

LOUIS S. KORNICKER

*Myodocopid Ostracoda
(Cypridinacea) from the
Philippine Islands*

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SMITHSONIAN CONTRIBUTIONS TO
ZOOLOGY

NUMBER 39

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SMITHSONIAN INSTITUTION PRESS
CITY OF WASHINGTON
1970

ABSTRACT

Kornicker, Louis S. Myodocopid Ostracoda (Cypridinacea) from the Philippine Islands. *Smithsonian Contributions to Zoology*, 39:1-32. 1970.—Seven species (6 new) of myodocopid Ostracoda are described. These were collected in 1967 during an ecological survey jointly sponsored by the University of Hawaii and the Smithsonian Oceanographic Sorting Center.

Official publication date is handstamped in a limited number of initial copies and is recorded in the Institution's annual report, Smithsonian Year.

UNITED STATES GOVERNMENT PRINTING OFFICE
WASHINGTON : 1970

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price 45 cents (paper cover)

Louis S. Kornicker

Myodocopid Ostracoda (Cypridinacea) from the Philippine Islands

An ecological survey jointly sponsored by Dr. Maxwell S. Doty of the University of Hawaii and the Smithsonian Oceanographic Sorting Center was undertaken in the Philippines from 21 August 1967 to 20 October 1967. Collections were made by Dr. Ernani G. Menez. The primary objective of their study is to identify plants and animals associated with two commercially important algal genera, *Caulerpa* and *Euclima*, and to use this and other ecological information to increase production of both genera. Collections were obtained primarily by washing algae and their holdfasts. Myodocopid ostracods were collected in 5 of the 16 stations sampled. Station localities are shown in the accompanying map, and station data are presented in Table 1. The distribution of all species in the samples submitted to me (6 are new) is shown in Table 2.

Müller (1906) described 11 myodocopid ostracods (8 new) from the vicinity of the Philippines including the northern half of the Celebes Sea. These were collected by the Siboga Expedition in 1899. Poulsen (1962, 1965) described 6 species (4 new) from the same general area, collected by the "Dana" and "Galathea" Expeditions and by Dr. Th. Mortensen (Poulsen, 1962, p. 2). Kornicker (1969) identified 2 genera from San Miguel Harbor, Ticao Island, Philippines, collected during the Albatross Philippine Expedition in 1908. The positions of the above collecting localities are shown in the accompanying map (Figure 1). (Numerous stations from which the pelagic ostracods *Gigantocypris danae* and *Macrocypridina castanea*

var. *rotunda* were reported by Poulsen (1962) are omitted from the map.) Species of Cypridinacea reported in the above publications and herein are listed in Table 3. The large proportion of new species found in each of these collections indicates that the Myodocopida in the region are highly diverse and relatively unknown.

Prior to the work of Müller (1906), Dana (1852) described 3 new species of *Cypridina* (*C. luteola*, *C. punctata*, *C. olivacea*) from Jolo Island, Sulu Archipelago, and Brady (1880) reported *Cypridina formosa* (?) Dana from Zamboanga, Philippines, and *Philomedes gibbosa* (Dana) from Cebu Island, Philippines.

The present locality of specimens described by Dana is unknown. From his descriptions (1852, 1853) and illustration (1855) it is possible to refer *Cypridina luteola* Dana to the genus *Paravargula*, but not with certainty. *Cypridina punctata* Dana was recognized by Müller (1912) as being a junior homonym of *Cypridina punctata* Reuss, 1849, and he also correctly referred it to "*Cypridinidarum genera dubia et species dubiae*." *Cypridina olivacea* Dana was referred to *Philomedes* by Sars (1866, p. 107), and to *Asterope* by Brady (1880, pp. 154, 159). Skogsberg (1920, pp. 433, 440) supported the assignment by Brady because of the shape of the carapace and its posterior hairs. Additional support for the placement of this species in the family Cyndroleberididae is the hirsute sensory bristle of the 1st antenna on the specimen illustrated by Dana (1855, pl. 91, fig. 5a), which also indicates that the specimen is a mature male. With present knowledge of the species it is not possible to assign it to any particular genus.

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TABLE 1.—Station localities and data

Station	Date (1967)	Lat. N.	Long. E.	Locality
M-5	Sept. 10	11°05'	125°41'	Coral reefs southwest of Botic Island, Salcedo, Samar Province, Philippines, water depth 1 m
M-9	Sept. 18	06°52'	122°04'22''	Great Santa Cruz Island, Zamboanga Province, Philippines, water depth 1 m
M-10	Sept. 19	06°56'	122°11'	Sacol Island, Zamboanga Province, Philippines, sandy mud flat near mangrove area, water depth 1-2 m, corals abundant
M-11a	Sept. 23	05°05'	119°58'	Mangrove area in the vicinity of Balimbing Point, Tawi-Tawi, Sulu Archipelago, Philippines, sandy mud bottom, water depth 1-2 m
M-13	Sept. 29	09°13'	123°30'	Cang-alwang, Siquijor Island, Negros Province, Philippines, reef flat, water depth 1-3 m

TABLE 2.—Distribution of species

Species	Number of specimens per station				
	M-5	M-9	M-10	M-11A	M-13
CYPRIDINIDAE					
<i>Paravargula nanipollex</i>	-	-	2	-	-
<i>Paravargula digitata</i>	-	-	-	2	-
<i>Skogsbergia menezii</i>	2	-	-	-	-
<i>Skogsbergia</i> species	-	1	-	-	-
<i>Cypridinodes</i> species	-	1	-	-	-
CYLINDROLEBERIDIDAE					
Cylindroleberidinae					
genus indet.	-	2	-	-	-
<i>Cylindroleberis variabilis</i>	-	-	3	-	1
<i>Parasterope zamboangae</i>	-	-	1	-	-
<i>Parasterope mckenziei</i>	2	-	-	-	-

Neither *Cypridina formosa* (?) Dana reported by Brady (1880) from Zamboanga nor *Cypridina formosa* Dana reported by Dana (1852, 1853, 1855) from Samoa are described in sufficient detail to enable their identification. There is no doubt, however, that they belong in the Cypridinidae. *Cypridina gibbosa* Dana described by Dana (1852) from the Pacific Ocean was referred to *Philomedes* by Brady (1880), when he reported it from Cebu Island, Philippines. Müller (1912, p. 19) referred the species to *Pyrocypis*, but questioned the correctness of Brady's identification. Dana's description and illustrations of the species are too meager for use in identification. Poulsen (1962, p. 255) states, "With the only very incomplete descriptions of *C. reynaudi* and *C. gibbosa* I find it difficult to go further than to admit the possibility of these two species belonging to *Cypridina*."

