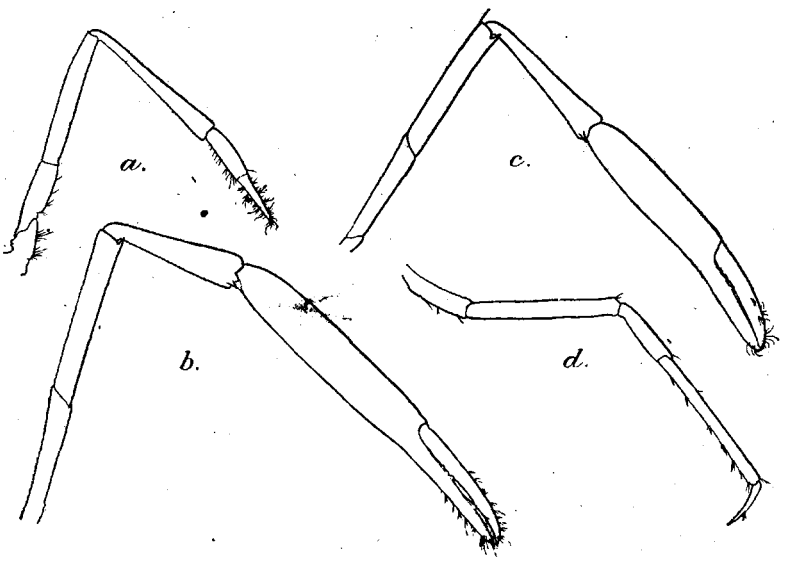
The third maxilliped bears a small arthrobranch and reaches about to the end of the basal antennular segment. The antepenultimate segment is somewhat curved and bears from 1 to 3 slender spines on the outer margin; the exopod reaches a little beyond its distal end. The ultimate segment is three-quarters the length of the penultimate.

The first peraeopods (text-fig. 59*a*) reach beyond the antennal

[1] Of eighty-four specimens thirty-four have 2 ventral teeth, thirty-seven have 3, eleven have 4 and two have 5.

scale by the length of the fingers. The carpus is a little longer than the merus, from 7 to 8 times as long as its distal breadth and from 1·35 to 1·5 times the length of the chela. The fingers are unarmed and are about as long as the palm.

The second peraeopods are equal; as in the forms already described they are much longer in males than in females and the proportions of the segments differ widely in the two sexes. In adult males (text-fig. 59*b*) they reach beyond the scale by the entire length of the chela and carpus. The merus is from 1·25 to 1·35 times the length of the carpus and is from 6 to 6·5 times as long as wide; it bears a conspicuous spine at the distal end of the lower margin. The carpus bears a curved, forwardly directed spine on




TEXT-FIG. 59.—*Periclimenes grandis* (Stimpson).

*a*. First peraeopod.
*b*. Second peraeopod of male.
*c*. Second peraeopod of female.
*d*. Third peraeopod.

the inner side of the distal border and is from 4 to 5 times as long as its greatest breadth, excluding the spine. The chela in well-grown specimens is from 2 to 2·5 times the length of the carpus. The palm is about 4·5 times as long as wide and is from 1·6 to twice the length of the fingers. The cutting margins of the fingers are excavate in the middle so that an oval gap is left when the claw is closed. In front of this excavation there is a single tooth on each finger, that on the dactylus being in advance of the other. Behind the excavation there is a large tooth on the fixed finger, succeeded by a variable number of smaller teeth and there is a series of medium-sized teeth, usually 4 or 5, on the proximal part of the dactylus. The tips of the fingers are inturned. The excavation in the fingers is to be seen only in very large males; usually both

chelae show a similar development, but I have seen one specimen in which the gap was present in one chela only.

In the female (text-fig. 59*c*) the merus is rather more slender, about 6·5 to 7·0 times as long as wide and equal to or a little longer than the carpus. The carpus is from 5 to 5·25 times as long as its distal breadth and, as in the male, bears a conspicuous distal tooth on the inner side. The chela is from 1·6 to 1·8 times the length of the carpus. The palm is equal to, a little longer or little shorter than the carpus and is from 1·3 to 1·6 times as long as the fingers. The fingers have inturned tips and may be provided with small inconspicuous teeth on the proximal half or third of their cutting edges.

The last three peraeopods are moderately slender; the fifth do not reach the apex of the antennal scale. In the third pair (text-fig. 59*d*) the merus is from 9 to 10 times as long as broad. The propodus bears long spinules on its posterior margin and is from 2·8 to 3·3 times as long as the dactylus. The dactylus is simple and slightly curved with a few setae on its anterior margin; its length is from 6 to 6·5 times its basal breadth.

The sixth abdominal somite is about 1·5 times the length of the fifth. The dorsal spines of the telson are so arranged as to divide its length into three equal parts.

The largest specimen, a male, is about 23 mm. in length.

Specimens from the Gulf of Manaar were almost completely transparent when alive, minutely speckled with red and blue. In some individuals a blue patch was visible at the ends of the merus and carpus of the second legs and a brownish red patch on the outer side of the propodus.

Stimpson's description agrees in every particular with the large males that I have examined, except that the chela of the second legs is said to be nearly three times the length of the carpus with fingers less than half the length of the palm. The assumption that Stimpson described a more fully developed male than any I have seen will fully account for these discrepancies.

In many respects *P. grandis* agrees with *P. andamanensis*. It differs, however, in its deeper rostrum, in the stronger spine at the distal end of the first antennular segment, in the much stouter merus and carpus of the second legs of the male and in the shorter and stouter legs of the last three pairs. The merus of the third legs is only 10 to 11 times as long as wide in *P. grandis*, from 15 to 16 times in *P. andamanensis*.

| | | | |
|---|---|---|---|
| C 384/1. | Kilakarai, G. of Manaar, 0–2 fms. | S. Kemp, Feb., 1913. | Many. |
| C 385/1. | Pamban, G. of Manaar. | S. Kemp, Feb., 1913. | One. |
| C 386/1. | Cochin backwater, near Ernakulam, S. India. | F. H. Gravely, Sept., 1914. | Thirteen. |
| C 387/1. | N. Cheval Paar, Ceylon. | T. Southwell, Nov., 1910. | Six. |
| C 338/1. | Paway I., Mergui Archipelago. | 'Investigator,' Feb., 1914. | Two. |

The species was very common in the Gulf of Manaar, among weeds in shallow water and also on the coral reefs.

The species was described from Ousima I. (Stimpson) and has been recorded from Ternate and Pulo Edam (de Man), Trincomalee (Müller), Cheval Paar (Pearson), Zanzibar (Lenz), Dar-es-Salaam (Ortmann) and the Red Sea (Nobili, Balss).

### **Periclimenes (Ancylocaris) vitiensis** Borradaile.

1898. *Periclimenes vitiensis*, Borradaile, *Ann. Mag. Nat. Hist.* (7) II, p. 383.
1899. *Periclimenes vitiensis*, Borradaile, *Proc. Zool. Soc. London*, p. 1005, pl. lxiv, figs 6*a*, *b*.
1899. *Periclimenes vitiensis*, Nobili, *Ann. Mus. civ. Genova* (2), XX, p. 234.
1917. *Periclimenes vitiensis*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XXII, p. 371 (part).

This species is very closely related to *P. grandis*. I have examined the type, an ovigerous female in the Cambridge Museum, but my work at that time was not sufficiently advanced to enable me to make full use of the opportunity. I noted, however, that in the telson of the type specimen both pairs of dorsal spines are situated in the posterior half, whereas in the specimens I have referred to *P. grandis* the foremost pair is situated in the anterior half. The position of these spines affords a valuable specific character in some species of *Periclimenes* (*cf. P. brevicarpalis* and *P. inornatus*) and I conclude, therefore, that *P. vitiensis* is possibly a distinct species. The specimens from Coetivy in the Seychelles subsequently referred by Borradaile to *P. vitiensis* should be re-examined, for it is not improbable that they belong in reality to *P. grandis*.

*P. vitiensis* was described by Borradaile from Viti Levu, Fiji.

### **Periclimenes (Ancylocaris) affinis** Borradaile.

1915. *Periclimenes* (*Falciger*) *affinis*, Borradaile, *Ann. Mag. Nat. Hist.* (8) XV, p. 211.
1917. *Periclimenes* (*Falciger*) *affinis*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 372, pl. liv, fig. 11.

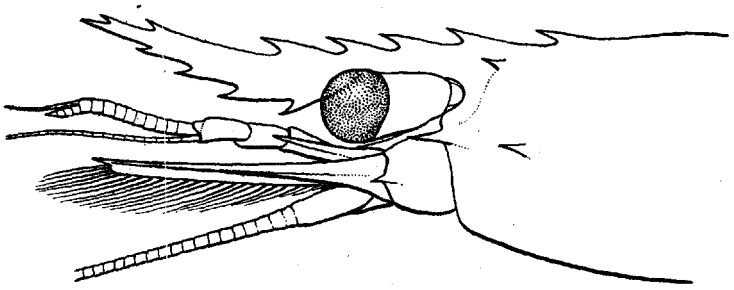
This species appears to be closely related to Paulson's *P. elegans*, which is described below. According to Borradaile's description and figures it differs (i) in its straighter rostrum, armed with only 2 teeth below, (ii) in the greater proportionate length of the first peraeopods which outreach the antennal scale by the chela and half the length of the carpus, and (iii) in the much more slender and proportionately longer carpus of the second peraeopods, about 6 times as long as wide according to the figure and a little longer than the merus.

*P. affinis* is recorded from Salomon I. in the Western Indian Ocean.

## Periclimenes (Ancylocaris) elegans (Paulson).

1875. *Anchistia elegans*, Paulson, *Crust. Red Sea*, p. 113, pl. xvii, figs. 1, 1*a–h*.
1906. *Anchistia elegans*, Nobili, *Ann. Sci. nat., Zool.* (9) IV, p. 52.

The rostrum (text-fig. 60) is rather deep, especially in females, and reaches to or a little beyond the end of the antennal scale. It is straight at the base, but in its distal half is directed upwards.

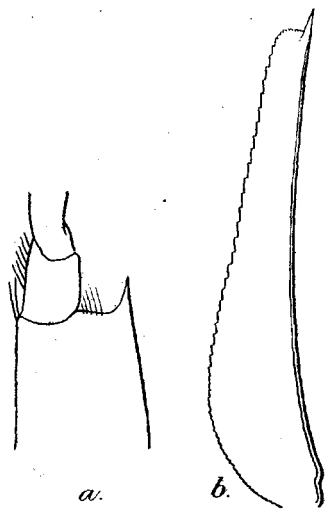


TEXT-FIG. 60.—*Periclimenes elegans* (Paulson).
Anterior part of carapace, rostrum, etc.

On the concave upper border there are from 6 to 8 teeth,[1] nearly always 7 or 8. The teeth are arranged much as in *P. grandis*, but the distinction into two groups is sometimes even more clearly marked than in that species. On the lower border there are from 3 to 5 teeth,[2] nearly always 3 or 4.

In the spines of the carapace and the eyes the species resembles *P. grandis*. A single band of dark pigment is frequently seen on the cornea.

The antennules also resemble those of *P. grandis*, but the terminal spine of the basal segment is rather longer, reaching almost or quite to the middle of the second segment, and the margin between this spine and



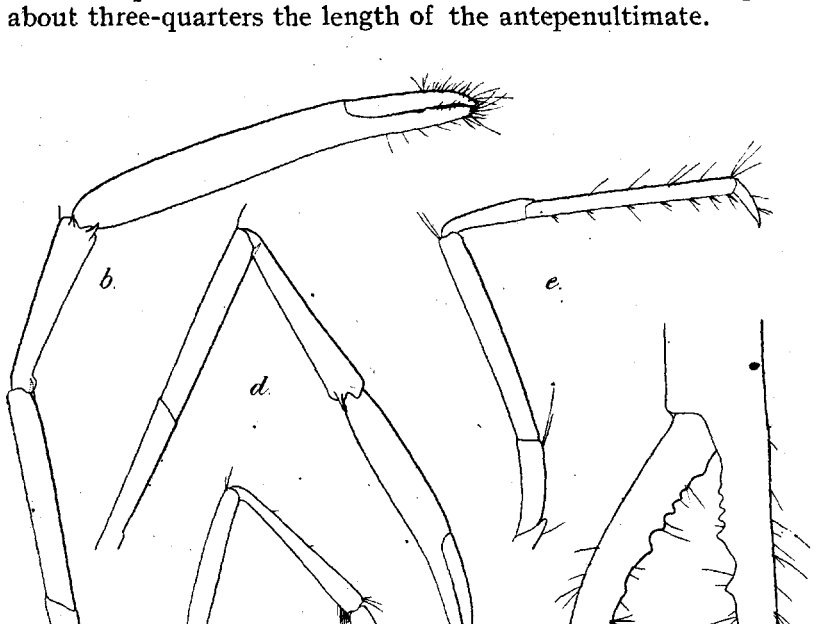

TEXT-FIG. 61.—*Periclimenes elegans* (Paulson).
*a*. Part of antennular peduncle.
*b*. Antennal scale.

[1] Of fifty specimens two have 6 dorsal teeth, thirty-six have 7 and twelve have 8.

[2] Of fifty specimens thirty-one have 3 ventral teeth, eighteen have 4 and one has 5.

the articulation is less clearly sinuous (text-fig. 61*a*). In both sexes the stouter ramus of the outer flagellum is shorter than the peduncle. In its distal third the antennal scale is rather more narrowed than in *P. grandis* and its outer margin more strongly concave; it is from 4·5 to nearly 5·5 times as long as wide (text-fig. 61*b*).

The third maxilliped possess a small arthrobranch; the antepenultimate segment bears from 1 to 4 spines on its outer edge and the exopod reaches about to its end. The ultimate segment is about three-quarters the length of the antepenultimate.




TEXT-FIG. 62.—*Periclimenes elegans* (Paulson).

*a*. First peraeopod. *c*. Fingers of same.
*b*. Second peraeopod of male. *d*. Second peraeopod of female.
*e*. Third peraeopod.

The first peraeopods (text-fig. 62*a*) reach beyond the antennal scale by about half the length of the chela. The carpus is from one-ninth to one-twelfth longer than the merus and is from 7 to 7·5 times as long as its distal breadth and from 1·2 to 1·4 times as long as the chela. The fingers are equal to or a little shorter than the palm and are unarmed.

The second peraeopods are equal. In males they extend beyond the antennal scale by the length of the carpus and chela. In none of the specimens I have seen do the legs present the rugose appearance described by Paulson. In males (text-fig. 62*b*) the merus is from 6 to 7 times as long as broad, with the usual spine

at the distal end of the lower margin; it is from 1·2 to 1·3 times as long as the carpus. The carpus is from 4 to 4·5 times as long as its distal breadth and bears two stout spines at the distal end, one on the inner side and one on the upper and inner aspect; inferiorly the distal end projects a little, producing the appearance of a tooth when seen in lateral view. The chela is from 2 to 2·5 times the length of the carpus and the palm is from 1·9 to 2·4 times as long as the fingers. The fingers (text-fig. 62*c*) frequently but not always show an excavation in the middle of their cutting edges as in *P. grandis*. Some specimens have comparatively large teeth on the fingers while others have only a few very small teeth.

In the female (text-fig. 62*d*) the merus of the second peraeopod is from 1·0 to 1·3 times as long as the carpus and is from 7 to 7·5 times as long as wide. The carpus varies from 4 to 5·5 times as long as its distal breadth; the spine on the inner side is well developed and frequently an acute process or short spine can be seen on the upper and inner aspect, corresponding to the second spine found in the male. The chela is from 1·4 to 2·1 times the length of the carpus, with palm from 1·3 times to twice[1] as long as the fingers. The fingers bear small teeth in the proximal half of their inner margins.

The last three peraeopods are stout; the fifth, when extended forwards, fall far short of the apex of the antennal scale. In the third pair (text-fig. 62*e*) the merus is from 7·5 to 8·5 times as long as broad; the propodite bears a series of spinules on its posterior edge and is from 3·5 to 4 times as long as the dactylus. The dactylus itself is simple, very slightly curved, and generally with one or two long setae in the middle of its anterior margin; its length is only from 4 to 4·5 times its basal breadth.

The last abdominal somite and telson agree with those of *P. grandis*.

The largest specimen, a male, is about 24 mm. in length.

Although the above account differs in some respects from Paulson's description (as translated by Nobili) and from his figures, I have little doubt that the identification is correct and that the discrepancies are mainly due to errors in the original account. A single adult male collected by Major R. B. Seymour Sewell in the Red Sea, belongs almost without question to Paulson's species and this individual is indistinguishable from specimens obtained in the Andamans. The specimen which Balss has recorded as *P. elegans* from St. John's I. in the Red Sea[2] apparently does not belong to this species as the spine on the carpus of the second leg is said to be absent.

C. 389–90/1. Port Blair, Andamans. S. Kemp, March, 1915; Feb., March, 1921. Many.

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[1] In exceptionally large females only.

[2] Balss, *Denk. math.-naturw. Kl. K. Akad. Wien*, XCI, p. 26 (1915).

| | | | |
|---|---|---|---|
| C 391/1. | East I., Andamans. | A. R. S. Anderson, 1898. | Two. |
| C 392/1. | Koweit Harbour, Persian Gulf. | R. B. Lloyd, Oct., 1905. | Two. |
| C 393/1. | Tor, Sinaitic Peninsula, Red Sea. | R. B. S. Sewell, 1916. | One. |

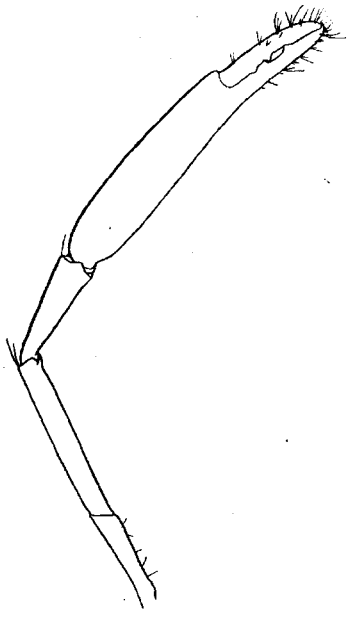
At Port Blair the species is abundant at low water in pools on the coral beach; it was found on Ross I., and on the shores of Aberdeen and North Bay, and was never obtained by dredging.

The species has hitherto been known only from the Red Sea.

### var. **dubius**, Borradaile.

1915. *Periclimenes* (*Falciger*) *dubius*, Borradaile, *Ann. Mag. Nat. Hist.* (8) XV, p. 211.

1917. *Periclimenes* (*Falciger*) *dubius*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 373, pl. liv, fig. 12.



