

## Decapod Crustacea : Pontoniinae

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### ABSTRACT

*The pontoniine shrimps collected during the MUSORSTOM Expedition, 1976, in the Philippines waters include nine species belonging to three genera. Three species are described as new; the six others are reported for the first time from the Philippines.*

### RÉSUMÉ

*La petite collection de crevettes Pontoniinae recueillie pendant la campagne MUSORSTOM comprend neuf espèces appartenant à trois genres distincts. Trois espèces sont décrites comme nouvelles; les six autres sont signalées pour la première fois aux Philippines.*

In the course of the MUSORSTOM Expedition, 1976, a small number of pontoniine shrimps were collected. As most collections of pontoniine shrimps have been confined to shallow depths, the occurrence of three new species of *Periclimenes* in deeper water is of particular interest. Specimens were obtained from eight trawl hauls, seven of which were at over

100 m depth. One specimen was obtained from a shallow dredge haul at 17 m. The collection consists of eighteen specimens, including nine species of three different genera. Eight specimens belong to one of the new species of *Periclimenes*.

I am most grateful to Dr. J. FOREST for enabling me to report upon this interesting collection.

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## List of Stations

Station 3. — 19.03.1976, 14° 01,7' N, 120° 16,0' E, 183-185 m : *Periclimenes latipollex* Kemp.

Station 17. — 21.03.1976, 13° 53,7' N, 120° 17,7' E, 17 m : *Periclimenes longirostris* (Borradaile).

Station 24. — 22.03.1976, 14° 00,0' N, 120° 18,0' E, 189 m : *Periclimenes foresti* sp. nov.

Station 31. — 22.03.1976, 14° 00,0' N, 120° 16,0' E, 187 m : *Periclimenes alcocki* Kemp.

Station 56. — 26.03.1976, 13° 53,1' N, 120° 08,9' E, 134-

129 m : *Periclimenes tosaensis* Kubo, *Periclimenes rectirostris* sp. nov.

Station 57. — 26.03.1976, 13° 53,1' N, 120° 13,2' E, 107 m : *Palaemonella* ? *rotumana* (Borradaile).

Station 64. — 27.03.1976, 14° 00,5' N, 120° 16,3' E, 194 m : *Periclimenes foveolatus* sp. nov.

Station 72. — 28.03.1976, 14° 11,8' N, 120° 28,7' E, 127 m : *Periclimenes tosaensis* Kubo.

Station 73. — 28.03.1976, 14° 15,0' N, 120° 31,2' E, 76 m : *Periclimenaeus truncatus* (Rathbun).

## SPECIES LIST

1. *Palaemonella* ? *rotumana* (Borradaile, 1898)
2. *Periclimenes alcocki* Kemp, 1922
3. *Periclimenes latipollex* Kemp, 1922.
4. *Periclimenes longirostris* (Borradaile, 1915)
5. *Periclimenes tosaensis* Kubo, 1951
6. *Periclimenes foveolatus* sp. nov.
7. *Periclimenes foresti* sp. nov.
8. *Periclimenes rectirostris* sp. nov.
9. *Periclimenaeus truncatus* (Rathbun, 1906).

## SYSTEMATIC ACCOUNT

### 1. *Palaemonella* ? *rotumana* (Borradaile)

Restricted synonymy :

*Periclimenes* (*Falciger*) *rotumanus* Borradaile, 1898: 383.

*Palaemonella vestigialis* Kemp, 1922: 123-126, figs. 1-2, pl. 3.

*Palaemonella rotumana*, BRUCE, 1970 : 276-279, pl. 1 c-f.

#### MATERIAL

St. 57, 107-96 m: 1 ♂, CL. 3.5 mm.

#### REMARKS

The single example is incomplete and lacks both second pereopods. Only two damaged ambulatory pereopods are preserved. The identification is not therefore considered fully certain. The rostrum has a dentition of  $\frac{7}{2}$  and feeble supra-orbital ridges are distinct. These ridges are without a distinct tubercle as is generally present in *P. rotumana*.

Although most records of *P. rotumana* have been from intertidal or shallow depths, this species has been reported previously in moderately deep water

i.e. 55 m and 70 m (CALMAN, 1939; HOLTHUIS, 1952) and from 128 m in the South China Sea (BRUCE, 1970). The present record suggests that the range of this species may well extend into deeper water.

#### DISTRIBUTION

Type locality, Rotuma Island, Fijian Islands. This species occurs commonly throughout the whole Indo-West Pacific region from the Red Sea to Mozambique in the west to the Hawaiian Islands to the east. It has not been previously recorded from the Philippine Islands, but has been reported from the nearby Aru Islands (HOLTHUIS, 1952).

### 2. *Periclimenes alcocki* Kemp (figs. 1-2)

*Palaemon* (*Brachycarpus*) *laccadivensis* (partim.) Alcock, 1901: 138.

*Periclimenes* (*Periclimenes*) *alcocki* Kemp, 1922 : 141 (key) 153, 154-156, figs. 21-24 ; KUBO, 1940: 33-35, figs. 1-2, (36 c) ; HOLTHUIS, 1952 : 8 ; BRUCE, 1978, 227-228, fig. 10.

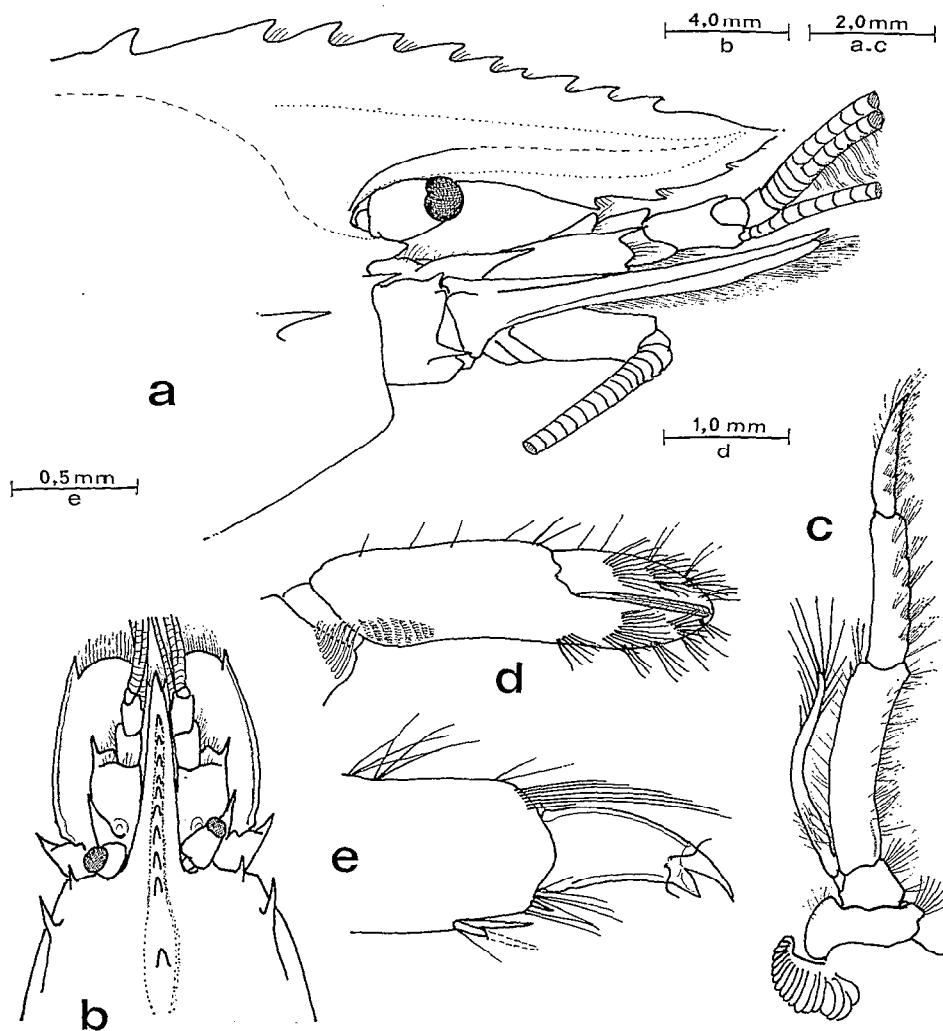


Fig. 1. — *Periclimenes alcocki* Kemp: Oviparous female.

a, anterior carapace, rostrum and antennae, lateral; b, idem, dorsal; c, third maxilliped; d, chela of first pereopod; e, dactylus of third pereopod.

#### MATERIAL

St. 31, 187-195 m: 1 ovig. ♀, CL. 12.0 mm.

#### REMARKS

The single example agrees very closely with the description and figures provided by KEMP (1922). It is in good condition, almost intact, lacking only one second pereopod. The rostrum bears a well developed lateral carina. The dorsal border has a short robust epigastric spine, with nine small acute dorsal teeth on the well marked dorsal lamina. The ventral lamina bears three small teeth on the distal half. The orbit is very feebly developed, but the inferior orbital angle is large and acute. The hepatic spines are large and slender, distinctly larger than

the antennal spines and strongly projecting, as are also the lateral spines of the basicerite. The cornea is small and the stalk is much broader proximally than distally, and dorso-ventrally flattened.

The incisor process of the mandible is well developed with three acute distal teeth, of which the central is the smallest. The molar process is rather feeble, antero-posteriorly compressed, with a few blunt teeth and a small tuft of short setae antero-dorsally. There is no palp. The maxillula has a deeply bilobed palp, the lower lobe bearing a very slender terminal seta. The upper lacinia is broad, tapering distally, bearing about eight short simple spines and numerous short simple setae. The lower lacinia is more slender, distally pointed, with numerous longer

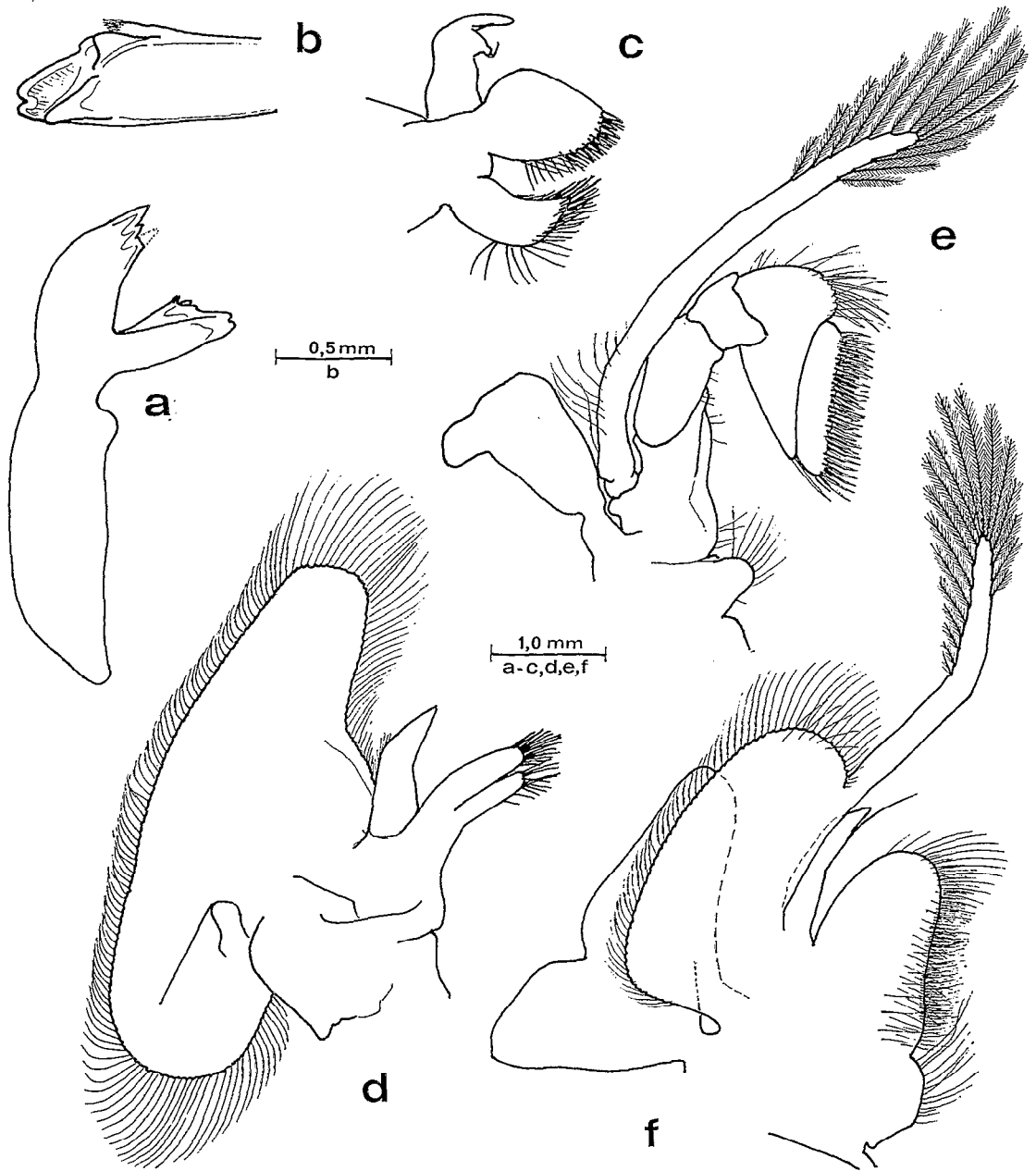


Fig. 2. — *Periclimenes alcocki* Kemp.: Ovigerous female.

a, mandible; b, molar process; c, maxillula; d, maxilla; e, second maxilliped; f, first maxilliped.

simple setae. The maxilla bears a pointed non-setose palp. The basal endite is deeply bilobed, the distal lobe being more robust than the proximal, with about fifteen and eleven short distal setae respectively. The coxal endite is absent. The scaphognathite is broad, about 2.5 times longer than the central width, and with the anterior lobe longer and narrower than the posterior. The first maxilliped has a pointed palp with a single preterminal seta. The basal endite is

large and strongly setose with slender simple setae, clearly separated by a small notch from the smaller coxal endite, which bears a row of longer slender setae. The caridean lobe is large and a large strongly bilobed epipod is also present. The second maxilliped is of normal form. The coxal segment is medially produced as a rounded lobe with numerous simple setae. The epipod is subrectangular, with a postero-lateral lobe, but no podobranch. The third