TABLE 3.—Philippine Cypridinacea

Taxa	Müller (1906)	Poulsen (1962, 1965)	Kornicker (1969)	Herein (1969)
CYPRIDINIDAE				
<i>Vargula hilgendorfi</i>	x	-	-	-
<i>Cypridina serrata</i>	x	-	-	-
<i>lepidophora</i> *	x	-	-	-
<i>acuminata</i>	-	x	-	-
<i>Codonocera cruenta</i>	x	-	-	-
<i>goniacantha</i>	x	-	-	-
<i>weberi</i>	x	-	-	-
<i>polygonia</i>	x	-	-	-
<i>stellifera</i>	x	-	-	-
<i>suensoni</i>	-	x	-	-
<i>Codonocera</i> species	-	-	x	-
<i>Monopia flaveola</i>	x	-	-	-
<i>Paravargula nanipollex</i>	-	-	-	x
<i>digitata</i>	-	-	-	x
<i>ensifera</i>	-	x	-	-
<i>Skogsbergia menezii</i>	-	-	-	x
<i>Skogsbergia</i> species	-	-	-	x
<i>Cypridinodes asymmetrica</i>	x	-	-	-
<i>Cypridinodes</i> species (2 species)	-	-	x	x
<i>Paradoloria nuda</i>	-	x	-	-
<i>Macrocypridina castanea</i> var. <i>rotunda</i>	-	x	-	-
<i>Gigantocypris danae</i>	-	x	-	-
CYLINDROLEBERIDIDAE				
<i>Cylindroleberis variabilis</i>	-	-	-	x
? <i>Cylindroleberis australis</i>	x	-	-	-
<i>Parasterope zamboangae</i>	-	-	-	x
<i>mckenziei</i>	-	-	-	x

*Skogsberg (1920) considered this species conspecific with *C. serrata*.

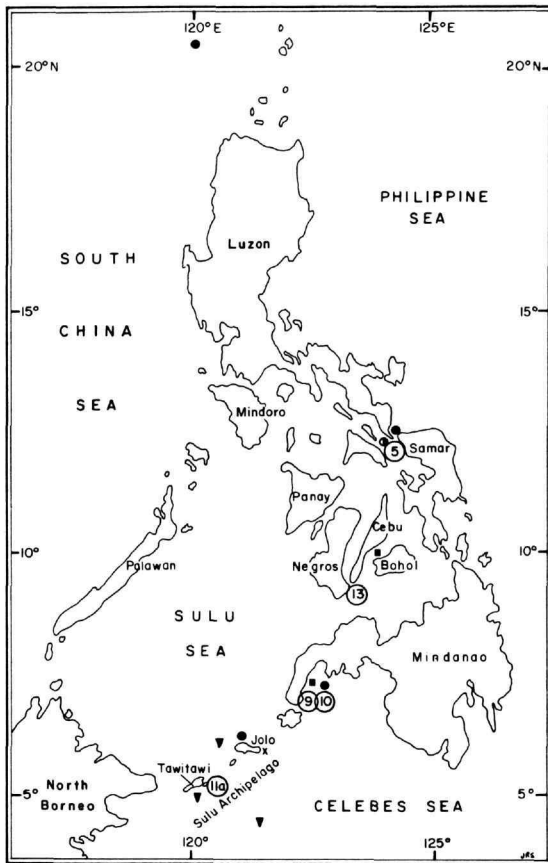


FIGURE 1.—Map of Philippines showing station localities: Kornicker (herein), circles with enclosed numbers; Müller (1906), inverted triangle; Poulsen (1962, 1965), filled in circle; Kornicker (1969), half-filled circle; Dana (1852), X; Brady (1880), filled-in square.

Because of the uncertainty of the identity of species reported in or near the Philippines by Dana and Brady, I have omitted these species from Table 3, but have included their approximate collecting localities on the map.

It is interesting to note that known ostracods in the Philippines belong in 2 families, Cypridinidae and Cylindroleberididae. The absence of members of the families Philomedidae, Sarsiellidae, and Rutidermatidae is probably the result of insufficient collecting.

I thank Dr. Thomas E. Bowman and Dr. Harald A. Rehder for criticizing the manuscript, and Mr. Jack R. Schroeder for final preparation of illustrations from my camera lucida drawings.

Family CYPRIDINIDAE

Genus *Paravargula* Poulsen, 1962

It is necessary to expand slightly the description of the genus given by Poulsen (1962, p. 202) to include the 2 new species described herein.

CARAPACE.—The caudal process of *P. nanipollex* is narrow.

MAXILLA.—The alpha- and beta-bristles of the 1st endopodite joint and the b-, c-, and d-bristles of the 2nd endopodite joint of *P. nanipollex* are without marginal spines.

SEVENTH LIMB.—The jaw opposite the comb bears a single tapered tooth on each side in *P. digitata* and 2 teeth on each side in *P. nanipollex*.

Paravargula nanipollex, new species

FIGURES 2, 3

HOLOTYPE.—USNM 125499, valves and some appendages in alcohol, remaining appendages on slide, ♀ with 7 eggs in marsupium.

PARATYPE.—USNM 125500, valves and appendages in alcohol, ♀ with 1 egg in marsupium.

TYPE-LOCALITY.—Holotype and paratype from same sample, Station M-10, Sacol Island, Zamboanga Province, Philippines, Lat. 06° 56' N, Long. 122° 11' E, water depth 1–2 m, sandy mud flat near mangrove area, corals abundant.

ETYMOLOGY.—The specific name “nanipollex” from the Latin “nanus” = a dwarf, and “pollex” = thumb, refers to the small size of the thumb-like process on the protopodite of the 5th limb.

DESCRIPTION OF FEMALE.—Carapace oval with prominent rostrum, fairly deep incisur and narrow caudal process (Figure 2a). Anterior edge of rostrum with 2 bristles (Figure 2c); narrow process below ventral bristle on right valve only (Figure 2c); slight bulge present along margins of both valves immediately below incisur (Figure 2d).

Infold: Behind rostrum and below incisur with numerous bristles (Figure 2d); anteroventral list with 42 bristles on left valve and 38 on right of holotype, about half of these being double bristles and hirsute. List of caudal process with numerous minute bristles (Figure 2b); single fairly long bristle present at ventral end of list of left valve only.

