

A NEW GENUS AND FIVE NEW SPECIES OF SHRIMPS (DECAPODA, PALAEMONIDAE, PONTONIINAE) FROM THE WESTERN ATLANTIC

BY

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The following descriptions constitute a prelude to a report in preparation on the shrimps (Decapoda Natantia) collected during the Smithsonian-Bredin Caribbean Expeditions of 1956, 1958, 1959, and 1960. An attempt is being made to include in that report keys and references to all of the shallow-water natantians known from the West Indies and, to some extent, from adjoining regions. In order to make that coverage as complete as possible, I am taking this opportunity to describe some of the apparently new species that have come to my attention from sources other than the Smithsonian-Bredin Expeditions. Most of the material studied is deposited in the Division of Crustacea of the Smithsonian Institution, but several lots were made available by L. B. Holthuis from the collections of the Rijksmuseum van Natuurlijke Historie in Leiden (RMNH).

Dr. Holthuis has promoted this study in his usual unselfish way, not only by lending specimens but also by sharing his incomparable knowledge of the subject matter. My Smithsonian colleague, Raymond B. Manning, has likewise assisted me on numerous occasions by calling attention to material and literature that otherwise would have been overlooked. David L. Meyer furnished the specimens, notes, and photographs that made possible the descriptions of the two crinoid commensals from Curaçao, and W. A. Starck, II, provided photographs that considerably enhanced the description of the *Diadema* shrimp. All of these contributions are gratefully and humbly acknowledged.

Periclimenes crinoidalis new species (figs. 1, 2)

Material. — Jan Thiel Beach, Curaçao, Netherlands Antilles; 38 meters; associated with the crinoid *Nemaster grandis* A. H. Clark; August 8, 1967; David L. Meyer: 4 males (largest is holotype, USNM 125084), 5 females (2 ovigerous), 3 juveniles.

Description. — Rostrum nearly horizontal, elevated above level of carapace in males and all but largest females, reaching about to level of midlength of second segment of antennular peduncle or about to end of peduncle in largest females; dorsal margin armed with 5 to 8 low but distinct teeth in males and small females, posterior tooth placed distinctly anterior to level of posterior margin of orbit, and with 9 teeth in largest females, posteriormost placed above or slightly posterior to

level of orbital margin; ventral margin armed with single inconspicuous subapical tooth (sometimes absent) in males and small females, and with 3 distinct teeth in largest females; midrib nearer ventral than dorsal margin of rostrum. Antennal spine not or barely reaching as far forward as bluntly acute ventral orbital angle, slightly smaller than hepatic spine. Carapace without postorbital ridge.

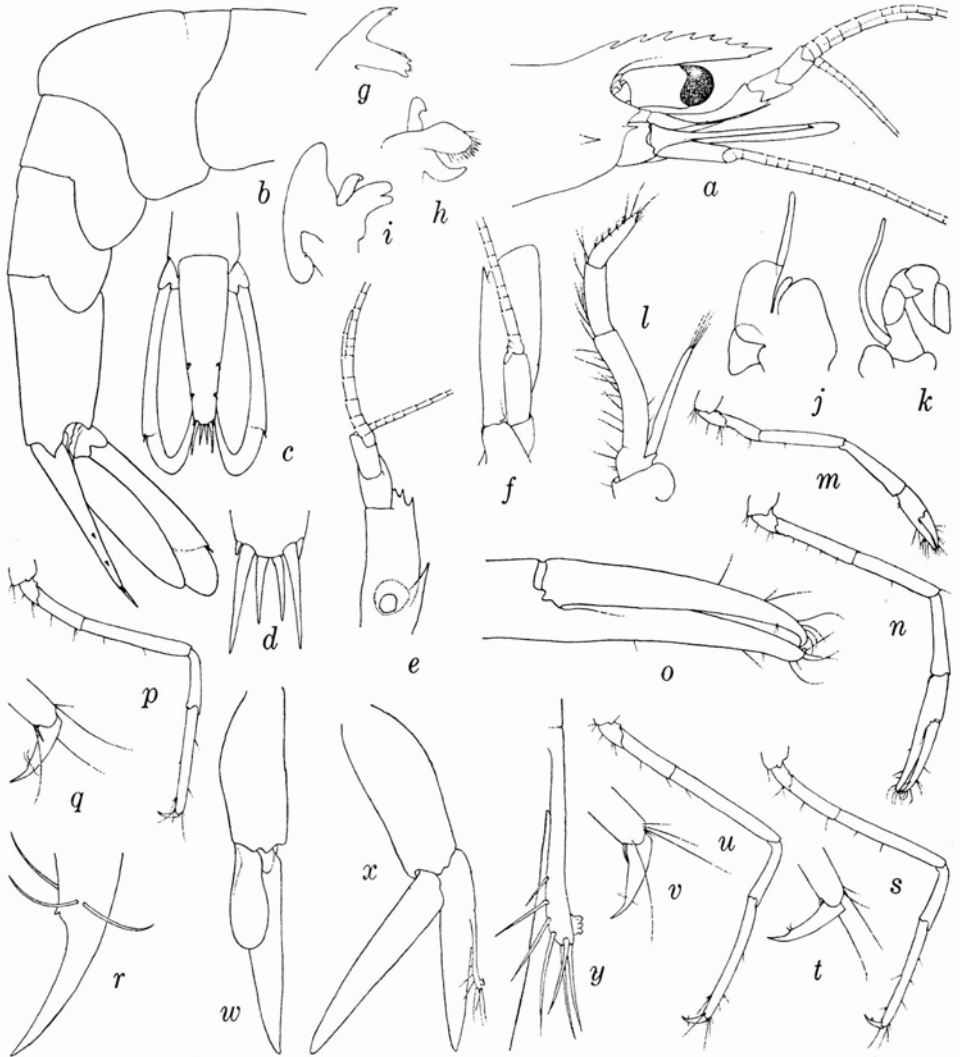


Fig. 1. *Periclimenes crinoidalis* new species, male holotype, carapace length 1.5 mm. *a*, anterior region; *b*, posterior abdominal somites; *c*, telson and uropods; *d*, tip of telson; *e*, right antennule; *f*, right antenna; *g*, right mandible; *h*, right first maxilla; *i*, right second maxilla; *j*, right first maxilliped; *k*, right second maxilliped; *l*, right third maxilliped; *m*, right first pereiopod; *n*, right second pereiopod; *o*, fingers of same; *p*, right third pereiopod; *q*, dactyl of same; *r*, tip of same; *s*, right fourth pereiopod; *t*, dactyl of same; *u*, right fifth pereiopod; *v*, dactyl of same; *w*, right first pleopod; *x*, right second pleopod; *y*, appendix masculina. Magnifications: *a-c*, *e*, *f*, *m*, *n*, *p*, *s*, *u*, $\times 15$; *g-l*, *w*, *x*, $\times 30$; *d*, *o*, *q*, *t*, *v*, $\times 54$; *y*, $\times 84$; *r*, $\times 360$.

All abdominal pleura broadly rounded. Third somite produced posteriorly into rounded cap over base of fourth somite. Sixth somite about half again as long as fifth. Telson, not including terminal spines, subequal in length to sixth somite; dorsal spines small but distinct, proximal pair situated somewhat distal to midlength of segment, distal pair about midway between proximal pair and extremity of telson; intermediate terminal spines no more than one-fifth as long as telson proper and much less than twice as long as mesial pair.

Eye with cornea slightly narrower than but more than half as long as eyestalk.

Antennular peduncle with stylocerite sharp and slender, reaching nearly to midlength of basal segment; distolateral margin of basal segment armed with 2 or 3 subequal spinelike teeth; distal and penultimate segments generally subequal but somewhat variable. Lateral antennular flagellum with branches fused for 3 to 6 segments, free part of shorter branch consisting of 2 segments and distinctly shorter than fused portion.

Antennal scale slightly overreaching antennular peduncle, about three times as long as wide; lateral margin faintly sinuous, distal tooth falling far short of strongly produced anteromesial angle of blade. Antennal peduncle falling far short of midlength of scale; basal segment with inconspicuous tooth near base of scale.

Mouth parts as figured. Mandible with narrow incisor process armed with 4 teeth, molar process well developed. Second maxilla with mesial process broadly cleft into 2 unequal lobes, scaphognathite rather broad but tapering distally. Third maxilliped stout, overreaching lateral spine on basal antennal segment by half of distal segment, exopod not reaching as far as end of antepenultimate segment.

First pereopod of male overreaching antennal scale by about half length of fingers; fingers unarmed, slightly longer than palm; carpus slightly longer than chela and slightly shorter than merus. First pereopod of large female with carpus proportionately longer, about one-fourth again as long as chela and subequal to merus. Second pereopods similar and subequal in two males in which both are intact, overreaching antennal scale by distal third to entire length of fingers; fingers slender, unarmed, about three-fourths as long as chela and shorter than merus; ischium slightly shorter than merus. Second pereopods of females dissimilar and unequal. Major cheliped overreaching antennal scale by fingers and two-thirds of palm; fingers robust and curved, about four-fifths as long as palm, each armed with 2 low teeth on opposable margins; carpus short, little more than one-fourth as long as chela and about three-fifths as long as merus; ischium and merus subequal. Minor cheliped of female overreaching antennal scale by most of chela; fingers slender, unarmed, more than half again as long as palm; carpus seven-tenths as long as chela and nearly as long as merus; ischium fully as long as merus. Third pereopod overreaching antennal scale by about length of dactyl; dactyl slender, with accessory denticle on flexor margin visible only at high compound magnification; propodus more than four times as long as dactyl and at least half again as long as carpus; merus slightly longer than propodus and nearly twice as long as ischium. Fourth pereopod reaching about as far as end of antennal

scale; proportions similar to those of third pereiopod. Fifth pereiopod reaching about as far as end of antennal scale, with similar proportions except for slightly longer propodus.