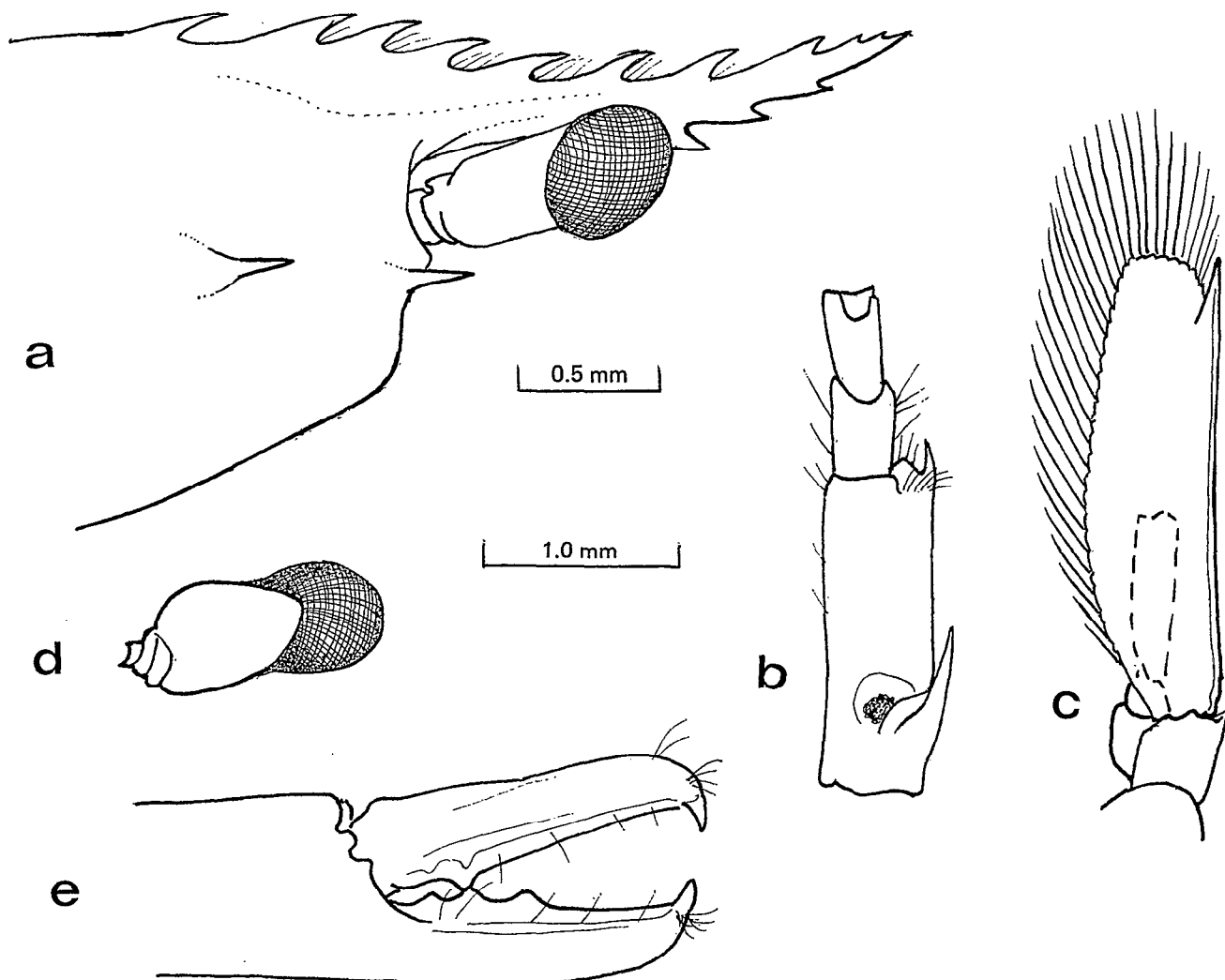


Fig. 3. — *Periclimenes latipollex* Kemp. Female.

a, anterior carapace and rostrum; b, antennule; c, antenna; d, eye, dorsal; e, fingers of second pereiopod.

maxilliped is robust. The ischiomerus is distinctly separated from the basis. On the proximal medial dorsal surface of the ischiomerus is a longitudinal row of about 25 short plumose setae, similar to those reported in *Periclimenes colemani*, an echinoid associate (BRUCE, 1975). A large oval epipod is present laterally on the coxal segment, which is produced medially as an angular setiferous lobe. A large functional arthrobranch is present laterally. All maxillipeds bear well developed exopods with numerous plumose setae distally.

The thoracic sternites are all narrow and the fourth is unarmed.

The chela of the first pereiopod bears feebly subspatulate fingers, with entire laterally situated cutting edges and small hooked tips, equal to about

two thirds of the palm length. The proximal region of the palm bears eight transverse rows of very short cleaning setae, and the adjacent distal end of the carpus bears a single row of longer setae. The second pereiopods are exactly as described by KEMP (1922), covered with minute tubercles. The ambulatory pereiopods have a short, robust, strongly biunguiculate dactylus, equal to about one sixth of the length of the propod, which is about eight times longer than wide in the third pereiopod. The unguis is slender, feebly demarkated, equal to about half the length of the corpus, which is about 1.8 times longer than wide. Sensory setae are present laterally. The accessory spine is half the length of the unguis, and of similar width at the base. The propods are sparsely spinulate ventrally.

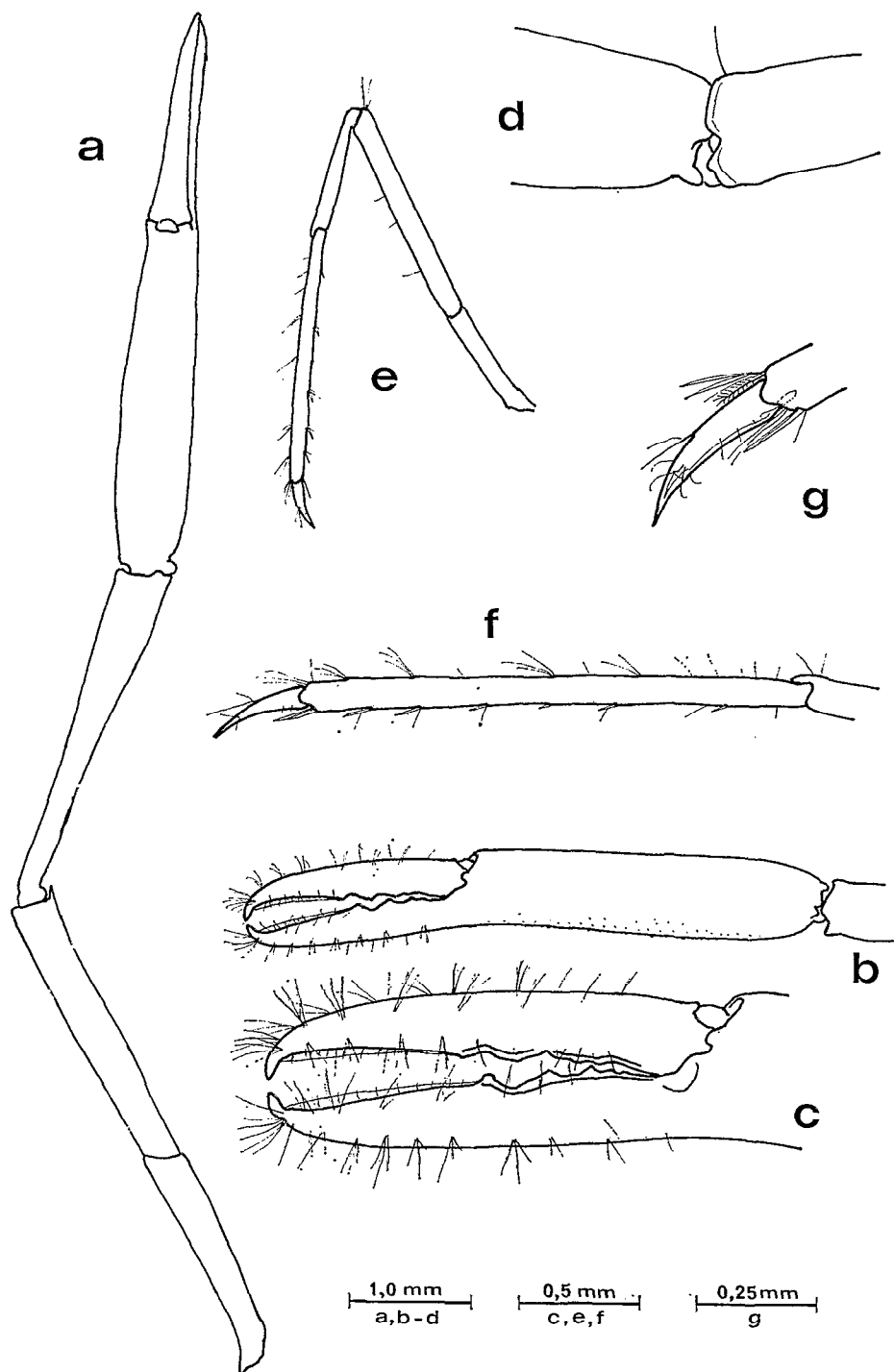


Fig. 4. — *Periclimenes longirostris* Borradaile : Male.

a, second pereopod; b, chela of second pereopod; c, fingers of chela of second pereopod; d, carpo-propodal joint of second pereopod; e, ambulatory pereopod (? fourth); f, *id.*, dactylus and propod; g, *id.*, dactylus.

The telson has four small dorsal spines on one side and three on the other. The posterior spines are as described. The ova are small, about 0.5 mm in length.

The present specimen, only the third recorded, differs from KEMP's specimen, which he described as soft and membranous, in being rigid and well calcified, and quite comparable to other species of the genus. It is probable that KEMP's specimen was a female that had only recently moulted and had not time to harden its integument.

The present record also is the shallowest depth at which this species has so far been reported, the two previous occurrences having been captured at 743 m (KEMP, 1922) and 310 m (KUBO, 1940).

#### DISTRIBUTION

Type locality, Laccadive Sea, 9° 34'57" N., 75° 46'30" E.

Only recorded otherwise from Kumano-nada, off Owasa, Mie Prefecture, Japan and Madagascar.

### 3. *Periclimenes latipollex* Kemp (fig. 3)

Restricted synonymy:

*Periclimenes* (*Periclimenes*) *latipollex* Kemp, 1922: 141 (key), 150-152, fig. 18, pl. 4 fig. 3; HOLTHUIS, 1952: 9, 33, 47-48, figs. 13-14.

*Periclimenes latipollex*, BRUCE, 1971: 2, 8-9; 1974 (1976): 478.

#### MATERIAL

St. 3, 133-185 m: 1 ♀, CL. 3.4 mm.

#### REMARKS

The single specimen, which lacks one of the second pereopods, agrees closely with the previously published informations provided by KEMP (1922) and HOLTHUIS (1952).

The rostrum is rather deeper than shown in KEMP's and HOLTHUIS' figures and is slightly upturned, with the tip reaching to the level of the end of the antennular peduncle only. The dorsal border bears ten teeth of which three are situated on the carapace, with the first in an epigastric position, separated by a wider interval from the other teeth. The two distal teeth are small. The curved ventral margin of the rostrum bears three well developed teeth, all on the distal half. KEMP's specimen had a rostral dentition of 8/3 and HOLTHUIS' of 8/2, both with a noticeably slender lamina. The hepatic and antennal spines are well developed and lie on almost the same level. The proximal segment of the antennular peduncle has the lateral border straight and the scaphocerite is 3.6 times longer than wide, instead of less than three times as shown by KEMP.

The dactyl of the single second pereopod bears a feeble lateral flange and has a single acute tooth and the fixed finger three blunter teeth, with the fingers opposing with a shearing action, as previously described. The accessory claws of the dactyls of the ambulatory pereopods are well developed as shown in KEMP fig. 18.

#### DISTRIBUTION

Type locality, Mergui Archipelago, at 113 m. Also known from the Kei Islands at 304 m; Ras Hafun, Somalia, at 78-82 m in association with *Acanthogorgia flabellum*, and from off northern Kenya at 155 m.

### 4. *Periclimenes longirostris* (Borradaile) (figs. 4, 18 a, d)

Restricted synonymy:

*Periclimenes rotumanus*, NOBILI, 1899: 235.

*Palaemonella longirostris* Borradaile, 1915: 210; 1917: 235, 357, 359, pl. 53 fig. 5.

*Periclimenes* (*Falciger*) *affinis* Borradaile, 1915: 211.

*Periclimenes* (*Ancylocaris*) *proximus* Kemp, 1922: 171 (key), 201-204, figs. 51-53.

*Periclimenes* (*Harpilius*) *longirostris*, HOLTHUIS, 1958: 3-6, fig. 1.

*Periclimenes longirostris*, BRUCE, 1974a: 191-192; 1977: 40, 46.

#### MATERIAL

St. 17, 17 m: 1 ♂, damaged, CL. 2.4 mm.

#### REMARKS

The single example lacks both first pereopods and all other pereopods are detached. The rostrum is slender, straight, not exceeding the scaphocerite, and has a dentition of 7, with the most posterior

2

tooth situated on the carapace. The supra-orbital spines are distinct and the disto-lateral spine of the scaphocerite extends well beyond the tip of the lamella.

The second pereopods closely resemble the figure given by HOLTHUIS (1958). The palm is subcylindrical, equal to about 1.7 times the length of the fingers and sparsely and minutely tuberculate dorsally. The proximal halves of the cutting edges of the fingers bear three long irregular teeth and the distal halves are entire. The carpus is about equal to the palm length, with the distal margin lacking any acute spines or teeth. The merus is about 0.8 of the carpus length and bears a small acute disto-ventral spine.

The ambulatory pereopods are moderately slender. The merus is about ten times longer than wide, and the propod about seventeen times, with about eight ventral spines. The smaller of the disto-ventral

pair has the proximal dorsal border finely pectinate. The dactylus is about 0.2 of the propod length and has a very feebly demarkated unguis. The dorsal border has a pair of setae at about half its length and a pair of sensory setae are present distally on each side. Some slender setae are also present on the proximal ventral border.

#### DISTRIBUTION

Type locality, Naifaro, Fadiffolu Atoll, Maldive Islands. Also reported from northern Red Sea, Zanzibar; Seychelle Islands; Andaman Islands; Papua and north eastern Australia. Not previously recorded from the Philippine Islands.

#### 5. *Periclimenes tosaensis* Kubo (fig. 5)

*Periclimenes (Ancylocaris) tosaensis* Kubo, 1951: 268-271, figs 7-8, tab. 2.

*Periclimenes (Harpilius) tosaensis*, BRUCE, 1966: 15-22, figs. 1-4.

*Periclimenes tosaensis*, BRUCE, 1976: 106-107, fig. 12.

#### MATERIAL

St. 56, 134-129 m: 2 ovigerous ♀, CLs. 5.1, 5.3 mm — St. 72, 122-127 m: 2 ovig. ♀ (damaged), CLs. 4.6, 4.8 mm.