Pore canals: Numerous pore canals present around

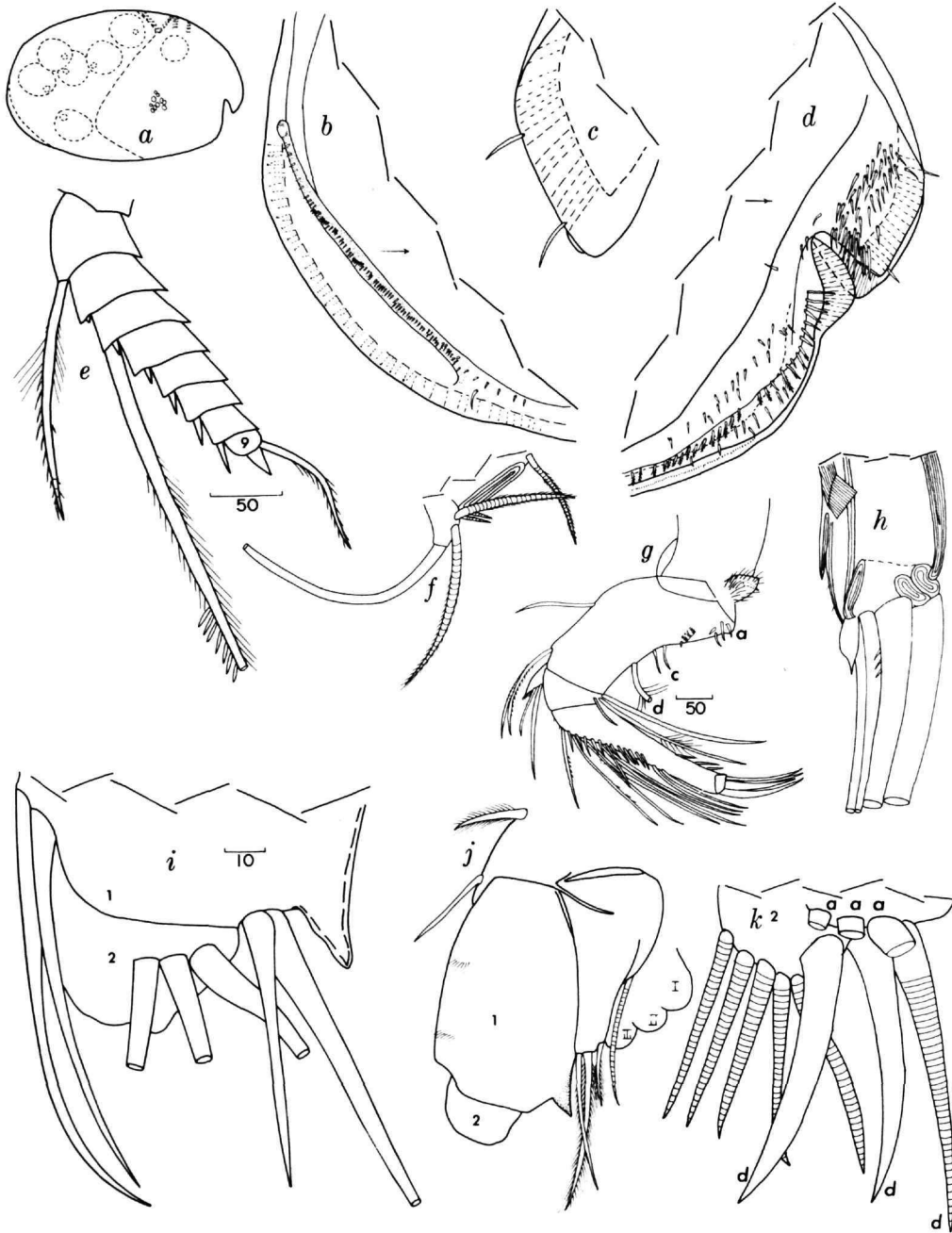


FIGURE 2.—*Paravargula nanipollex* Kornicker, USNM 125499, adult ♀, carapace: *a*, complete specimen, length 1.64 mm; *b*, caudal process left valve, medial view; *c*, rostrum right valve, medial view; *d*, anterior left valve, medial view. Second antenna: *e*, left exopodite joints 2–9, all bristles not shown, lateral view; *f*, left endopodite and bristle of protopodite, medial view. Mandible: *g*, right limb, medial view; *h*, distal end left limb, medial view. Right maxilla, lateral view: *i*, tip showing proximal part of 3 a-bristles; *j*, limb showing exopodite; *k*, tip showing end bristles. Same scale in microns: *b*, *d*, *g*; *c*, *e*, *f*, *j*; *h*, *i*, *k*.

anterior, ventral and posterior margins, some terminating on valve edge as minute pores (Figure 2*b*).

Selvage: With smooth margin present along anterior and ventral margins, broadest in area of incisure; double selvage present along ventral margin (Figure 2*d*).

Size: Holotype, length 1.64 mm, height 1.04 mm. Paratype (shell distorted), length 1.64 mm, height 0.98 mm.

First antenna: Second joint with short spines forming clusters on medial surface and ventral and dorsal

margins; 3rd joint short with short bare ventral bristle, slightly longer dorsal bristle with few spines, and row of short spines on medial surface; 4th joint with short ventral bristle and longer spinous dorsal bristle; Sensory bristle of 5th joint with 9 long proximal filaments and 4 short distal filaments; medial bristle of 6th joint bare or with few spines; a-bristle bare, shorter than bristle on 6th joint; d- and e-bristles bare, slightly shorter than sensory bristle of 5th limb.

Second antenna: Protopodite with spinous medial bristle; endopodite 1-jointed with 4 proximal bristles,