First pleopod of male with margin of endopod entire, not bilobate. Appendix masculina on endopod of second pleopod subequal in length to appendix interna. Lateral branch of uropod with distinct movable spine inserted between distolateral angle and margin of blade.

Color. — “Red, splotted with white, blending perfectly with the host”.

Size. — Carapace lengths of males, 1.1-1.5 mm (holotype, 1.5 mm); of females with eggs, 2.0 and 2.3 mm; of females without eggs, 1.3-1.5 mm; of juveniles, 0.7-1.0 mm.

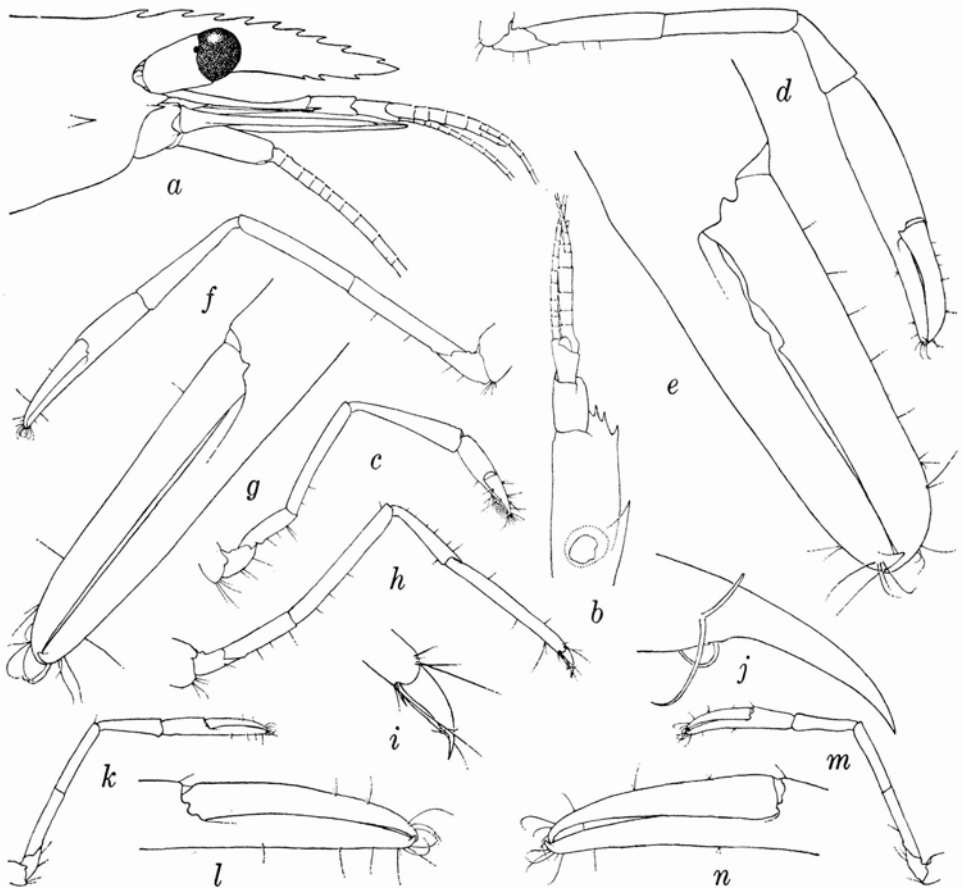


Fig. 2. *Periclimenes crinoidalis* new species. *a-j*, ovigerous female paratype, carapace length 2.3 mm. *a*, anterior region; *b*, right antennule; *c*, right first pereiopod; *d*, right second pereiopod; *e*, fingers of same; *f*, left second pereiopod; *g*, fingers of same; *h*, right third pereiopod; *i*, dactyl of same; *j*, tip of same. *k-n*, male paratype, carapace length 1.3 mm. *k*, right second pereiopod; *l*, fingers of same; *m*, left second pereiopod; *n*, fingers of same. Magnifications: *a-d*, *f*, *b*, *k*, *m*, $\times 15$; *e*, *g*, *i*, *l*, *n*, $\times 54$; *j*, $\times 360$.

Remarks. — Both the male holotype and the smallest male lack the left second pereopod. The other two males (carapace lengths, 1.2 and 1.3 mm) have both pereopods of the second pair, but they are subequal and agree in form with the minor second pereopods of the five females. I can think of only two explanations of this circumstance: (1) the improbable possibility that the male of this species, in contradistinction to the female, has both second pereopods equal and slender or (2) all four of the males have lost the major second pereopod and, in two of the specimens, it has been regenerated as a second minor cheliped.

In the two larger juvenile specimens, each with a carapace length of 1.0 mm, the rostrum does not extend quite as far forward as the end of the basal segment of the antennular peduncle; it is armed dorsally with 4 teeth and ventrally with none; and the basal antennular segment is armed distolaterally in one specimen with 2 teeth on one side and 1 tooth and a rudiment on the other side and in the other specimen with 1 tooth and rudiment on one side and only a single tooth on the other side. In the smallest juvenile, with a carapace length of 0.7 mm, the rostrum reaches barely as far as the midlength of the basal antennular segment; it is armed dorsally with 2 teeth and ventrally with none; and each basal antennular segment is armed with a single distolateral tooth. All three juveniles have the lateral antennular flagellum fused for apparently only 2 segments.

Of the species recorded from American waters, *Periclimenes crinoidalis* seems to be most similar to *P. iridescens* Lebour, 1949. It is readily distinguished from that species, however, by the absence of a tooth in the dorsal midline of the carapace well posterior to the level of the orbital margin, the caplike form of the third abdominal somite, and by the presence, in adults, of more than one tooth on the distolateral margin of the basal antennular segment. From *P. yucatanicus* (Ives, 1891), the only other American species with multiple distolateral teeth on the basal antennular segment, *P. crinoidalis* differs in numerous characters, such as the form of the rostrum and antennal scale and the inconspicuous denticle on the flexor margin of the dactyls of the three posterior pereopods.

The microscopic size of the accessory denticle on the dactyls of the posterior pereopods in this species substantiates the suggestion made by Holthuis (1951: 46) that this character "is not of a very large value". It has been apparent for some time that this accessory tooth or denticle had little phylogenetic significance; as it now seems to have lost most of its practical importance, it is probably best to abandon it as a means of subdividing this rather large and unwieldy genus.

***Periclimenes meyeri* new species (figs. 3, 4)**

Material. — Jan Thiel Beach, Curaçao, Netherlands Antilles; 24 meters; associated with a crinoid *Nemaster* sp. ?; August 3, 1967; David L. Meyer: 1 male (holotype, USNM 125086), 1 female with male and ovigerous female epicaridean isopod attached to abdomen.

Description. — Rostrum nearly horizontal, reaching about to level of midlength of distal segment of antennular peduncle in male, slightly overreaching peduncle in female; dorsal margin armed with 6 low but distinct teeth in male, posterior

tooth placed distinctly anterior to level of posterior margin of orbit, with 7 similar teeth and vestige of eighth in female, posteriormost placed slightly posterior to level of orbital margin; ventral margin armed in distal half with 2 low teeth in male, 4 in female; midrib equidistant from dorsal and ventral margins of rostrum distally. Antennal spine not reaching anteriorly nearly as far as bluntly acute ventral orbital angle, subequal to hepatic spine in male, hepatic spine larger in female. Carapace without postorbital ridge.