TEXT-FIG. 63.—*Periclimenes elegans*, var. *dubius*, Borradaile.

Second peraeopod of male.

Certain specimens from Madras Harbour differ from typical *P. elegans* only in the proportionately stouter carpus of the second peraeopods in males (text-fig. 63). In adults of this sex the carpus is only 3 times as long as its distal breadth and in females barely 4 times. This is the only difference I can find and I do not regard the two forms as specifically distinct. So far as I can understand from the published account Borradaile's name *dubius* is correctly applied to these specimens.

| | | | |
|---|---|---|---|
| C 460/1. | Madras Harbour. | S. Kemp, May, 1918. | Six. |

### **Periclimenes (Ancylocaris) holmesi** Nobili.

1900. *Anchistia tenuipes*, Holmes (*nec* Borradaile), *Occas. Papers California Acad. Sci.* VII, p. 216.

1904. *Periclimenes tenuipes*, Rathbun, *Harriman Alaska Exped.* X, *Crust.*, p. 34, text-figs. 12*a*, *b*. [p 5.

1907. *Periclimenes holmesi*, Nobili, *Ann. Mus. Univ. Napoli* (2) XXI,

1921. *Periclimenes tenuipes*, Schmitt, *Univ. California Publ., Zool.* XXIII, p. 39, figs. 24*a*, *b*.

This, the only species of *Periclimenes* known from the Pacific Coast of America, is very closely related to *P. elegans*; in the description which Holmes has given and in the additional notes and figures supplied by Miss Rathbun I am unable to find any differences worthy of note. In view of the widely distant localities in which the two forms have been found, it seems unlikely that they are specifically identical, but this can only be determined by actual comparison of specimens.

*P. holmesi* is known only from the Californian Coast, extending from Santa Catalina I. to the Gulf of California.

### Periclimenes (Ancylocaris) amymone de Man.

1902. *Periclimenes amymone*, de Man, *Abhandl. Senckenb. naturf. Ges.* XXV, p. 829, pl. xxv, figs. 53*a–g*.

In this species, which I have not seen, the legs are conspicuously stouter than in any of the related species. In the female on which de Man's detailed description is based the carpus of the second peraeopod is only about 2·4 times its distal breadth with the merus 1·6 times its length. In the third pair the merus is only 6 times as long as broad and the propodite is five times as long as the dactylus. The dactylus is short and stout, scarcely more than 3 times as long as its basal breadth. *P. amymone* also differs from all related species in the absence of spinules on the posterior border of the propodite of the last three pairs of legs.

The species is recorded from Ternate.

### Periclimenes (Ancylocaris) demani Kemp.

1915. *Periclimenes demani*, Kemp, *Mem. Ind. Mus.* V, p. 279, pl. xiii. fig. 10, text-figs. 27 *a–i*.

This species is related to *P. grandis*, but differs from it and from all other species in the same section of the genus in the structure of the apex of the antennal scale: the spine which terminates the outer margin reaches only to, or to a very small extent beyond the apex of the lamella (text-fig. 64). It also differs from *P. grandis* in having the carpus of the second leg of the male as long as the merus and in the proportionately shorter chela, always less than 1·5 times the length of the carpus and in the longer and more slender legs of the last three pairs. As in *P. grandis* the anterior of the two pairs of spines on the dorsum of the telson is placed in the proximal half of the telson-length.

TEXT-FIG. 64.—*Periclimenes demani* Kemp.
Antennal scale.

C 514/1. Jack and Una Is., Mergui Archipelago. 'Investigator,' Dec., 1913. One.

*P. demani* was hitherto known only from the Chilka Lake in Orissa and from the Adyar R. and Ennur backwater near Madras. In the Chilka Lake it has been found living in water ranging in specific gravity from 1·000 to 1·0265.

### Periclimenes (Ancylocaris) lifuensis Borradaile.

1898. *Periclimenes lifuensis*, Borradaile, *Ann. Mag. Nat. Hist.* (7) II, p. 384.
1899. *Periclimenes lifuensis*, Borradaile, in Willey's *Zool. Results*, p. 405, pl. xxxvi, figs. 1*a–c*.

I have seen the type of this species in the Cambridge Museum, but have not dissected it to examine the mandible. It is the only known species of the genus in which the supra-orbital spine is present and the hepatic absent.

The antennal scale is not much narrowed apically; the outer margin is concave and the terminal spine extends beyond the apex of the lamella. The merus of the second peraeopods bears a spine at the distal end of the lower margin. Only one of the posterior legs is in existence; it is very stout, with the propodus only about 4 times as long as broad and with the dactylus simple, strongly curved and partially concealed by thick hairs. The telson bears two pairs of dorsal spines, placed rather close together near the middle of its length.

*P. lifuensis* is known only from Lifu in the Loyalty Is.

### Periclimenes (Ancylocaris) tenuipes Borradaile.

(Plate VIII, fig. 11.)

1898. *Periclimenes tenuipes*, Borradaile, *Ann. Mag. Nat. Hist.* (7) II, p. 384.
1899. *Periclimenes tenuipes*, Borradaile, in Willey's *Zool. Results*, p. 406, pl. xxxvi, figs. 2*a–f*.
1899. *Periclimenes tenuipes*, Nobili, *Ann. Mus. civ. Genova* (2) XX, p. 235.
1904. *Periclimenes borradailei*, Rathbun, *Harriman Alaska Exped.* X, *Crust.*, p. 34.
1907. *Periclimenes borradailei*, Nobili, *Ann. Mus. Univ. Napoli* (n.s.) II, no. 21, p. 5.
1915. *Periclimenes* (*Falciger*) *kolumadulensis*, Borradaile, *Ann. Mag. Nat. Hist.* (8) XV, p. 213.
1917. *Periclimenes* (*Falciger*) *borradailei* and *kolumadulensis*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, pp. 372, 376, pl. lv, fig. 17.

The rostrum varies greatly in length; in the specimens I have examined it is from 1·6 to twice the length of the carapace, while in the large male described by Borradaile as *P. kolumadulensis* it is said to be 2·5 times the length of the carapace. The rostrum is very slender, straight at the base, but with the distal half bent obliquely upwards. It bears from 9 to 12 teeth (nearly always 10 or 11) [1] on the upper border; the posterior tooth is placed on the

[1] Of thirty-two specimens two have 9 dorsal teeth, twelve have 10, seventeen have 11 and one has 12.

carapace, but is not widely separated from the next, which is either above or a little behind the posterior limit of the orbit. In most specimens the upper teeth are arranged in two groups, the five proximal teeth being separated by a marked interval from the four or five distal, with or without a single isolated tooth between the two. On the lower border in the anterior two-thirds there are from 6 to 9 teeth (usually 7 or 8),[1] extending close up to the apex.

The carapace is obtusely angled at the lower limit of the orbit. The antennal spine is strong and is flanked by a short carina; the hepatic is behind it, but on a lower level. There is no supra-orbital spine.

The eyes are large and somewhat depressed, with the cornea wider than the stalk. The ocular spot touches the cornea.

The basal segment of the antennular peduncle bears a short lateral process; the outer margin terminates in a sharp spine which does not reach the middle of the next segment. The second and third segments are slender, but the whole peduncle is not long, scarcely reaching beyond the middle of the antennal scale. The free portion of the shorter ramus of the outer antennular flagellum is extremely short; the fused part is longer than the peduncle and is composed of some 12 to 15 segments. The antennal scale in full grown specimens is from 6·5 to 7 times as long as wide and is very narrow distally. The outer margin is strongly concave and the terminal spine projects far beyond the apex of the lamella.

The third maxillipeds do not reach the end of the antennular segment; the ultimate segment is about two-thirds the length of the antepenultimate.

The mero-carpal articulation of the first peraeopods reaches the end of the antennular peduncle. The carpus is about 1·5 times the length of the merus, and is from 2 to 2·75 times as long as the chela. The fingers are a little longer than the palm and are unarmed.

The second peraeopods in males may outreach the rostrum by the whole of the chela and carpus and a portion of the merus, they are from 5·5 to 7·5 times as long as the carapace. The legs forming a pair are, as a rule, equal and similar in structure. There is a strong spine at the distal end of the merus on the lower side. In the largest male the merus is about 6·5 times as long as wide. The carpus is 1·4 times as long as the merus; it is slender at the base but is suddenly dilated in its distal third, the length being about 7·5 times the distal breadth. On the inner side of the carpus at the distal end there is a small obscure tooth, much as in *Periclimenes agag*. The chela is about 1·25 times the length of the carpus; the palm is 5 times as long as broad and about 1·9 times the length of the fingers. In smaller males the limbs are more slender, with the carpus much less dilated at the distal end. In one such male the merus is 8 times as long as broad and the carpus

[1] Of thirty-two specimens four have 6 ventral teeth, sixteen have 7, eleven have 8 and one has 9.

13 times as long as broad, 1·5 times as long as the merus and a little longer than the chela. The palm in this specimen is 1·3 times the length of the fingers. In the smallest male in the collection the carpus is as much as 1·4 times as long as the chela.

The series of specimens in the collection comprises a number of individuals which, in the proportions of the segments of the second peraeopods, are intermediate between those described above, indicating quite clearly that the differences are due to progressive growth. The second legs of very large males appear to develop in a phenomenal manner, as in the Hippolytid genus *Saron* and in *Palaemon*.

In ovigerous females the second peraeopods are from 4·5 to 5·7 times as long as the carapace. The carpus is from 1·5 to 1·8 times as long as the merus and from 1·2 to 1·4 times as long as the chela. The palm is about 1·3 times the length of the fingers.

In the second peraeopods of some large males each finger is conspicuously excavate in its proximal half. In other males no trace of this excavation is visible; the fingers meet throughout their length when the claw is closed and are armed only with a series of very small teeth, most conspicuous at the proximal end. Specimens in intermediate stages, with the gape in the fingers poorly developed, are not uncommon. As a rule the fingers in both legs of a pair are similarly formed, but I have seen a specimen in which one chela only possessed gaping fingers, as in the type of Borradaile's *P. kolumadulensis*. In large females the fingers sometimes exhibit a small excavation, similar to that seen in some large males but less well developed.

The last three legs are extremely long and slender, the fifth reaching to or a little beyond the rostrum. The merus of the third pair is from 20 to 26 times as long as wide. The propodus is from 4·5 to 5·5 times the length of the dactylus; it bears some short spinules on its posterior edge and shows traces of subdivision into 5 to 7 subsegments. The dactylus is simple, curved, and with a few setae in the middle of its anterior margin; it is from 6·5 to 7·5 times as long as its basal breadth.

The sixth abdominal somite is about one-third longer than the fifth. The foremost pair of dorsal spinules on the telson are situated in the anterior half of the telson, the second pair rather further from the foremost than from the apex. The intermediate apical spines are very long.

The largest specimen, a male, is about 22 mm. in length.

The species is characteristically coloured when alive. The carapace and abdomen are semitransparent, with a few narrow oblique streaks of white and red on the former and mid-dorsal and lateral red stripes on the latter. On the rostrum, at the junction of the middle and distal thirds, there is a band of dark red pigment; in front of this the rostrum is entirely sulphur yellow, while behind it on the inferior half there is a streak of the same colour. The tip of the telson and the basal portions of the uropodial setae are bright red. The eyestalk has two white longitu-

dinal streaks and some red speckling. On the first legs there is a sharply defined red spot at the distal ends of the ischium, merus and carpus. Between the bases of the first legs there is a bright red sternal spot. On the second legs there is a similar spot at the distal end of the ischium and a large red patch at the end of the merus. The carpus is sulphur yellow throughout, the colour extending on to the base of the chela which is otherwise dull red. The eggs are pale grey, when eyed with a bright blue eyespot.

Borradaile's descriptions of *P. tenuipes* and *P. kolumadulensis* are both inadequate and I suspect that the figures of the former are erroneous in several particulars. Re-examination of the types is necessary before the synonymy given above can be regarded as beyond doubt. From the description I have given it will be seen that the range of variation is very great and that the characters which Borradaile gives in his account of *P. kolumadulensis* are insufficient for the distinction of two species. Seeing that the type-specimen of *P. tenuipes* was damaged it is unfortunate that Borradaile contented himself with a mere record of the additional examples obtained by Prof. Gardiner at Haddumati Atoll.

Two misconceptions appear to have arisen regarding the proper name of this species. Miss Rathbun (*l.c.*, 1904) proposed *P. borradailei* under the impression that the name *tenuipes* was preoccupied by Holmes. Holmes' species was, however, not described until 1900. Nobili (*l.c.*, 1907) has stated that Leach described a species from the Mediterranean under the name *Periclimenes tenuipes* and that Heller erroneously regarded *Brachycarpus biunguiculatus* as synonymous with this form. These statements apparently led Borradaile in 1917 to abandon his *P. tenuipes* in favour of *P. borradailei*.

The paper by Nobili was, I believe, written during the distinguished author's last illness. It is most unfortunate that it should even have been published, for it is evident from internal evidence that it is the product of a disordered mind. The Palaemonid gill-formulae which are given in the paper obviously have no relation to the real facts and the illustrations of the mouthparts of *Brachycarpus* can only be regarded as mythical. Leach does not seem ever to have described *Periclimenes tenuipes* and the species is not referred to by Heller, nor is it a fact, as stated by Nobili, that in his work on the Red Sea Decapoda he himself proposed the name *P. borradailei* for Borradaile's *P. tenuipes*.

*P. tenuipes* may therefore stand as the name of this species, while for the form described by Holmes Nobili's *P. holmesi* may be employed.

| | | | |
|---|---|---|---|
| C 461–5/1. | Port Blair, Andamans, 4–8 fms. | S. Kemp, Feb., 1915, Feb., Mch., 1921. | Thirty-five. |
| 5525/9. | Off Ceylon, 34 fms., 6°01' N., 81°16' E. | 'Investigator.' | One. |

I have also seen two specimens belonging to the Paris Museum from Mahé in the Seychelles (Alluaud coll.). The specimens from Port Blair were all obtained in Ross Channel on a bottom composed mainly of small corals and sponges.

*P. tenuipes* was originally described from New Britain and has since been recorded by Nobili from Beagle Bay in New Guinea and by Borradaile from Haddumati Atoll in the Maldives and, as *P. kolumadulensis*, from Kolumadulu Atoll in the same group.

### Periclimenes (Ancylocaris) longimanus (Dana).

1852. *Anchistia longimana*, Dana, *U. S. Explor. Exped., Crust.* I, p. 579, pl. xxxvii, figs. 6*a*, *b*.

This species, of unknown locality, is easily distinguished from all other known members of the genus by the extraordinary length of the antennular peduncle. It reaches well beyond the antennal scale and the ultimate segment, according to Dana's figure, is 6 times as long as wide.

### Periclimenes (Ancylocaris) digitalis, sp. nov.

(Plate VIII, fig. 12.)

The rostrum reaches slightly beyond the end of the antennal scale. It is straight at the base, but a little upturned in its distal third. On the upper border, in the single specimen examined, there are 11 teeth; of these the two hindmost are situated on the carapace behind the orbit and the posterior tooth is separated from the next by a rather considerable interval. The remaining teeth are large and evenly spaced except for the foremost, which is small, placed near the tip, and rather remote from the next of the series. On the lower border there are 2 teeth, placed just in front of the middle of the rostral length.

The carapace bears sharp hepatic and antennal spines, the former on a lower level than the latter. The lower limit of the orbit is defined by an acute process and there is a conspicuous ridge close behind the orbital margin and parallel with it. Superiorly this ridge ends in a minute tubercle which is probably a vestige of the supra-orbital spine, inferiorly it ends in the antennal spine. The ridge is almost exactly similar to that found in *Palaemonella vestigialis* but is rather more sharply defined.

The eye is large with the cornea spherical and wider than the stalk. The ocular spot is visible, but is partly confluent with the cornea.

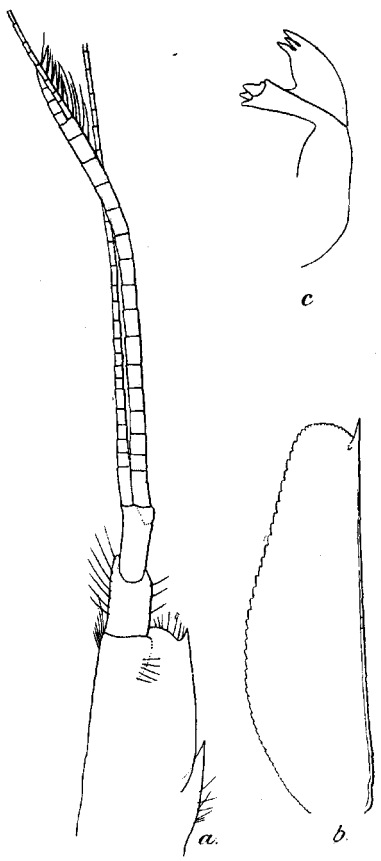
The lateral process of the basal segment of the antennular peduncle (text-fig. 65*a*) reaches barely to the middle of the segment; the terminal spine of the outer margin is short and the margin between this spine and the articulation of the second segment is convex. The outer flagellum is cleft for only a very short distance; the fused basal part comprises 16 segments and is longer than the peduncle. The antennal scale (text-fig. 65*b*) is a little more than 3 times as long as broad; the outer margin is straight

or very slightly concave and ends in a strong spine which projects a trifle beyond the end of the lamella.

The exopod of the third maxilliped reaches nearly to the end of the antepenultimate segment, the latter bearing a series of 8 short spines on its outer edge. The ultimate segment is two-thirds the length of the penultimate.

The first peraeopods reach beyond the antennal scale by the chela and fully half the length of the carpus. The carpus is a little longer than the merus and fully 1·4 times the length of the chela. The fingers are longer than the palm and are unarmed.

The second peraeopods in the single female examined are equal and very slender, reaching beyond the scale by the chela, carpus and one-third the length of the merus. The merus bears a spine at the distal end of its lower border; it is rather more than 11 times as long as broad and is exactly equal in length with the carpus. The carpus is unarmed and is nearly 9 times as long as its distal breadth. The chela is almost 1·25 times the length of the carpus or merus. The palm is 4·5 times as long as wide and 1·3 times as long as the fingers. The fingers have inturned tips; their cutting edges are entire distally, but in the proximal third are provided with a few small teeth.




TEXT-FIG. 65.—*Periclimenes digitalis*, sp. nov.
*a*. Antennule. *b*. Antennal scale.
c. Mandible.

The last three peraeopods are all very slender. The fifth reach beyond the scale by the dactylus and more than half the propodus. In the third pair the merus is about 18 times as long as wide. The propodus is entirely devoid of spinules on its posterior margin and is scarcely more than twice the length of the dactylus. The dactylus itself is simple, slightly curved and extremely slender, about 14 times as long as its basal breadth.