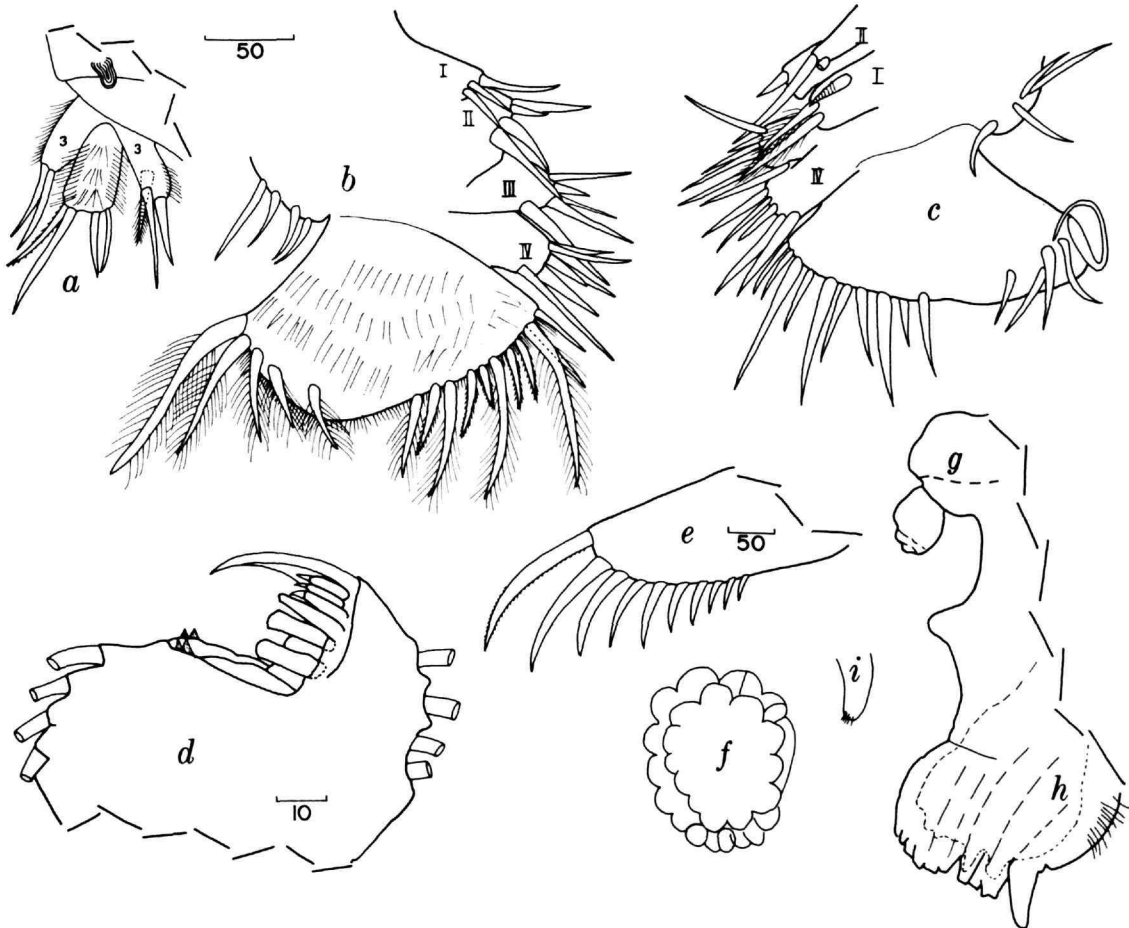


FIGURE 3.—*Paravargula nanipollex* Kornicker, USNM 125499, adult ♀: a, 5th limb, anterior view; b, left 6th limb, medial view; c, right 6th limb, medial view; d, terminus of right 7th limb; e, left lamella of furca, lateral view; f, lateral eye, all ommatophores not shown; g, medial eye and rod-shaped organ; h, upper lip; i, tip of right tusk of upper lip, lateral view. Same scale in microns: a-c; e-i.

2 short bare, 2 longer spinous, and 1 long sensory filament (Figure 2f). Exopodite (Figure 2e): joints 3-9 with basal spines; bristle of 2nd joint with few ventral and dorsal hairs both proximally and near tip and with about 6 ventral spines; bristles of joints 3 to 8 with natatory setae; blade-like spines present near middle of ventral margins of bristles on joints 3 and 4; 9th joint with 4 bristles, 2 long, 1 medium, 1 short; long and medium bristles with natatory hairs, short bristle with few spines.

Mandible (Figure 2g, h): Spinous coxale endite with small bristle at base. Ventral margin of basale with 4 a-bristles, 3 medial, 1 lateral, 1 minute b-bristle or process at end of muscle, 2 bare c-bristles, and 1 long spinous d-bristle. Dorsal margin of basale with 1 bristle near center and 2 subterminal. First endopodite joint with 4 ventral bristles, 1 very short. Second endopodite joint: ventral margin with 2 single and 1 pair of spines, all smooth and slender; dorsal margin with 9 long and 14 short bristles, only 1 of short bristles pectinate. End joint with 3 claws and 3 or 4 bristles; 3 small teeth observed on central claw of each limb; small bulb-like process on ventral corner of end joint of left limb of holotype.

Maxilla (Figure 2i-k): Coxale with plumose bristle; 1st and 2nd endites each with about 6 bristles; 3rd endite with 6 bristles, 1 proximal, 5 distal; exopodite rather long with 3 bristles, short proximal bristle and outer terminal bristle spinous, inner terminal bristle bare. Endopodite: tooth of 1st joint triangular; 2-alpha-bristles and 2 beta-bristles present, both bare; 2nd joint with 3 bare a-bristles; all bristles and claw-like bristles of 2nd joint bare (Figure 2k).

Fifth limb (Figure 3a): Protopodite with fairly small process (Figure 3a). Outer lobe of 3rd joint with 2 bare bristles; inner lobe with 1 spinous proximal bristle and 2 bare terminal bristles; 4th and 5th joints united and with total of 4 bristles; no process present between 2 pairs of bristles of 4th and 5th joints; joints 3 to 5 hirsute. Epipodial appendage with about 52 bristles.

Sixth limb (Figure 3b, c): 4 bristles in place of epipodial appendage, one slightly longer than others; endite I with 3 or 4 bristles; endite II with 4 bristles; endite III with 5 bristles; endite IV with 5 or 6 bristles; one of terminal bristles on endites II, III, and IV quite short. End joint with 15 to 16 bristles; gap without bristles present between posterior 5 bristles and remaining bristles; next-to-last bristle about three-fourths

length of posterior bristle; medial surface and lateral ventral margin of end joint hirsute.

Seventh limb: Each limb with 21 bristles 6+6 in distal group and 5+4 in proximal group; each bristle with 1-7 bells; comb with about 15 teeth, proximal teeth with square tips; jaw opposite comb with 2 small teeth on each side (Figure 3d).

Furca (Figure 3e): Each lamella with 10 claws, 2nd claw united with lamella; claw 5 slightly stouter than claw 4.

Upper lip (Figure 3h, i): Unpaired anterior part with about 6 angular pegs; paired posterior part with about 3 pegs followed by elongate process with rounded tip.

Medial eye and rod-shaped organ (Figure 3g): Medial eye large, pigmented. Rod-shaped organ pear-shaped with vague protuberance at tip.

Lateral eye (Figure 3f): Eye well developed with about 28 ommatophores.

Eggs: Brood chamber of holotype with 7 well-developed eggs with black eyes; paratype with 1 well-developed egg.

Comparisons: The carapace of *P. nani-pollex*, new species, is smaller than that of previously described species and does not have a prolonged caudal process. The morphology of the upper lip, the armature of the jaw on the 7th limb, the small size of the finger-like process on the protopodite of the 5th limb, and the absence of spines on the b-, c-, and d-bristles on the 2nd joint of the endopodite of the maxilla are also distinguishing features.

Paravargula digitata, new species

FIGURES 4-6

HOLOTYPE.—USNM 125539, valves and some appendages in alcohol, remaining appendages on slides, juvenile ♂.

PARATYPE.—USNM 125540, undissected in alcohol, juvenile (instar ?III), length 1.05 mm, height 0.60 mm.

TYPE-LOCALITY.—Holotype and paratype from same sample, Station M-11a, mangrove area in the vicinity of Balimbing Point, Tawi-Tawi, Sulu Archipelago, Philippines, Lat. 05°05' N, Long. 119°58' E, sandy mud bottom, water depth 1-2 m.

ETYMOLOGY.—The specific name "digitata" from the Latin "digitatus" = digitated, refers to the digitate processes on the list of the caudal process.

DESCRIPTION OF JUVENILE MALE.—Carapace with fairly deep incisure and extended caudal process, surface smooth (Figure 4*a, b*).

Infold (Figure 4*c-e*): Infold posterior to rostrum with 10 bristles forming row parallel to anterior margin; 4 or 5 bristles present posterior to row and 2 bristles present at inner end of incisure (Figure 4*e*); infold along anteroventral margin with 28 bristles on right valve and 34 on left valve of holotype, anterior 4 or 5 bristles single and without spines, remaining bristles double and with spines on longer bristle of the two; list on infold of caudal process with about 25 digitate processes (Figure 4*c*); bristle present on infold near ventral end of list.