All abdominal pleura broadly rounded. Third somite not produced posteriorly to form distinct cap over base of fourth somite. Sixth somite about two-thirds again as long as fifth. Telson, not including terminal spines, slightly longer than sixth somite; dorsal spines small but distinct, proximal pair situated distal to midlength of telson, distal pair nearer to extremity than to proximal pair; intermediate

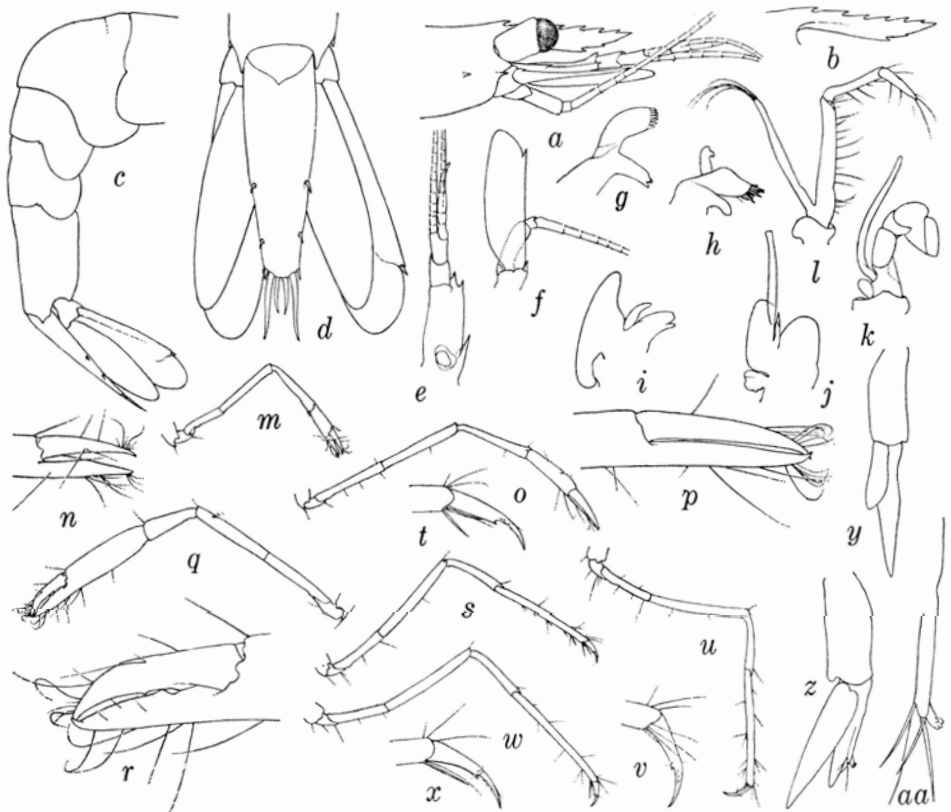


Fig. 3. *Periclimenes meyeri* new species, male holotype, carapace length 1.3 mm. a, anterior region; b, rostrum; c, posterior abdominal somites; d, telson and uropods; e, right antennule; f, right antenna; g, right mandible; h, right first maxilla; i, right second maxilla; j, right first maxilliped; k, right second maxilliped; l, right third maxilliped; m, right first pereiopod; n, fingers of same; o, right second pereiopod; p, fingers of same; q, left second pereiopod; r, fingers of same; s, right third pereiopod; t, dactyl of same; u, right fourth pereiopod; v, dactyl of same; w, right fifth pereiopod; x, dactyl of same; y, right first pleopod; z, right second pleopod; aa, appendix masculina. Magnifications: a-c, e, f, m, o, q, s, u, w, $\times 15$; d, g-l, y, z, $\times 30$; n, p, r, t, v, x, $\times 54$; aa, $\times 84$.

terminal spines more than one-third as long as telson proper and nearly twice as long as mesial pair.

Eyes with cornea slightly narrower than and less than half as long as eyestalk.

Antennular peduncle with stylocerite sharp and slender, reaching nearly to mid-length of basal segment; distolateral margin of basal segment armed with 2 sub-equal spinelike teeth; distal segment slightly longer than penultimate. Lateral antennular flagellum with branches fused for 3 or 4 segments, free part of shorter branch consisting of 2 segments and distinctly shorter than fused portion.

Antennal scale overreaching antennular peduncle, nearly three and one-half times as long as broad; lateral margin nearly straight, distal tooth falling far short of strongly produced anteromesial angle of blade. Antennal peduncle falling short of midlength of scale; basal segment with sharp lateral tooth near base of scale.

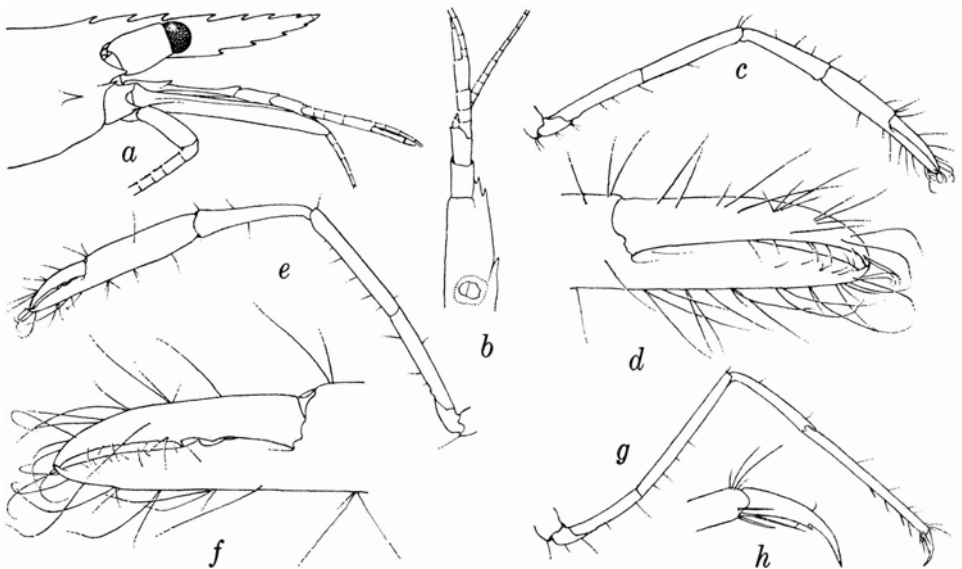


Fig. 4. *Periclimenes meyeri* new species, female paratype, carapace length 1.9 mm. *a*, anterior region; *b*, right antennule; *c*, right second pereiopod; *d*, fingers of same; *e*, left second pereiopod; *f*, fingers of same; *g*, right third pereiopod; *h*, dactyl of same. Magnifications: *a-c*, *e*, *g*, $\times 15$; *d*, *f*, *b*, $\times 54$.

Mouth parts as figured. Mandible with unusually broad incisor process armed with 7 teeth, molar process somewhat reduced. Second maxilla with mesial process cleft into 2 unequal lobes, scaphognathite rather narrow distally. Third maxilliped small, reaching only to level of lateral spine on basal segment of antennal peduncle, exopod slightly overreaching antepenultimate segment.

First pereiopod reaching about as far as distolateral tooth on antennal scale; fingers unarmed, subequal to palm in length; carpus slightly longer than chela and slightly shorter than merus. Second pereiopods unequal and dissimilar. Major cheliped of male overreaching antennal scale by fingers and about half of palm;

fingers stout, about three-fifths as long as palm, each armed with 2 low teeth on opposable margins; carpus slightly less than two-fifths as long as chela and slightly more than three-fifths as long as merus; ischium slightly shorter than merus. Major cheliped of female similar to that of male but fingers more slender and carpus longer, about two-thirds as long as chela. Minor cheliped of second pair in male overreaching antennal scale by fingers and half of palm but more slender and shorter than major cheliped because of smaller chela; fingers slender, unarmed, and nearly four-fifths as long as palm; carpus nearly three-fourths as long as chela, somewhat shorter than merus, and subequal to ischium. Minor cheliped of female similar to that of male but proportionately shorter and with shorter carpus. Third pereopod overreaching antennal scale by dactyl and distal part of propodus; dactyl slender, with inconspicuous accessory denticle on flexor margin; propodus about four times as long as dactyl and more than half again as long as carpus; merus somewhat shorter than propodus but fully 1.7 times as long as ischium. Fourth pereopod overreaching antennal scale by slightly more than length of dactyl; proportions similar to those of third pereopod. Fifth pereopod also overreaching antennal scale by slightly more than length of dactyl and with similar proportions except for slightly longer propodus.

First pleopod of male with endopod entire, not bilobate. Appendix masculina on endopod of second pleopod shorter than appendix interna. Lateral branch of uropod with distinct movable spine inserted between distolateral angle and margin of blade.

Color. — Color photographs furnished by the collector indicate that this shrimp is black or blackish brown with a middorsal stripe of golden orange extending from the tip of the rostrum to the tip of the telson. The stripe is divided on the carapace by a narrow tapered mesial stripe of the darker color and on the posterior abdominal somites it is speckled with the darker color. The color of the shrimp matches that of the host crinoid, which is black with orange-tipped pinnules.

Size. — Carapace length of male holotype, 1.3 mm; of female paratype, 1.9 mm.

Remarks. — This species displays characters that are found in other American species, but the combination of characters is so unique that the affinities of the species are nearly impossible to determine. The apparent sexual dimorphism in the posterior limit of the dorsal dentition of the rostrum makes the comparison of this structure with those of other species difficult. The distal spines on the basal antennular segment recalls the similar or even more extensive spination in *P. yucatanicus* (Ives, 1891) and *P. crinoidalis* described above. The arrangement of the rostral teeth, the more produced and less truncate distal margin of the antennal scale, and the less prominent accessory denticle on the dactyls of the posterior pereopods immediately distinguish *P. meyeri* from *P. yucatanicus*. The form of the rostrum and of the third abdominal somite and the presence of a small but distinct (with moderate magnification) denticle on the dactyls of the posterior pereopods separate it from *P. crinoidalis*. The expanded form of the incisor process of the mandible seems to be unique among American species; it

recalls the form of that process in the Indo-Pacific *P. ceratophthalmus* Borradaile, 1915, which also is apparently associated with crinoids, but the molar process is less reduced in that species.

It is a pleasure to name this species for the collector, David L. Meyer, who kindly donated material and descriptive notes on this and the preceding species to the national collections.