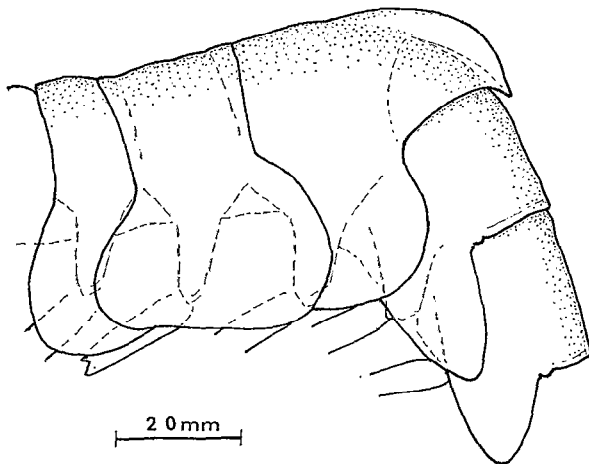


Fig. 5. — *Periclimenes tosaensis* Kubo. Ovigerous female. Abdomen, lateral aspect.

#### REMARKS

Three specimens have the rostra intact, with a dentition of 7-8, all with an epigastric spine on  $\frac{1-2}{1-2}$  the carapace. The third abdominal segment is distinctly posteriorly produced in the dorsal midline. The second pereopods are present in one specimen,

subequal in size and similar, with purple fingers. The dactyls of the walking legs are simple, with a distinctly demarkated unguis. The ova vary from approximately 0.5 mm (undeveloped) to 0.8 mm (advanced).

#### DISTRIBUTION

Type locality, near Usa, Kochi Prefecture, Japan. Also known from the northern South China Sea, and from the Seychelle Islands. Not previously recorded from the Philippine Islands.

#### 6. *Periclimenes foveolatus* sp. nov.

(figs. 6-9, 17 a-b, 18 b, e)

#### MATERIAL

St. 31, 187-195 m: 1♀, CL. 8.5 mm — St. 34, 191-188 m: 1 ♂, 1 ovig. ♀, CLs. 9.0, 8.0 mm — St. 63, 191-195 m: 1 ovig. ♀, CL. 9.5 mm — St. 64, 194-195 m: 1 ovig. ♀, CL. 8.4 mm.

#### DESCRIPTION

A large sized species of *Periclimenes* with a moderately slender body form in the male, and more stout build in the female. The dorsal aspect of the body is mainly smooth but the lateral aspects, particularly the branchiostegite and the pleura, are covered with a large number of small but distinct depressions producing a generally pitted appearance.

The rostrum is moderately deep, with a well developed lateral carina, and is slightly depressed. The dorsal margin bears 8-10 small acute teeth, of which the first may be slightly behind the level of the orbital margin. The ventral margin is convex and bears 3-6 teeth on its distal third. The three proximal teeth are small but well developed, more distal teeth being smaller and more irregular. The rostrum is extended posteriorly across three quarters of the carapace as a robust post-orbital carina, which is without an epigastric spine. The orbit is feebly developed. The inferior orbital angle is distinctly produced and extends well beyond the small marginal antennal spine. The hepatic spine is large and robust. The antero-lateral angle of the carapace is not produced, and is bluntly obtuse. The abdominal segments present no special features. The pleura, including the fourth and fifth, are broadly rounded. The sixth segment is short, about 1.3 times longer than deep. The postero-lateral angle is acute and the postero-ventral angle is blunt. The telson is about 1.8 times the length of the sixth abdominal segment, and almost three times longer than wide. The lateral margins are convergent, almost straight, and the posterior border, which is about 0.28 as wide as the anterior width of the telson, is rounded with a small median point. Two pairs of very small dorsal spines



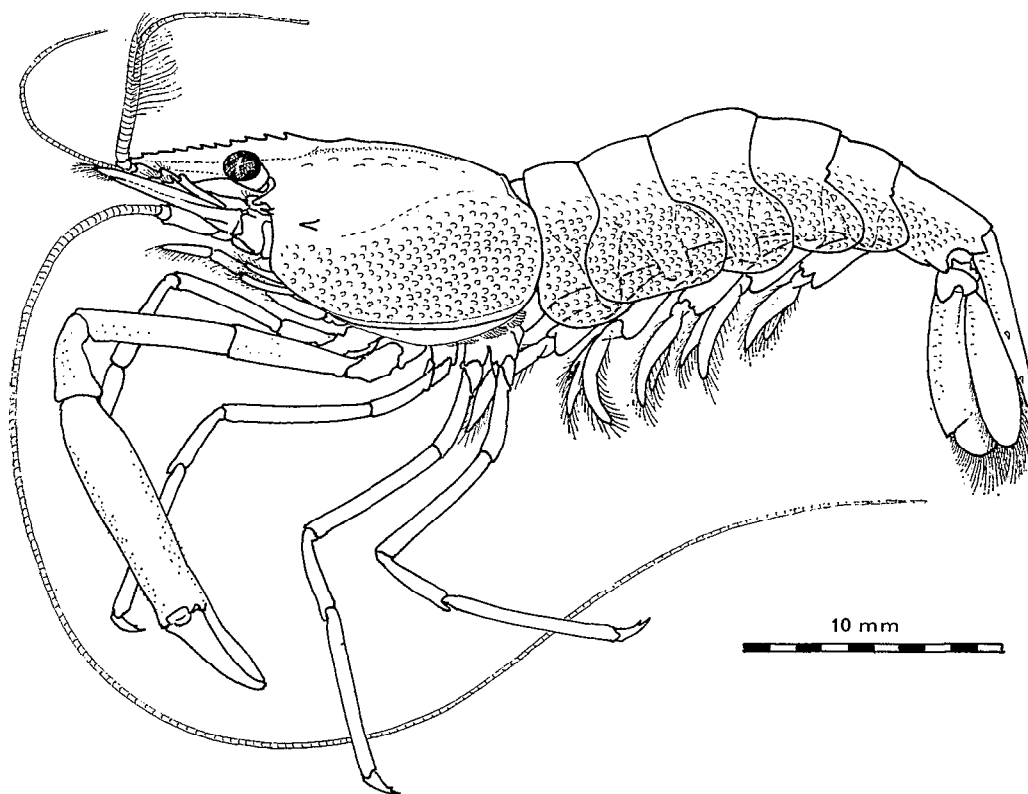


Fig. 6. — *Periclimenes foveolatus* sp. nov.: Male, holotype.

are present submarginally at about 0.5 and 0.8 of the telson length. The posterior telson spines are all short, with the lateral spines similar to the dorsal telson spines, the intermediate twice as long, and stout, and the submedian spines about 1.5 times as long as the lateral spines, moderately slender and sparsely setose.

The antennules have an acute stylocerite, reaching to the level of the middle of the medial border. The antero-lateral lobe is well developed and produced anteriorly, and bears a small spine laterally. The intermediate segment is about one third of the length of the proximal and bears a well developed lateral lobe. The distal segment is more slender, equal to about half the length of the medial border of the proximal segment. The flagella are slender. The upper flagellum is biramous, with the proximal two thirds of the rami fused. The lower flagellum is filiform.

The antenna has a robust basicerite, armed laterally with a small acute tooth. The carpopocrite reaches to about the middle of the scaphocerite, which is about 2.7 times longer than broad. The lateral margin is distinctly convex and the anterior margin evenly rounded, produced well beyond the tip of the large disto-lateral spine.

The eye is well developed with a large globular cornea and a short robust peduncle.

The mouthparts are, in general, typical of the genus *Periclimenes*. In the dissected specimen, the mandible is without a palp. The molar process is robust, with large blunt teeth distally. The incisor process is well developed, with four acute teeth, the central pair being smaller than the others, and with a spiniform seta on the disto-lateral margin. The maxilla has a strongly bilobed palp, with a small hooked seta on the lower lobe. The upper lacinia is broad with 8-9 strong teeth distally and setae ventrally. The lower lacinia is slender, tapering distally, and provided with numerous slender setae. The maxilla has a normal, tapering, non-setiferous palp. The endite is deeply bilobed, the distal lobe being rather more robust, with the lobes bearing about 20 and 10 simple setae respectively. The scaphognathite is about 2.4 times longer than broad, with anterior and posterior lobes both well developed. The first maxilliped has a slender, elongated palp. The basal endite is rather narrow, rounded, fringed with simple setae and separated by a small notch from the much smaller, rounded coxal endite, which is sparsely setose but bears a long plumose seta.

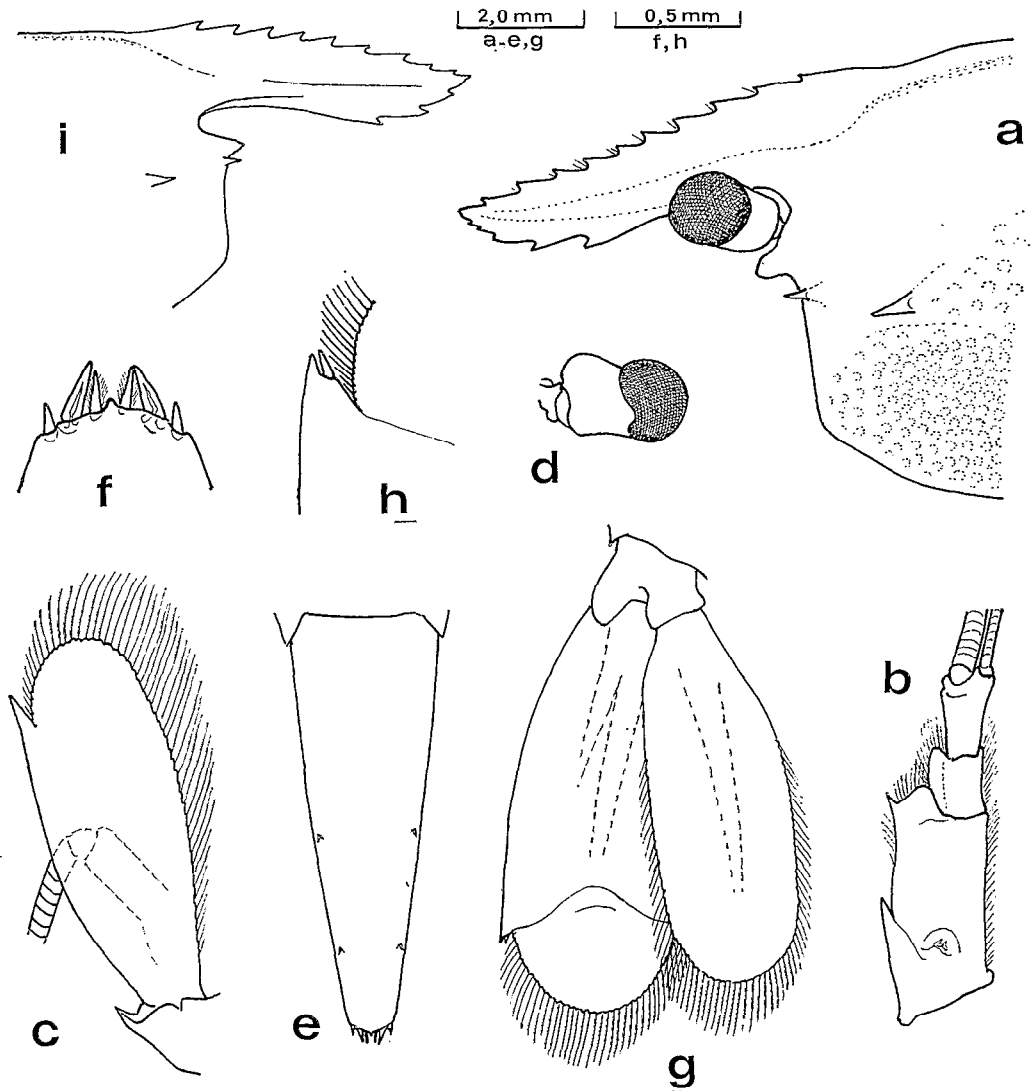


Fig. 7. — *Periclimenes foveolatus* sp. nov. : Male, holotype.

a, anterior carapace and rostrum; b, antennule; c, scaphocerite; d, eye, dorsal aspect; e, telson; f, posterior telson spines; g, uropod; h, postero-lateral spines of exopod of uropod.

Female, allotype; i, anterior carapace and rostrum.

The exopod is well developed with a large caridean lobe. The flagellum is robust with about 14 plumose setae distally. A large triangular epipod is also present. The second maxilliped is of normal type, with a robust flagellum and a large oval epipod. The third maxilliped is robust. The ischio-merus and basis are distinct. The disto-lateral border of the ischio-merus bears some short spines and several robust setae. The exopod and epipod are well developed and a small arthrobranch is present. The fourth thoracic sternite is without a median process.

The first pereopods are normal and reach beyond the carpocerite by about three quarters of the length

of the carpus. The chela has a subcylindrical, slightly compressed palm, about twice as long as deep. The fingers are simple, with entire, laterally situated cutting edges and small hooked tips, slightly shorter than the palm in length, with numerous groups of setae. The carpus is about 1.25 times the length of the chela, and 0.8 of the length of the merus.