The sixth abdominal somite is about 1·5 times as long as the fifth. The telson bears two pairs of dorsal spines, so arranged as to divide its length into three more or less equal parts. The outer margin of the external uropod is ciliated.

The single specimen is an ovigerous female about 22 mm. in length.

In the possession of a post-orbital ridge this species, as already noted, bears a close resemblance to *Palaemonella vestigialis*; the mandible, however, is devoid of a palp (text-fig. 65*c*). In the genus *Periclimenes* it does not appear to have any close allies.

C 404/1. Port Blair, Andamans, 3–5 fms. S. Kemp, Feb., 1921. One, TYPE.

The specimen was caught off Viper I. on a bottom composed of mud and decaying vegetation.

### **Periclimenes (Ancylocaris) brocki** (de Man).

1887. *Anchistia Brockii*, de Man, *Arch. Naturgesch.* LIII, i, p. 548, pl. xxii*a*, figs. 3, 3*a–d*.
1917. *Periclimenes* (*Cristiger*) *brocki*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 324.

I have examined a specimen from Suvadiva Atoll in the Maldives, determined by Borradaile and have nothing to add to de Man's detailed description. The species was described from Amboina.

### **Periclimenes (Ancylocaris) rotumanus** Borradaile.

1898. *Periclimenes rotumanus*, Borradaile, *Proc. Zool. Soc. London*, p. 1005, pl. lxiv, figs. 5, 5*a*, *b*.
1899. *Periclimenes rotumanus*, Nobili, *Ann. Mus. civ. Genova* (2) XX, p. 235.

I have seen the type of this species in the Cambridge Museum; the second peraeopods are now missing. The species is recorded from Rotuma in the S. Pacific (Borradaile) and Beagle Bay, New Guinea (Nobili).

### Genus **Harpilius** Dana.

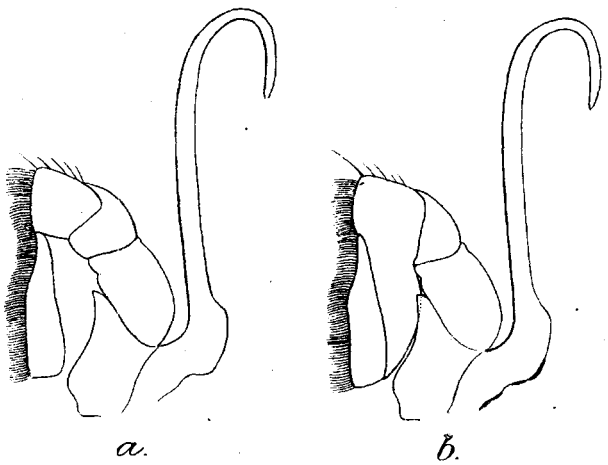
1852. *Harpilius*, Dana, *U. S. Explor. Exped., Crust.* I, p. 575.
1917. *Harpiliopsis* and *Harpilius*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, pp. 379, 380.
1921. *Harpilius*, Tattersall, *Journ. Linn. Soc., Zool.* XXXIV, p. 338.

This genus is very closely related to *Periclimenes*, agreeing with it in all important structural characters and differing only in its more clumsy and depressed form. In habit of body there is, moreover, considerable variation; of the species I have myself examined *H. beaupresi* and *H. depressus* are very strongly depressed, while in *H. lutescens* and *H. gerlachei* this feature is much less pronounced.

In *Harpilius* the distal spine of the basal antennular segment is usually very long, the antepenultimate segment of the third

maxilliped is often broadened, the second peraeopods are heavily built with the distal end of the merus flattened or hollowed beneath to accommodate the carpus when the limb is folded, and the last three peraeopods are stout, without spinules on the propodus and with a simple strongly hooked dactylus. The combination of these characters gives the species a very distinct facies, though a parallel to each may be found in the genus *Periclimenes*.

Most if not all the species of the genus are found in association with corals and there can be little doubt that they are specially adapted to life in this environment: the depressed form and stout legs with hooked dactyli are obviously well suited to an existence among the branching stems of a madrepore colony. In general appearance *Harpilius* bears a close resemblance to *Corallio-caris*, the species of which are found in similar situations.




TEXT-FIG. 66.—Second maxilliped of *Harpilius lutescens*, Dana.
*a*. As shown by Dana.
*b*. With some of the errors corrected.

Tattersall has already questioned the validity of the genus *Harpiliopsis* and I endorse all that he has said. Borradaile's reasons for establishing the new genus are indeed remarkable. Apart from the supposed absence of the arthrobranch on the third maxilliped in *Harpilius*, the difference between this genus and *Harpiliopsis* lies in the form of the second maxilliped. Of *Harpilius* Borradaile has seen no specimens and his description of the appendage is derived from Dana's fig. 4*f* of *H. lutescens*. In his generic description of *Harpilius* he says "second maxilliped .... with last joint posterior to preceding joint" and adds that "the second maxilliped of the type *Harpilius* is so remarkable that no species which does not share this peculiarity can be retained in the genus."

It is, of course, evident at first sight that Dana's figure is erroneous and that the narrowly triangular terminal segment,

instead of being attached only by its apex (obviously an impossible arrangement), is joined in normal fashion to the propodus, the free edge of the latter being almost entirely concealed by the overlying ischium and merus. The erroneous division of the propodus into two segments is also seen in the figure of *Oedipus superbus* on the same plate. I give here (text-fig. 66) a copy of Dana's figure, together with another in which the more important errors have been eliminated. The latter does not differ in any noteworthy feature from the normal type.

One of the specimens I have seen I doubtfully refer to *H. lutescens*. This individual has a normal second maxilliped and, as in *H. beaupresi* and *H. depressus*, possesses an arthrobranch on the third maxilliped. In *H. gerlachei*, as Tattersall has pointed out, this gill is suppressed and the species is otherwise peculiar in the absence of the hepatic spine. Tattersall has suggested that a new genus may be required for the species, but with this I am unable to agree and think that if any change is to be made it should be in the direction of merging *Harpilius* in *Periclimenes*.

Owing to inadequate original description the recognition of Dana's *H. lutescens*, Stimpson's *H. depressus* and of the form which Ortmann called *Anchistia spinigera* is attended with much difficulty, and the possibilities of erroneous identification in this paper are enhanced by the fact that the specimens I have seen are all from the western part of the Indo-Pacific region while the descriptions are based on material found much further to the east.

The species of *Harpilius*, as I understand them, may be separated by the following characters :—

*A.* Hepatic spine present.
  *B.* Antero-lateral angles of carapace rounded; ischium of second leg with at least one spine situated at distal end of lower border, merus with spine at distal end of upper border, fingers with 1 to 3 large teeth.
    *C.* Antennal spine remote from lower orbital angle and flanked by a carina; hepatic spine on same level as antennal; antepenultimate segment of third maxilliped 3 times as long as broad; ischium of second leg with 3 distal spines, 1 above and 2 below, carpus with dorsal spine, 1 tooth on dactylus and 2 on fixed finger; R. 4–7 : 2–4 ... ... *beaupresi* (Audouin).
    *C'.* Antennal spine close to lower orbital angle, without carina; hepatic spine on much lower level than antennal; antepenultimate segment of third maxilliped 6 times as long as broad; ischium of second leg with 1 distal spine placed inferiorly, carpus without dorsal spine, 2 teeth on dactylus and 3 on fixed finger.
      *D.* Merus and palm of second leg each 3 times as long as broad; posterior pair of dorsal spines of telson placed much nearer to anterior pair than to apex; R. 5–7 : 2–5 ... ... ... *depressus* Stimpson.
      *D'.* Merus and palm of second leg each 5 times as long as broad; posterior pair of dorsal spines of telson placed midway between anterior pair and apex; R. 7 : 4 ... ... ... var. *gracilis*, nov.
  *B'.* Antero-lateral angles of carapace rectangular; ischium of second leg unarmed, merus without spine at

distal end of upper border, fingers with 5 or more small teeth [antepenultimate segment of third maxilliped about 3 times as long as broad].

*C*. Hepatic spine remote from frontal margin of carapace; last three legs stout, propodus of third pair 4 times as long as broad, at distal end nearly twice as broad as dactylus; R. 7 : 1-2 ... *lutescens* Dana.

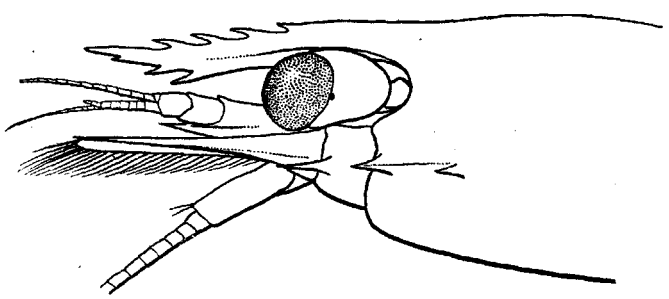
*C'*. Hepatic spine situated on frontal margin of carapace; last three legs more slender, propodus of third pair 7 times as long as broad, at distal end scarcely broader than dactylus; R. 7–9 : 1–2 ... *consobrinus* de Man.

*A'*. Hepatic spine absent [ischium of second leg unarmed, merus without spine at distal end of upper border; antepenultimate segment of third maxilliped 3 times as long as broad]; R. 3–5 : 1 ... ... ... *gerlachei* Nobili.

## Harpilius beaupresi (Audouin).

1825. *Palaemon beaupresii*, Audouin, *Explic. somm. des planches de Crust.*, p. 91, in Savigny's *Descr. d'Egypte*, pl. x, fig. 4 (1809).
? 1891. *Anchistia spinigera*, Ortmann, *Zool. Jahrb., Syst.* V, p. 511, pl. xxxvi, fig. 23.
? 1901. *Anchistia spinigera*, Lenz, *Zool. Jahrb., Syst.* XIV, p. 434.
1915. *Harpilius Beaupresii*, Balss, *Denk. math.-naturw. Kl. K. Akad. Wien* XCI, p. 26.
1917. *Harpiliopsis beaupresi*, Borradaile, *Trans. Linn Soc.* (2) *Zool.* XVII, pp. 324, 379, pl. lv, fig. 21.
1921. *Harpilius beaupresi*, Tattersall, *Journ. Linn. Soc., Zool.* XXXIV, p. 389, pl. xxviii, fig. 8.

Borradaile, who gives numerous other references, separates this species from *H. depressus* merely by the proportions of the antepenultimate segment of the third maxilliped. If, however, I have identified Stimpson's species correctly, the two differ in a number of important characters.



TEXT-FIG. 67.—*Harpilius beaupresi* (Audouin). Anterior part of carapace, rostrum, etc.

The principal characters of *A. beaupresi* are the following:—

(i) The rostrum is rather shallow with from 4 to 7 dorsal teeth (usually 4 or 5) and 2 to 4 (usually 2 or 3) ventral. The posterior dorsal tooth is placed on the base of the rostrum in advance of the hinder limit of the orbit. The midrib of the rostrum is continuous with the orbital margin (text-fig. 67).

(ii) The antennal spine is remote from the lower orbital angle

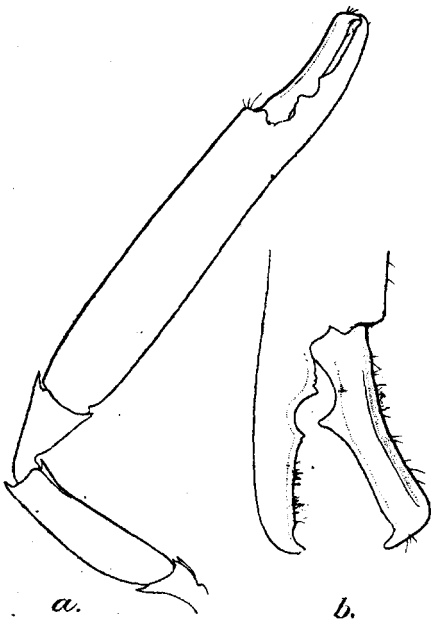
and is supported by a carina which extends backwards to a point immediately above the base of the hepatic spine. The hepatic and antennal spines are about on a level with one another and the antero-lateral angle of the carapace is rounded.

(iii) The spine on the outer side of the second segment of the antenna is very long. The terminal spine of the antennal scale reaches almost as far forwards as the apex of the lamella.

(iv) The antepenultimate segment of the third maxilliped is broad, scarcely more than 3 times as long as wide.

(v) The first peraeopod is slender, with carpus about 8 times as long as its distal breadth and with fingers more than half as long as the palm.

(vi) In the second peraeopod (text-fig. 68) the ischium bears three distal spines, one above and two, which are smaller, below. The merus has a strong spine at the distal end of its upper border; the lower border ends in a sharp spine on the outer side and in a rounded lobe on the inner side. The carpus has a sharp spine on the upper and outer aspect of the distal margin and an acute process, sometimes spiniform, on its lower side. The outer margin of the dactylus is straight or slightly concave and on the lower surface of the segment there is a sharp longitudinal carina. There is a large triangular tooth on the inner margin of the dactylus a little behind its middle point and at the base a rounded protuberance. The tooth fits between two teeth on the fixed finger, the hindmost of which is broad and frequently exhibits a serrated edge. The palm is about 2·5 times as long as the fingers.




TEXT-FIG. 68.—*Harpilius beaupresi* (Audouin).
*a*. Second peraeopod.
*b*. Fingers of same.

(vii) In the third pair of peraeopods the merus is about 3·2 times as long as wide. The propodus is much narrower than the merus, about 6·5 times as long as wide, and at the distal end very little broader than the dactylus.

(viii) The pleura of the fourth and fifth abdominal somites are acutely pointed infero-posteriorly.

(ix) The anterior of the two pairs of dorsal spines on the telson is placed a little behind the middle. The posterior pair is midway between the anterior pair and the apex.

The largest specimen examined is about 16 mm. in length.

Thanks to the excellence of Savigny's figures the identity of this species is beyond all doubt Richters' *Pontonia* (*Harpilius*) *dentata*, as de Man and Borradaile have suggested, is no doubt synonymous.

Borradaile regards Ortmann's *Anchistia spinigera* as a synonym of *H. depressus*, but while it may be true that the specimens he himself recorded under the former name in 1898 and 1899 belong to Stimpson's species, it does not seem probable that this is also true of those which Ortmann and Lenz have described. Both these authors refer to the presence of three spines at the distal end of the merus of the second leg and this character, so far as I am aware, occurs only in *H. beaupresi*. On the other hand Ortmann states that the dactylus of the second leg bears two teeth and the fixed finger three and this applies to *H. depressus* rather than to *H. beaupresi*. Further information is necessary before the position of Ortmann's species can be decided.

The specimens of *H. beaupresi* in the Zoological Survey of India are from the following localities:—

| | | | |
|---|---|---|---|
| 7240/10. | Aden. | Brit. Mus. | One. |
| C 407/1. | Tor, Gulf of Suez. | R. B. S. Sewell, 1916. | Eight. |
| C 408/1. | Port Blair, Andamans. | J. Wood-Mason. | Five. |
| C 459/1. | Port Blair, Andamans. | S. Kemp, March, 1915. | One. |

The specimen from Aden had been determined by Miers as *Anchistia petitthouarsi* (Audouin).

I have also seen specimens belonging to the Paris Museum from Mahé in the Seychelles (Alluaud coll.) and from Massouah, Red Sea (Raffray coll.).

The species has been recorded from numerous localities in the Red Sea (Audouin, Heller, Paulson, Nobili, Balss) from the Chagos Archipelago and the Maldives (Borradaile) and from Pulo Edam near Batavia (de Man). If Ortmann's *Anchistia spinigera* is synonymous the species extends further east to Samoa (Ortmann) and Laysan (Lenz).

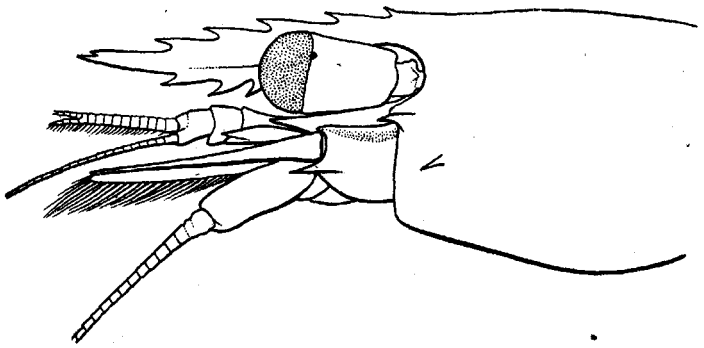
**Harpilius depressus** Stimpson.

1860. *Harpilius depressus*, Stimpson, *Proc. Acad. Sci. Philadelphia*, p. 38.
1898. *Periclimenes spinigerus*, Borradaile, *Ann. Mag. Nat. Hist.* (7) II, p. 383.
1899. *Periclimenes spinigerus*, Borradaile, in Willey's *Zool. Results* p. 405.
1903. *Harpilius depressus*, Rathbun, *Bull. U. S. Fish Comm.* XXIII, iii, p. 920, text-fig. 68.
1915. *Harpilius depressus*, Balss, *Denk. math.-naturw. Kl. K. Akad. Wien*, XCI, p. 27.
1917. *Harpiliopsis depressus*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 380, pl. lvi, fig. 22.

*Harpilius depressus* was described by Stimpson from the Hawaiian Is. and I am not altogether certain that the form which occurs on the Indian coast is correctly referred to the same species. The specimens examined differ from the original description in two particulars: there is no difference between the sexes in the form of the third maxilliped and the fingers of the second peraeopod are always more than half the length of the palm. Stimpson's description is very brief and his account of the spines on the segments of the second leg is inadequate. Further information on the form occurring in the Hawaiian Is. is necessary before the name of the Indian form can be regarded as beyond doubt.

The principal characters of the specimens to which I apply the name are the following:—

(i) The rostrum is deeper than in *H. beaupresi* and bears 5 to 7 teeth above (usually 6 or 7) and 2 to 5 below (usually 3 or 4). The posterior dorsal tooth is placed at the base of the rostrum in



TEXT-FIG. 69.—*Harpilius depressus* Stimpson.
Anterior part of carapace, rostrum, etc.

advance of the hinder limit of the orbit. The midrib of the rostrum is continuous with the orbital margin (text-fig. 69).

(ii) The antennal spine is placed close to the lower orbital angle and is not supported by a carina. The hepatic spine is placed on a much lower level than the antennal and the postero-lateral angle of the carapace is rounded.

(iii) The spine on the outer side of the second segment of the antenna is very long. The terminal spine of the antennal scale does not reach as far forwards as the distal end of the lamella.

(iv) The antepenultimate segment of the third maxilliped is broad, about 6 times as long as wide.