Periclimenes paivai new species (figs. 5-7)

Material. — Ubatuba, Estado de São Paulo, Brazil; among the tentacles of a medusa *Mastigias* sp.; June 7, 1958; H. Rodrigues da Costa: 1 male, 1 ovigerous female (RMNH). — Ubatuba; January 16, 1963; Jayme de Loyola e Silva: 2 ovigerous females. — Guarujá, Santos, Estado de São Paulo, Brazil; August 7, 1956; H. Rodrigues da Costa: 4 ovigerous females (RMNH). — Cananéia, Estado de São Paulo, Brazil; No. D.C. 112; August 6, 1949: 1 ovigerous female (holotype, USNM 92855).

Description. — Rostrum directed slightly upward, reaching nearly to level of midlength of distal segment of antennular peduncle; dorsal margin armed with 8 to 10 prominent teeth, posterior tooth far removed from second, second situated posterior to or in line with posterior margin of orbit; ventral margin armed with 2, rarely 1, teeth; midrib nearer ventral than dorsal margin of rostrum except at distal extremity. No antennal spine ventral to strongly produced lobe defining ventral margin of orbit. Hepatic spine prominent. Carapace without postorbital ridge.

All abdominal pleura broadly rounded. Third somite not unusually produced posteriorly. Sixth somite more than twice as long as fifth. Telson, not including

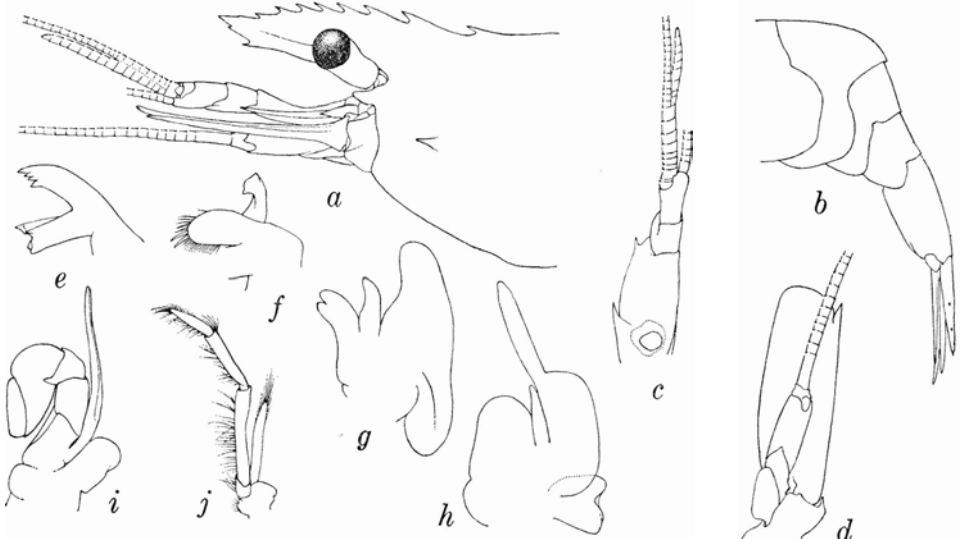


Fig. 5. *Periclimenes paivai* new species, ovigerous female holotype, carapace length 5.2 mm. *a*, anterior region; *b*, posterior abdominal somites; *c*, left antennule; *d*, left antenna; *e*, left mandible; *f*, left first maxilla; *g*, left second maxilla; *h*, left first maxilliped; *i*, left second maxilliped; *j*, left third maxilliped. Magnifications: *b*, $\times 3.6$; *a*, *c*, *d*, *j*, $\times 7.2$; *e-i*, $\times 15$.

terminal spines, slightly shorter than sixth somite; dorsal spines distinct, proximal pair situated at about midlength of segment, distal pair about midway between proximal pair and distal end of telson; intermediate terminal spines about twice as long as mesial pair.

Eyes with cornea slightly wider than but less than half as long as eyestalk.

Antennular peduncle with stylocerite sharp and slender, reaching about to midlength of basal segment; distolateral margin of basal segment armed with single spinelike tooth and produced to about midlength of second segment; distal segment distinctly longer than penultimate in dorsal view. Lateral antennular flagellum with branches fused for 4 to 8 segments, free part of shorter branch consisting of 4 to 9 segments and subequal to or longer than fused portion.

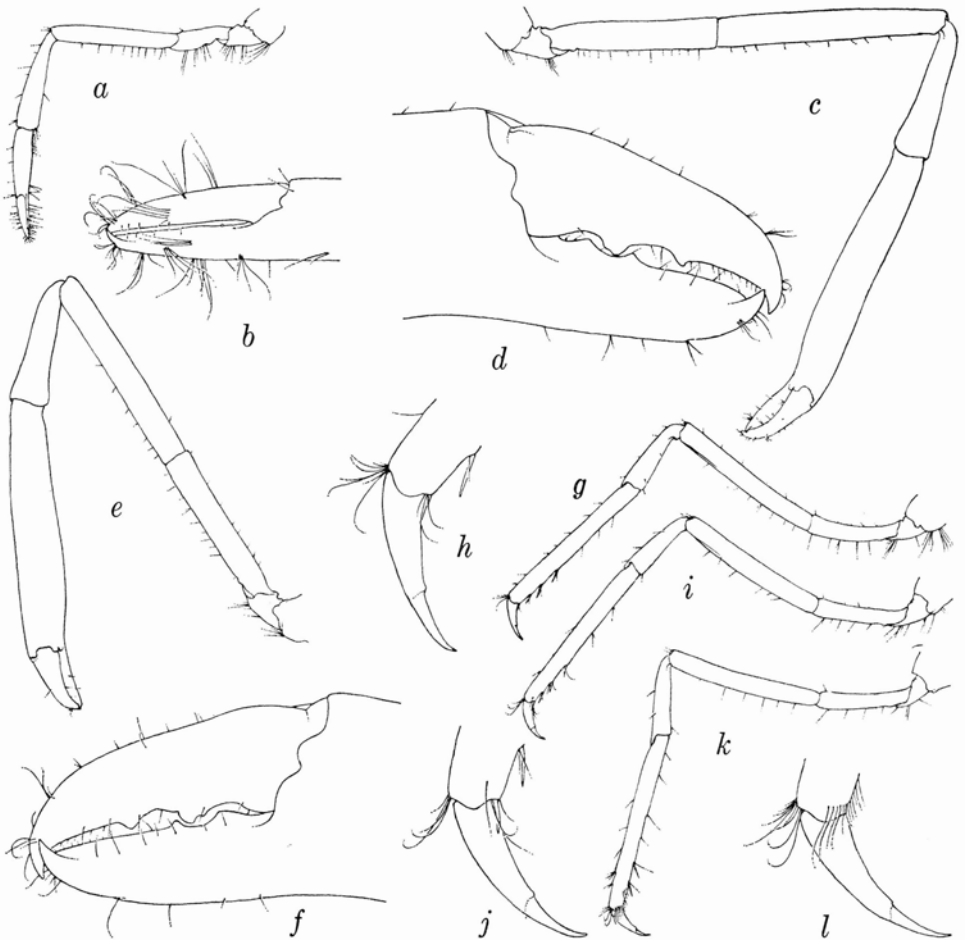


Fig. 6. *Periclimenes paivai* new species, ovigerous female holotype. *a*, left first pereiopod; *b*, fingers of same; *c*, right second pereiopod; *d*, fingers of same; *e*, left second pereiopod; *f*, fingers of same; *g*, left third pereiopod; *h*, dactyl of same; *i*, left fourth pereiopod; *j*, dactyl of same; *k*, left fifth pereiopod; *l*, dactyl of same. Magnifications: *a*, *c*, *e*, *g*, *i*, *k*, $\times 7.2$; *b*, *d*, *f*, *h*, *j*, *l*, $\times 30$.

Antennal scale distinctly overreaching antennular peduncle, nearly three times as long as wide; lateral margin nearly straight, distal tooth falling short of moderately to strongly produced distal margin of blade. Antennal peduncle nearly reaching midlength of scale; basal segment with spinelike tooth lateral to base of scale.

Mouth parts as figured. Mandible with strong incisor and molar processes, former armed with 4 teeth, latter sharply dentate. Second maxilla with mesial process cleft into two unequal lobes, scaphognathite moderately broad. Third maxilliped reaching distal third of distal segment of antennal peduncle, exopod not reaching as far as end of antepenultimate segment.

First pereopod overreaching antennal scale by two-thirds of fingers; fingers unarmed, about two-thirds as long as palm; carpus slightly shorter than chela and distinctly shorter than merus. Second pereopods similar but slightly unequal. Right second pereopod overreaching antennal scale by slightly more than chela and carpus; fingers robust and short, less than one-third as long as palm in large specimens, each armed with 2 teeth on opposable margins, proximal tooth on dactyl partially divided; carpus considerably less than half as long as chela and nearly two-thirds as long as merus; ischium about three-fourths as long as merus. Left second pereopod slightly shorter, overreaching antennal scale by chela and most of carpus; otherwise similar to right member of pair. Fingers much longer, up to three-fourths as long as palm and obscurely dentate in small adult specimens. Third pereopod overreaching antennal scale by dactyl and part of propodus; dactyl slender, with microscopic denticle on flexor margin; propodus three to three and one-half times as long as dactyl and nearly twice as long as carpus; merus slightly shorter than propodus and nearly twice as long as ischium. Fourth pereopod overreaching antennal scale by slightly more than length of dactyl; proportions similar to those of third pereopod. Fifth pereopod also overreaching antennal scale by slightly more than length of dactyl and with similar proportions.