Selvage: Lamellar prolongation present along anterior and ventral margin, broadest in vicinity of incisure; double prolongation present along ventral margin; inner layer about half width of outer and with serrate margin.

Pore canals: Canals numerous along anterior and ventral margins and margin of caudal process, most canals terminating in pore or slender hair near valve edge.

Size: USNM 125539, holotype, length 1.89 mm, height 1.02 mm.

First antenna: Second joint with short spines forming clusters along ventral margin; 3rd joint short with 2 bristles, 1 ventral, 1 dorsal; 4th joint with 2 short

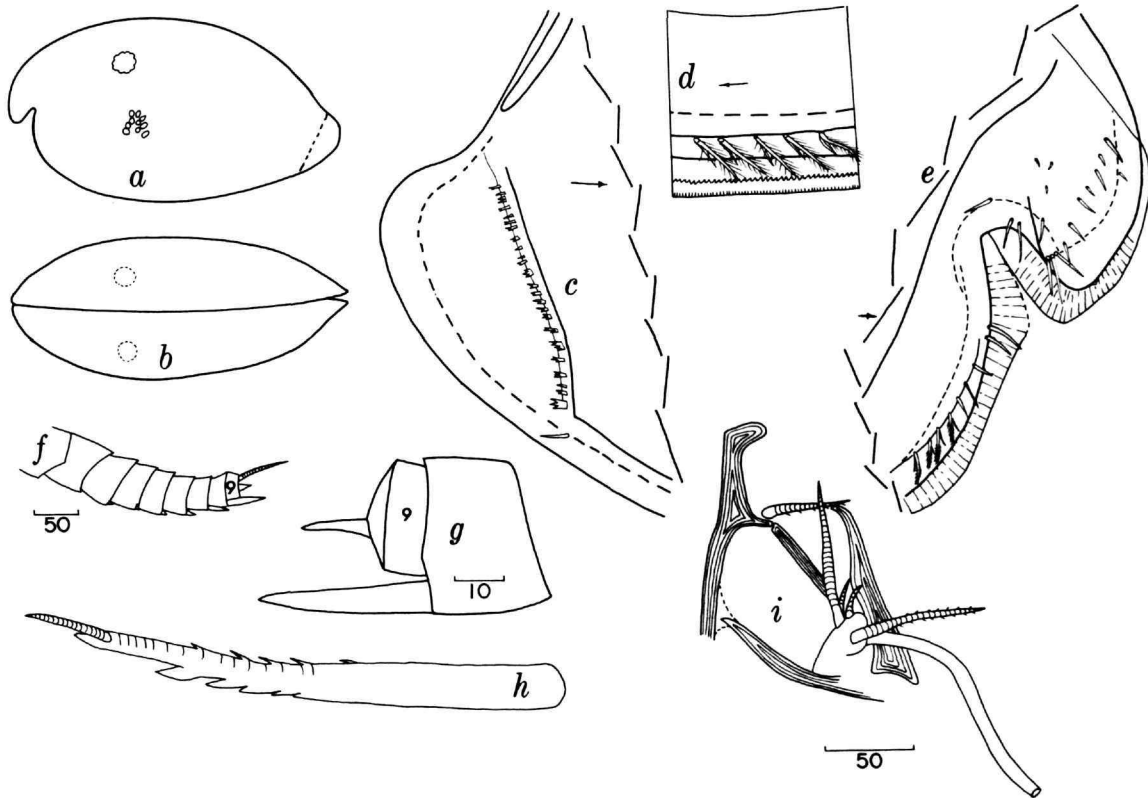


FIGURE 4.—*Paravargula digitata* Kornicker, USNM 125539; juvenile δ , carapace: *a*, complete specimen, length 1.02 mm; *b*, same, dorsal view, anterior to left; *c*, caudal process left valve, medial view; *d*, segment of anteroventral margin of right valve, medial view; *e*, anterior left valve, medial view. Second antenna: *f*, joints 2-9 left exopodite, lateral view, most bristles not shown; *g*, detail of joints 8 and 9 right limb without bristles; *h*, detail of bristle on exopodite 2nd joint; *i*, left endopodite and bristle of protopodite, medial view. Same magnification in microns: *c, e, f, d, i, g, h*.

bristles, 1 ventral, 1 dorsal; Sensory bristles of 5th joint with 7 long proximal filaments and 3 short distal filaments; 6th joint with usual medial bristle; a-bristle slightly longer than bristle on 6th joint; b-bristle with 4 spinous filaments, length of bristle about two-thirds

length of sensory bristle of 5th joint; d- and e-bristles bare, longer than b-bristle; c-, f-, and g-bristles equal in length and with short spinous filaments.

Second antenna (Figure 4*f-i*): Medial bristle of protopodite with few marginal spines; endopodite with



FIGURE 5.—*Paravargula digitata* Kornicker, USNM 125539, juvenile ♂: a, detail of tooth of left maxilla; b, 2nd and 3rd endopodite joints of left mandible, medial view; c, detail of proximal bristles on dorsal margin of b; d, detail of tip of b; e, bristles on proximal part of ventral margin of left mandible, medial view; f, coxale endite of mandible; g, distal part 5th limb, posterior view; h, tip 7th limb; i, right lamella of furca (tip of 4th claw broken) and copulatory organs; j, anterior of body showing, medial eye, rod-shaped organ and upper lip; k, lateral eye, ommatophores not shown. Same magnification in microns: a, c-e, h; b, i-k; f, g.

long stout filament and 4 bristles, 2 fairly long and 2 short. Exopodite: bristle of 2nd joint reaching 7th joint, with 4 or 5 ventral spines and smaller dorsal spines; bristles of joints 2 to 8 with natatory hairs; ventral hairs near middle of bristles of 3rd and 4th joints, shorter than proximal and distal hairs and spine-like; 9th joint with 4 bristles, 1 short, 1 medium, 2 long; short bristle bare, others with natatory hairs; joints 3-9 with basal spines; spine on 8th joint about 3 times length of 9th joint.

Mandible (Figure 5b-f): Coxale endite large, spinous, with 2 stout pectinate spines at tip and small process between them. Basale: ventral margin with 4 a-bristles, 3 medial, 1 lateral, 2 c-bristles with small process proximal to them, and 1 long spinous d-bristle; dorsal margin with 3 bristles, 1 near middle, 2 subterminal. Exopodite with short distal and long proximal bristle and several spines on prolonged tip. Endopodite: Ventral margin of 1st joint with 4 bristles: 2 long and 2 short, shortest of latter bristles bare, remaining bristles spinous. Dorsal margin of 2nd joint with 3 proximal bristles, 1 short, pectinate, 2 long, and 7 bristles near middle (Figure 5b); medial surface with 7 oblique rows of spines. Ventral margin of 2nd joint with single proximal spine and pair of distal spines, medial spine shorter than lateral spine. End joint with 4 bristles and 3 claws, medial and dorsal claws pectinate.