(v) The first peraeopod is rather stouter than in *H. beaupresi*. The carpus is less than 6 times as long as its distal breadth and the fingers are less than half as long as the palm.

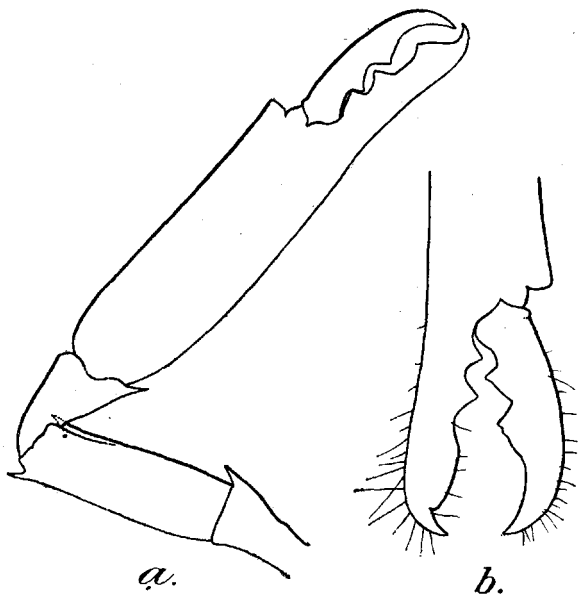
(vi) In the second peraeopod (text-fig. 70) the ischium bears a single spine, which is large and placed at the distal end of the lower border. The merus is closely similar to that of *H. beaupresi*. The carpus has one spine only placed on the lower side.

The outer margin of the dactylus is convex and the segment does not possess the longitudinal carina seen in *H. beaupresi*. There are two large teeth on the dactylus fitting between three on the fixed finger. The teeth on the latter occupy the whole length of the inner margin and the foremost is often broadly rounded. The palm is rather less than twice as long as the fingers.

(vii) In the third pair of peraeopods the merus is rather more than 3·5 times as long as wide. The propodus is much narrower than the merus and is from 5·5 to 6 times as long as wide; at the distal end it is not broader than the dactylus.

(viii) The pleura of the fourth and fifth abdominal somites are acutely pointed infero-posteriorly.

(ix) The anterior of the two pairs of dorsal spines on the




TEXT-FIG. 70.—*Harpilius depressus* Stimpson.
*a*. Second peraeopod. *b*. Fingers of another specimen.

telson is placed in the middle of its length. The posterior pair is placed very much closer to the anterior pair than to the apex.

The largest specimen examined is about 24 mm. in length.

In life the species was closely and elegantly striped with deep blue on a pale grey ground. There was a narrow mid-dorsal stripe of bright yellow on the third abdominal somite and a similar stripe close to the inferior margins of the first three pleura. The tail-fan was transparent olive-green, the uropods were blotched with blue and with milk-white tips. The chelae of the second legs were finely dotted and suffused with green, with yellowish fingers; the basal segments and the other legs were spotted with blue, the dactyli of the last three pairs being reddish. The eggs were pale brown.

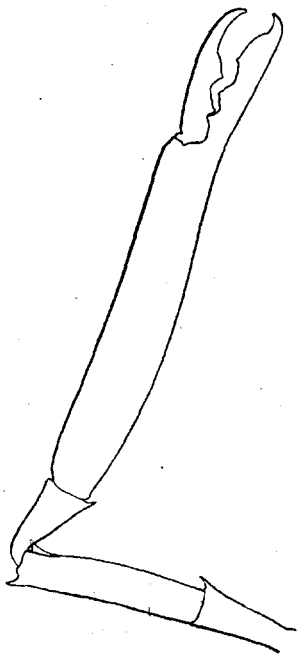
C 410/1. Madras Harbour, 4-5 fms. S. Kemp, May, 1918. Five.

*H. depressus* was described by Stimpson from the Hawaiian Is. and has since been recorded from that locality by Miss Rathbun. It has also been recorded by Borradaile from Rotuma and the Loyalty Is. (as *P. spinigerus*) and from the Chagos Archipelago, the Maldives, Minikoi and the Seychelles, and by Balss from numerous localities in the Red Sea.

var. **gracilis**, nov.

A single specimen in the collection differs conspicuously from the remainder in its much more slender form. It differs from typical *H. depressus* of the same sex in the following particulars:—

| *H. depressus*, typical form. | *H. depressus* var. *gracilis*. |
|---|---|
| Antennal scale less than 3 times as long as wide and not longer than carapace. | Antennal scale 3·5 times as long as wide and considerably longer than carapace. |
| Second peraeopod (text-fig. 70) with both merus and palm about 3 times as long as wide. Palm rather less than twice as long as fingers. | Second peraeopod (text-fig. 71) with merus 5 times and palm 5·5 times as long as wide. Palm 2·5 times as long as fingers. |
| Third peraeopod with merus about 3·5 times and propodus 5·5 to 6 times as long as wide. | Third peraeopod with merus fully 4·5 times and propodus 7 times as long as wide. |
| Anterior dorsal spines of telson placed about in the middle of its length; posterior pair much closer to anterior pair than to apex. | Anterior dorsal spines of telson placed much behind the middle of its length; posterior pair almost equidistant between anterior pair and apex. |



TEXT-FIG. 71.—*Harpilius depressus* var. *gracilis*, nov.
Second peraeopod.

In all other respects the variety closely resembles the typical form. The rostrum is deep in lateral view and reaches nearly to the end of the antennal scale; it bears 7 teeth above and 4 below. The hepatic spine is present and situated on a lower level than the antennal, precisely as in typical *H. depressus*.

The differences in the proportions of the chela are very striking and it is possible that the specimem deserves full specific recognition; of this, however, I find it difficult to be certain with the small number of specimens which are available. It will be noticed that, apart from the attenuated form of certain appendages, the only character by which the variety can be distin-

guished is the position of the spines on the back of the telson.

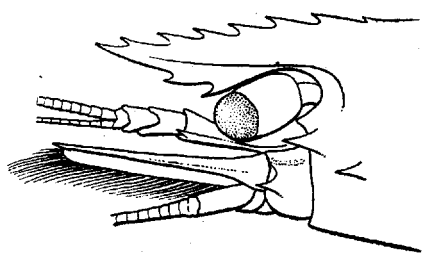
The specimen is 16 mm. in length.

3252/10. Andamans. 'Investigator.' One, TYPE.

## ? Harpilius lutescens Dana.

? 1852. *Harpilius lutescens*, Dana, *U. S. Explor. Exped., Crust.* I, p. 576, pl. xxxvii, figs. 4*a-h*.
? 1901. *Harpilius lutescens*, Nobili, *Ann. Mus. Univ. Napoli* (n.s.) I, 3, p. 3.
? 1906. *Harpilius lutescens*, Nobili, *Ann. Sci. nat., Zool.* (9) IV, p. 63.
? 1915. *Harpilius consobrinus*, Balss, *Denk. math.-naturw. Kl. K. Akad. Wien*, XCI, p. 27.
1921. *Harpilius depressus*, Tattersall, *Journ. Linn. Soc., Zool.* XXXIV, p. 389, pl. xxviii, fig. 7.

Dr. Tattersall has very kindly allowed me to examine the specimen from the Red Sea which he recently recorded under the name of *Harpilius depressus*. I find that this specimen is specifically distinct from those which I refer to *H. depressus* and agrees less closely with Stimpson's description. The second leg has one spine at the distal end of the merus on its lower side, but none on the ischium and carpus, and on the inner margin of each of the fingers there is a series of five small teeth. Of *H. depressus* Stimpson says, "Pedes secundi grandes, laeves; ischii, meri, carpique apicibus dentibus spiniformibus armatis; manu carapace duplo longiore, digitis palma dimidia brevioribus, intus forte 2-3-dentatis."



TEXT-FIG. 72.—? *Harpilius lutescens* Dana. Anterior part of carapace, rostrum, etc.

Dr. Tattersall's specimen bears a very close resemblance to *H. consobrinus*, but differs from de Man's exhaustive description in a few points which appear to have specific value. I attribute it with considerable doubt to *H. lutescens*, the identification presupposing a large amount of error in Dana's figures.

The principal characters of the specimen are as follows:—

(i) The rostrum is deep and bears 7 teeth above and 2 below. The posterior dorsal tooth is situated on the carapace behind the orbit. The midrib of the rostrum is not continuous with the orbital margin, but curves round the orbit in the form of a sharp carina some distance behind the margin proper (text-fig. 72).

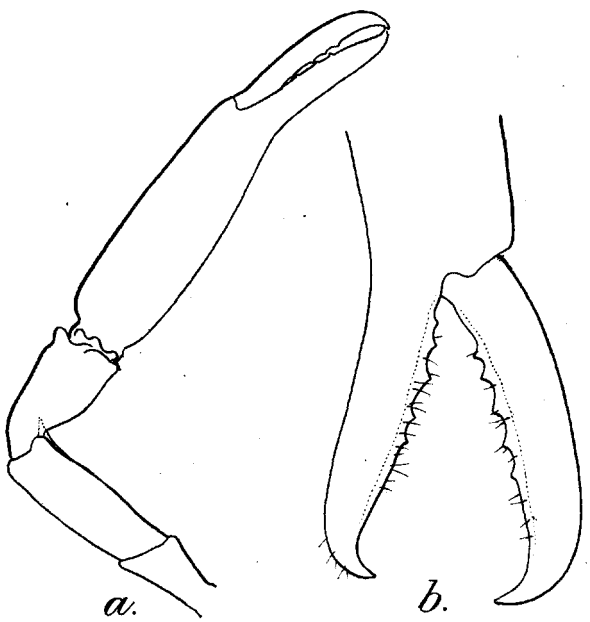
(ii) The antennal spine is placed close to the lower orbital angle and is not supported by a carina. The hepatic spine is situated below the level of the antennal and the antero-lateral angle of the carapace is sharply rectangular.

(iii) The spine on the outer side of the second segment of the antenna is short. The terminal spine of the antennal scale projects well beyond the distal end of the lamella.

(iv) The antepenultimate segment of the third maxilliped is slightly more than 3 times as long as broad.

(v) The carpus of the first peraeopod is about 7·5 times as long as its distal breadth and the fingers are very little shorter than the palm.

(vi) In the second peraeopod (text-fig. 73) the ischium is unarmed. The merus has no spine at the distal end of the upper border; the lower border ends in a spine on the outer side and in a rounded lobe or process on the inner side. The carpus is unarmed. The fingers are bent slightly inwards in relation to the




TEXT-FIG. 73.—? *Harpilius lutescens* Dana.
*a*. Second peraeopod. *b*. Fingers of second peraeopod.

palm and each bears in the proximal two-thirds of its inner margin a series of 5 small teeth. The palm is less than twice the length of the fingers.

(vii) The last three peraeopods are stout. In the third pair (see Tattersall's fig. 7) the merus is 4 times as long as wide. The propodus is as broad as the merus and is barely 4 times as long as wide.[1] At the distal end the propodus is nearly twice as broad as the dactylus.

(viii) The pleura of the fourth and fifth abdominal somites are not acutely pointed infero-posteriorly.

[1] It is a little too broad in Tattersall's figure.

(ix) The anterior of the two pairs of dorsal spines on the telson is placed a little behind the middle of its length. The posterior pair is midway between the anterior pair and the apex.

The specimen bears a very close resemblance to *H. consobrinus*. The following are the only points of any significance in which it differs from de Man's fully detailed description :—

(i) The carina behind the orbital margin is not mentioned by de Man.

(ii) The hepatic spine is set far back from the frontal margin of the carapace.

(iii) The fused portion of the outer antennular flagellum is composed of 11 segments.

(iv) The carpus of the second peraeopod does not exhibit on its upper side the "scharfe kante" referred to by de Man; this, however, is not shown in his figures. The palm is slightly more than 1·5 times the length of the fingers, whereas in *H. consobrinus* it is less than 1·2 times. Except that there are only 5 teeth on each finger, the second leg agrees closely in all other respects with de Man's descriptions and figures.

(v) The last three peraeopods are much stouter. In *H. consobrinus* the merus of the third leg is 5 times and the propodus 7 times as long as wide. The breadth of the dactylus is scarcely more than half the distal breadth of the propodus, whereas according to de Man's figure the two are almost equally broad in *H. consobrinus*.

(vi) De Man speaks of three pairs of dorsal spines on the telson in *H. consobrinus*, but this is perhaps merely an abnormality.

The specimen differs from Dana's figures in a number of points, particularly in the deeper rostrum and in the much stouter carpus and shorter fingers of the second leg. The figures, as de Man has pointed out, are doubtless erroneous in many respects, but the specimen agrees with them and differs from *H. consobrinus* in the position of the hepatic spine.

The specimen from the Red Sea, which Nobili records without comment as *H. lutescens*, presumably belongs to the same species as that which I have examined. Nobili, however, when writing in 1906, appears not to have been aware that de Man had given the name *H. consobrinus* to the specimens he formerly described as *H. lutescens*. The specimens which Balss has recorded from the Red Sea as *H. consobrinus* also probably belong to this species.

*Harpilius lutescens* was described by Dana from a specimen obtained at Tongatabu in Polynesia. If my identification is correct its distribution extends westwards to the Red Sea.

### **Harpilius consobrinus** de Man.

1887. *Harpilius lutescens*, de Man, *Arch. Naturgesch.* LIII, i, p. 536, pl. xxii*a*, fig. 1.

1902. *Harpilius lutescens*, de Man, *Abhandl. Senck. naturf. Ges.* XXV, p. 836, pl. xxvi, fig. 54.

Ternate and Noordwachter Is.

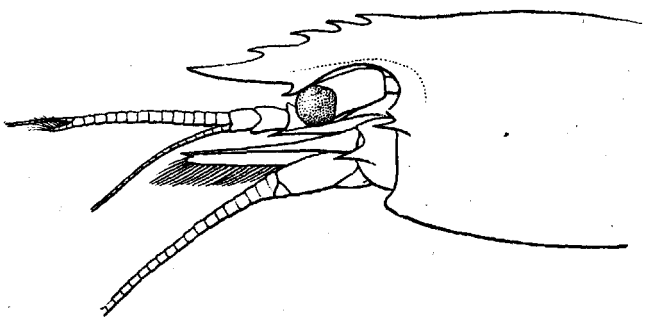
## **Harpilius gerlachei** Nobili.

1905. *Harpilius Gerlachei*, Nobili, *Bull. Mus. Paris* XI, p. 160.
1907. *Harpilius Gerlachei*, Nobili, *Bull. sci. France Belgique* XL., p. 45, pl. iv, figs. 10, 10*a*.
1915. *Harpilius Gerlachei*, Balss, *Denk. math.-naturw. Kl. K. Akad. Wien* XCI, p. 27.
1921. *Harpilius gerlachei*, Tattersall, *Journ. Linn. Soc., Zool.* XXXIV, p. 390, pl. xxviii, fig. 9.

This species is readily distinguished from all other members of the genus by the absence of the hepatic spine of the carapace. It also differs from all, with the possible exception of *H. consobrinus*, in the absence of an arthrobranch on the third maxilliped.

The principal characters of the species are as follows:—

(i) The rostrum is rather shallow and bears from 3 to 5 teeth above, usually 4, and 1 below. The posterior dorsal tooth is placed near the base of the rostrum in advance of the hinder



TEXT-FIG. 74.—*Harpilius gerlachei* Nobili.
Anterior part of carapace, rostrum, etc.

limit of the orbit. The midrib of the rostrum is not continuous with the orbital margin, but curves round the orbit in the form of an ill-defined crest some distance behind the margin proper (text-fig. 74).

(ii) The antennal spine is placed close to the lower orbital angle and is not supported by a carina. The hepatic is absent. The antero-lateral angles of the carapace are a little produced, but rounded.

(iii) The spine on the outer side of the second segment of the antenna is short. The terminal spine of the antennal scale projects well beyond the distal end of the lamella.

(iv) The antepenultimate segment of the third maxilliped is a little more than 3 times as long as broad.

(v) The carpus of the first peraeopod is from 5 to 5·5 times as long as its distal breadth and the fingers are little more than half the length of the palm.

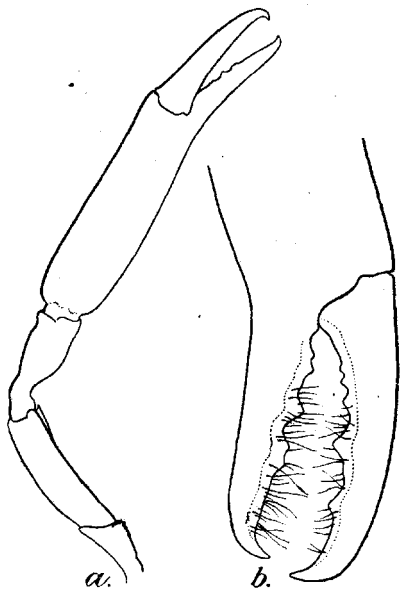
(vi) In the second peraeopod (text-fig. 75) the ischium is unarmed. The merus has no spine at the distal end of the upper border; the lower border ends acutely on the outer side and in a rounded lobe or process on the inner side. The carpus is unarmed.

The fingers are armed in the proximal three quarters of their length with from 3 to 7 teeth, very irregular in their size and distribution. The palm is less than twice the length of the fingers.

(vii) In the third pair of peraeopods the merus is about 3·5 times as long as wide. The propodus is as broad as the merus and is about 4·5 times as long as wide; at the distal end it is very little broader than the dactylus.

(viii) The pleura of the fourth and fifth abdominal somites are not acutely pointed infero-posteriorly.

(ix) The anterior of the two pairs of dorsal spines on the telson is placed behind the middle of its length. The posterior pair is midway between the anterior pair and the apex.




TEXT-FIG. 75.—*Harpilius gerlachei* Nobili.
*a*. Second peraeopod.
*b*. Fingers of second peraeopod.

The largest specimen examined is a female about 18 mm. in length.

The telson of one of the specimens is abnormal, bearing 5 teeth on one of the lateral margins and 3 on the other.

| | | | |
|---|---|---|---|
| C 412-3/1. | Pamban and Kilakarai, Gulf of Manaar. | S. Kemp, Feb., 1913. | Four. |

The specimens were all obtained on madrepore coral. Those examined by Nobili were found to the north-east of Arzana I. in the Persian Gulf, "parmi les polypiers." Tattersall's specimens are from a coral reef at Khor Dongonab in the Red Sea and those recorded by Balss are from the Gulf of Suez, the Red Sea and the S. Coast of Arabia.

## Genus **Pontoniopsis** Borradaile.

1915. *Pontoniopsis*, Borradaile, *Ann. Mag. Nat. Hist.* (8) XV, p. 207.
1917. *Pontoniopsis*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 377.