First pleopod of male with margin of endopod entire, not bilobate. Appendix masculina on endopod of second pleopod subequal in length to appendix interna and furnished with about 8 long stout marginal setae. Lateral branch of uropod with prominent movable spine inserted between distolateral angle and margin of blade.

Size. — Carapace length of male, 3.8 mm, of ovigerous females, 2.6 to 5.2 mm (largest is holotype).

Remarks. — This species is closely related to *Periclimenes pauper* Holthuis, 1951, from Cubagua Island, Venezuela. All of the specimens from Estado de São Paulo, Brazil are considerably larger than the unique male type-specimen of *P. pauper*. They may eventually prove to represent the mature form of that species but they differ from Holthuis's description in having the rostrum directed slightly upward rather than horizontal, 8 to 10 rather than 7 teeth on the dorsal margin, and 1 or 2 rather than no teeth on the ventral margin; the distal segment of the antennular peduncle is considerably longer than, rather than subequal to, the

penultimate segment, and the accessory branch of the lateral flagellum is nearly as long as or longer than the fused portion, rather than less than half as long; and the incisor process of the mandible terminates in 4, rather than 3, teeth, and there are no denticles on the posteromesial margin of that process.

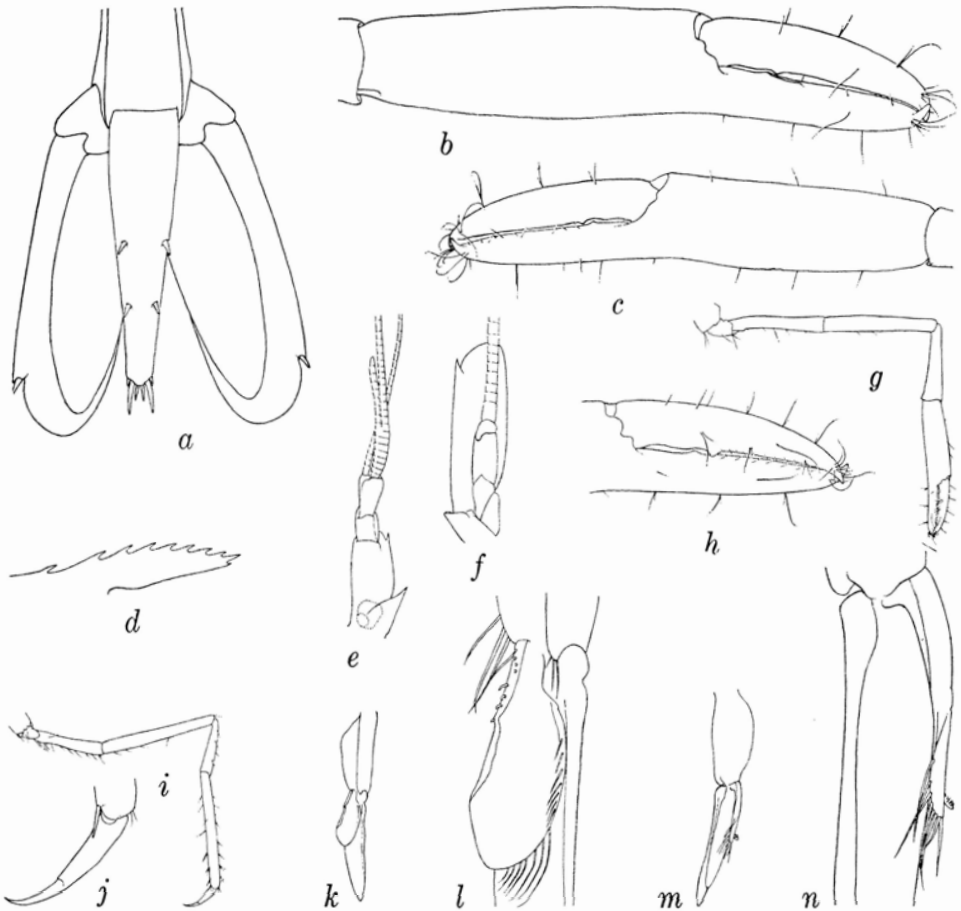


Fig. 7. *Periclimenes paivai* new species. *a*, ovigerous female paratype, carapace length 3.1 mm, telson and uropods; *b*, same specimen, chela of right (minor) second pereiopod; *c*, ovigerous female paratype, carapace length 2.6 mm, chela of left (major) second pereiopod. *d-n*, male paratype, carapace length 3.8 mm. *d*, rostrum; *e*, right antennule; *f*, right antenna; *g*, right second pereiopod; *h*, fingers of same; *i*, right third pereiopod; *j*, dactyl of same; *k*, right first pleopod; *l*, endopod of same; *m*, right second pleopod; *n*, appendix masculina. Magnifications: *d-g*, *i*, *k*, *m*, $\times 7.2$; *a*, $\times 15$; *b*, *c*, *h*, *j*, *l*, *n*, $\times 30$.

This species is named for the late João de Paiva Carvalho, who kindly donated a collection containing the holotype to the national collections in 1952 when he supervised the Department of Biological Oceanography at the Universidade de São Paulo.

Lipkebe new genus

Definition. — Body subcylindrical. Rostrum laterally compressed in distal half, broadened proximally into eavelike, anterolaterally acuminate expansions over bases of eyestalks. Carapace smooth, armed with antennal (branchiostegal?) and hepatic (postorbital?) spines, without pterygostomial spine, branchiostegal sinus, or branchiostegal groove. Pleura of anterior three abdominal somites rounded, of fourth and fifth acute or subacute. Telson armed with two pairs of lateral spines and three pairs of terminal spines. Antennal scale well developed. Mandible without palp; incisor process tapering distally and narrower than molar process. First maxilliped with lash on caridean lobe. Second and third maxillipeds without exopods. First pereopod with undivided carpus. Second pereopods markedly unequal and dissimilar. Dactyls of three posterior pereopods with inconspicuous swelling on flexor margin and cluster of minute spinules on extensor margin. Lateral branch of uropod with strong distolateral tooth but no movable spine between it and blade.

Type-species. — *Lipkebe holthuisi* new species (see below).

Gender. — Masculine.

Lipkebe holthuisi new species (figs. 8, 9)

Material. — Gulf of Mexico west-northwest of Dry Tortugas, Florida; 25° 13' N 83° 55' W; 119 meters; sand and gravel; bottom temperature 20° C.; April 19, 1954; "Oregon" station 1024: 2 ovigerous females (larger is holotype, USNM 97433).

Description. — Rostrum nearly horizontal, laterally compressed in distal half, unarmed but carinate dorsally and ventrally, somewhat sinuous dorsally, convex ventrally, reaching as far as end of antennular peduncle; basal portion expanded to form broad, anterolaterally acuminate eaves over orbits; dorsal carina forming high crest between eaves, in holotype disappearing short distance posterior to level of posterior margin of orbit, in paratype reaching about as far as ridges extending posterolaterally from supraorbital eaves. Carapace almost subcylindrical, slightly more depressed than compressed, armed only with minute antennal or branchiostegal spine just posterodorsal to pterygostomial angle and strong hepatic or postorbital spine; anterolateral angle rounded; lateral margin not interrupted by elongate sinus; no longitudinal groove on branchiostegal region.

Pleura of three anterior abdominal somites rounded, entire in female; pleura of fourth and fifth somites broadly acuminate posteriorly, that of fifth somite of paratype sharper than in holotype. Sixth somite about half again as long as fifth but not much more than half as long as telson, excluding terminal spines. Telson with anterior pair of lateral spines placed slightly proximal to midlength and posterior pair about equidistant between anterior pair and distal margin of telson; intermediate pair of terminal spines fully twice as long as mesial pair.

Eyes well developed, cornea no broader than and nearly as long as short, stout eyestalk.