The second pereopods are well developed and similar but slightly unequal, somewhat smaller in the females than in the male. The palm is subcylindrical, feebly swollen proximally and densely covered with minute tubercles. The fingers are slightly less than half the palm length in the male, and slightly

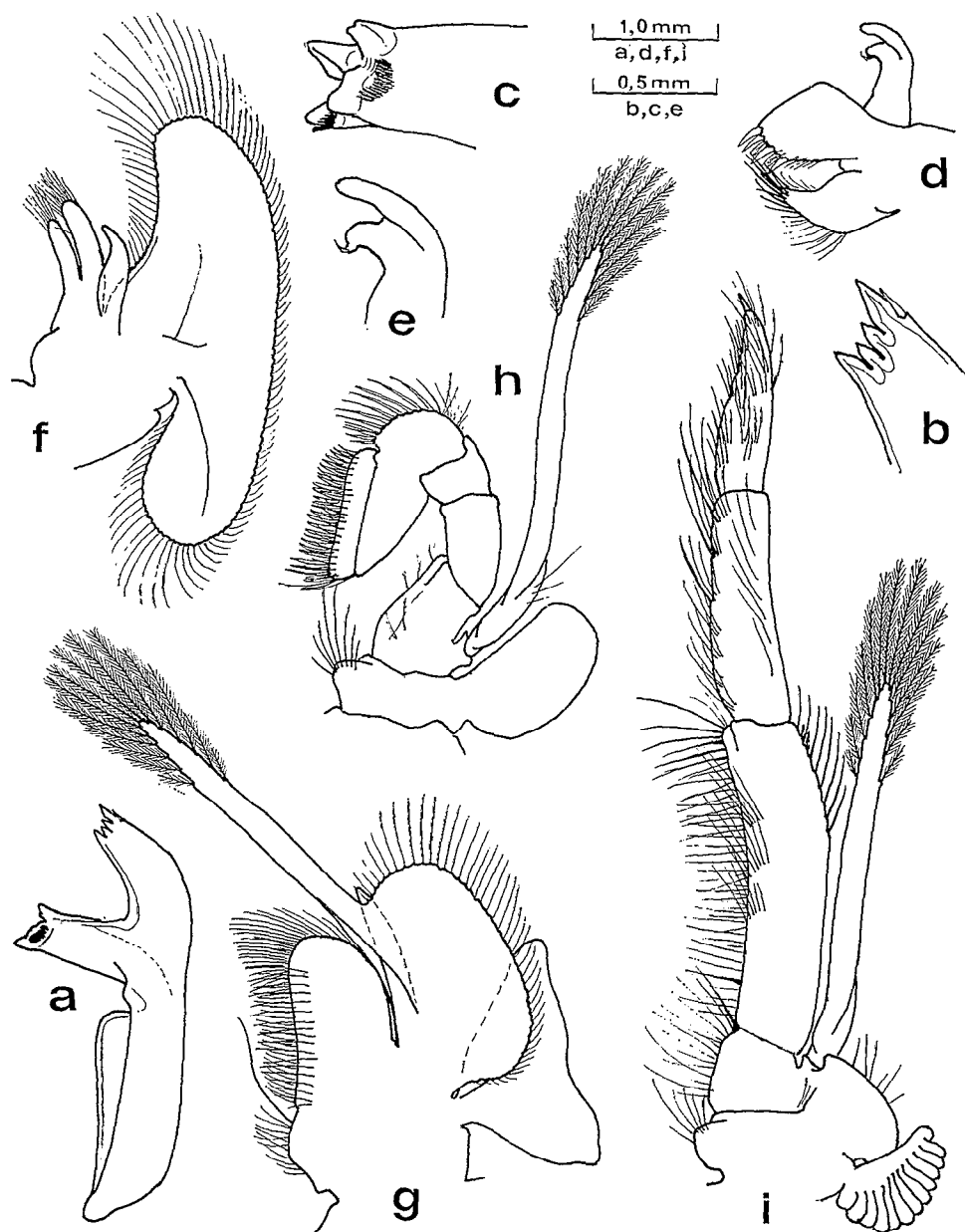


Fig. 8. — *Periclimenes foveolatus* sp. nov.: Paratype, female.

a, mandible; b, incisor process; c, molar process; d, maxillula; e, palp of maxillula; f, maxilla; g, first maxilliped; h, second maxilliped; i, third maxilliped.

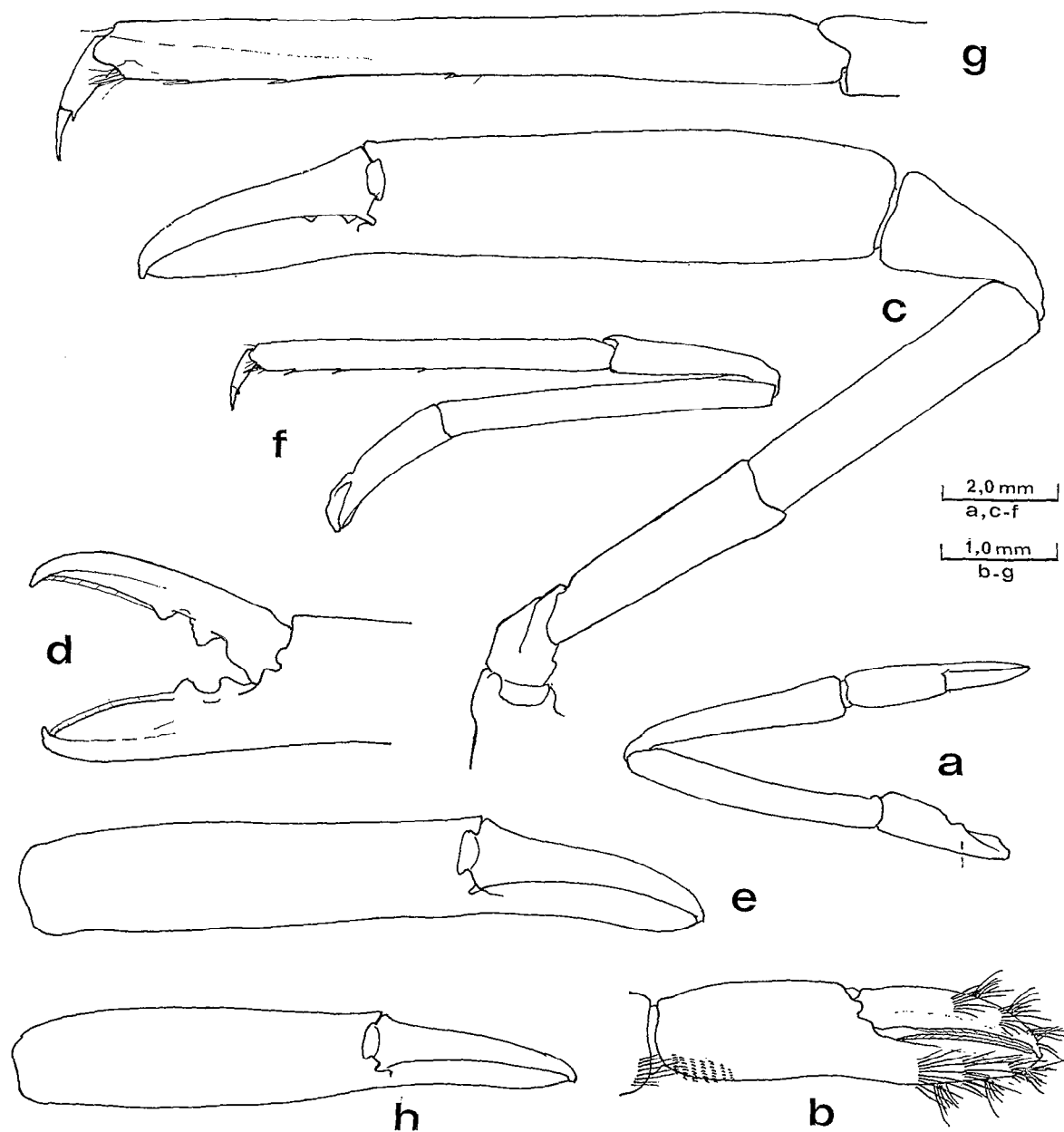


Fig. 9. — *Periclimenes foveolatus* sp. nov.: Male holotype.

**a**, first pereopod; **b**, chela of first pereopod; **c**, major second pereopod; **d**, fingers of major second pereopod; **e**, minor second pereopod; **f**, third pereopod; **g**, dactylus and propod of third pereopod.  
 Female allotype; **h**, chela of second pereopod.

more in the females. The fingers are compressed, without a lateral flange on the dactylus, and non-tubercular. The tips are hooked, that of the dactylus fitting into a notch on the fixed finger. The distal half of the cutting edge is entire and the proximal half bears two stout teeth on each finger. The carpus is short and stout, about one third of the palm length, without teeth but finely tuberculate and without a disto-ventral spine. The ischium is a little less than half the palm length and without special features, as are the robust basis and coxa. The minor chela of the male is about 0.9 of the length of the major, but otherwise similar. In the female the chela is about 0.7 of the length of the longer male chela.

The ambulatory pereiopods are slender, the third extending beyond the carpocerite by the distal end of the carpus. The dactylus is slender, about three times longer than the proximal width, with a distinct unguis equal to 0.6 of the corpus length. The corpus bears a small acute accessory spine distally. The propod is slender, over ten times longer than wide, scarcely tapering. A pair of slender disto-ventral spines is present, with three single spines on the distal half of the ventral border. The carpus is slightly less than half and the merus, about 0.9 of the propod length. The fourth and fifth pereiopods are similar but more slender.

The endopod of the male first pereiopod is about four times longer than the proximal width. The distal half is broadly expanded to about 1.7 times the proximal width. The lateral border bears nine plumose setae over its central three fifths. The proximal half of the medial border bears seven robust plumose setae proximally, and eight short spines distally. The distal margin bears only two feeble simple setae. The appendix masculina on the second pleopod is slightly exceeded by the appendix interna. The ventral aspect bears three longitudinal rows of strong simple setae, with the longest setae situated at the tip.

The uropods are normal. The protopodite is bluntly rounded postero-laterally. The exopod is broad, about 2.4 times longer than wide, with a convex lateral margin bearing a small acute distal tooth with a small mobile spine medially. The endopod is exceeded by the exopod and is about 3.75 times longer than wide. The ova are numerous and small.

#### TYPES

The pair of specimens from Stn. 34 are designated as the type specimens, the male as holotype and the female as allotype, and are deposited in the collections of the Museum national d'Histoire naturelle, Paris, registration number Na 3556.

*Type locality*.—MUSORSTOM, St. 34, 14° 01,0' N, 120° 15,8' E to 13° 59,2' N, 120° 18,8' E (10 miles N. of Ambil Island), 191-188 m.

#### MEASUREMENTS (mm.)

| St.....                        | 31   | 34   | 34   | 63   | 64   |
|--------------------------------|------|------|------|------|------|
|                                | ♀    | ♂    | ♀    | ♀    | ♀    |
| Total length (approx.).....    | 34   | 38   | 31   | 35   | 33   |
| Carapace length.....           | 13   | 14   | 11.5 | 14   | 13.5 |
| Post-orbital carapace length.. | 8.5  | 9.5  | 7.0  | 9.5  | 8.4  |
| Chela length, L:R.....         | 10.3 | 13.5 | —    | —    | 10.0 |
|                                | 10.0 | 11.3 | 10.3 | —    | 9.5  |
| Length of ova.....             | —    | —    | 0.5  | 0.55 | 0.45 |

*Colouration and host*.—No data.

#### REMARKS

*Periclimenes foveolatus* is most remarkable for the strongly pitted surface of the branchiostegites and pleura, which is clearly discernable in all specimens. No other species of *Periclimenes* has been described with any similar features and in all other species these surfaces are uniformly smooth.

*P. foveolatus* appears to be most closely related to the two other species of *Periclimenes* also collected by this expedition, *P. alcocki* and *P. foresti*. All three species also show fine tuberculations of the second pereiopods,—an uncommon feature in *Periclimenes* species, but also found in such shallow water species as *P. elegans* (Paulson), and *P. longirostris* Borradaile. *P. foveolatus* resembles *P. alcocki* in the biunguiculate dactyls of the ambulatory pereiopods, but it has a well developed eye and lacks an epigastric spine. It also lacks the four pairs of dorsal telson spines found in *P. alcocki*, and the fingers of the second pereiopods are not conspicuously spatulate.

*P. foveolatus* can be readily distinguished from *P. foresti* by the presence of a large, well developed eye, strong post-orbital carina, without an epigastric tubercle, and the presence of an accessory spine on the dactyls of the third to fifth pereiopods.

#### 7. *Periclimenes foresti* sp. nov. (figs. 10-11, 17 c)

##### MATERIAL

St. 24, 189-209 m: 1 adult ♀, CL. 12.0 mm.

##### DESCRIPTION

A large sized species of *Periclimenes*, in general closely similar to *P. foveolatus*.

The rostrum bears nine small acute dorsal teeth and a single small tooth is present ventrally, at a level a little posterior to the ninth dorsal tooth. A post-rostral carina extends across the anterior third of the carapace, bearing a large broad, blunt epigastric tubercle at about one fifth of the post-

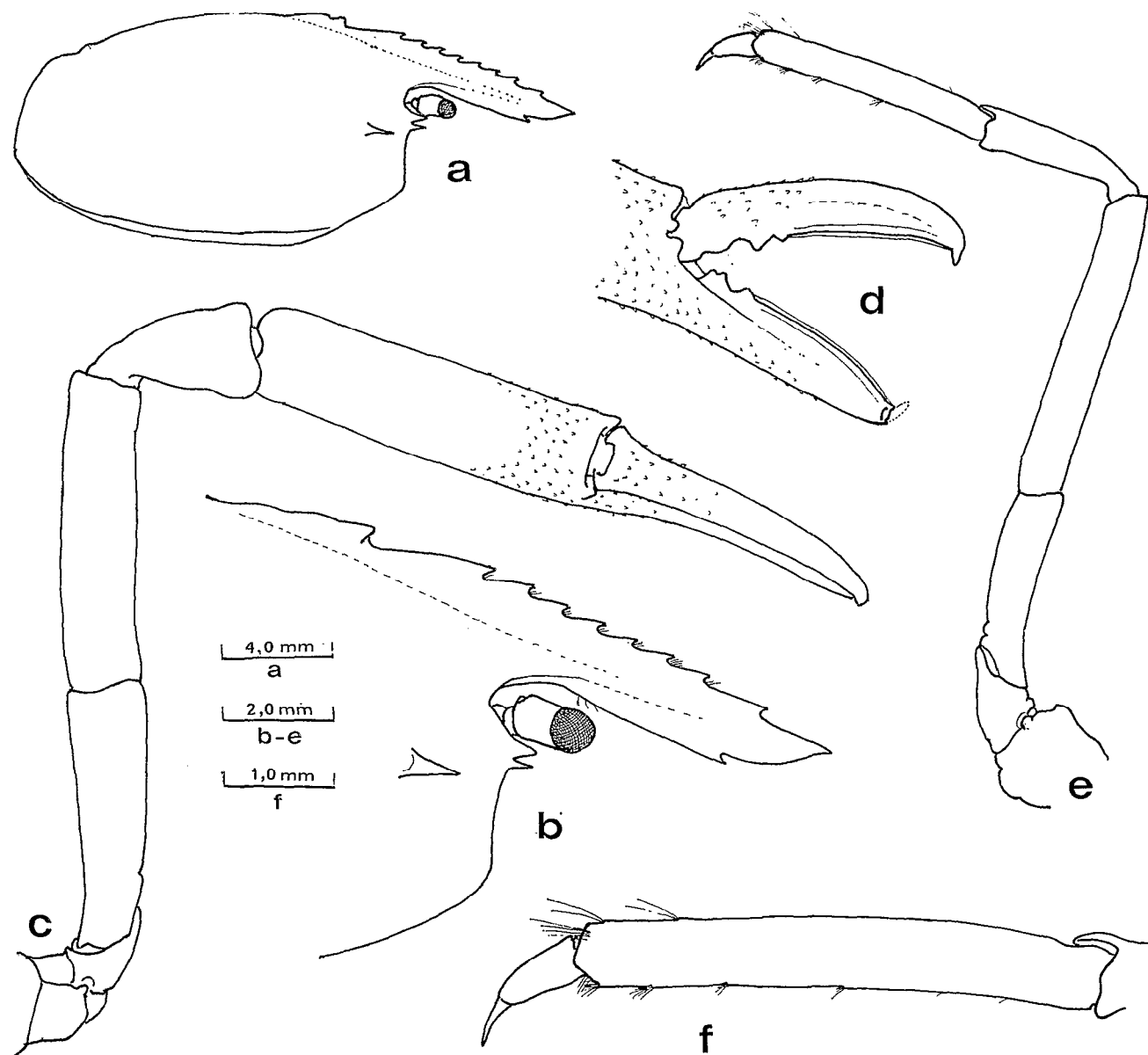


Fig. 10. — *Periclimenes foresti* sp. nov. : Adult female, non-ovigerous, holotype.

a, carapace and rostrum ; b, anterior carapace and rostrum ; c, second pereiopod ; d, fingers of second pereiopod ; e, third pereiopod ; f, dactylus and propod of third pereiopod.

orbital carapace length, and continuous with the rostral carina. Lateral rostral carinae are feebly developed. The branchiostegite is without foveolations.