This genus, of which I have seen no specimens, was erected by Borradaile for a single species, *P. comanthi*, found on crinoids in the Torres Straits. It appears to be very closely related to *Periclimenes* and *Harpilius*, but differs in its depressed and toothless rostrum, which is lanceolate in dorsal view. Supra-orbital and hepatic spines are wanting and the dactyli of the last three legs are simple.

### Genus **Dasycaris**, nov.

Rostrum long, laterally compressed, with teeth. Carapace laterally compressed, sculptured, with regions well-defined; antennal and hepatic spines present, each flanked by a strong carina. Antennular peduncle with basal segment greatly narrowed distally; antennal scale well developed. Mandible without palp; inner lacinia of maxillula narrow: all maxillipeds with exopods, the second without podobranch, the third slender. Carpus of first peraeopod not divided into subsegments. Last three pairs of peraeopods with strongly hooked dactylus, without basal protuberance and without accessory claw. Pleura of third, fourth and fifth abdominal somites drawn out inferiorly into long acute processes.

Type and only known species,—*Dasycaris symbiotes*, sp. nov.

This genus is proposed for a remarkable Pontoniine prawn found on Alcyonaria belonging to the genus *Pteroeides*. In most of its characters the genus resemble *Periclimenes*, but the carapace is sculptured, the basal segment of the antennular peduncle is strongly narrowed distally and some of the abdominal pleura are produced inferiorly and end in very sharp spinous processes. The dactylus of the posterior legs appears simple under low magnifications, but when stained and examined under a high power it is seen to possess a pit on the posterior margin, through which a fleshy process can apparently be protruded.

In certain species of *Harpilius* (*H. beaupresi* and *H. depressus*) the pleura of the fourth and fifth abdominal somites are acutely produced infero-posteriorly, though not to the same extent as in *Dasycaris*. In *Harpilius*, however, the carapace is depressed and not sculptured and the basal antennular segment is very broad.

In some respects *Dasycaris* resembles Nobili's little known genus *Coutierea*. The latter, however, is a much more extreme form, with a pterygostomian spine on the carapace and with abnormally developed antennal and supra-orbital spines. In *Coutierea*, moreover, the dactylus of the posterior legs bears a basal protuberance, indicating affinity with *Coralliocaris* and *Conchodytes* rather than with the *Periclimenes* group of genera.

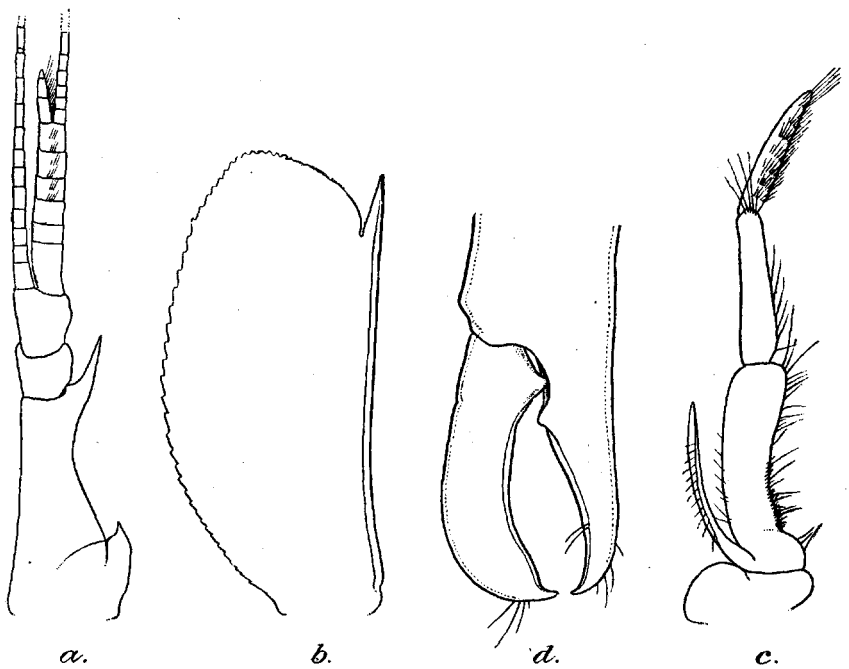
### **Dasycaris symbiotes**, sp. nov.

(Plate IX.)

The rostrum reaches to the end of the second segment of the antennular peduncle in the female, to the end of the third segment in the male. It is straight, very slightly upturned at the tip and is extremely shallow in lateral view. It bears above 5 sharp teeth; of these the three posterior are placed close together, with two situated behind the posterior limit of the orbit, while the foremost is little, if at all, in front of the middle of the rostral length. The lower border is unarmed. Behind the rostrum in the middle of the carapace there is another sharp tooth, widely separated from the posterior of those forming the rostral series; this tooth forms the

termination of a sharp carina which commences in the posterior quarter of the carapace.

The lower limit of the orbit is defined by an acute angulation of the frontal margin. The supra-orbital spine is absent. The antennal spine is large, with the hepatic placed behind it on the same level; both spines are supported by strong carinae. The surface of the carapace is uneven; a blunt ridge runs backwards from the lower orbital angle and is separated from the antennal and hepatic spines by a well-marked furrow. There is a similar furrow above this ridge and a large shallow depression on the gastric




TEXT-FIG. 76.—*Dasycaris symbiotes*, sp. nov.

*a*. Antennule. *c*. Third maxilliped.
*b*. Antennal scale. *d*. Fingers of second peraeopod.

region. The upper limit of the branchial cavity is defined externally by a groove and an irregular fold.

The eyes are rather slender. The cornea is hemispherical and scarcely wider than the stalk and there is no trace of the ocular spot.

The basal segment of the antennular peduncle (text-fig. 76*a*) is externally concave and is remarkably narrow in its distal third; its least breadth is only one quarter its length excluding the terminal spine. The lateral process does not reach the middle of the basal segment and consists of a comparatively broad plate with an acute termination; it thus differs considerably from that of *Periclimenes* in which the whole process has the form of a simple spine. The

terminal spine of the outer margin is very sharp and long, extending beyond the end of the second segment. The second and third segments are broad and the length of the two combined is scarcely more than half that of the basal segment. The free part of the stouter of the two rami composing the outer flagellum is about one-third the length of the fused basal portion, the latter comprising 6 segments. The total length of the shorter ramus is less than that of the peduncle.

The antennal scale (text-fig. 76*b*) scarcely reaches beyond the end of the antennular peduncle. It is only about 2·2 times as long as broad and the outer margin, which is very slightly concave, ends in a spine which reaches almost as far forwards as the broadly rounded apex of the lamella.

The third maxilliped (text-fig. 76*c*) bears a foliaceous epipod. The exopod does not reach the end of the slightly curved antepenultimate segment. The ultimate segment is as long as the penultimate.

The first peraeopods are slender and reach beyond the antennal scale by the chela and a portion of the carpus. The chela is a little longer than the carpus and the merus a little longer than the chela. The carpus is about 6 times as long as wide. The palm is 4 times as long as wide and is twice as long as the fingers. The fingers bear some short hairs, but their inner margins are unarmed.

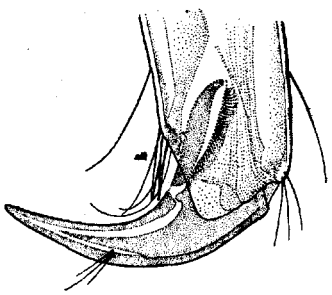
In the male specimen the second pair of peraeopods is very unequal; in the female one leg only, apparently the larger of the two, is present.

The larger limb extend beyond the antennal scale by the whole length of the chela and carpus and is covered with minute tubercles. The merus is longer than the ischium and is broadest distally, the lower border ending in a strong tooth. The carpus is very short, scarcely longer than broad; it is little more than one-third the length of the merus and is unarmed. The chela is about 2·75 times the length of the merus; the palm is about 3·5 times as long as wide and is from 2·2 to 2·5 times as long as the dactylus. The dactylus is heavy, with strongly convex outer border (text-fig. 76*d*); at the base of its inner margin it is provided with a large acute tooth which fits into a cavity in the fixed finger. In front of this cavity the fixed finger bears a small tooth. In the distal two-thirds of their length the inner margin of each finger is entire, the margin is, however, a little concave with the result that a small gap is left when the claw is closed. The tips are inturned and cross one another.

In the smaller second leg the tooth at the distal end of the merus appears to be absent and the carpus is nearly twice as long as wide and rather less than half the length of the merus. The chela is 1·65 times the length of the merus, with fingers unarmed and slightly less than half the length of the palm.

The three posterior peraeopods are stout; the third reach beyond the antennal scale by the length of the dactylus. The merus is about 4·5 times as long as broad and is 2·3 times the length of the car-

pus. The propodus is conspicuously curved, about 6 times as long as broad and 3 times the length of the dactylus; at the distal end of the lower border there are two pairs of spinules. The dactyli have the form of strong hooks and are about 3 times as long as their basal breadth. The dactyli appear simple under low magnifications, but when stained and mounted and viewed under a high power a pit or pore can be detected on the interior side near the base (text-fig. 77). In this pit a fleshy process is lodged and this process is continuous with striated muscle tissue at the base of the dactylus. From the structure of the parts it seems probable that the process can be protruded through the pit. Examination of living material is necessary before the function of the process can be determined accurately; it is possible that it acts as a pad and helps the prawn to retain a grip on the host.



TEXT-FIG. 77.—*Dasycaris symbiotes*, sp. nov Dactylus of third peraeopod, from a stained preparation.

The abdominal somites are smooth. In both sexes the pleura of the third, fourth and fifth somites are produced inferiorly to long sharply pointed processes. In the male the pleura of the first two somites are pointed at their posterior angles, while in the female the pleura of these somites are rounded, with a small pointed projection in the middle of the lower margin of the second. The sixth somite is rather more than 1·5 times the length of the fifth; posteriorly it bears a sharp spine on either side of the base of the telson. The telson is shorter than the uropods and possesses two pairs of dorsal spines; the foremost of these is placed a little in front of the middle point of the telson, while the second pair is rather nearer to the first than to the apex. The terminal telson spines are short.

The female specimen is 13 mm. in length, the male about 9·5 mm.

With the female there is a note by Col. Alcock which reads,—"Transparent grey with dark points on a Pteroeid of exactly similar colour." In *A Naturalist in Indian Seas*, p. 113, Col. Alcock further says,—"Another zoophyte that we often dredged was *Pteroeides elegans* (or a species intimately close to it), one of the sea-pens, of a grey colour profusely marked with little, blackish rings. In its leaves three small species of crustaceans are accustomed to hide, all of whom are coloured and spotted exactly like the living citadel in which they dwell." One of the other crustaceans associated with the *Pteroeides* is an Alpheid, but what the third is I do not know.

| | | | |
|---|---|---|---|
| 1729/7. | 2½ miles E.S.E. of Santapilli Lt., near Vizagapatam, Madras Coast, 15-17 fms. | 'Investigator,' Feb., 1890. | One ♀, TYPE. |
| C 406/1. | 3 miles E.S.E. of Kabusa Is., Mergui, 12°44′30″ N., 97°55′30″ E., 35 fms. | 'Investigator,' Oct., 1913. | One ♂, TYPE. |

Alcock's notes refer to the female obtained at the first of these localities. The labels of the male do not indicate that it was found in any particular association.

## Genus **Thaumastocaris**, nov.

Rostrum well developed, laterally compressed, with large teeth. Carapace laterally compressed, not sculptured. Basal segment of antennule broad; antennal scale well developed. Mandible without palp; inner lacinia of maxillula narrow; all maxillipeds with exopods, the second without podobranch, the third slender. Carpus of first peraeopods divided into a number of subsegments. Last three peraeopods with dactylus biunguiculate, but without basal process. Pleura of abdominal somites rounded inferiorly.

Type and only known species,—*Thaumastocaris streptopus*, sp. nov.

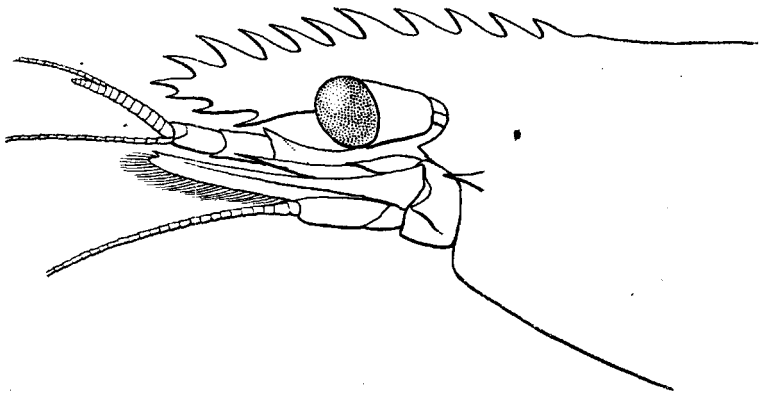
This genus is proposed for a Pontoniine prawn from New Caledonia belonging to the Paris Museum which is remarkable for the fact that the carpus of the *first* pair of peraeopods is divided into a number of subsegments. In this curious feature it differs, I believe, from all Macrura hitherto known.

The carpus of the second peraeopod is frequently segmented in Caridea and the character is of value in distinguishing certain of the families into which the tribe is divided. Much less significance is, however, to be attributed to the occurrence of the same feature in the first peraeopod of *Thaumastocaris*, for it is by this feature alone that it can be distinguished from *Periclimenes*. In *Thaumastocaris* the hepatic spine is absent and the dactylus of the last three legs biunguiculate. In these points it resembles *Periclimenaeus* and I have no doubt that it is in this subgenus or in the closely related *Periclimenes s.s.* that it finds its nearest allies. It is not easy to decide how much importance should be attributed to a unique character such as that on which this genus is founded; it is possible that its affinities would be more clearly shown by regarding it merely as a subgenus of *Periclimenes*.

### **Thaumastocaris streptopus**, sp. nov.

The rostrum (text-fig. 78) reaches to the end of the antennal scale and is deep in lateral view. The upper border is straight and in the single specimen examined bears a series of 10 closely set teeth which increase in size from behind forwards and are all very large; the three posterior teeth are situated on the carapace behind the

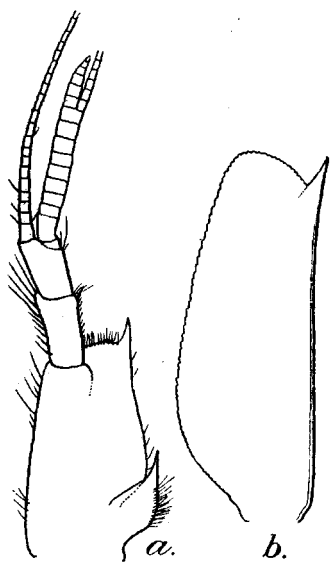
orbit. The lower border is convex and bears three smaller teeth in its distal half.



TEXT-FIG. 78.—*Thaumastecaris streptopus*, sp. nov.
Anterior part of carapace, rostrum, etc.

The carapace is smooth, without trace of areolation or sculpture. The orbital angle is acute; below it there is a sharp antennal spine, but both supra-orbital and hepatic are missing. The eyes are large; the ocular spot is merged in the cornea and the breadth of the cornea is greater than that of the stalk.

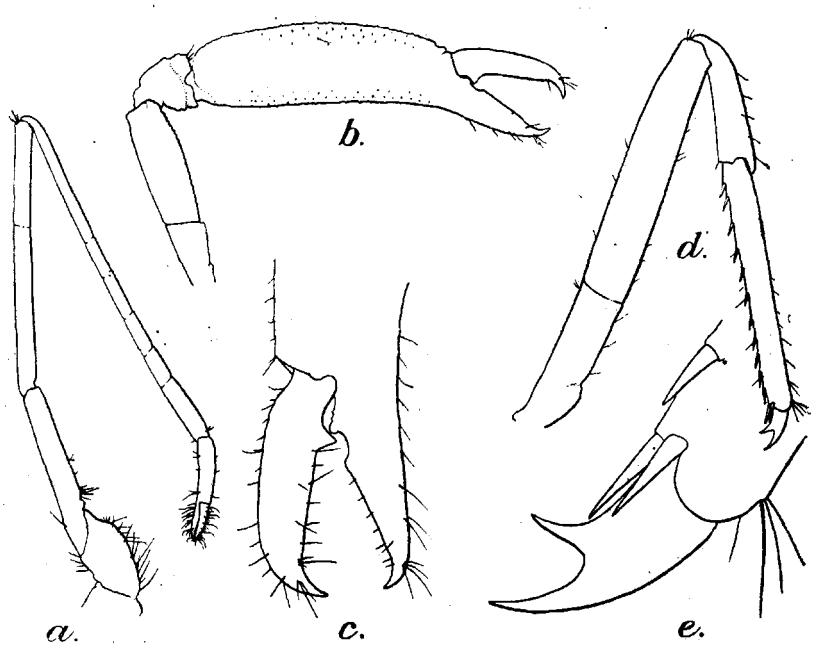
The antennular peduncle (text-fig. 79*a*) extends nearly to the end of the antennal scale. The lateral process does not quite reach the middle of the basal segment; the spine at the outer distal angle is long and the margin between this spine and the articulation of the second segment is a little convex. The free portion of the shorter of the two rami composing the outer antennular flagellum is much shorter than the fused part, the latter comprising 9 segments. The antennal scale (text-fig. 79*b*) is not quite 3 times as long as wide; the outer margin is slightly concave and terminates in a spine which reaches almost to the end of the lamella.




TEXT-FIG. 79.—*Thaumastocaris streptopus*, sp. nov.
*a*. Antennule.
*b*. Antennal scale.

The distal endite of the maxilla, as in most Pontoniinae, is divided into two lobes. The third maxilliped extends to the middle of the second antennular segment and is slender. It possesses a small arthrobranch and the exopod does not reach the distal end of the antepenultimate segment. The ultimate segment is less than two-thirds as long as the penultimate.

The first peraeopods (text-fig. 80*a*) are very long and slender: the mero-carpal articulation reaches to the end of the basal antennular segment. The merus is about 14 times as long as wide and is divided by a rather obscure articulation into two subsegments, the distal about two-thirds the length of the proximal. The car-




TEXT-FIG. 80.—*Thaumastocaris streptopus*, sp. nov.

*a*. First peraeopod. *c*. Fingers of second peraeopod.
*b*. Second peraeopod. *d*. Third peraeopod.
*e*. Dactylus of same.

pus is very slender, about 1·35 times as long as the merus and 3·6 times as long as the chela. It is divided by transverse or oblique articulations into six subsegments, the order of which, when arranged according to length is 1, 6, 3, 2, 4, 5. The first subsegment is twice as long as the sixth, the second, third and fourth are subequal and the fifth, which is the shortest, is about 2·5 times as long as wide. The chela is slender, with fingers unarmed and little more than half the length of the palm.