Antennular peduncle with acute stylocerite; strong distolateral spine of basal

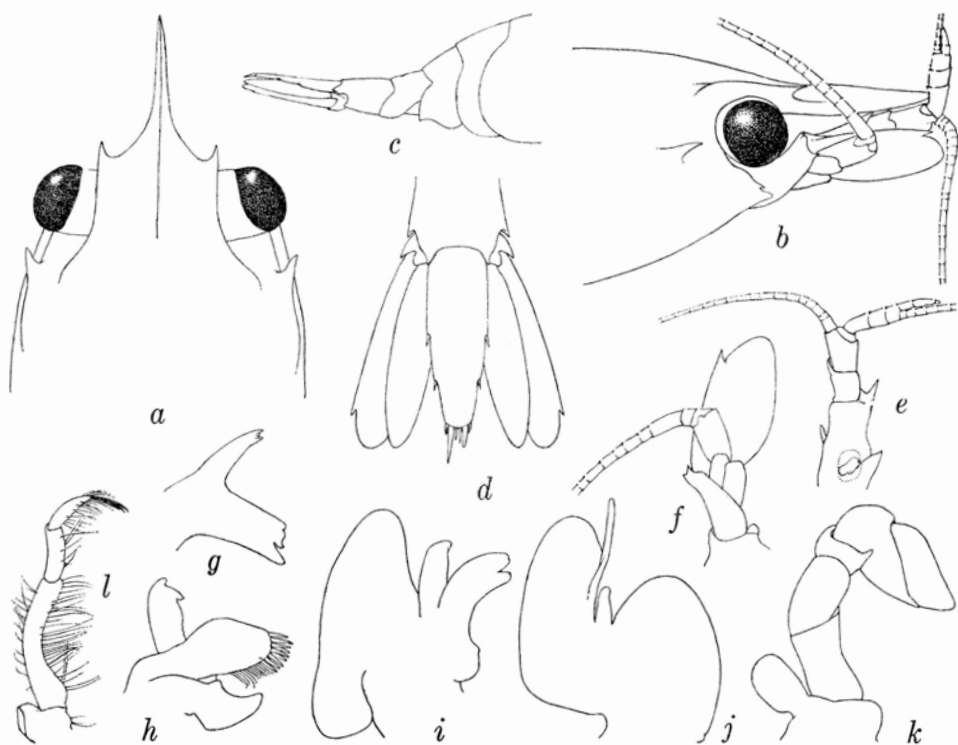


Fig. 8. *Lipkebe bolthuisi* new species, ovigerous female holotype, carapace length 2.7 mm. *a*, anterior region in dorsal view; *b*, same in lateral view; *c*, posterior abdominal somites; *d*, telson and uropods; *e*, right antennule; *f*, right antenna; *g*, right mandible; *h*, right first maxilla; *i*, right second maxilla; *j*, right first maxilliped; *k*, right second maxilliped; *l*, right third maxilliped. Magnifications: *c*, $\times 7.2$; *a*, *b*, *d-f*, *l*, $\times 15$; *g-k*, $\times 30$.

segment reaching to about distal fourth of second segment, anterior margin of basal segment produced between distolateral spine and lateral margin of second segment nearly to midlength of second segment; prominent spinelike process arising from near midlength of ventromesial surface of basal segment; distal segment only slightly longer than second. Lateral antennular flagellum with branches fused for 3 to 5 segments; free part of shorter branch shorter than fused portion and consisting of 3 segments.

Antennal scale slightly overreaching antennular peduncle, only twice as long as broad; lateral margin faintly convex, distal tooth falling far short of distal margin of strongly produced blade. Antennal peduncle reaching about to midlength of scale; basal segment with stout distoventral tooth.

Mouth parts as figured. Mandible with incisor process armed distally with row of 4 denticles; molar process dentate or lobate. Second maxilla with mesial lacinia broadly but shallowly cleft. First maxilliped with well-developed lash on caridean lobe. Second and third maxillipeds without exopods. Third maxilliped reaching about as far as end of antennal peduncle.

First pereiopod overreaching antennal scale by slightly more than length of chela; fingers unarmed and longer than palm; carpus slightly longer than chela but shorter than merus. Second pereiopods very unequal and dissimilar. Major cheliped overreaching antennal scale by chela and carpus; fingers about half as long as palm, dactyl with large basal tooth closing into depression in fixed finger;

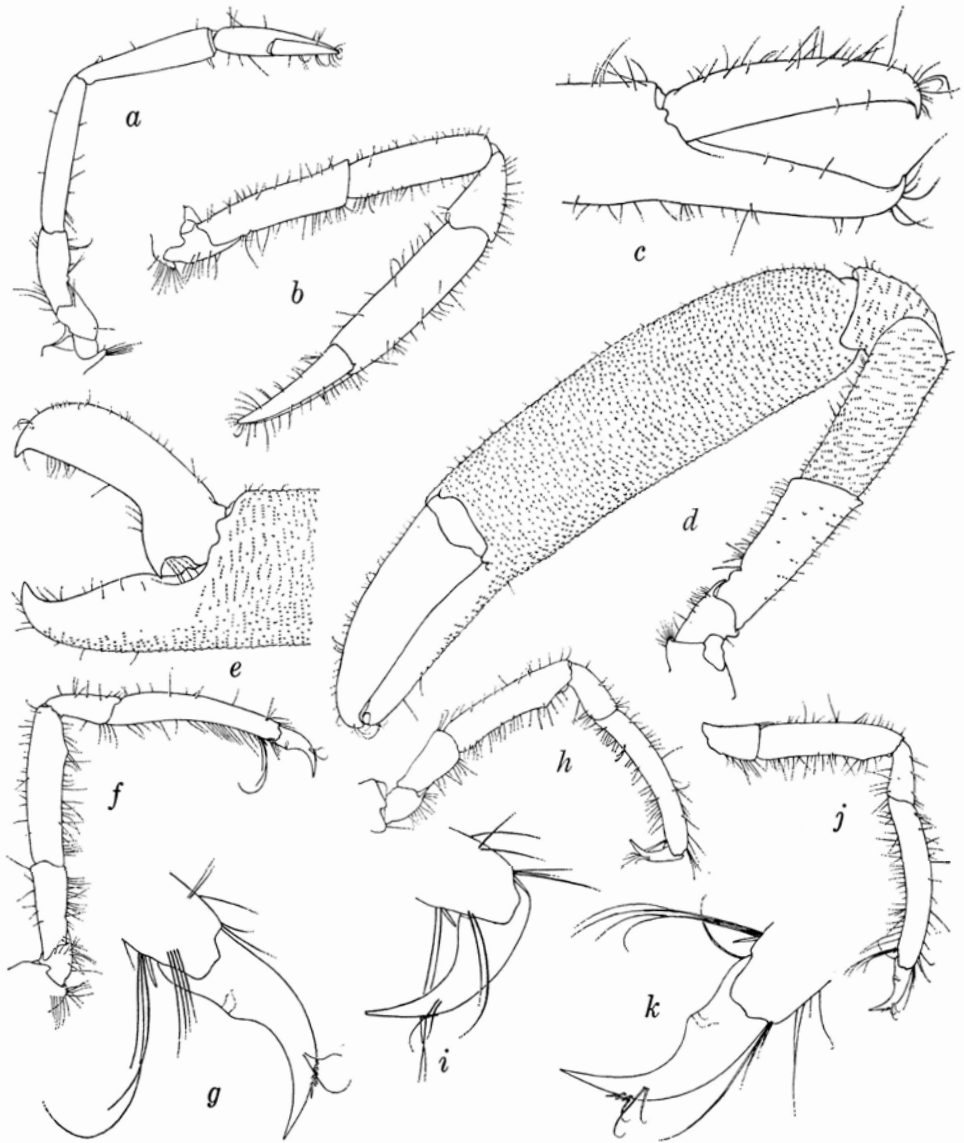


Fig. 9. *Lipkebe bolthuisi* new species, ovigerous female holotype. *a*, right first pereiopod; *b*, right second pereiopod; *c*, fingers of same; *d*, left second pereiopod; *e*, fingers of same; *f*, right third pereiopod; *g*, dactyl of same; *h*, right fourth pereiopod; *i*, dactyl of same; *j*, right fifth pereiopod; *k*, dactyl of same. Magnifications: *a*, *b*, *d-f*, *b*, *j*, $\times 15$; *c*, $\times 30$; *g*, *i*, *k*, $\times 54$.

carpus less than one-fourth as long as palm; merus nearly twice as long as carpus and one-half times as long as dactyl; carpus less than half as long as propodus; antennal scale by chela and carpus; fingers about seven-tenths as long as palm, unarmed; carpus slightly less than half as long as palm; merus more than half again as long as carpus and somewhat shorter than ischium. Third pereopod overreaching antennal scale by dactyl and one-fourth of propodus; dactyl with low rounded prominence in proximal half of flexor margin and cluster of minute spinules on distal third of extensor margin; propodus somewhat curved, about two and about as long as ischium. Minor cheliped of second pair also overreaching merus subequal to propodus and three-fourths again as long as ischium, with low prominence near distal end of flexor margin. Fourth pereopod reaching about as far as end of antennal scale; propodus nearly three times as long as dactyl; carpus much less than half as long as propodus; merus slightly shorter than propodus and more than twice as long as ischium, with prominence on flexor margin similar to that of third pereopod. Fifth pereopod falling slightly short of end of antennal scale; proportions about as in fourth pereopod.

Lateral branch of uropod without movable spinule between distolateral tooth and blade.

Size. — Carapace length of ovigerous female holotype 2.7 mm, of ovigerous female paratype 2.0 mm. Maximum dimension of eyed eggs about 0.3 mm.

Remarks. — The species of the subfamily Pontoniinae that lack exopods on the second and third maxillipeds display a rather wide range of presumably generic characters. It is with some hesitation that another genus is added to the several monotypic ones already established in that section of the subfamily, but there seems no alternative at the present time. *Lipkebe holthuisi* is superficially like the species of *Coutierea* and *Pseudocoutierea*, but it differs in having the distal portion of the rostrum compressed and bladelike rather than subcylindrical, and in lacking a prominent antennal spine, branchiostegal sinus, and branchiostegal groove. It is similar to *Coutierea* and unlike *Pseudocoutierea* in having a strong hepatic or post-orbital spine. It approaches *Pseudocoutierea* and differs from *Coutierea* in the relatively short rostrum, smooth carapace, lack of a pterygostomial spine, rounded pleura of the two anterior abdominal somites, large basal tooth on the dactyl of the major second cheliped, and reduced prominences, or none, on the flexor margins of the merus, carpus, and dactyl of the three posterior pereopods.