The antennae are similar to those of *P. foveolatus*. The eye is of very small size, with a reduced but well pigmented cornea. The mouthparts are very similar to *P. foveolatus*. An epipod is present on the second maxilliped and an arthrobranch on the third maxilliped.

The first pereiopods are as in *P. foveolatus*. Only one second pereiopod is preserved. The palm is sub-cylindrical, about 3.6 times longer than wide, slightly compressed, and minutely tuberculate. The fingers are equal to three quarters of the length of the palm and are also distinctly tuberculate proximally. The dactylus has a distinctly hooked tip. A pair of teeth are present at about one third of the length of the cutting edge, and the rest of the cutting edge is entire.

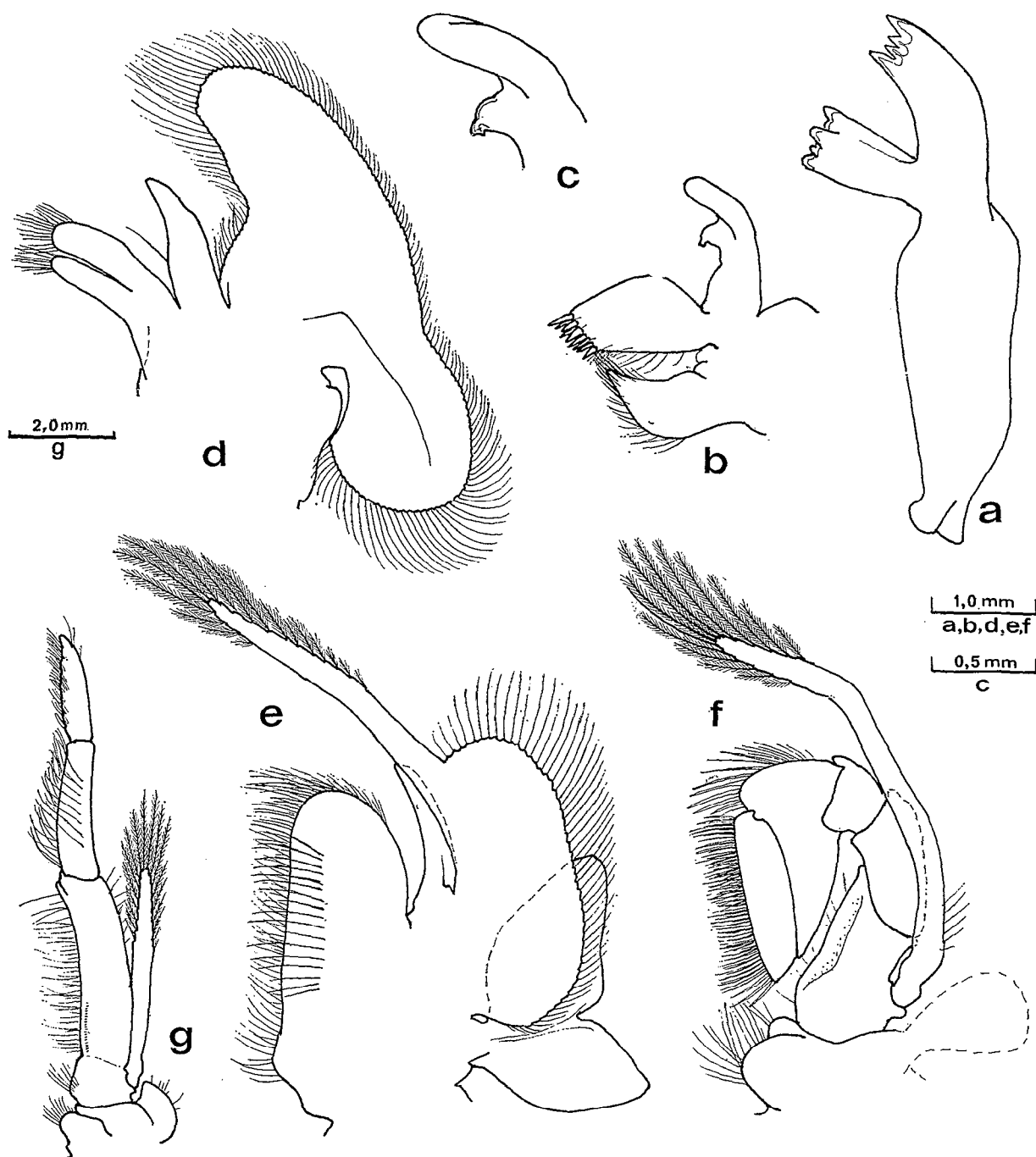


Fig. 11. — *Periclimenes foresti* sp. nov.: Adult female, non-ovigerous, holotype.

a, mandible; b, maxillula; c, distal palp of maxillula; d, maxilla; e, first maxilliped; f, second maxilliped (epipod missing); g, third maxilliped (arthrobranch missing).

The fixed fingers bears a large notched tooth proximally separated by a distinct notch from a smaller acute tooth at about one fourth of the length of the cutting edge, the rest of which is entire. The carpus, merus, ischium and basis are as in *P. foveolatus*.

The third pereopod is moderately robust. The dactylus has a stout corpus, with a sinuous lower border. The unguis is about 0.5 of the length of the corpus. There is no accessory spine present. The propod is about 7.5 times longer than wide, and 3.7 times the length of the dactylus. The ventral border bears four small slender spines, largely concealed by short setae. The carpus, merus and ischium present no special features.

The pleura are without foveolations. The caudal fan has the telson badly damaged, but appears basically to have been similar to *P. foveolatus*.

#### TYPE

The single example is designated as the holotype, and is deposited in the collections of the Museum national d'Histoire naturelle, Paris, registration number Na 3560.

*Type locality*.—MUSORSTOM, St. 24, 14° 00,0' N, 120° 18,0' E to 14° 01,7' N, 120° 20,2' E) (11 miles N. of Ambil Island), 189-209 m.

#### MEASUREMENTS (mm.)

|                                   |      |
|-----------------------------------|------|
| Total length (approx.).....       | 43   |
| Carapace length.....              | 18   |
| Post-orbital carapace length..... | 12   |
| Chela length.....                 | 12.3 |

*Colouration and host*.—No data.

#### REMARKS

The new species, *P. foresti*, is closely related to the other two deep water species of *Periclimenes* also collected by the MUSORSTOM Expedition, *P. alcocki* and *P. foveolatus*. It resembles *P. alcocki* particularly in the reduced size of the eye but differs from that species in having only a single ventral rostral tooth, the fingers of the second pereopods equal to about three quarters of the length of the palm, and the dactyls of the ambulatory legs without accessory spines. The telson appears not to have had four pairs of dorsal spines, as is found in *P. alcocki*.

From *P. foveolatus*, *P. foresti* can be distinguished by the presence of only a single ventral rostral tooth, the short post-rostral carina with blunt epigastric tubercle, the absence of foveolations on branchiostegite and pleura, the reduced size of the eye, the relatively longer fingers of the second pereopod, the stouter propods of the ambulatory pereopods and the lack of accessory spines on the dactyls.

*Periclimenes foresti* also bears a superficial

resemblance to the shallow water species *P. brevicarpalis* (Schenkel), an associate of actinarians. It may be distinguished from that species by the reduced size of the eye and the presence of an epigastric tubercle and of minute tuberculations on the second pereopods.

The new species is dedicated to Jacques FOREST, in recognition of frequent assistance readily provided to the author over many years.

#### 8. *Periclimenes rectirostris* sp. nov. (figs. 12-15)

##### MATERIAL

St. 56, 134-129 m: 2 ♂, 1 ovigerous ♀, CLs. 4.85, 5.4, 5.6 mm.

##### DESCRIPTION

A medium sized species of rather slender build, with the males distinctly smaller and more slender than the female.

The carapace is smooth, with a few sparse short setae. The rostrum is elongated, slender, straight and subequal to the post-orbital carapace length. The tip of the rostrum extends well beyond the antennular peduncle and the end of the scaphocerite. The dorsal margin bears twelve small teeth in the female and eleven in the male, all anterior to the orbital margin, mainly of uniform size but slightly smaller distally. The lower border, feebly convex bears five teeth in the female, opposite the sixth to eleventh dorsal teeth and four in the male, opposite the sixth to tenth teeth. The lateral carinae of the rostrum are well developed. The orbit is obsolete. Supra-orbital spines are absent. The hepatic spine is small and acute, situated at a slightly higher angle than the antennal spine, which is more slender and submarginal. The inferior orbital angle is slightly produced. The antero-lateral angle of the carapace is reduced and not produced.

The abdominal segments are smooth and glabrous. The third abdominal segment is not posteriorly produced. The fifth segment is about two-thirds of the length of the sixth, which is slightly longer than deep. The postero-ventral angle of the sixth segment is blunt and the lateral angle feebly acute. The pleura of the first three segments are broadly rounded with the fourth and fifth bluntly angled. The telson is three times longer than wide proximally, tapering strongly, with feebly convex sides, to about 0.2 of its proximal width, distally rounded without a median point. Two pairs of very small marginal dorsal spines are present at about 0.7 and 0.8 of the length. Three pairs of posterior spines are present: the lateral spines are similar to the dorsal; the submedian are stout, almost 0.1 of the telson length,



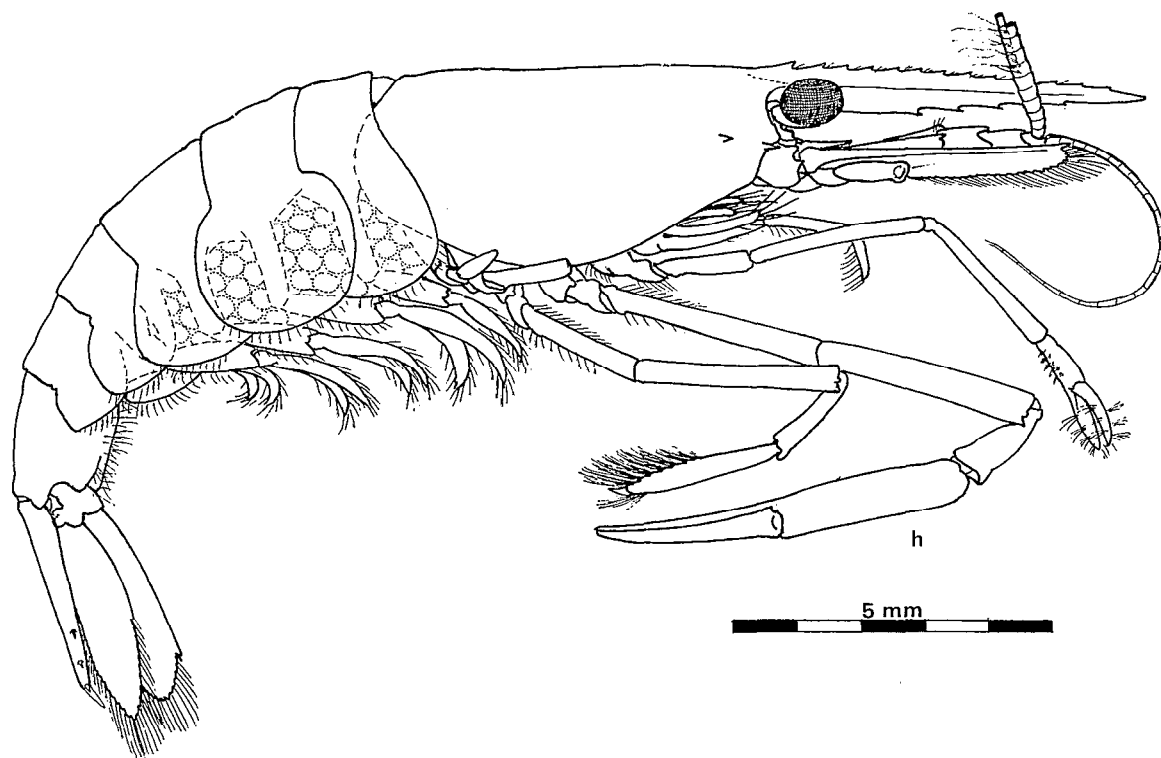


Fig. 12. — *Periclimenes rectirostris* sp. nov.: Holotype, female.

with a slender tip; the submedian spines are slender with a slightly swollen proximal half and a slender setose distal half, slightly shorter than the submedian spines.

The antennule is slender and the peduncle is shorter than the scaphocerite. The proximal segment has the sides parallel, with a small acute tooth on the proximal part of the ventral medial border. The stylocerite is short and acute, with the tip reaching the level of one third of the medial border. The statocyst is well developed, with a granular statolith. The disto-lateral angle of the segment is well produced and bears a rounded medial lobe with an acute lateral tooth that reaches almost to the middle of the intermediate segment. The intermediate and distal segments are subequal, equal to 0.8 of the length of the proximal segment. The upper flagellum is biramous with the rami fused for the seven proximal segments. The shorter free ramus consists of twelve slender segments and the longer ramus of only six. About twenty-five groups of aesthetascs are present. The lower flagellum is also slender and consists of about 23 segments.

The antenna has a robust basicerite with a small acute lateral tooth. The carpcerite is short and robust and falls short of the level of the anterior

margin of the proximal segment of the antennular peduncle. The flagellum is missing in all specimens. The scaphocerite is slender and elongated, extending well beyond the antennular peduncle, about five times longer than the greatest width, situated at about 0.3 of the length. The lateral border is straight with an acute distal tooth, which is not exceeded by the bluntly angled anterior margin of the lamina.

The eye has a large globular cornea with a distinct dorsal accessory pigment spot. The stalk is short and stout, its distal width less than that of the cornea, and equal to about twice its length.

The epistome is unarmed. The fourth thoracic sternite is without a median process and the subsequent sternites are narrow, increasing slightly in width at the seventh and eighth.