Judging from the size of the basal segments the second peraeopods do not differ greatly in size, but only the left limb (text-fig. 80*b*) is present in the unique specimen. It extends beyond the

antennal scale by the greater part of the chela. The merus is rather less than 3 times as long as wide; it is conspicuously tuberculate along its lower border, but does not bear a distal tooth. The carpus is a little longer than broad and is about half the length of the merus. Its surface is somewhat uneven and it bears one obscure tubercle on its upper surface and two beneath. There is an excavation in the anterior margin on the inner side and the border above this excavation is obscurely crenulate. The chela is about 3 times as long as the merus and the fingers are a little less than half the length of the palm. The palm is nearly 3 times as long as wide and is rather closely covered with conspicuous tubercles except on the middle of its inner face. The fixed finger is bent at an obtuse angle to the palm. There is a large triangular tooth at the base of the dactylus which fits into a socket in the fixed finger (text-fig. 80*c*). In the proximal third of the fixed finger there are two teeth separated by a shallow excavation; the anterior of these is blunt and little developed, the posterior is broad and crenulate on the summit. The tips of the fingers are inturned and cross one another when the claw is closed.

The last three peraeopods are stout; the third (text-fig. 80*d*) reach a little beyond the antennal scale, the fifth to the end of the basal antennular segment. In the third pair the merus is 5·5 times as long as wide and the propodus is 5·5 times as long as the dactylus. In the third and fourth pairs the posterior margin of the propodus is thickly furnished with spinules along its entire length; in the fifth pair the spinules are restricted to the distal end. The dactylus (text-fig. 80*e*) is broad and biunguiculate, with the accessory claw large.

The pleurobranchs as in other Pontoniinae are five in number, one being situated above the base of each peraeopod.

The sixth abdominal somite is short; it bears a strong spine on either side of the base of the telson and one at each postero-lateral angle. The telson is flattened above, with two pairs of large dorsal spines. The anterior pair is situated well in advance of the middle, while the posterior pair is midway between the anterior pair and the apex. At the tip of the telson there are as usual 6 spines, the intermediate pair the longest. The median pair is unusually slender.

The species is described from a single male about 24 mm. in length.

The specimen is the property of the Paris Museum. It was obtained in August 1890 at Noumea in New Caledonia by Abbé Cullieret.

## Genus **Anchistus** Borradaile.

1898. *Anchistus*, Borradaile, *Ann. Mag. Nat. Hist.* (7) II, p. 387.
1917. *Anchistus*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 387.

The genera *Anchistus* and *Pontonia* comprise species which have adopted a more secluded mode of life than any of those contained in the preceding genera. The species of *Anchistus* live in the mantle-

cavity of lamellibranch molluscs, those of *Pontonia* in a similar situation or in the branchial sac of ascidians. In both genera the prawns probably enter their hosts when larvae and never leave them throughout the whole period of their lives (*vide* p. 117).

The structural changes which they have undergone in response to this remarkable environment are not great. The species are more or less depressed in habit of body and, except for the occasional presence of the antennal, all the spines of the carapace have disappeared; the second legs are very heavy, frequently unequal, and without spines on the ischium, merus or carpus To each of these characters a parallel can be found in other genera of the family. The only structural feature of unequivocal value is afforded by the inner lacinia of the maxillula, which is very broad and densely covered with hair.[1] In this respect *Anchistus* and *Pontonia* agree with *Conchodytes*—which also lives in lamellibranchs—and differ from all other genera of Pontoniinae in which the maxillula has been described.

The characters available for separating *Anchistus* from *Pontonia* are very slight, though there can be little doubt that the genera constitute two natural groups of species. In *Anchistus* the rostrum is laterally compressed in its distal half and frequently bears small teeth at or near the apex. The two distal segments of the third maxilliped[2] are always slender and are not twisted as in the related genus. The dactylus of the last three legs is either simple and strongly hooked, or is scoop-shaped with the distal part of the anterior border bent inwards, and with an accessory tooth. Minor distinctions are to be found in the last abdominal somite and telson. The former is bluntly produced on either side of the telson and with the postero-lateral corners more or less rounded, whereas these four angles are sharply acute or spinous in *Pontonia*. In *Anchistus* the dorsal spines of the telson are very small and inconspicuous, in *Pontonia* they are usually large.

The distal endite of the maxilla, as in some species of *Pontonia* and most *Periclimenes* is divided into two lobes.

Borradaile recognises five species of this genus and also includes, though with some doubt, Milne-Edwards' *Pontonia armata*. This species can never be identified with certainty from the brief description which has been published, and the same remark also applies to *A. spinuliferus* (Miers). Pesta's *Marygrande mirabilis* is no doubt an *Anchistus*; but the author seems to have confused two distinct species in drawing up his specific description.

I have myself seen four species of *Anchistus*, two of which appear to be undescribed. They are distinguished by the following characters:—

*A.* Rostrum toothless; antepenultimate segment of third maxilliped very broad, contrasting strongly in width with two distal segments; chela of first leg with its lateral edges

[1] See Borradaile's figs. 25*e* and 26*e* *loc. cit.*, 1917.

[2] Borradaile distinguishes *Anchistus* from *Pontonia* by the slenderness of these two segments; they are, however, equally slender in some species of *Pontonia*.

produced and bent downwards, the lower surface thus being deeply channelled; dactyli of last three legs simple, less than half as broad at base as distal end of propodus ... *inermis* (Miers).

*A'*. Rostrum with teeth at or near apex; antepenultimate segment of third maxilliped rather slender, not contrasting strongly in width with two distal segments; chela of first leg normal in form; dactyli of last three legs little narrower at base than distal end of propodus.

*B*. Dactyli of last three legs normal in form, simple and consisting of a broad basal portion and a slender curved apical claw; basal segment of antennular peduncle with a short tooth at distal end of outer margin [antennal spine present] ... ... ... ... *gravieri*, sp. nov.

*B'*. Dactyli of last three legs scoop-shaped with distal part of upper border reflected inwards, biunguiculate; basal segment of antennular peduncle without terminal tooth.

*C*. Rostrum more or less pointed with teeth on upper border near apex; antennal spine present; dactyli of last three legs with sharp accessory claw and very minute and inconspicuous spinules ... ... *miersi* (de Man).

*C'*. Rostrum squarely truncate with teeth only at the apex; antennal spine absent; dactyli of last three legs with short blunt accessory claw and large spinules ... ... ... ... *demani*, sp. nov.

## Anchistus inermis (Miers).

1884. *Harpilius inermis*, Miers, *Rep. Zool. Coll. H.M.S. 'Alert,'* p. 291, pl. xxxii, fig. B.
1894. *Pontonia pinnae*, Ortmann, *Denk. med.-naturw. Ges. Jena* VIII, p. 16. pl. i, fig. 3.
1906. *Pontonia pinnae*, Nobili. *Ann. Sci. nat., Zool.* (9) IV, p. 65.
1907. *Pontonia pinnae*, Nobili, *Bull. Sci. France Belgique* XL, p. 49, pl. iv, figs. 11–11*b*.
1917. *Anchistus inermis* and *Pontonia pinnae*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, pp. 388, 391.
1921. *Anchistus inermis*, Tattersall, *Journ. Linn. Soc., Zool.* XXXIV, p. 391, pl. xxvii, fig. 4.

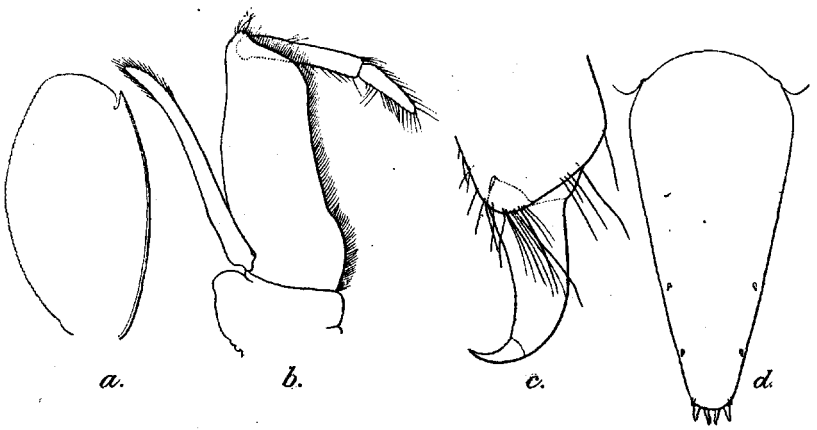
Other references are given by Borradaile. The principal characters of the species are as follows:—

The rostrum is directed downwards, toothless and with the apex broadly rounded in lateral view. The lower limit of the orbit is defined by an acute projection from the frontal margin of the carapace; the antennal spine is either altogether absent or is represented merely by a minute pointed process. The basal segment of the antennular peduncle is produced distally on its outer side in the form of a convex lobe, the outer margin terminating in a short spine. The fused portion of the outer antennular flagellum comprises 5 segments. The antennal scale (text-fig. 81*a*) is broadly oval and little narrowed anteriorly; the strongly convex outer border terminates in a rather small tooth which does not reach the distal end of the lamella.

The antepenultimate segment of the third maxilliped (text-fig. 81*b*) is longer than the two distal segments taken together and is very broad; its least breadth is more than three times that of the penultimate segment. The lower margins of the basis and ischium of the first peraeopods are heavily fringed with setae. The carpus

is a little longer than the merus and nearly twice as long as the chela; the fingers are much shorter than the palm. The structure of the chela, as Tattersall has pointed out, is very peculiar.[1] The edge, both on its outer and inner side, is produced to form a sort of flap which is bent downwards and is thickly fringed with long setae on its margin. The chela is thus deeply hollowed in a longitudinal direction when viewed from below and in a transverse section the lower surface would be semicircular (see Tattersall, *loc. cit.*, fig. 4).

The second peraeopods are unequal, either the right or left limb may be enlarged. In the larger of the two the merus is from 2·0 to 2·4 times as long as broad; the carpus is very short, only one-sixth to one-eighth the length of the chela and the fingers are a little more than half the length of the palm. The dactylus




TEXT-FIG. 81.—*Anchistus inermis* (Miers).

*a*. Antennal scale.
*b*. Third maxilliped.
*c*. Dactylus of third peraeopod.
*d*. Telson.

is strongly convex externally. On the inner margin it bears in its basal half a very large triangular tooth and a rounded knob close to the articulation; when the claw is closed both the tooth and the knob are received into a large socket in the fixed finger. The inner margin of the fixed finger is obtusely produced in the middle and in the basal half, on a crest which borders the socket on its upper side, there are usually from 3 to 6 small denticles, the foremost placed at the summit of the obtuse prominence referred to above. In all well-developed specimens the distal half of each finger is internally concave. The fingers of the smaller limb are similar, but the tooth on the dactylus is usually less well developed.

In the last three peraeopods the propodus is without spinules on its posterior edge. The dactylus (text-fig. 81*c*) is strongly hooked, with the terminal claw bent at right angles to the proxi-

[1] The character is not sexual as suggested by Tattersall.

mal portion. It is extremely slender, the basal breadth being only about half that of the distal end of the propodus.

The apex of the telson (text-fig. 81*d*) is generally armed with six spines. The two forming the median pair are more slender than the intermediates; the outermost are very short and inconspicuous and are occasionally missing. The dorsal spines are very small and are sometimes absent. When present the anterior pair is placed behind the middle of the telson, with the posterior pair midway between the first pair and the apex.

An exceptionally large female is about 39 mm. in length; the majority of the specimens examined do not exceed 26 mm.

Living specimens vary in colour from pale straw to bright orange yellow. In females the entire body and legs are covered with minute white dots and the eggs are pale straw, yellow, orange or brown. Males are semitransparent and lack the white dots found in the female.

Dr. W. T. Calman has been kind enough to compare certain specimens which I sent him with the holotype of Miers' *Harpilius inermis*. He writes that the type "agrees exactly with your Indian specimens in the form of the chela of the first leg and in the dorsal spinules of the telson (these are very small, near the decurved lateral edge, and easy to overlook), as well as in all other characters that I can see. I think there can be no doubt that your specimens belong to Miers' species."

Tattersall is doubtless right in his suggestion that Ortmann's *Pontonia pinnae*[1] is synonymous with this species. The only point of difference concerns the proportionate length of the palm and fingers of the second peraeopod as shown in the figure. On this no reliance can be placed, as Ortmann's figures are usually inaccurate. I have examined specimens belonging to the Paris Museum which were obtained at the same locality in the Persian Gulf as those which Nobili recorded as *Pontonia pinnae* and find that they are typical *A. inermis*.

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|---|---|---|---|
| C 415/1. | Port Blair, Andamans. | S. Kemp, Feb., March, 1921. | Thirty-four. |
| C 441/1. | Andamans. | A. R. S. Anderson. | Nine. |
| C 442/1. | Paway I., Mergui Archipelago. | 'Investigator,' Feb., 1914. | Two. |
| C 416/1. | Cheval Paar, Ceylon, 6 fms. | T. Southwell, Jan., Feb., 1911. | Four. |
| C 458/1. | Pamban, G. of Manaar. | S. Kemp, Feb., 1913. | Five. |

I have also seen specimens belonging to the Paris Museum from the Pearl banks S.W. of Arzana I. in the Persian Gulf, obtained in *Pinna* (Bonnier and Pérez coll.) and from Vanikoro, in the Santa Cruz group, Polynesia.

The specimens from Port Blair were all obtained in the mantle-cavity of species of *Pinna*, a mollusc which occurs in abundance at low water at Brigade Creek and on the shore south of Viper I.

[1] The specific name used by Ortmann was preoccupied by Lockington in 1879 (see Addendum, p. 287).

Every large *Pinna* which was opened contained a pair of prawns belonging either to this species or to *Conchodytes biunguiculatus*. One pair of *A. inermis* was found in *Pinna nigrina* Lam., one pair in *P. vexillum* Born. and the remainder in *P. bicolor* Gmelin.[1] The specimens from Pamban were also obtained in *Pinna*.

The species was described by Miers from a specimen obtained in *Pinna* at Porte Molle in Queensland. It has been recorded from Shark Bay, W. Australia, in *Pinna* (Miers); from the Monte Bello Is., N.W. Australia, in *Pinna* (Rathbun); from Penang, "taken from the infra-branchial chamber of a large Gastropod"[2] (Lanchester); from Trincomali in Ceylon (Müller); from the Ceylon Pearl banks (Pearson); from the Persian Gulf Pearl banks, in *Pinna* (Nobili)[3]; from Dar-es-Salaam, in *Pinna* (Ortmann)[3]; and, in the Red Sea, from Djibouti (Nobili)[3] and Suakin Harbour, in *Pinna* (Tattersall).

### Anchistus mirabilis (Pesta).

1911. *Marygrande mirabilis*, Pesta, *Zool. Anz.* XXXVIII, p. 571, text-figs. 1–5.
1913. *Marygrande mirabilis*, Pesta, *Denk. math-naturw. Kl. K Akad. Wiss. Wien* LXXXIX, p. 675, text-figs. 31, 32.

Pesta appears to have confused two forms when describing this species. The dactylus of the posterior legs is described and figured as simple, but he includes as a variety of the same species a form in which it is biunguiculate (*v.* Pesta, 1913, text-figs. 31*d*, *e*). Judging from the species of *Anchistus* that I have seen it does not seem possible that these two types of dactylus can be found in one and the same species.

The form with simple dactylus is closely related to Miers' *A. inermis*, from which, so far as can be ascertained from Pesta's account, it differs only in the less depressed rostrum with apex more pointed in lateral view. These characters are insufficient and re-examination of Pesta's specimens is necessary before it is possible to reach any definite conclusions regarding the identity of the species. That it is not synonymous with Miers' species may be inferred from the fact that it was found in the mantle-cavity of *Tridacna gigas*, whereas *A. inermis* is apparently always associated with *Pinna*.

Pesta's specimens were obtained at Samoa.

### Anchistus gravieri, sp. nov.

The rostrum (text-fig. 82) reaches to the end of the second segment of the antennular peduncle and is directed downwards. In lateral view it is rather deep, but obliquely truncate terminally

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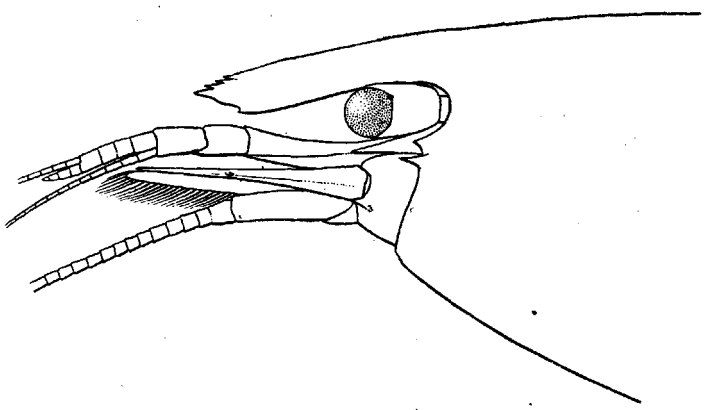
[1] I am indebted to Dr. Baini Prashad for the identification of the species of *Pinna*.

[2] This is, I believe, the only record of a Macruran from a Gastropod and is doubtless an error.

[3] Recorded as *Pontonia pinnae*.

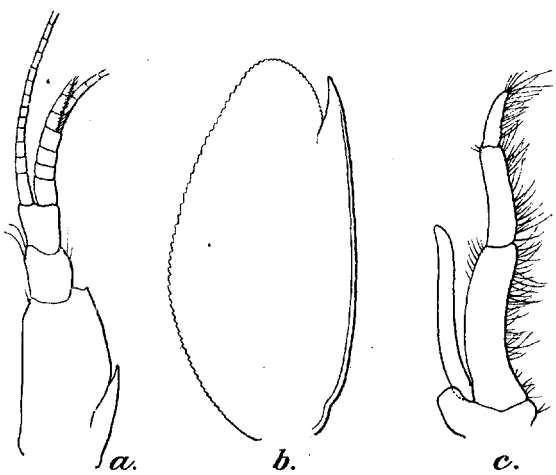
with the apex sharply pointed. On the upper edge close to the tip there are three sharp teeth, placed close together with setae in the interstices. On the lower border there is a small denticle placed



TEXT-FIG. 82.—*Anchistus gravieri*, sp. nov.
Anterior part of carapace, rostrum, etc.

near the distal end beneath the hindmost tooth on the upper edge.