There is a special satisfaction in being able to name this species for Lipke B. Holthuis of the Rijksmuseum van Natuurlijke Historie in Leiden, who is generally recognized as the dean of decapod specialists today and who set the precedent for such name combinations in his invaluable revision (1951) of the Pontoniinae of the Americas.

***Tuleariocaris neglecta* new species (figs. 10, 11)**

Material. — Three miles southwest of Alligator Reef Light, Monroe County, Florida; 7.5 meters; on the long-spined sea urchin *Diadema antillarum* (Philippi); May 27, 1960; W. A. Starck, II: 1 male. — Rodney's Rock, north of Roseau, Dominica; on *Diadema antillarum*; February 26, 1966;

R. B. Manning: 1 ovigerous female. — Same; February 28, 1966: 1 male. — Rocky point south of Mahaut village, Dominica; on *Diadema antillarum*; March 2, 1966; R. B. Manning: 4 males, 7 females (1 ovigerous). — Bellairs Research Institute of McGill University, St. James, Barbados; on *Diadema antillarum*; June 22, 1959; A. G. Fish: 1 male (holotype, USNM 107294). — Open southwest coast of Curaçao near entrance to Piscadera Baai, in front of Caribbean Biological Station; on *Diadema antillarum* found among and under rocks; about 0.5 meter; November 26, 1956; L. B. Holthuis no. 1015: 3 males, 2 females (1 ovigerous) (RMNH).

Description. — Rostrum continuing slight ventral inclination of anterior part of carapace, reaching about as far as end of second segment of antennular peduncle, armed dorsally with 7 to 11 low teeth, compressed ventrally into distally convex blade occasionally bearing 1 to 4 minute teeth; provided laterally with eavelike flange, distal portion widest at about one-third of length from tip and expanding abruptly at base to form rounded eave dorsal and posterior to orbit. Carapace little compressed, armed with distinct hepatic or postorbital spine and small submarginal tooth or spine near anterolateral angle near end of carina extending anteroventrally from first spine; anterolateral angle blunt; lateral margin strongly sinuous.

Pleura of all abdominal somites rounded. Sixth somite about twice as long as fifth and slightly longer than telson, excluding terminal spines. Telson with 2 pairs of lateral spines dividing segment very roughly into thirds, proximal portion longest, distal portion slightly shorter, and interval between pairs of spines shortest; intermediate pair of terminal spines nearly three times as long as mesial pair.

Eyes large, cornea somewhat depressed dorsoventrally in normal position, broader and longer than short, stout eyestalk.

Antennular peduncle with acute but short stylocerite; distolateral lobe of basal segment armed with 2 to 4 strong spines, ventromesial margin armed with small spine or tooth at about midlength; third segment distinctly longer than second. Lateral antennular flagellum with fused portion consisting of 2 to 4 segments and subequal in length to 2- or 3-segmented free part of shorter branch.

Antennal scale reaching well beyond antennular peduncle, nearly four and one-half times as long as broad; lateral margin nearly straight in distal two-thirds, distal tooth falling far short of margin of strongly produced blade. Antennal peduncle not reaching beyond proximal third of scale; basal segment with stout distoventral tooth.

Mouth parts as figured. Mandible very small, incisor process reduced and unarmed, molar process dentate. First maxilla large, mesial lacinia broad and truncate. Second maxilla with mesial lacinia entire, subacute; palp broad and narrowly acute distally, overreaching broad scaphognathite. First maxilliped with caridean lobe narrow but provided with prominent lash. Second maxilliped unusually thick and robust, with prominent exopod and distal segment applied subterminally to penultimate segment. Third maxilliped slender, reaching about to midlength of distal segment of antennal peduncle, exopod not reaching end of antepenultimate segment of maxilliped.

First pereopod reaching level of distolateral tooth of antennal scale; fingers

unarmed, half as long as palm; carpus somewhat shorter than slender merus. Second pereopods slender, similar, and reaching level of distolateral tooth of antennal scale; subequal in adult males, movable finger about twice as long as fixed finger, unarmed, about one-fourth as long as palm; carpus slightly shorter

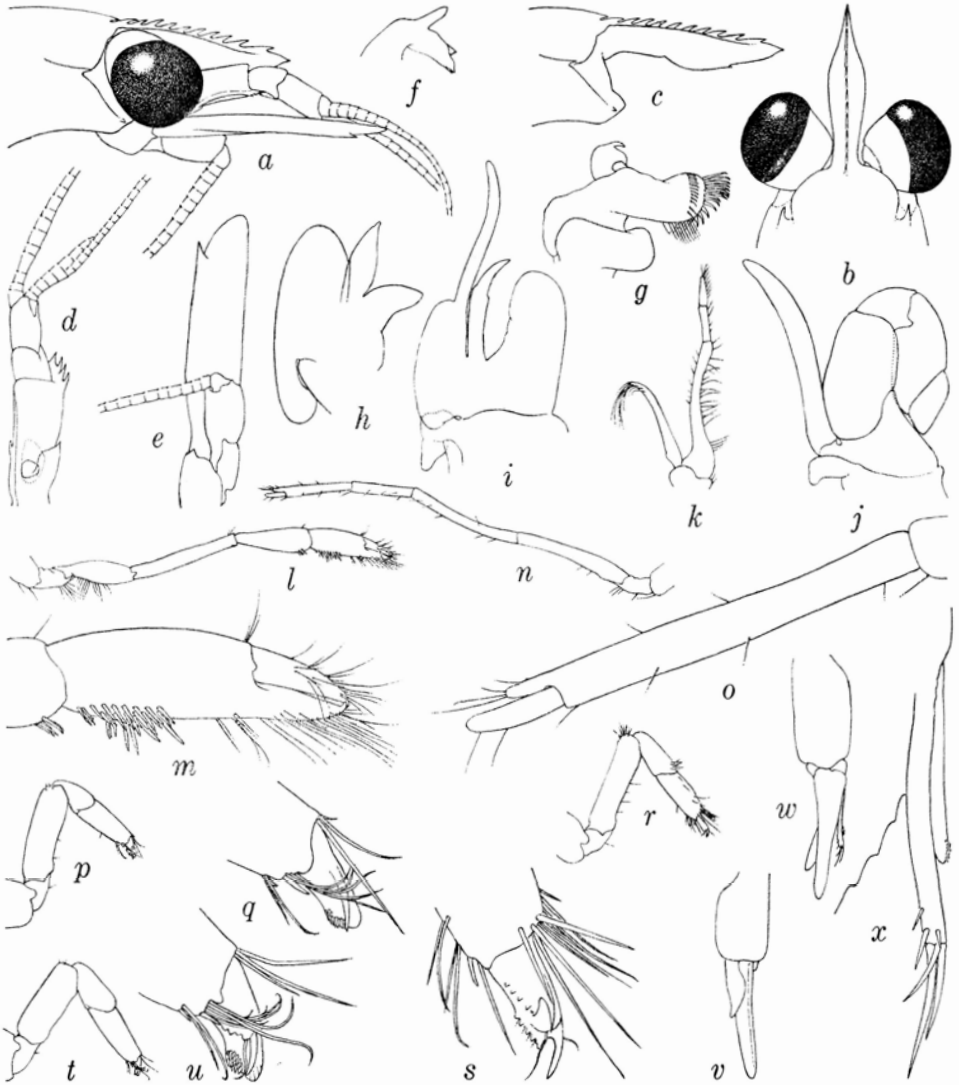


Fig. 10. *Tuleariocaris neglecta* new species, male holotype, carapace length 2.8 mm. *a*, anterior region in lateral view; *b*, same in dorsal view; *c*, rostrum; *d*, right antennule; *e*, right antenna; *f*, right mandible; *g*, right first maxilla; *h*, right second maxilla; *i*, right first maxilliped; *j*, right second maxilliped; *k*, right third maxilliped; *l*, right first pereopod; *m*, chela of same; *n*, left second pereopod; *o*, chela of same; *p*, right third pereopod; *q*, dactyl of same; *r*, right fourth pereopod; *s*, dactyl of same; *t*, right fifth pereopod; *u*, dactyl of same; *v*, right first pleopod; *w*, right second pleopod; *x*, appendix masculina. Magnifications: *a-e*, *k*, *l*, *n*, *p*, *r*, *t*, *v*, *w*, $\times 15$; *f-j*, $\times 30$; *m*, $\times 54$; *o*, *q*, *s*, *u*, *x*, $\times 84$.

than palm; merus nearly twice as long as carpus and nearly as long as ischium. Right second pereiopod of female like that of male. Left considerably larger and stronger, overreaching antennal scale by three-fourths of chela; fingers more than one-third as long as palm, movable finger curiously flattened, spoonlike; carpus short, about one-fourth as long as palm; merus somewhat longer than palm and much longer than twisted ischium. Third pereiopod short and stout, barely overreaching anterolateral angle of carapace; dactyl blunt, armed with cluster of scalelike spines near distal angle of flexor margin and with large curved spine arising near extensor margin at about midlength but not extending beyond extremity of segment; propodus more than twice as long as dactyl; carpus stout, slightly more than three-fourths as long as propodus; ischiomerus nearly twice as long as propodus. Fourth pereiopod slightly more slender than third, reaching nearly to anterolateral angle of carapace; dactyl terminating in long slender spine separated by U-shaped sinus from distally denticulate flexor margin; propodus about twice as long as dactyl, with rather dense brush of stout setae distally; carpus slightly longer than propodus; ischiomerus about twice as long as carpus. Fifth pereiopod reaching anteriorly about as far as distal extremity of flexed second maxilliped in position; dactyl like that of third pereiopod; propodus more than two and one-half times as long as dactyl; carpus fully as long as propodus; ischiomerus about twice as long as carpus.