Maxilla: Coxale with plumose bristle. Exopodite with 3 bristles: proximal bristle plumose and close to terminal bristle; outer of 2 terminal bristles plumose. Endopodite: 1st joint with triangular tooth, 2 alpha- and 2 beta-bristles (Figure 5a); outer alpha-bristle with short marginal spines; outer beta-bristle pectinate. End joint with 4 bare a-bristles, 3 b-, 2 c-, and 3 d-bristles, all pectinate.

Fifth limb (Figure 5g): Epipodial appendage with 41 plumose bristles. Prodopodite with elongate process slightly bending and widening at tip. Third endite with stout pectinate bristle and 5 smaller bristles. Main tooth with 5 pectinate teeth, 1 peg, and proximal bristles. Third joint of exopodite with 2 bristles on outer lobe and 3 on inner lobe. Fourth joint not separated from 5th, each with 2 bristles.

Sixth limb: First endite with 2 proximal and 2 terminal bristles; 2nd endite with 2 proximal and 2 terminal bristles, 1 quite short; 3rd endite with 1 proximal and 5 terminal bristles; 4th endite with about 7 bristles; end joint with 13-14 spinous bristles, next-to-last bristle about three-fourths length of last bristle; lateral

surface and medial ventral margin of end joint hirsute; 3 bristles in place of epipodial appendage.

Seventh limb (Figure 5h): Limb with 21 bristles, proximal group with 11 bristles, 6 on one side, 5 on other; distal group with 10 bristles, 5 on each side; each bristle tapering distally and with 1 to 4 bells. Terminal comb with about 15 teeth, proximal 5 teeth on each side subequal in length and with square tips, remaining teeth longer and all with square tips except longest middle tooth. Jaw opposite comb with 1 stout tooth on each side.

Furca (Figure 5i): Each lamella with 9 claws; claw 5 stouter than 4th claw (on holotype, claw 4 on each lamella broken at tip, and 9th claw missing on left lamella); each claw with teeth along concave margin; claw 1 with about 6 medial teeth near tip.

Rod-shaped organ and medial eye (Figure 5j): Rod-shaped organ pear-shaped; medial eye well developed.

Lateral eye (Figure 5k): Eye well developed with about 31 ommatophores.

Upper lip (Figure 5j): Anterior elongate rather transparent anterior lobe present. Posterior paired part with elongate tapering tusk followed by short lobe occupying anterior half.

Copulatory organ (Figure 5i): Organ with 2 unequal lobes, shorter lobe with 3 short bristles.

DESCRIPTION OF JUVENILE (instar ?III).—Carapace similar in lateral outline to juvenile male described above but with deeper incisure (Figure 6a, b);

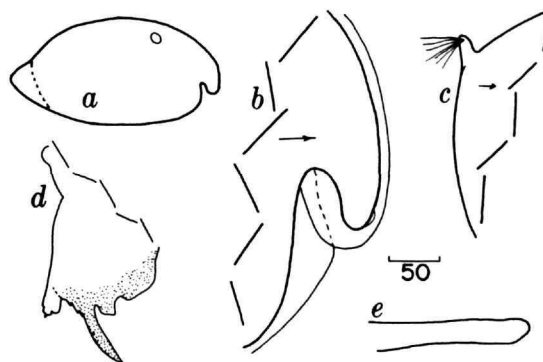


FIGURE 6.—*Paravargula digitata* Kornicker, USNM 125540, instar ?III: a, complete carapace, length 1.04 mm; b, anterior right valve, lateral view; c, dorsal process on posterior of body; d, upper lip, lateral view, anterior to right; e, 7th limb. Same magnification in microns: b-e.

USNM 125540, length 1.04 mm, height 0.60 mm. Sixth limb with several bristles on end joint. Seventh limb without bristles or terminal comb (Figure 6e). Furca with 7 claws on each lamella; 2nd claw not separated from lamella by suture; 5th claw longer and stouter than 4th, dentition of claws similar to that on claws of juvenile male described above. Upper lip also similar to that of juvenile male. (Figure 6d). Posterior differs from juvenile male in having spined thumb-like dorsal process (Figure 6c). Lateral eye well developed.

COMPARISONS.—*Paravargula digitata*, new species, differs from previously described species of the genus in having digitate processes on the list of the caudal process. The caudal process is more pronounced than that of *P. nanipollex*, new species. The incisur is more deeply indented than that of *P. hirsuta* Poulsen (1962, p. 204). The carapace of *P. digitata* resembles in lateral outline that of *P. ensifera* Poulsen (1962, p. 211), which is also found in the Philippines, but the upper lip of the latter species does not have an elongate lobe on the anterior unpaired part and the comb and jaw of the 7th limb are quite different.

Genus *Skogsbergia* Poulsen, 1962

This genus is represented in the collection by an adult male and female from Station M-5 and a juvenile instar (stage III) from Station M-9. A new species is established herein for the 2 specimens from Station M-5. Because of its immaturity it is not possible to identify with certainty the specimen from Station M-9. Dimensions of the juvenile (USNM 125660) are length 0.96 mm, height 0.62 mm.

Skogsbergia menezi, new species

FIGURES 7-9

HOLOTYPE.—USNM 125497, valves and some appendages in alcohol, remaining appendages on slides, adult ♂.

PARATYPE.—USNM 125498, ♀ from same sample as holotype. TYPE-LOCALITY.—Station M-5, coral reefs southwest of Botic Island, Salcedo, Samar Province, Philippines, Lat. 11°05' N, Long. 125°39' E, 10 Sept. 1967, water depth 1 m.

ETYMOLOGY.—The species is named after its collector, Dr. Ernani G. Meñez.

DESCRIPTION OF MALE.—Carapace with broad ros-

trum, fairly shallow incisur, and narrow but well-defined caudal process (Figure 7a).

Ornamentation: Surface smooth without pits. Inferior corner of rostrum with small projection (Figure 7e). (Preserved specimen has radial markings caused by distribution of cells between shell and vestment.)

Infold: Area behind rostrum with 8-9 bristles in row paralleling anterior margin and additional bristles as shown in Figure 7b. Infold along anteroventral margin with 29 double bristles on right valve and 24 on left; longer of double bristles broad, spinous. Infold of caudal process with list having indistinct protuberances (Figure 7c, d); bristle present at ventral end of list of left valve.

Selvage: Broad selvage with smooth edge present along ventral and anterior margins; selvage broadening and overlapping in region of incisur (Figure 7b). Selvage along ventral margin consisting of inner layer with fringed edge and outer layer about twice width of inner layer.

Size: USNM 125497, length 1.49 mm, height 0.88 mm.