The mandible has a moderately robust corpus and is without a palp. The molar process is stout with four large teeth and two small patches of short setae. The incisor process is robust with three stout teeth distally, of which the central tooth is smaller than the others. The maxillula has a feebly bilobed palp, with the lower lobe lacking a terminal seta but bearing a fine preterminal seta. The upper lacinia is broad, tapering distally and bearing seven or eight stout simple distal spines with numerous spiniform

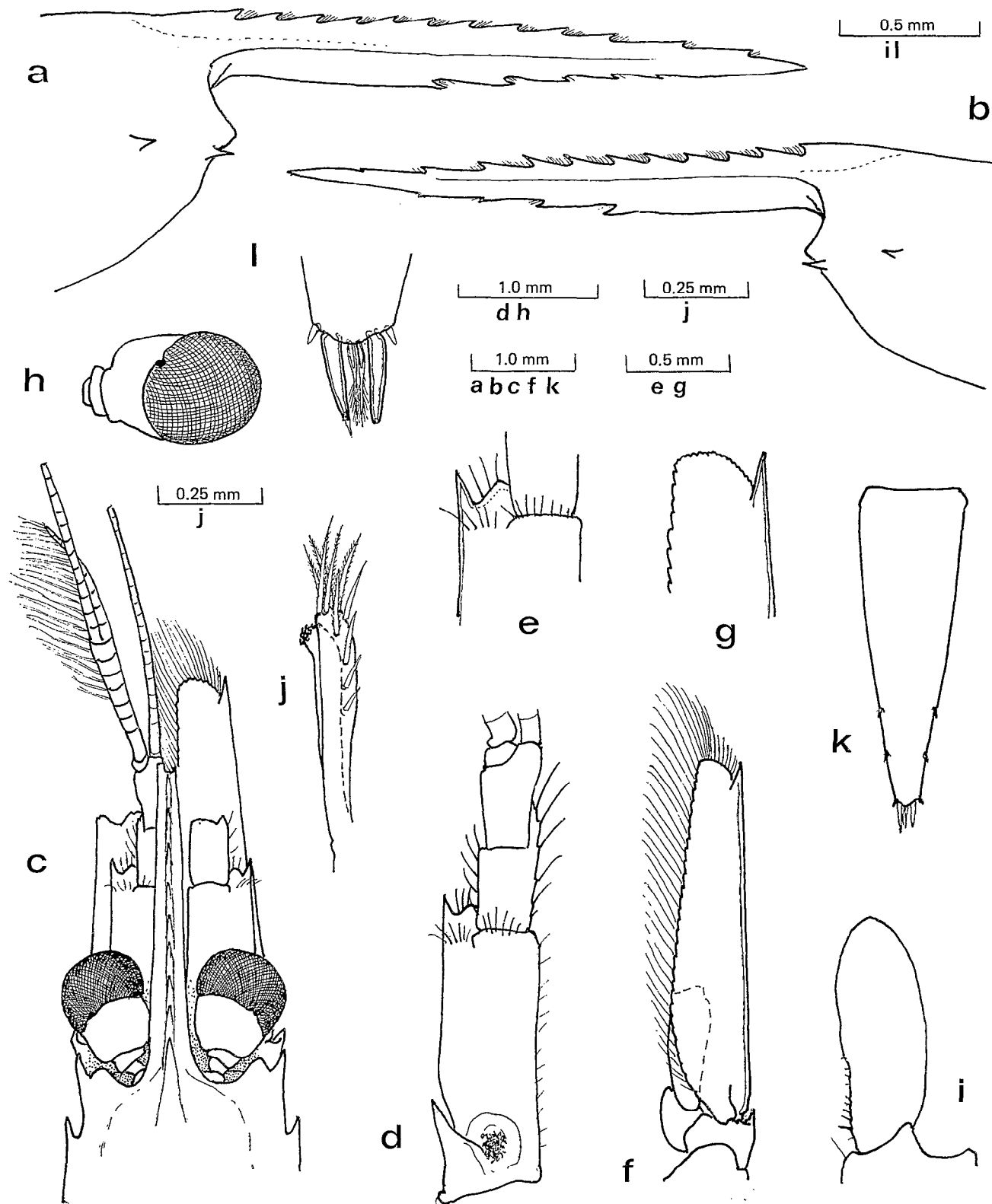


Fig. 13. — *Periclimenes rectirostris* sp. nov.

a, anterior carapace and rostrum, holotype female; b, *idem*, allotype, male; c, anterior carapace and antennae, damaged, male paratype; d, antennule; e, disto-lateral angle of proximal segment of antennule; f, antenna; g, disto-lateral spine of scaphocerite; h, eye, dorsal; i, endopod of first male pleopod; j, appendix interna and appendix masculina; k, telson; l, posterior telson spines.

setae. The maxilla has a well developed non-setose palp. The basal endite is deeply bilobed, with the upper lobe broader than the lower, both provided with a terminal tuft of slender simple setae. The coxal endite is absent. The scaphognathite is three times longer than broad, with a narrow anterior lobe with a concave medial border. The posterior lobe is of normal size. The first maxilliped has a slender palp with a slender plumose terminal seta. The basal endite is large with a rounded anterior margin, bearing long slender setae which also extend along the straight medial margin and onto the ventral aspect. The coxal endite is feebly demarkated from the basal endite with four terminal plumose setae and a single lateral seta. The caridean lobe is well developed but narrow and a bilobed epipod is present. The second maxilliped is of normal form. The coxa has a small setose median process. The exopod is slender with six distal setae and a small epipod is present. The third maxilliped is slender, extending anteriorly to the distal border of the carapocrite. The ischio-meral and basal segments of the endopod are almost completely fused. The combined segment is bowed, about five times longer than its average width. The lateral border is sparsely setose. The medial border has numerous longer setae over the distal half but the proximal third of the ischio-meral portion is provided with shorter wooly setae that extend on to the adjacent ventral surface. The basal portion is slightly expanded and bears half a dozen slender setae. The coxa also bears a small rounded setose medial process. The penultimate segment is about 5.5 times longer than wide, with sparse rows of median and ventral setae. The terminal segment is about 0.45 of the length of the penultimate, more slender, about 4.5 times longer than wide and similarly setose. The two distal segments are subequal to the ischiomerus and basis. The exopod is well developed, as long as the ischiomerus, with seven distal setae. A well developed angular epipod is present and a small tri-lamellar arthrobranch.

The first pereopod is slender and slightly exceeds the tip of the rostrum when extended, the merus extending beyond the carapocrite. The chela has a subcylindrical slightly compressed palm, about 1.8 times longer than deep, and with four transverse rows of serrate cleaning setae proximally. The fingers are broad, about 1.2 times the palm length, subspatulate, with laterally situated finely and uniformly denticulate cutting edges extending round the tips. The carpus is slender, about 6.0 times longer than its distal width, tapered proximally and subequal to the length of the merus, which is uniform, about 7.5 times longer than wide. The ischium, basis and coxa are normal. The coxa bears a large setose ventral process.

The second pereopods, present only in the

female, are subequal and similar, and exceed the tip of the rostrum by three quarters of the length of the palm of the chela. The palm is subcylindrical, uniform, smooth, about 4.0 times longer than deep. The fingers are subequal to the palm length on one side and slightly shorter on the other. The dactyl is slender, compressed, sparsely setose, about 8.0 times longer than deep, with a small acute hooked tip. The cutting edge is straight, with a single small tooth proximally, and entire. The fixed finger is similar but bears 3-4 small teeth proximally, mainly distal to the level of the single tooth on the dactyl. The carpus is about half the length of the palm, 2.5 times longer than wide, moderately expanded distally and unarmed. The merus is about 1.2 times the palm length, uniform, about 7.0 times longer than deep, and with a small acute disto-ventral angle. The ischium is slightly longer and more slender than the merus and unarmed. The basis and coxa are normal. The ventral border of the basis and the proximal dorsal and ventral margins of the ischium bear a fringe of fine setae.

The ambulatory pereopods are moderately slender. The third extends anteriorly to the tip of the scaphocrite. The dactyl is slender and simple, with a well demarkated unguis, equal to almost half the length of the corpus. The corpus is compressed, about 2.4 times longer than deep, with only a single sensory seta distally. The propod is about 6.0 times the length of the dactyl and 6.0 times longer than wide with the greatest width at about half its length, tapering and slightly dorso-ventrally expanded distally, ventrally flattened with a double longitudinal row of eight long slender spines. Outside each pair of spines a dense tuft of long, very fine filamentous plumose setae arise, forming a medial and lateral brush along the distal half of the propod. The dorsal margin is sparsely setose with a few long setae distally. The carpus is about 0.6 of the propod length, slightly expanded distally, 4.5 times longer than wide and unarmed. The merus is twice the length of the carpus, uniform, about 9.0 times longer than deep and without a disto-ventral angle, 0.45 of the merus length, and setose along dorsal and ventral margins. The basis and coxa are normal, with numerous setae. The fourth and fifth pereopods are similar.

The endopod of the male first pleopod is about 2.7 times longer than its central width, with the distal half slightly expanded and rounded, with setae. The proximal medial border bears a series of about nine very small simple spines. The appendix interna of the male second pleopod is slightly shorter than the appendix masculina, which bears a longitudinal row of five short simple ventral spines and five finely denticulate distal spines.

The uropods are normal, with the protopodite

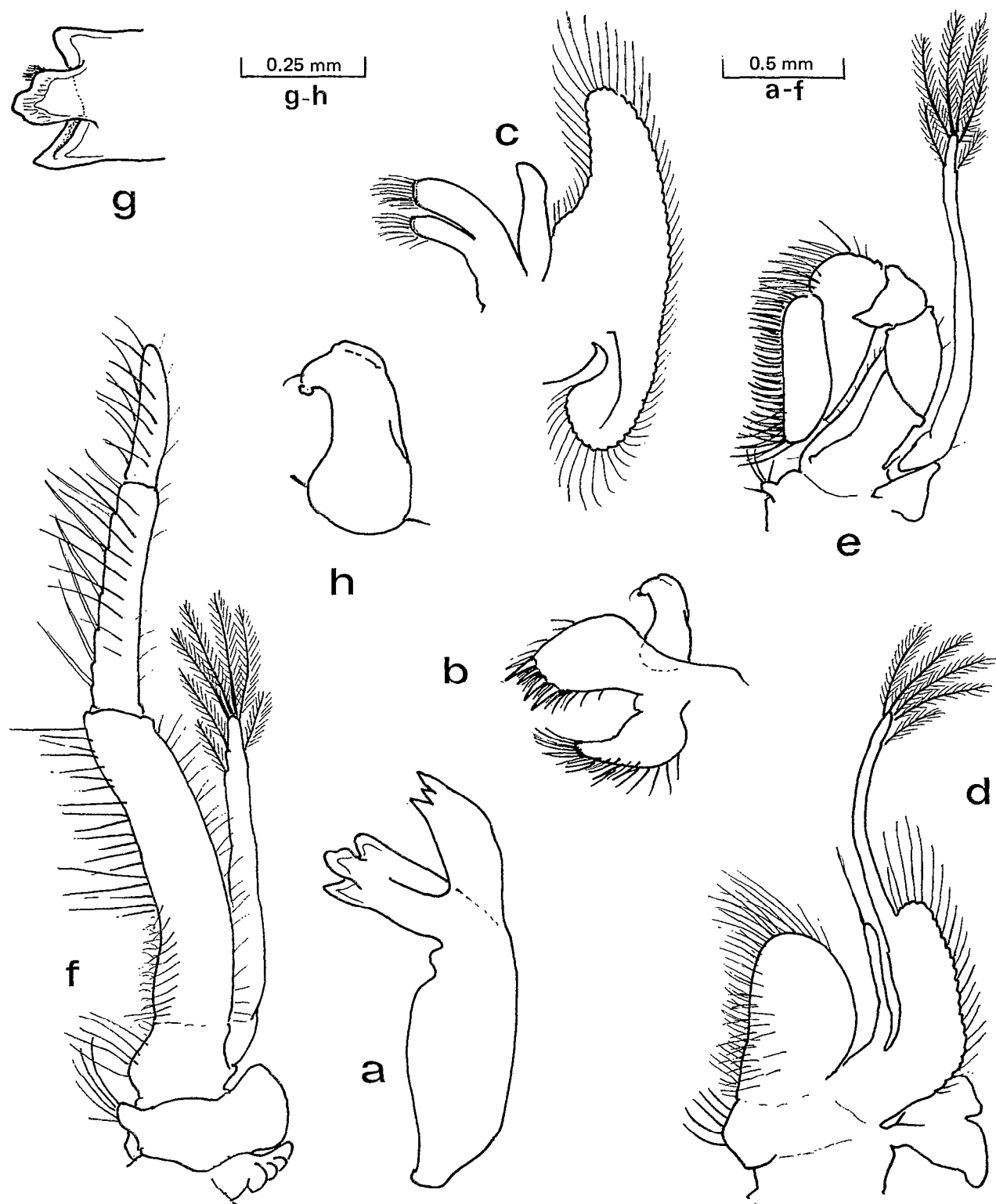


Fig. 14. — *Periclimenes reclirostris* sp. nov.: Paratype male.

a, mandible; b, maxillula; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped; g, molar process of mandible; h, palp of maxillula.