First pleopod of male with endopod tapering to narrowly acute tip. Appendix masculina on second pleopod more than one-third again as long as appendix interna. Lateral branch of uropod with long movable spine between distolateral projection and blade.

Color. — A male and ovigerous female taken southwest of Alligator Reef Light, Monroe County, Florida, were recorded as black in life. The color pattern suggested in fig. 11g has been delineated from a photograph of one of these specimens by W. A. Starck, II. The specimen was probably photographed with transmitted light; by reflected light, it may appear darker.

The specimens from Curaçao were described by L. B. Holthuis as "entirely dark purplish black, sometimes with a white line over the lateral parts of the body. This line extends from the basal part of the scaphocerite to the end of the fifth abdominal somite".

Size. — Carapace length of male holotype 2.8 mm, of other males 1.1 to 2.25 mm, of females 1.1 to 2.7 mm, of ovigerous females 2.1 and 2.7 mm. In the two smallest males, with carapace lengths of 1.1 and 1.2 mm, the appendix masculina is slightly shorter than the appendix interna; it is longer in all males with carapace lengths of 1.4 mm or more.

Habitat. — These shrimps have been found only on the spines of *Diadema antillarum* which, according to notes furnished by L. B. Holthuis, "they held with the third to fifth pereiopods. The body was held parallel to the longitudinal axis of the spine, with the head directed towards the base of the spine, the telson towards the tip of the spine. This position is just the reverse of that of *Gnatho-*

phylloides mineri, which always (as far as I could make out) has the head directed outwards, towards the tip of the spine. The third maxilliped, the first and second pereopods are stretched out forward, but due to their small size they are not conspicuous”.

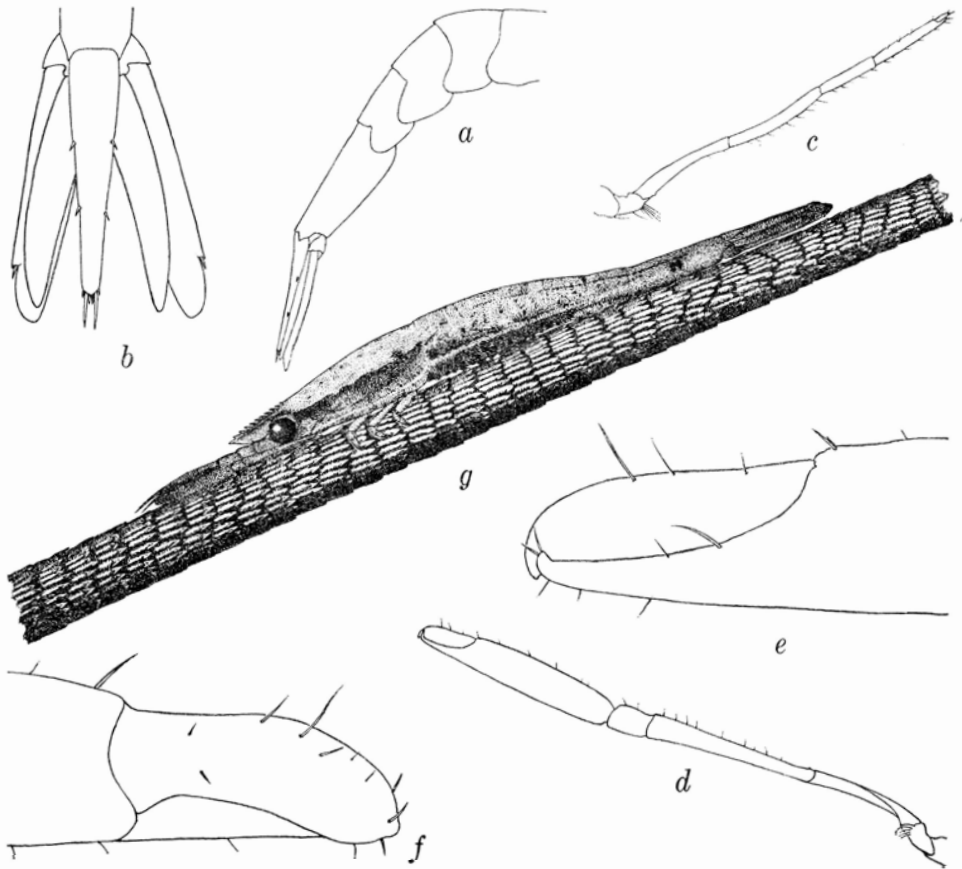


Fig. 11. *Tuleariocaris neglecta* new species. *a*, male paratype, carapace length 2.25 mm, from southwest of Alligator Reef Lighthouse, Monroe County, Florida, posterior abdominal somites; *b*, same specimen, telson and uropods; *c*, ovigerous female, carapace length 2.7 mm, from Rodney's Rock, Dominica, right second pereopod; *d*, same specimen, left second pereopod; *e*, fingers of same; *f*, same; *g*, ovigerous female on spine of *Diadema antillarum* (Philippi), from southwest of Alligator Reef Lighthouse (adapted from photograph by W. A. Starck, II). Magnifications: *a*, *g*, $\times 7.2$; *b-d*, $\times 15$; *e*, *f*, $\times 84$.

Remarks. — One of the most unusual characteristics of *Tuleariocaris*, not mentioned by Hipeau-Jacquotte (1965) and Bruce (1967), is the fact that the three posterior pairs of pereopods are composed of only six segments, the ischium and merus being indistinguishably fused. All seven segments are distinct in *Stegopontonia* Nobili, 1906.

Tuleariocaris neglecta differs from *T. bolthuisi* Hipeau-Jacquotte, 1965, from

Madagascar and Hawaii in having the rostrum broadest near midlength in dorsal view, rather than triangular, and in having the appendages longer and more slender; the antennal scale is distinctly more than four times as long as broad in *T. neglecta*, whereas it is apparently much less than four times as long as broad in *T. holthuisi*. *T. neglecta* is very near *T. zanzibarica* Bruce, 1967, from Zanzibar and New Caledonia. It differs from Bruce's description as follows: the rostrum is deepest at about midlength rather than "basally"; the spine or tooth near the anteroventral angle of the carapace is very small, either falling short of or reaching barely beyond the margin, rather than distinctly overreaching the margin; the second segment of the antennular peduncle is shorter, rather than slightly longer, than the third; the basal segment of the antennal peduncle is armed with a stout distoventral tooth, rather than unarmed; the scaphognathite of the second maxilla is broad, rather than "narrow"; and the distal segments of the second maxilliped are only moderately, rather than much, narrower than the merus. Direct comparison of the Indo-Pacific and Atlantic forms may show that some of these differences are untenable, but it seems best to consider the two forms distinct for the present.

The specific name selected for this unique shrimp was suggested by its history. Apparently the species was first discovered at Curaçao by L. B. Holthuis in 1956. That finding was reported as "A probably new species ... found in the spines of *Diadema*" in Information Bulletin No. 1 (February 1958, p. 7) of the Association of Island Marine Laboratories. In 1959, A. G. Fish found the species at Barbados and, in the following year, W. A. Starck, II, collected it in southern Florida. Holthuis planned to describe the species, but before there was an opportunity to do so he learned that A. J. G. Figueira had discovered it or a closely related species in the eastern Atlantic (the Salvage Islands off N. W. Africa) and that he was going to describe it. Holthuis sent his specimens to Figueira for inclusion in the description, but the latter subsequently left Madeira for Canada, and the Curaçao material was returned to Leiden. I am therefore reluctantly describing the species by default, for Holthuis informs me that other commitments prevent him from studying the animal in the foreseeable future.

ZUSAMMENFASSUNG

Die folgenden Taxa sind beschrieben: *Periclimenes crinoidalis* sp. n., als Commensal auf der Seelilie *Nemaster* bei Curaçao in 38 m Tiefe; *Periclimenes meyeri* sp. n. auf einer *Nemaster* sp. bei Curaçao in 24 m Tiefe; *Periclimenes paivai* sp. n., von Estado de São Paulo, Brasilien; *Lipkebe holthuisi* gen. n., sp. n., vom Golf von Mexiko in 119 m Tiefe; und *Tuleariocaris neglecta* sp. n., auf den Stacheln der Seeigel *Diadema antillarum* in Florida, Dominica, Barbados, und Curaçao.

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