First antenna (Figure 7f): Third and 4th joints each with 2 short bare bristles, 1 ventral, 1 dorsal; sensory bristle of 5th joint with 9 long proximal filaments, 3 short distal filaments with marginal spines, and 1 very short smooth filament near tip; 6th joint with bare dorsal bristle. Seventh joint with a-, b-, and c-bristles: a-bristle about same size as bristle on 6th joint, bare or with few short spines; b-bristle with sucking disk on short stout proximal filament; 2 following filaments each with 2 small suckers; and 2 distal filaments with marginal spines; c-bristle with sucker disk having diameter 1.3 times larger than that on b-bristle; following 2 filaments each with 2 small suckers; following filaments with few marginal spines. Eighth joint with d-, e-, f-, and g-bristles: d- and e-bristles bare, shorter than b-bristle; f- and g-bristles stout, each with dense plumage of proximal hairs and numerous distal filaments.

Second antenna (Figure 7g-i): Protopodite with short medial bristle; endopodite 1-jointed with 1 long sensory-type bristle and 4 short bristles, 1 of which is longer than remaining 3. Exopodite: joints 4-9 with basal spines, basal spine on joint 4 minute, spine on joint 8 more than 4 times the length of joint 9; some basal spines with few marginal teeth; bristle of 2nd joint hirsute proximally and with 4 or 5 blade-like

ventral spines and same number of dorsal hairs distally; remaining bristles with natatory hairs, some bristles also with blade-like marginal spines; 9th joint with 4 bristles, dorsal bristle short spinous.

Mandible (Figure 7j, k): Coxale endite spinous

with 2 larger terminal spines with small peg between them; small bristle present at base of endite; dorsal margin of basale with 1 bristle near middle and 2 terminal; ventral margin of basale with 3 short a-bristles, 1 short b-bristle, 3 shorts c-bristles, and 1 long spinous

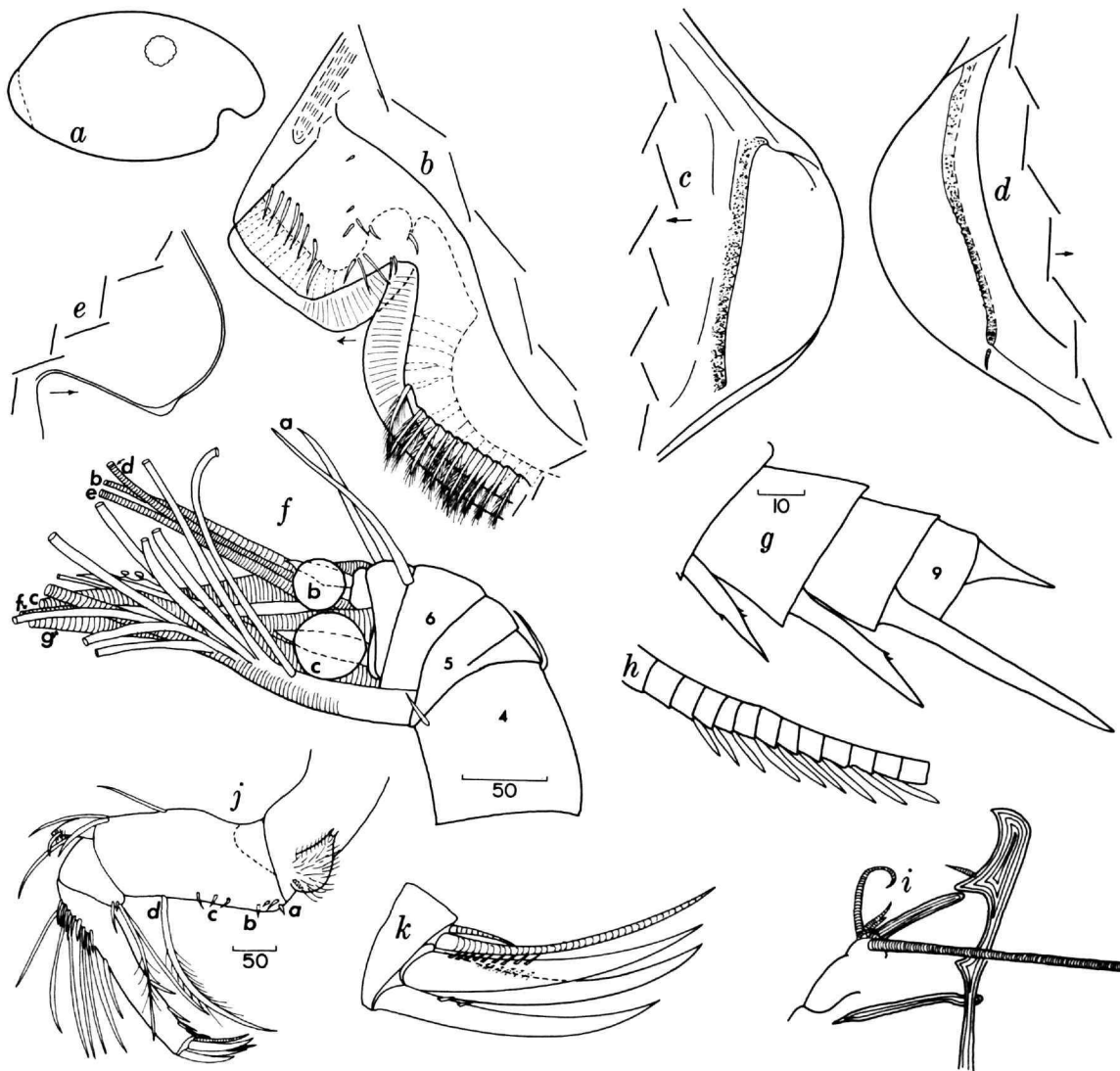


FIGURE 7.—*Skogsbergia menezi* Kornicker, USNM 125497, adult ♂, carapace: a, complete specimen, length 1.49 mm; b, anterior right valve, medial view; c, caudal process right valve, lateral view; d, caudal process left valve, medial view; e, rostrum right valve, lateral view. Appendages: f, distal end first antenna, distal ends of bristles not shown; g, joints 7-9 exopodite 2nd antenna, bristles not shown; h, segment proximal to middle of bristle on 4th joint of exopodite of left 2nd antenna; i, endopodite and bristle of protopodite of right 2nd antenna; j, right mandible, medial view; k, detail of end joint of j. Same scale in microns: b-e, j; f, i; g, h, k.