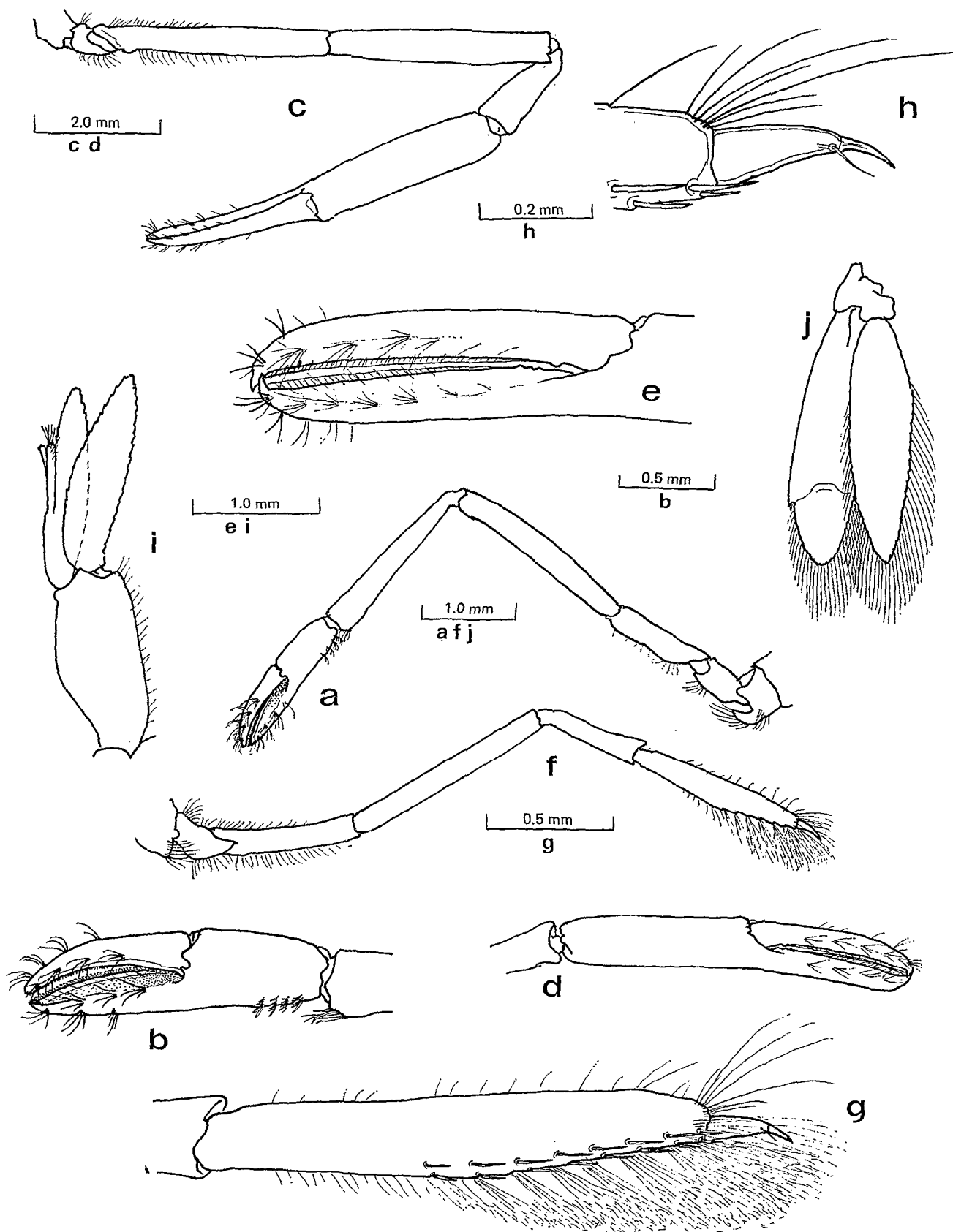


Fig. 15. — *Periclimenes rectirostris* sp. nov.

a, first pereopod; b, *idem*, chela; c, second pereopod; d, *idem*, chela; e, *idem*, fingers of chela; f, third pereopod; g, *idem*, propod and dactyl; h, *idem*, dactyl; i, first pleopod; j, uropod. a-b, f-j, male paratype; c d e, female holotype.

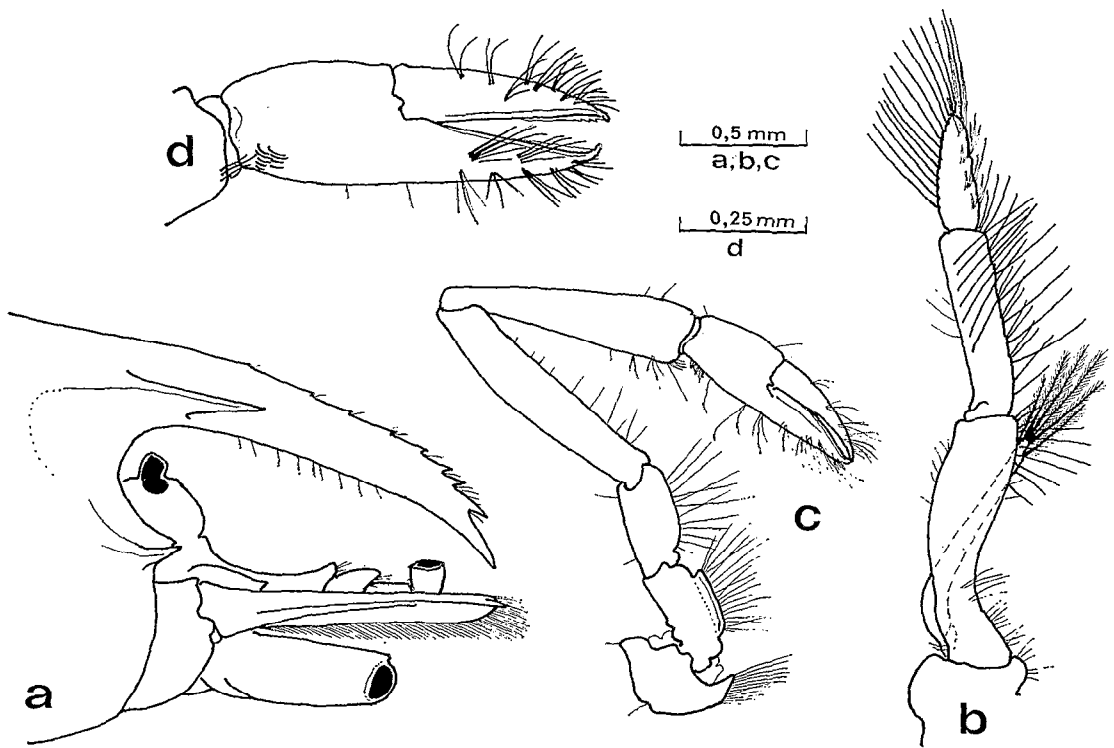


Fig. 16. — *Periclimenaeus truncatus* (Rathbun): Male.  
 a, anterior carapace and antennal peduncles; b, third maxilliped; c, first pereopod; d, chela of first pereopod.

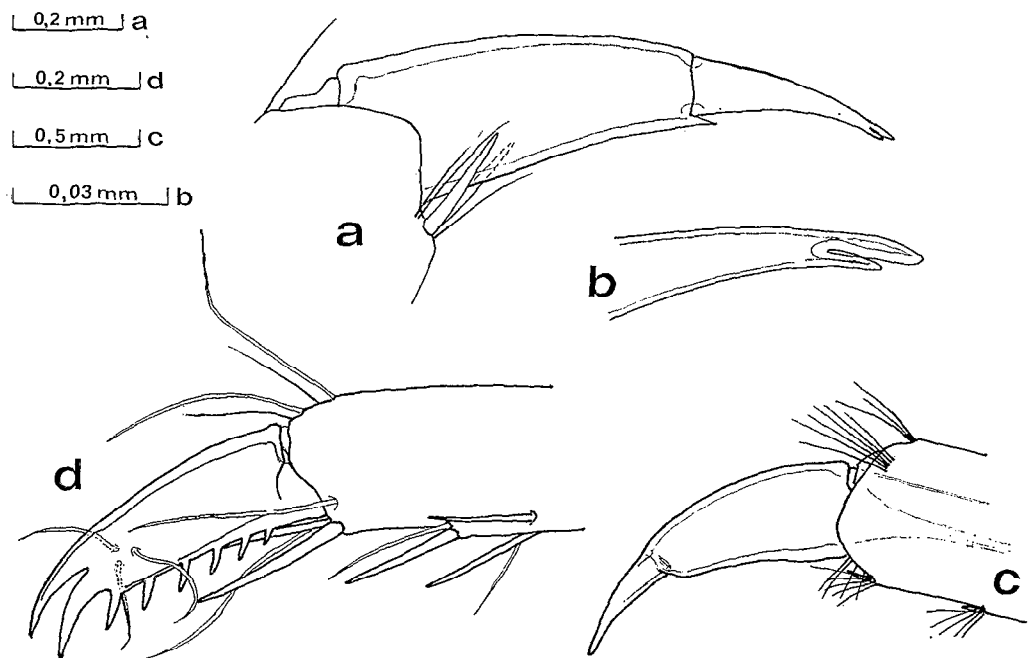


Fig. 17. — Dactyls of ambulatory pereopods.  
 a, *Periclimenes foveolatus* sp. nov.; b, *idem*, tip of unguis; c, *Periclimenes foresti* sp. nov.; d, *Periclimenaeus truncatus* (Rathbun).

bluntly rounded postero-laterally. The subequal slender rami clearly exceed the tip of the telson. The exopod is about 3.7 times longer than broad and bears a small acute lateral tooth, with a small mobile spine medially, at about 0.8 of its length. The endopod is slightly shorter than the exopod and is about 3.5 times longer than wide.

The ova are numerous and small.

#### TYPES

The ovigerous female is designated as the holotype specimen and the male with intact rostrum as allotype. The male with damaged rostrum and antennae (dissected) is a paratype. The types are deposited in the collections of the Museum national d'Histoire naturelle, Paris, registration number Na 3702 (holotype) and Na 3703 (paratype).

*Type locality*.—MUSORSTOM, Stn. 56, 13° 53.1' N, 120° 08.9' E to 13° 53.3' N, 120° 10.7' E (3 miles NE. of town of Lubang), 134-129 m.

#### MEASUREMENTS (mm.)

|                                | Holotype | Allotype | Paratype |
|--------------------------------|----------|----------|----------|
| Total length (approx.).....    | 25.0     | 23.0     | —        |
| Carapace length.....           | 12.6     | 11.4     | —        |
| Post-orbital carapace length.. | 5.6      | 5.4      | 4.85     |
| Length of P2 chela.....        | 5.5; 5.4 | —        | —        |
| Length of ovum.....            | 0.42     |          |          |

*Colouration*.—Colouration in life not recorded. Preserved specimens with tips of rostrum and fingers of second pereopods rusty red.

*Host*.—Probably *Eremopyga denudata* (de Meiger), which was collected in numbers at this station.

#### REMARKS

In its general morphology *P. rectirostris* shows a close resemblance to *P. hirsutus* Bruce, a species previously noted as being without close associates in the genus *Periclimenes* (BRUCE, 1971). It shares with that species the straight slender rostrum, the form of the propods of the ambulatory pereopods and the spinulation of the telson, and many other details. In general *P. rectirostris* is also a more slender elongated form in its body and all appendages.

The examination of a further specimen of *Periclimenes hirsutus* from Guitar Island, near Long Island, Andaman Islands, collector R. L. BRACHMA-CHARY, in May 1975 on *Astropyga radiata*, has shown that the cutting edges of the fingers of the first pereopods are very finely pectinate, only discernable under high magnification, and not simple as stated in the original description, but this feature is less marked than in *P. rectirostris*.

*P. rectirostris* can be distinguished from *P. hirsutus* by the following features:

- 1, absence of general pubescence of body and appendages.
- 2, rostrum subequal to post-orbital carapace length with four or five ventral teeth and eleven or twelve dorsal teeth.
- 3, fingers of first pereopod with finely pectinate cutting edges.
- 4, dactyls of ambulatory pereopods simple and propods with a double row of long slender ventral spines.

#### 9. *Periclimenaeus truncatus* (Rathbun)

(figs. 16, 17 d, 18 c, f)

Restricted synonymy:

*Coralliocaris truncata* Rathbun, 1906: 920, figs. 70, pl. 24 fig. 2; KEMP, 1922: 269.

*Coralliocaris* (*Coralliocaris*) *truncata*, BORRADAILE, 1917: 382 (key), 385.

*Periclimenaeus truncatus*, HOLTHUIS, 1952: 14, 117-121, figs. 48-49; BRUCE, 1974 (1976): 473, 474.

#### MATERIAL

St. 73, 76-70 m: 1 ♂, incomplete, CL. 2.4 mm.

#### REMARKS

The specimen, which lacks both second pereopods, agrees closely with the description and figures given by HOLTHUIS (1952).

The rostrum bears eight dorsal teeth, which are very small posteriorly, and is distinctly downcurved. The most proximal tooth is minute. The telson and uropods are as previously described, but there is no trace of a long lateral spine on the external border of the uropod.

The third maxilliped is robust with the ischio-merus completely fused to the basis. The combined segment is bowed, about 3.5 times longer than its maximum width, rather narrower proximally than distally and sparsely setose along its medial border. The penultimate segment of the exopod is about 0.75 times the length of the proximal segment, and four times longer than wide, with rows of long slender simple setae along medial and lateral margins. The terminal segment is about half the length of the proximal segment, about three times longer than broad, with four rows of spiniform setae on the medial border and about a dozen long slender setae along the lateral margin to the tip. The exopod is about same length as the proximal segment of the endopod, with four long plumose setae only distally. The coxal segment is rounded medially with a small rounded epipod laterally. There is no arthrobranch.

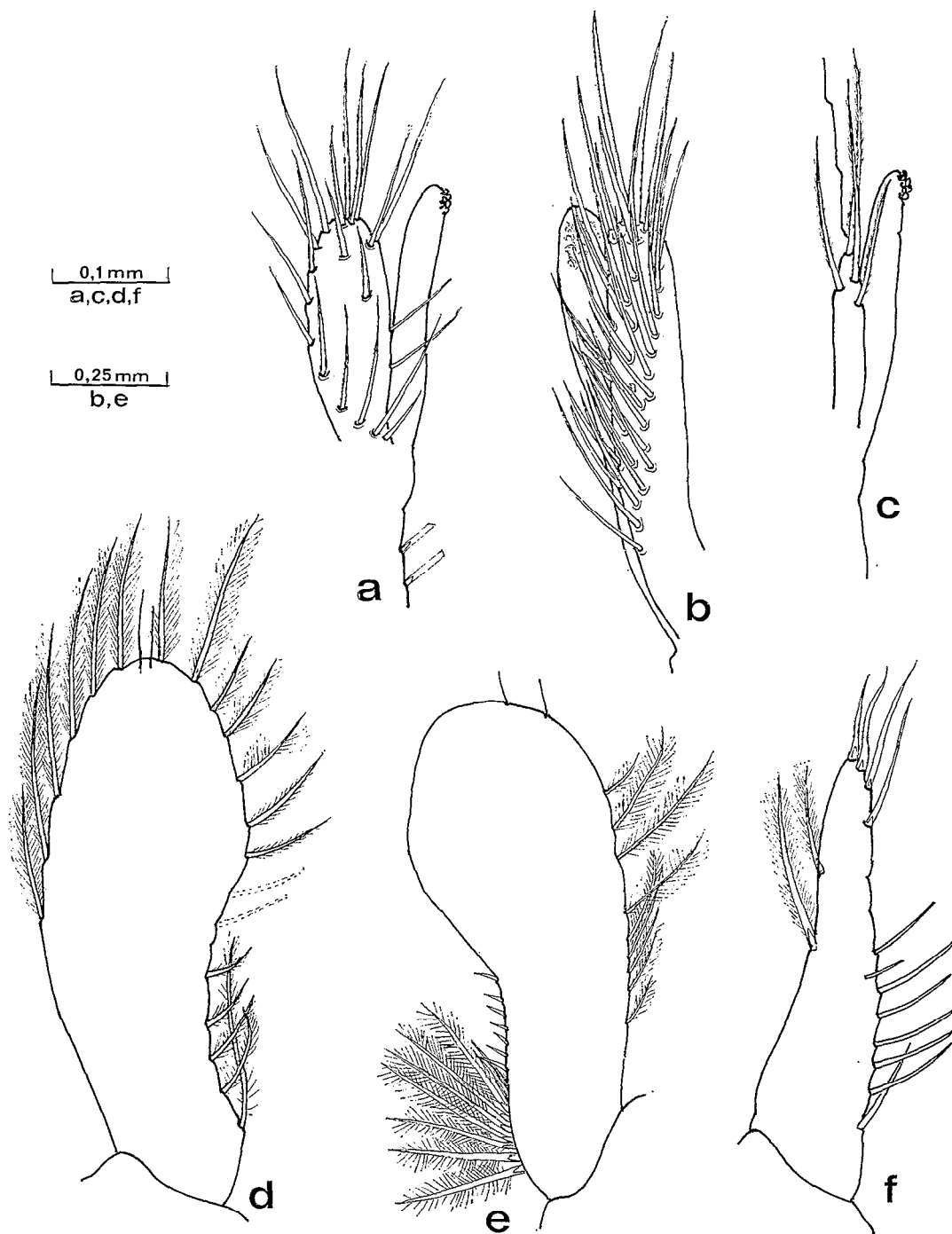


Fig. 18. — Endopod of male first pleopod and appendices internae and masculinae.  
 a, d, *Periclimenes longirostris*; b, e, *Periclimenes foveolatus* sp. nov; c, f, *Periclimenaeus truncatus* Rathbun.