The lower limit of the orbit is acutely produced and there is in addition a strong antennal spine. The cornea is a little narrower



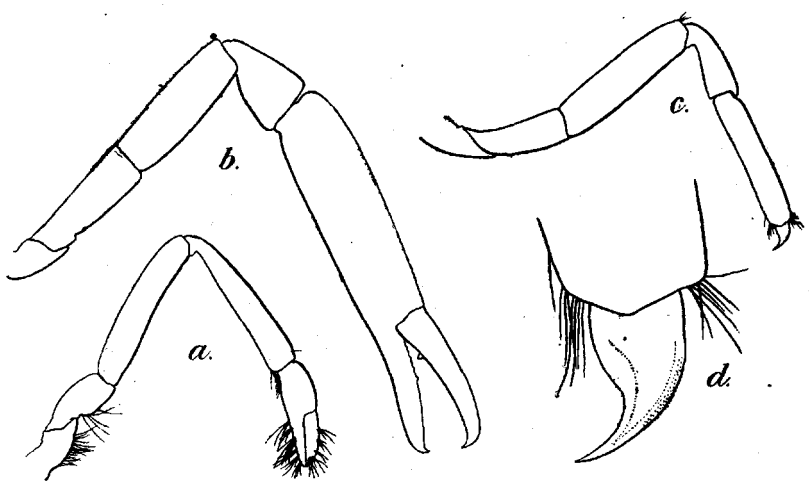

TEXT-FIG. 83.—*Anchistus gravieri*, sp. nov.
*a*. Antennule. *b*. Antennal scale.
*c*. Third maxilliped.

than the stalk and the black ocular spot is distinct. The basal segment of the antennular peduncle is produced on the outer side of the articulation of the second segment much as in *A. inermis*, and the outer margin ends in a small tooth (text-fig. 83*a*). The

fused portion of the two rami composing the outer antennular flagellum consists of 4 segments. The antennal scale is strongly narrowed distally (text-fig. 83*b*); the outer margin is convex and terminates in a large spine which does not reach as far forwards as the sharply rounded distal end of the lamella.

The antepenultimate segment of the third maxilliped (text-fig. 83*c*) is slender, as in *A. miersi*, and does not contrast strongly in width with the two terminal segments; in length it is slightly greater than these two segments combined.

The first peraeopods (text-fig. 84*a*) reach beyond the antennal scale by the chela and half the length of the carpus. There are a few setae on the lower borders of the basis and ischium. The merus and carpus are equal in length, each 1·5 times as long as the chela. The palm is normal in form, without the curious structure seen in *A. inermis*; the fingers bear tufts of setae and




TEXT-FIG. 84.—*Anchistus gravieri*, sp. nov.

*a*. First peraeopod. *c*. Third peraeopod.
*b*. Second peraeopod. *d*. Dactylus of same.

are somewhat spatulate, unarmed and longer than the palm.

In the single specimen examined only the right leg of the second pair is present (text-fig. 84*b*). It reaches beyond the antennal scale by rather more than the length of the chela. The merus is 3 times as long as wide and about 1·5 times as long as the carpus. The carpus is conical, about two-thirds as broad as long and one quarter the length of the chela. The palm is 1·75 times the length of the fingers. In the dentition of the fingers the species resembles *A. inermis*; the dactylar tooth is, however, smaller and the inner edge of the fixed finger is not angulate and bears six small denticles in the proximal half.

The merus of the third leg (text-fig. 84*c*) is 4 times as long

as wide, that of the fifth 4·5 times. The propodus in all three is without spinules on its posterior edge. The dactylus (text-fig. 84*d*) is simple and short, broad at the base, and with a slender terminal claw which is bent at an angle of 45° to the main axis of the segment. The telson is similar to that of *A. inermis*.

The single specimen is about 20 mm. in length.

With this species I have associated the name of Prof. Ch. Gravier, to whom I am indebted for the opportunity of examining a most interesting collection of unnamed Pontoniinae belonging to the Paris Museum. *A. gravieri* is distinguished from *A. inermis* (i) by the presence of teeth on the rostrum, (ii) by the strong antennal spine, (iii) by the shape of the antennal scale, (iv) by the slender antepenultimate segment of the third maxilliped, (v) by the form of the chela of the first peraeopod and (vi) by the broad-based dactyli of the last three peraeopods. *A. spinuliferus* can never be recognised with certainty from Miers' wholly inadequate description; it appears, however, to differ from the species described above in its unarmed rostrum. In *A. mirabilis* (Pesta) the rostrum is also unarmed and the proportions of the segments of third maxilliped are different. *A. miersi*, *A. demani* and *A. biunguiculatus* are easily distinguished by the form of the dactylus of the last three legs.

The single specimen examined is from Vanikoro, one of the Santa Cruz Is. in Polynesia, and is the property of the Paris Museum. The label does not indicate that the individual was found in the mantle-cavity of a lamellibranch.

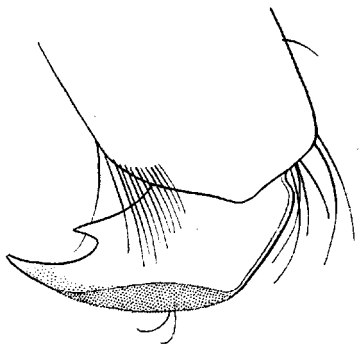
### **Anchistus miersi** (de Man).

1888. *Harpilius Miersi*, de Man, *Journ. Linn. Soc., Zool.* XXII, pl. xvii, figs. 6–10.
1906. *Anchistus miersi*, Nobili, *Ann. Sci. nat., Zool.* (9) IV, p. 63.
1917. *Anchistus miersi*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 388, pl. lvi, fig. 25.
1921. *Anchistus miersi*, Tattersall, *Journ. Linn. Soc., Zool.* XXXIV, p. 391.

Borradaile quotes other references. De Man has given an excellent description of this species and I have little to add to what he has said. The types of the species are in the collection of the Zoological Survey of India. In the specimens I have seen there are four or five teeth on the upper border of the rostrum near the apex and one or two very small denticles on the lower side. In a young individual, about 11 mm. in length, an obsolete tooth can be seen at the distal end of the outer margin of the basal antennular segment; but in well-grown specimens no trace of this tooth remains. The antennal scale is anteriorly narrowed, much as in *A. gravieri*.

The second peraeopods vary somewhat in proportions and in the dentition of the fingers. In a specimen from Batavia the carpus, as in the types, is conspicuously longer than broad and the palm is only about 1·5 times the length of the fingers. There

are two rather small teeth on the proximal part of the inner margin of the dactylus[1] and 8 or 9 small denticles on the proximal half of the fixed finger. In a specimen from Pulo Condore the carpus is as broad as long and the palm is nearly twice the length of the fingers: there is only one large tooth at the base of the dactylus[1] and 5 denticles on the fixed finger. The distal part of the upper border of the dactylus of the last three legs is bent inwards the segment thus forming a sort of scoop (text-fig. 85). There is a large tooth on the posterior margin. On the reflected part near the tip of the dactylus there are a number of extremely minute spinules, only visible under a high power of the microscope. The lateral margins of the telson are armed with two pairs of very small spines arranged in the same way as in *A. inermis*.



Text-fig. 85.—*Anchistus miersi* (de Man). Dactylus of third peraeopod.

| | | | |
|---|---|---|---|
| 8238/6. | Elphinstone I., Mergui Archipelago. | J. Anderson, March, 1887. | Two, TYPES. |
| C 418/1. | Port Blair, Andamans. | S. Kemp, Feb., 1921. | One, young. |

The specimen from Port Blair, which is only 11 mm. in length, was found in a *Tridacna* on the shore at Aberdeen. It was almost transparent when alive, with large sparsely distributed red chromatophores.

I have also seen specimens belonging to the Paris Museum from Batavia (Reynaud coll.) and from Pulo Condore (Germain coll.). The specimen from the latter locality was found in *Tridacna*.

*A. miersi* has been recorded from Mangareva in the Gambier Is. in the pearl oyster (Nobili), from Funafuti in the Ellice Is. (Whitelegge), from the D'Entrecasteaux Is., British New Guinea, in *Tridacna squamosa* (Borradaile), from Elphinstone I. in the Mergui Archipelago (de Man), the Maldives (Borradaile), the Seychelles (Borradaile), from the vicinity of Arzana I. in the Persian Gulf, in *Spondylus* (Nobili), from the Red Sea, in *Pinna* (Nobili) and from Suakin Harbour, in *Pinna* (Tattersall).[2] The species has thus been recorded from four different genera of lamellibranchs.

### Anchistus demani, sp. nov.

This species is closely related to *A. miersi*, but is distinguished by the following characters:—

---

[1] In addition to the rounded knob near the articulation.

[2] Tattersall states that Henderson has recorded the species from the coasts of India, but I have not been able to find the reference.

*A. miersi* (de Man).

Rostrum apically pointed in lateral view, with 4 or 5 small teeth on upper border near tip and sometimes with 1 or 2 denticles on lower border.

Antennal spine of carapace present.

Dactylus of last three peraeopods scoop-shaped; apex slender and sharply pointed; accessory spine sharp and conspicuous; reflected portion of upper margin with fine microscopic spinules (text-fig. 85).

Distance between the two pairs of dorsal spinules of telson (when present) about equal to distance between posterior pair and apex.

Larger, ovigerous females 25 mm. or more in length.

*A demani*, sp. nov.

Rostrum squarely truncate at apex in lateral view, the upper end of the truncate margin armed with 2 or 3 small teeth (text-fig. 86).

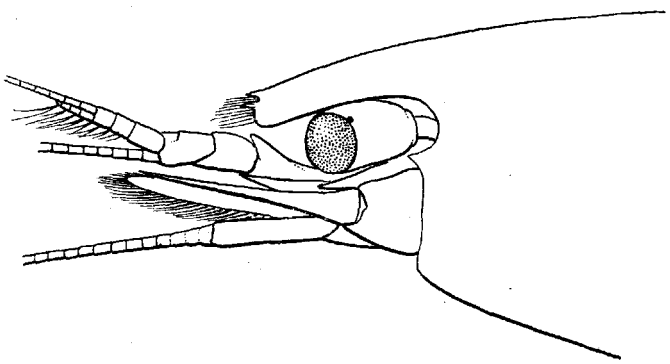
Antennal spine of carapace absent.

Dactylus of last three peraeopods scoop-shaped; apex broader and less sharply pointed; accessory spine very blunt and inconspicuous; reflected portion of upper margin entirely covered with rather coarse spinules (text-fig. 88).

Distance between the two pairs of dorsal spinules of telson more than twice the distance between posterior pair and apex (text-fig. 87*h*).

Smaller, ovigerous females 10 mm. in length.

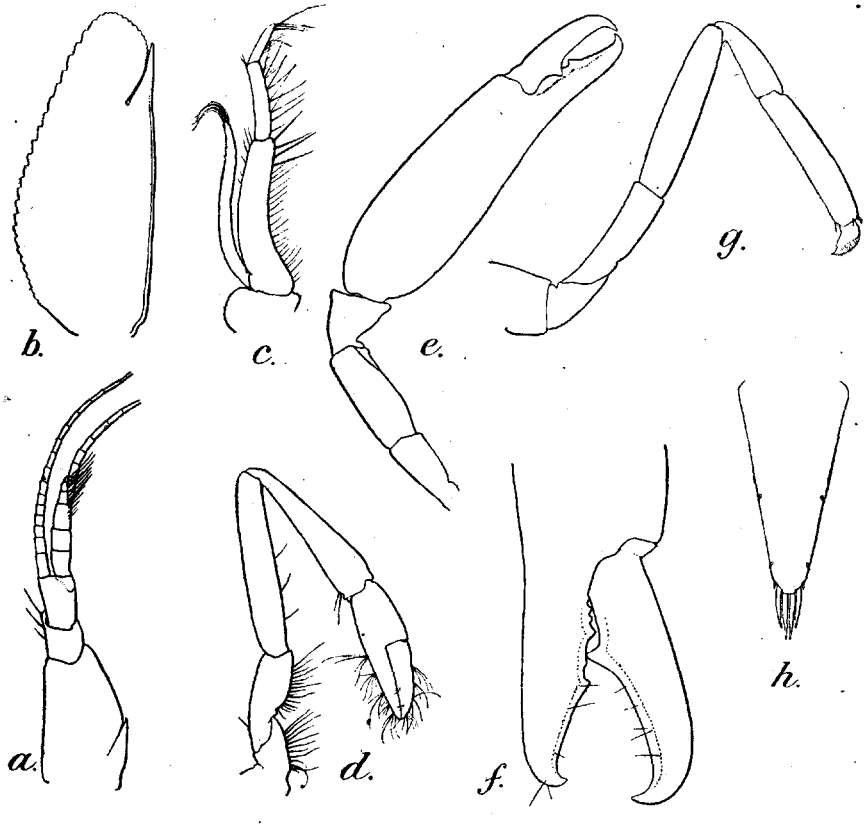
In other respects the species closely resembles *A. miersi*. The distal end of the basal segment of the antennular peduncle (text-



TEXT-FIG. 86.—*Anchistus demani*, sp. nov.
Anterior part of carapace, rostrum, etc.

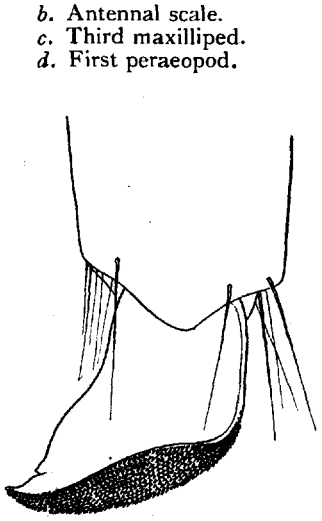
fig. 87*a*) is produced externally beyond the articulation of the second segment and the outer margin does not end in a spine. The fused portion of the outer flagellum is short and is composed of only 3 segments, as against 5 or 6 in *A. miersi*. The antennal scale (text-fig. 87*b*) is strongly narrowed distally and the antepenultimate segment of the third maxilliped (text-fig. 87*c*) is little broader than the distal segments.

In the first peraeopods (text-fig. 87*d*) the carpus is shorter than the merus and about one-sixth longer than the chela, the fingers are longer than the palm. The second peraeopods are unequal. In the larger of the two (text-fig. 87*e*) the merus is 2·5 times as long as broad; the carpus is little more than half the length of the merus and is as broad as long. The palm of the larger limb is 2·5 times the length of the merus and is twice or rather more than twice as long as the fingers. The dactylus (text-fig. 87*f*) bears a large triangular tooth in its proximal third and a knob close to the articulation; the fixed finger has a series of 4




TEXT-FIG. 87.—*Anchistus demani*, sp. nov.

*a*. Antennule.
*b*. Antennal scale.
*c*. Third maxilliped.
*d*. First peraeopod.
*e*. Second peraeopod.
*f*. Fingers of second peraeopod.
*g*. Third peraeopod.
*h*. Telson.



TEXT-FIG. 88.—*Anchistus demani*, sp. nov.
Dactylus of third peraeopod.

or 5 small teeth in its proximal half. In the smaller limb the dentition is similar, but the palm is only about 1·5 times as long as the fingers. The merus of the third peraeopod (text-fig. 87*g*) is 5 times, that of the fifth peraeopod 5·5 times as long as broad. As in other species of the genus the propodites in all three pairs are without spinules on their posterior edges.

The three specimens examined are from 9 to 10 mm. in length: one is an ovigerous female.

Two of the specimens, which were found together in a large *Tridacna*, were transparent when alive and dotted all over with pale green chromatophores. The female bore green eggs. The third specimen also found in *Tridacna*, was transparent with red chromatophores; it differs structurally from the other two in the cornea of the eye, which is blacker and distinctly wider than the stalk.

The affinity of this small species with *A. miersi* is clearly shown by the similarity in structure of the dactyli of the last three legs. Borradaile's *Anchistus biunguiculatus* also possesses biunguiculate dactyli, but their detailed structure has not been described. In this species, however, the rostrum is toothless and the fixed finger of the second peraeopod is straight and is much shorter than the dactylus which is strongly hooked at the end. In *A. miersi* and *A. demani* the fingers are of equal length and both have inturned tips.

| | | | |
|---|---|---|---|
| C 419/1. | Port Blair, Andamans. | S. Kemp, March, 1915. | Two, TYPES. |
| C 420/1. | Port Blair, Andamans. | S. Kemp, Feb., 1921. | One. |

The specimens were all obtained from *Tridacna*, found at low water on the shore at Aberdeen.

## Genus **Pontonia** Latreille.

1917. *Pontonia*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XXII, p. 389.

This genus comprises species which live either in the mantle cavity of lamellibranch molluscs or in the branchial sac of ascidians.

In structure *Pontonia* closely resembles *Anchistus*, with which it agrees in the very broad and hairy inner lacinia of the maxillula. The species of *Pontonia* are, however, rather more depressed in habit and the rostrum, though it may be dorsally carinate and with a small ventral keel near the tip, is always toothless and never exhibits the strong lateral compression found in the related genus. The two distal segments of the third maxilliped are frequently but not always broad and the plane of their greatest breadth, as in *Conchodytes*, is more or less at right angles to that of the preceding segment. This curious disposition is brought about either by a twisting of the antepenultimate segment or by a torsion at the articulation between the penultimate and antepenultimate segments. The dactylus of the last three legs is simple and not strongly hooked, or biunguiculate, sometimes with a series of spines along the posterior margin. There is a tooth or spine at the distal end of the last abdominal somite on either side of the base of the telson and the postero-lateral angles are acutely produced. The dorsal spines of the telson are usually large.

The antennal spine, as in *Anchistus*, is present or absent. The distal endite of the maxilla is divided into two lobes in the typical species, *P. tyrrhena*, but is slender and undivided in the Indian forms.

Borradaile distinguishes the genus from *Anchistus* by the greater proportionate breadth of the two distal segments of the third maxilliped; they are, however, slender in at least one species of *Pontonia.*[1] His statement in the generic diagnosis that the dactylus of the last three legs is simple is evidently a *lapsus calami*, for it is biunguiculate in *P. tyrrhena* and in the majority of the species.

Nobili[2] has pointed out that Forskål's *Cancer custos*[3] was obtained in a species of *Pinna* in the Red Sea and that the name cannot be applied, as it frequently has been, to the Mediterranean species more properly known as *Pontonia tyrrhena.* On the Indian coasts two Pontoniine prawns are found in *Pinna*, viz. *Anchistus inermis* (Miers) and *Conchodytes biunguiculatus* (Paulson). Both of these, if my identifications are correct, also occur in the Red Sea, but Forskål's description is too indefinite to enable us to decide which was the original of his *C. custos.* Nobili, moreover, is of the opinion that the name *custos* is preoccupied by Forskål's own use of the term on p. 89 of his work in reference to a *Pinnotheres.*

To the genus *Pontonia* Borradaile assigns ten species, but of these Ortmann's *P. pinnae*, as Tattersall has suggested, is synonymous with *Anchistus inermis*, while Parisi has pointed out that *P. nipponensis* de Haan belongs to the genus *Conchodytes.* Two species from the W. Coast of America are to be added to the genus: *P. pinnae* Lockington[4] (*nec* Ortmann), which Borradaile appears to have overlooked, and *P. margarita* Smith[4] which he refers to the genus *Conchodytes.*

Only four species have hitherto been recorded from the Indo-Pacific region, viz. *P. brevirostris* Miers[5] from the Seychelles in "clamp shells," *P. ascidicola* Borradaile[6] from New Britain in a ascidian, *P. minuta* Baker[7] from S. Australia, a species of unknown association, and *P. quadratophthalma*, also of unknown association, recently described by Balss[8] from N.W. Australia.

I have seen only two Indo-Pacific species of this genus, both of which appear to be undescribed. They are related to *P. ascidicola* and were found lodged in the branchial sac of simple ascidians. Dr. Asajiro Oka, who found these specimens when examining the Indian Museum collection of Tunicata, remarks that judging from their size they "must have entered the body of the host as larvae and grown up there to maturity.[9]"

The six Indo-Pacific species of *Pontonia* may be distinguished by the following characters:—

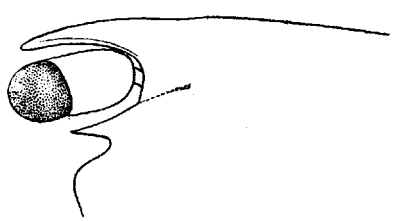
---

[1] *P. okai*, sp. nov.
[2] Nobili, *Bull. sci. France Belgique* XL, p. 49 (1907).
[3] Forskal, *Descr. Anim.*, p. 94 (1775).
[4] See Addendum, p. 287.
[5] Miers, *Zool. Coll. H.M.S. 'Alert,'* p. 562, pl. li, fig. B (1884).
[6] Borradaile, in Willey's *Zool. Results*, p. 409, pl. xxxvi, figs. 6*a*, *b* (1902).
[7] Baker, *Trans. R. Soc. S. Australia* XXXI, p. 189, pl. xxiv, figs. 9–12 (1907).
[8] Balss, *K. Svenska Vet.-Akad. Handl.*, LXI, no. 10, p. 15, text-fig. 7 (1921).
[9] Oka, *Mem. Ind. Mus.* VI, p. 2 (1915).

| | |
|---|---|
| *A.* Dactylus of last three legs simple.[1] | |
| *B.* Rostrum reaching only to middle of eyes; last two segments of third maxilliped together fully as long as antepenultimate segment ... ... ... | *brevirostris* Miers. |
| *B'.* Rostrum twice as long as eyes; last two segments of third maxilliped together much shorter than antepenultimate segment ... ... ... | *minuta* Baker. |
| *A'.* Dactylus of last three legs biunguiculate and with a number of spines on its posterior margin. | |
| *B.* Rostrum well developed; eyes normal in form. | |
| *C.* Penultimate segment of third maxilliped 4 times as long as wide and more than twice as long as ultimate; carpus of first leg not longer than chela; dactylus of last three legs with 11–13 spines behind biunguiculate apex ... ... ... | *okai*, sp. nov. |
| *C'.* Penultimate segment of third maxilliped 2·5 times as long as wide and 1·5 times as long as ultimate; carpus of first leg longer than chela; dactylus of last three legs? ... ... | *ascidicola* Borr. |
| *C''.* Penultimate segment of third maxilliped less than twice as long as wide and shorter than ultimate; carpus of first leg not longer than chela; dactylus of last three legs with 4–6 spines behind biunguiculate apex ... ... ... | *anachoreta*, sp. nov. |
| *B'.* Rostrum rudimentary; eyestalks flattened with inner margins contiguous, bearing cornea at outer distal angle ... ... ... ... | *quadratophthalma* Balss. |

## **Pontonia okai**, sp. nov.

The rostrum (text-fig. 89) is toothless, broad at the base and very slender at the apex which is acute in both dorsal and ventral views. Dorsally it is carinate throughout the greater part of its length, but there is no suggestion of a ventral keel. It is curved downwards and is a little shorter than the eyes, reaching about to the middle of the basal antennular segment.



TEXT-FIG. 89.—*Pontonia okai*, sp. nov. Anterior part of carapace, rostrum and eye.

The carapace is considerably depressed. It bears only an antennal spine and the lower limit of the orbit is not angulate. The eyes are short, with cornea slightly narrower than the stalk; the ocular spot appears to be absent.

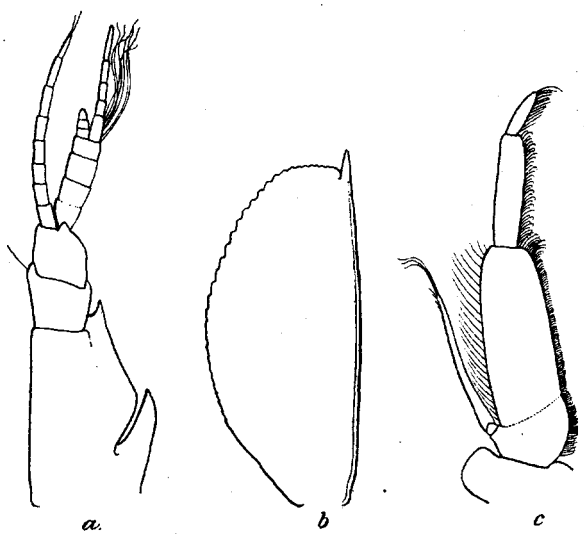
The antennular peduncle (text-fig. 90*a*) is a little shorter than the antennal scale. The basal segment is broad at the base with a large lanceolate lateral process which reaches the middle of its length. The outer margin in front of the process is slightly concave and ends in a stout tooth which reaches beyond the middle of the second segment. The second segment is broader than long, the third about the same length and as broad as long. The free portion of the stouter ramus of the outer flagellum is extremely short and the fused portion comprises 3 or 4 segments. The

[1] In *P. minuta* described as "simple—or perhaps a little bifid at the tip."

terminal segment of the antennal peduncle reaches nearly to the end of the antennular peduncle. The antennal scale (text-fig. 90*b*) is a little more than twice as long as broad; the outer margin is very slightly convex, terminating in a spine which reaches beyond the end of the lamella.

The incisor-process of the mandible ends in 5 teeth and on the inner side near the apex there is a series of 5 or 6 spinules.

The third maxilliped (text-fig. 90*c*) reaches the end of the scale; the exopod is slender and does not reach the distal end of the antepenultimate segment. The latter is about 2·75 times as long as wide; it contrasts strongly in breadth with the two terminal segments and is rather longer than the two combined. The penultimate segment is slender, rather less than 4 times as long as wide and more than twice as long as the ultimate segment. The inner edges of the three distal segments are thickly fringed with hooked hairs which retain debris.

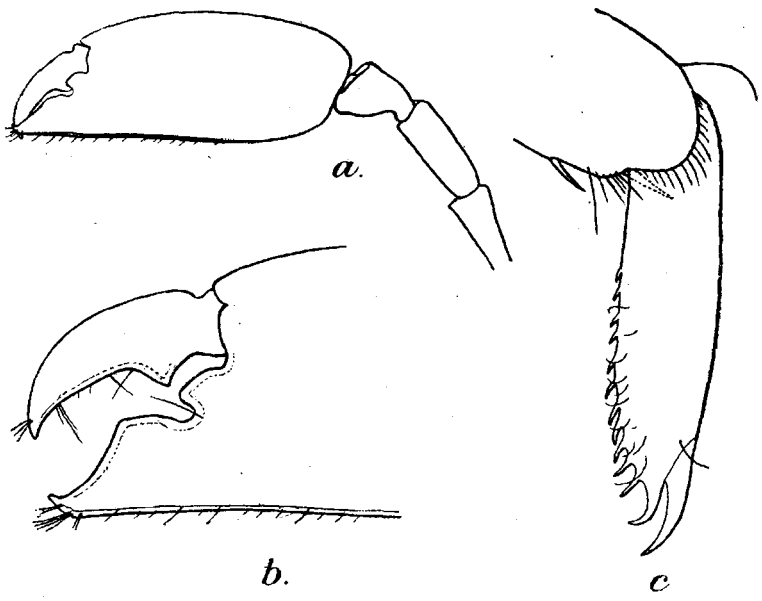



TEXT-FIG. 90.—*Pontonia okai*, sp. nov.
*a*. Antennule. *b*. Antennal scale. *c*. Third maxilliped.

The first peraeopod reaches beyond the scale by almost the whole length of the chela. The carpus is about three-quarters the length of the merus and is slightly shorter than the chela; the fingers are about the same length as the palm. There are dense tufts of setae on the fixed finger.

The second peraeopods are very large, unequal and dissimilar. The ischium in both legs bears a short tooth at the distal end of its lower border. In the larger limb (text-fig. 91*a*) the merus is 2·5 times as long as wide; the carpus is shorter than the merus and is very narrow at the base. The chela is swollen and very heavy and bears a few sparse hairs. The palm is about 2·5 times the length of the merus or fingers and is about twice as long as

wide. The chela is carinate on its lower edge from the middle of the palm to the tip of the fixed finger. The finger-tips cross one another when the claw is closed; at the base the fixed finger is twice as broad as the dactylus. The dactylus (text-fig. 91*b*) has a very large triangular tooth in the proximal half of its inner margin. There are two large teeth on the fixed finger. The foremost of these is very large and obtuse, the hindmost smaller, more acute and pointing forwards, the two being separated by a deep and narrow notch. When the claw is closed the dactylar tooth partially overlies the posterior tooth of the fixed finger. In the smaller second peraeopod the merus is a little broader, with more strongly convex borders; the palm is only 1·3 times the length of the merus or fingers. As in the larger limb the fixed finger is twice as broad as the dactylus, but the fingers are unarmed on the inner



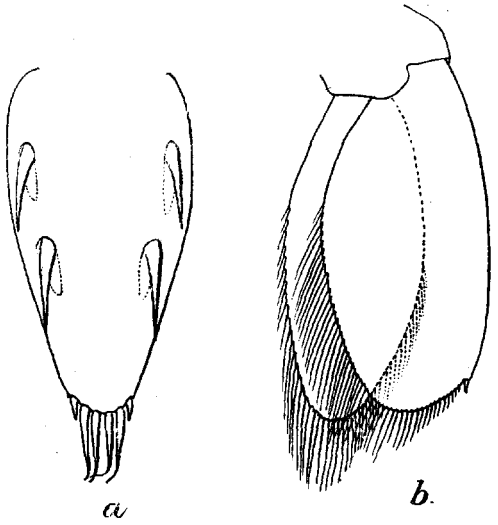

TEXT-FIG. 91.—*Pontonia okai*, sp. nov.
*a*. Large second peraeopod. *b*. Fingers of same.
*c*. Dactylus of third peraeopod.

margin except for three very obscure teeth at the proximal end, one on the dactylus and two on the fixed finger.

The last three peraeopods are long and slender. The third pair reaches beyond the scale by half the length of the propodus the fifth by the length of the dactylus. The merus is from 6 to 6·5 times as long as wide; the propodus bears a few spinules on its posterior border and is from 3·7 to 4·3 times as long as the dactylus. The dactylus (text-fig. 91*c*) is straight and slender, more than 4 times as long as wide; it is apically biunguiculate and the large terminal claw appears to be articulated. Behind the two distal claws there is a series of 11 to 13 spines which are short and

broad where they begin, in the proximal third of the posterior border, and become longer and more slender as they approach the apex.

Excluding the terminal spines the telson (text-fig. 92*a*) is less than twice as long as its basal breadth; it bears two very large dorsal spines on either side. The median and intermediate apical spines are subequal and much longer than the outer. The outer uropod (text-fig. 92*b*) is shorter than the inner, with the spine that




TEXT-FIG. 92.—*Pontonia okai*, sp. nov.
*a*. Telson. *b*. Uropods.

terminates the outer border placed close to the distal end.

A single pair of specimens of this species has been examined. The male is about 8·0 mm. is length and the female 8·5 mm.

The species is related to Borradaile's *P. ascidicola*, the description of which is very meagre, but differs conspicuously in the proportions of the two ultimate segments of the third maxilliped. In *P. ascidicola*, also, the carpus of the first leg is longer than the chela and the fingers of the smaller second leg are said to be provided with teeth just as in the larger limb of the pair.

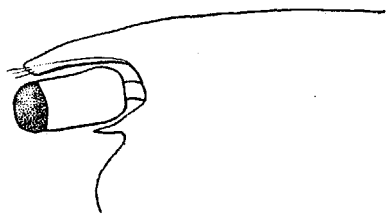
| | | | |
|---|---|---|---|
| C 421/1. | Off C. Negrais, Burma, 15°25′ N., 93°45′ E., 40–49 fms. | 'Investigator,' Nov., 1909. | Two, TYPES. |

The specimens were found by Dr. Asajiro Oka when working at the collection of Tunicata belonging to the Indian Museum. He discovered them in the branchial sac of the type-specimen of *Ascidia willeyi*, Oka.

### **Pontonia anachoreta**, sp. nov.

This species is closely allied to *P. okai* and also lives in ascidians. It differs from the description given above only in the following points:—

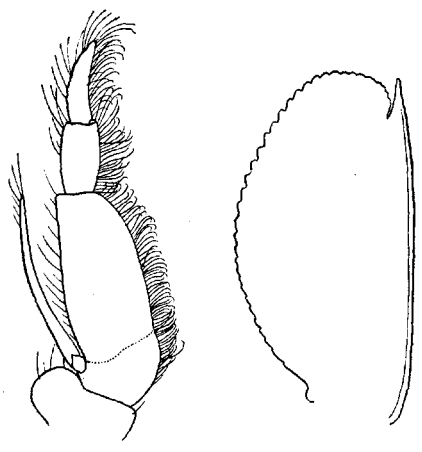
The apex of the rostrum is rather blunt in lateral view and is provided with one or two terminal setae (text-fig. 93).



TEXT-FIG. 93.—*Pontonia anachoreta*, sp. nov. Anterior part of carapace, rostrum and eye.

The antennal scale is rather broader, slightly less than twice as long as wide, and the terminal spine does not extend beyond the apex of the lamella (text-fig. 94*a*).

The antepenultimate segment of the third maxilliped (text-fig. 94*b*) is little more than twice as long as wide and the proportions of the two ultimate segments are conspicuously different. The penultimate segment is about 1·7 times as long as wide and is shorter than the ultimate segment.



*b*. *a*.

TEXT-FIG. 94.—*Pontonia anachoreta*, sp. nov.
*a*. Antennal scale.
*b*. Third maxilliped.

The fingers of the first peraeopod are considerably longer than the palm.

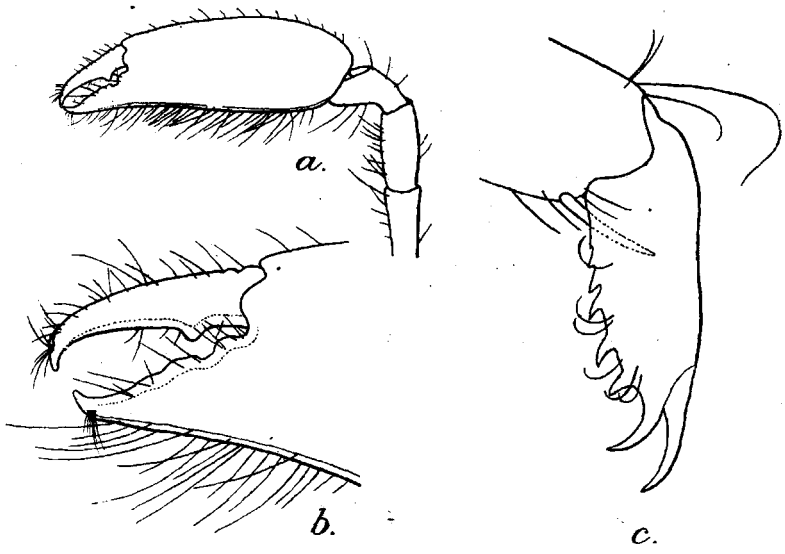
The second peraeopods do not possess a tooth at the distal end of the lower border of the ischium. The chela of the larger limb (text-fig. 95*a*) is sharply carinate on the lower side throughout its length and is here thickly fringed with very long setae. The dactylus (text-fig. 95*b*) has a large tooth, as in *P. okai*, but the fixed finger is unarmed in its distal half and bears at the base two bluntly rounded teeth separated by a broad notch. The chela of the smaller limb is fringed with long setae on its lower border. The fingers have inconspicuous teeth at the base, much as in the related species; their inner margins are, however, concave they gape widely when the claw is closed and their length is almost or quite equal to that of the palm.

The merus of the last three peraeopods is rather stouter, from 5 to 5·5 times as long as broad The dactylus (text-fig. 95*c*) is broader, from 3 to 3·5 times as long as wide and bears only from 4 to 6 spines in addition to the two distal claws. The terminal claw, as in *P. okai*, is apparently articulated.

The telson, excluding the terminal spines, is more than twice as long as its basal breadth, but is otherwise closely similar to that of the related species.

A single pair of specimens has been examined; the female is about 10 mm. in length and the male about 6·5 mm.

In *P. ascidicola*, according to Borradaile's figure the penultimate segment of the third maxilliped is about 2·5 times as long as




TEXT-FIG. 95.—*Pontonia anchoreta*, sp. nov.
*a*. Larger second peraeopod. *b*. Fingers of same.
*c*. Dactylus of third peraeopod.

wide and nearly 1·5 times the length of the ultimate segment. It is thus intermediate in form between *P. anachoreta* and *P. okai*.

C 422/1. Off Madras Coast, 20 fms. 'Investigator.' Two, TYPES.

The specimens were found by Dr. Asajiro Oka in an ascidian which he has described under the name of *Polycarpa annandalei*.

## Genus **Pontonides** Borradaile.

1917. *Pontonides*, Borradaile, *Trans. Linn. Soc.* (2) *Zool.* XVII, p. 387.

This genus was established by Borradaile for *Pontonia maldivensis*,[1] a species found at Fadiffolu Atoll in the Maldives, which is remarkable for the absence of exopods from all three pairs of maxillipeds.

*Periclimenes beaufortensis*, Borradaile,[1] from Beaufort in North Carolina, appears from the description to be a related form, but with exopods absent from only the first two pairs of maxillipeds. In both species the rostrum is toothless, but in *P. maldivensis* the segments of the third maxilliped are broad, whereas in *P. beaufortensis* the appendage is described as moderately slender. The dactylus of the last three legs is simple in both species. For the present at

[1] Borradaile, *Ann. Mag. Nat. Hist.* (9) V, p. 132 (1920).