The first pereopod has the fingers about 1.2 times the length of the palm. The cutting edges are only well developed over the distal half of the fingers and that of the dactylus appears feebly dentate. The basis is slightly longer than the ischium and bears a well developed setose ventral carina. The coxa also bears a robust acutely pointed setose medial process. The third pereopod has twelve long slender ventral spines and a disto-ventral pair of spines, which are finely pectinate along their dorsal border. The spines are about equal in length to the width of the propod. The dactylus has a distinctly demarkated unguis and the corpus bears a well developed accessory spine with a row of six slender spinules along the ventral border. A pair of sensory setae are present on the distal corpus laterally and a single one medially.

The endopod of the male first pleopod is about four times longer than the width at the base, tapering strongly distally. The distal half of the lateral border bears two plumose setae. The tip bears two short, feebly setulose setae and the distal four fifths of the medial margin probably had a row of eleven slender setae, of which the eighth and the ninth have been lost. On the male second pleopod, the appendix interna far exceeds the appendix masculina, and bears only four distal concinni. The appendix masculina is short, about five times longer than wide, with a long terminal slender seta, feebly setulose, a similar adjacent seta, and a pair of shorter ventral setae only.

This species is an associate of sponges and has been reported in association with *Biemna fortis* (Topsent). Its bathymetric range extends from 4-90 m.

#### DISTRIBUTION

Type locality Molokai, Hawaii. Also recorded from the Kei Islands and Ternate, Indonesia, and from Zanzibar. Not previously reported from the Philippine Islands.

### *The Deep-Water Pontoniine Shrimps*

The subfamily Pontoniinae is abundantly represented in warm shallow waters, particularly those associated with coral reefs. An overwhelming majority of the known species are "commensals" of other marine invertebrates, although the mechanisms of the associations have not been precisely investigated. Records of pontoniine shrimps from deeper waters are rare, although this may be partly explained by their small size, cryptic habits and the general inadequacy of trawl and dredge sampling. It seems most probable that the few deep water species known are also "commensals" but the hosts have not generally been identified.

Present knowledge of the deep water species occurring in over 100 m is summarized in the Table below.

TABLE I

|                                                   | Depth     | Locality             | Author           |
|---------------------------------------------------|-----------|----------------------|------------------|
| <b><i>Palaemonella</i></b>                        |           |                      |                  |
| 1. <i>P. rotumana</i> (Borradaile).....           | 128 m     | South China Sea      | BRUCE, 1970      |
| <b><i>Periclimenes</i></b>                        |           |                      |                  |
| 2. <i>P. alcocki</i> Kemp.....                    | 743 m     | Laccadive Sea        | KEMP, 1922       |
| 3. <i>P. curvirostris</i> Kubo.....               | 300 m     | Japan                | KUBO, 1940       |
| 4. <i>P. foresti</i> .....                        | 189-209 m | South China Sea      | Present report   |
| 5. <i>P. foveolatus</i> .....                     | 187-195 m | South China Sea      | Present report   |
| 6. <i>P. granulatus</i> Holthuis.....             | 100 m     | Mediterranean Sea    | HOLTHUIS, 1950   |
| 7. <i>P. hertwigi</i> Balss.....                  | 205 m     | Japan                | KUBO, 1940       |
| 8. <i>P. korni</i> (Lo Bianco)*.....              | 1080 m    | Mediterranean        | LO BIANCO, 1903  |
| 9. <i>P. laccadivensis</i> Alcock & Anderson..... | 1285 m    | Laccadive Sea        | KEMP, 1922       |
| 10. <i>P. latipollux</i> Kemp.....                | 155 m     | Western Indian Ocean | KEMP, 1922       |
| 11. <i>P. rectirostris</i> .....                  | 134-129 m | South China Sea      | Present report   |
| 12. <i>P. tenellus</i> (Smith).....               | 437 m     | N. W. Atlantic Ocean | SMITH, 1882      |
| 13. <i>P. sp.</i> .....                           | 236-256 m | Western Indian Ocean | BRUCE, 1974      |
| <b><i>Periclimenaeus</i></b>                      |           |                      |                  |
| 14. <i>P. ardeae</i> Bruce.....                   | 126-140 m | Western Indian Ocean | BRUCE, 1974      |
| 15. <i>P. natalensis</i> (Stebbing).....          | 800 m     | S-W Indian Ocean     | STEBBING, 1915   |
| 16. <i>P. novaezealandiae</i> (Borradaile) .....  | 128 m     | New-Zealand          | BORRADAILE, 1916 |
| 17. <i>P. robustus</i> Borradaile.....            | 119-141 m | Western Indian Ocean | BRUCE, 1974      |

\* The specimen is of very small size and presents a juvenile appearance. It seems possible that it may have been caught in the net when near the surface.

|                                        | Depth     | Locality          | Author         |
|----------------------------------------|-----------|-------------------|----------------|
| <b>Mesopontonia</b>                    |           |                   |                |
| 18. <i>M. gorgoniophila</i> Bruce..... | 117-132 m | South China Sea   | BRUCE, 1967    |
| <b>Dasycaris</b>                       |           |                   |                |
| 19. <i>D. doederleini</i> Balss.....   | 130 m     | Sagami Bay, Japan | BALSS, 1924    |
| <b>Coutierea</b>                       |           |                   |                |
| 20. <i>C. agassizi</i> (Coutière)..... | 170 m     | Barbados          | COUTIÈRE, 1901 |

There are therefore 20 species of six genera that are known to occur, at over 100 m. Of these, only one species, *P. laccadivensis* is known to occur in over 1000 m, and this is still known only from the holotype described first in 1894 (ALCOCK & ANDERSON, 1894). *P. alcocki* is the only other species found in over 500 m depths, and this is still known only from a few specimens, including the one in the present report at 187-195 m, a considerably shallower depth. It is evident that several species can occur over a wide bathymetric range, thus *Palaemonella rotumana* and *Periclimenaeus truncatus* both occur in the intertidal zone and the former is common in tropical shore pools.

Few of the shrimps listed above have had their hosts identified, although there is little doubt that they are all, except *Palaemonella rotumana*, a free-

living micropredator, "commensals" of some marine invertebrates. *Periclimenes latipollex* is known to associate with gorgonians, such as *Acanthogorgia flabellum* Hickson (BRUCE, 1971), *P. hertwigi* has been found in association with the echinothurid urchins *Areosoma thetidis* (H. L. Clark) and *Phormosoma* sp. (BRUCE, 1972; KURO, 1940) and *Mesopontonia gorgoniophila* has been found on the gorgonians *Melitheia? albitincta* Ridley and *Acabaria frondosa* (Brundin). In shallow water *Periclimenaeus ardeae* and *P. robustus* occur in sponges, so it is probable that the deep water species, *P. natalensis* and *P. novae-zealandiae* have similar associations. *Dasycaris* species in shallow water are found in association with pennatulaceans and antipatharians, so *D. doederleini* may be expected on a similar type of host. The host of *Coutierea agassizi* remains an enigma.

## LITERATURE CITED

- ALCOCK, A., 1901.—A descriptive catalogue of the Indian Deep-Sea Crustacea Decapoda Macrura and Anomala in the Indian Museum. Being a revised Account of the Deep-Sea Species collected by the Royal Indian Marine Survey Ship Investigator, 1-286, i-iv, pls. 1-3.
- BALSS, H., 1924.—Ostasiatische Decapoden. V. Die Oxyrhynchen und Schlussteil (Geographische Übersicht der Decapoden Japans). *Arch. Naturgesch.*, 90A (5): 20-84, figs. 1-2, pl. 1.
- BORRADAILE, L. A., 1898.—A Revision of the Pontoniidae. *Ann. Mag. nat. Hist.*, (7) 2: 376-391.
- BORRADAILE, L. A., 1915.—Notes on Carides. *Ann. Mag. nat. Hist.*, (8) 15: 205-213.
- BORRADAILE, L. A., 1916.—Crustacea, I.—Decapoda. *Nat. Hist. Rep. Brit. Antarct. Exped.*, 3 (2): 75-110, figs. 1-16.
- BORRADAILE, L. A., 1917.—On the Pontoniinae. The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr. J. Stanley Gardiner. *Trans. Linn. Soc. Lond. Zool.*, (2) 17: 323-396, pls. 52-57.
- BRUCE, A. J., 1966.—Notes on some Indo-Pacific Pontoniinae, I. *Periclimenes tosaensis* Kubo. *Crustaceana*, 10 (1): 15-22, figs 1-4.
- BRUCE, A. J., 1967.—Notes on some Indo-Pacific Pontoniinae, III-IX. Descriptions of some new genera and species from the western Indian Ocean and South China Sea. *Zool. Verhand.*, Leiden, 87: 1-73, figs. 1-29.
- BRUCE, A. J., 1970.—Observations on the Indo-West Pacific species of the genus *Palaemonella* Dana, 1852 (Decapoda, Pontoniinae). *Crustaceana*, 19 (3): 273-287, figs 1-7, pl. 1.
- BRUCE, A. J., 1971.—On a new commensal shrimp *Periclimenes hirsutus* sp. nov. (Crustacea, Decapoda Natantia, Pontoniinae) from Fiji. *Pacific Sci.*, 25 (1): 91-99, figs. 1-6.
- BRUCE, A. J., 1974.—A synopsis of the pontoniinid shrimp fauna of Central East Africa. *J. Mar. Biol. Ass. India*, 16 (2): 462-490.
- BRUCE, A. J., 1974.—A report on a small collection of pontoniinid shrimps from the Island of Farqhar. *Crustaceana*, 27 (2): 189-203, figs. 1-8.
- BRUCE, A. J., 1975.—*Periclimenes colemani* sp. nov., a new shrimp associate of a rare sea urchin from Heron Island, Queensland (Decapoda Natantia, Pontoniinae). *Rec. Aust. Mus.*, 29 (18): 485-502, figs. 1-8.

- BRUCE, A. J., 1976.—A report on some pontoniinid shrimps collected from the Seychelle Islands by the F.R.V. *Manihine*, 1972, with a review of the Seychelle Islands pontoniinid shrimp fauna. *Journ. Linn. Soc. Lond., Zool.*, **59**: 89-153, tabs. 1-8, figs. 1-30.
- BRUCE, A. J., 1977.—Pontoniine shrimps in the collections of the Australian Museum. *Rec. Aust. Mus.*, **31** (2): 39-81, figs. 1-16.
- BRUCE, A. J., 1978.—A report on a collection of pontoniinid shrimps from Madagascar and adjacent seas. *J. Linn. Soc. Lond., Zool.*, **62**: 205-290, figs. 1-44.
- CALMAN, W. T., 1939.—Crustacea: Caridea. *Sci. Rep. John Murray Exped.*, **6**: 183-224, figs. 1-8.
- COUTIÈRE, H., 1901.—Note sur *Coralliocaris Agassizi* n. sp. provenant des dragages du Blake (1878-1879). *Bull. Mus. Hist. nat. Paris*, **7**: 113-117, fig. 1.
- HOLTHUIS, L. B., 1950.—Description d'une nouvelle espèce du genre *Periclimenes* Costa (Crustacés Décapodes, Natantia) des côtes Algériennes. *Bull. Trav. St. Aquicult. Pêche, Castiglione*, **2**: 107-118, fig. 1, pl. 1.
- HOLTHUIS, L. B., 1952.—The Decapoda of the Siboga Expedition. Part XI. The Palaemonidae collected by the Siboga and Snellius Expeditions with remarks on other species. II. Subfamily Pontoniinae. *Siboga Exped. Mon.*, **39** a<sup>10</sup>: 1-252, figs. 1-110, tab. 1.
- HOLTHUIS, L. B., 1958.—Contributions to the Knowledge of the Red Sea, 8. Crustacea Decapoda from the northern Red Sea (Gulf of Aqaba and Sinai Peninsula). I. *Macrura*. *Bull. Sea Fish. Res. Stn. Israel*, **17** (8-9): 1-40, figs 1-15.
- KEMP, S., 1922.—Notes on the Crustacea Decapoda in the Indian Museum. XV. Pontoniinae. *Rec. Indian Mus.*, **24**: 113-288, figs. 1-105, pls. 3-9.
- KUBO, I., 1940.—Studies on Japanese Palaemonoid Shrimps. II. Pontoniinae. *Journ. Imp. Fish. Inst. Tokyo*, **34**: 31-75, figs. 1-36.
- KUBO, I., 1951.—Some macrurous decapod crustacea found in Japanese waters, with descriptions of four new species. *J. Tokyo Univ. Fish.*, **38**: 259-289, figs. 1-16.
- NOBILI, G., 1899.—Contribuzione alla Conoscenza della Fauna carcinologica Papuasias, della Molucche e dell Australia. *Ann. Mus. Stor. nat. Genova*, **40**: 230-282.
- RATHBUN, M. J., 1906.—The Brachyura and Macrura of the Hawaiian Islands. *Bull. U.S. Fish. Comm.*, **23** (3): 827-930, figs. 1-79, pls. 3-24.
- SMITH, S. I., 1882.—Report on the Crustacea. Pt. I. Decapoda. Reports on the Results of Dredging, under the Supervision of Alexander Agassiz, on the East Coast of the United States, during the Summer of 1880, by the U.S. Coast Survey Steamer «Blake». Commander J. R. Bartlett, U.S.N., Commanding. *Bull. Mus. comp. Zool. Harvard*, **10**: 1-108, pls. 1-15.
- STEBBING, T. R. R., 1915.—South African Crustacea (Part VIII, for the Marine Investigation of South Africa). *Ann. S. Afr. Mus.*, **15**: 57-104, pls. 13-25.