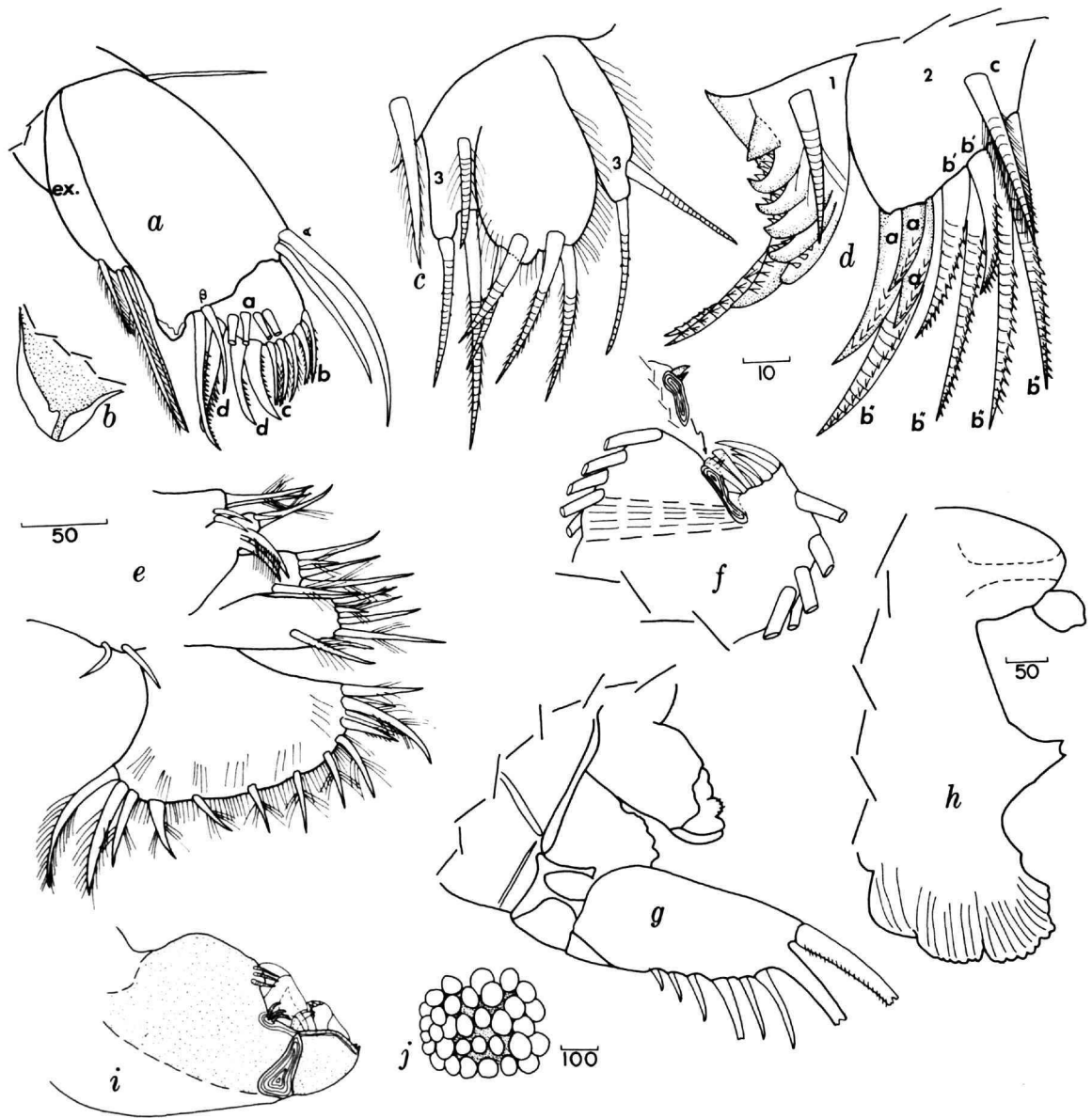


FIGURE 8.—*Skogsbergia menezi* Kornicker, USNM 125497, adult ♂: *a*, maxilla; *b*, detail of tooth on *a*; *c*, right 5th limb, posterior view; *d*, 1st and 2nd endopodite joints of right 5th limb, posterior view; *e*, left 6th limb, medial view; *f*, distal part of left 7th limb; *g*, right lamella of furca and copulatory appendage, lateral view; *h*, anterior of body showing medial eye, rod-shaped organ and upper lip; *i*, detail of right copulatory appendage, lateral view; *j*, lateral eye. Same magnification in micron: *a*, *e*, *i*; *b*–*d*, *f*, *g*, *h*.

d-bristle; ventral margin of 1st endopodite joint with 4 bristles, 2 long and 2 short; exopodite reaching about three-fourths length of dorsal margin of 1st endopodite joint and with long proximal and short distal bristle; dorsal margin of 2nd endopodite joint with 7 long and 10 short bristles, short bristle following 2 proximal long bristles coarsely pectinate, others bare; ventral margin with 2 single spines followed by 1 pair of spines; end joint with 3 claws and 4 bristles, claws pectinate proximally along concave margin (seen best under oil immersion).

Maxilla (Figure 8*a, b*): Endite I with 11 bristles; endites II and III with fewer bristles; coxale with plumose bristle; exopodite broad with 3 bristles; 1st endopodite joint with 2 alpha- and 2 beta-bristles, longest beta-bristle pectinate; end joint with 4 bare a-bristles; 3 d-bristles strongly pectinate.

Fifth limb (Figure 8*c, d*): First exopodite joint with 3 anterior bristles; main tooth with usual triangular proximal tooth, 6 pectinate teeth and proximal spinous posterior bristle; 2nd exopodite joint with 3 stout pectinate a-bristles, 2 b'-bristles, 4 b''-bristles, and 1 spinose c-bristle; 3rd joint with 3 bristles on interior lobe and 2 on exterior lobe; 4th and 5th joints not separated by suture; combined joints with 4 bristles divided into 2 pairs; low protuberance present between each pair; outer lobe of 3rd joint and 4th + 5th joints hirsute. Epipodial appendage with about 52 bristles. Protopodite with usual anterior elongate sclerotized process.

Sixth limb (Figure 8*e*): Two bristles in place of epipodial appendage on left limb, 3 on right limb; endite I with 2 short medial bristles and 2 terminal bristles; endite II with 2 short medial bristles and 2 terminal bristles, 1 long and 1 short; endite III with 5 bristles; endite IV with 7 bristles; end joint with 14 bristles, of these the 2 posterior bristles are longer and more hirsute than others; medial surface and lateral ventral margin of end joint hirsute.

Seventh limb (Figure 8*f*): Each limb with 18 to 20 bristles, 9-12 in distal group and 8 or 9 proximally; each bristle with 1-6 bells; terminal comb with about 11 teeth, proximal teeth with square tips; jaw opposite comb with 2 small teeth. (Each limb is rather short and forms coil on each side of body.)

Furca (Figure 8*g*): Each lamella with 8 claws; claw 2 united with lamella, claw 5 stouter than claw 4, each claw with teeth along concave margin. (Tips of claws 1, 2, and 5 broken on specimen examined.)

Rod-shaped organ and medial eye (Figure 8*h*): Rod-shaped organ small, ovate with protuberance at tip. Medial eye large with pigmented central region.

Lateral eye (Figure 8*j*): Large, black in preserved specimen, with about 32 ommatophores.

Upper lip (Figure 8*h*): Lip with unpaired anterior and paired posterior parts and without tusks.

Anterior process: Tip of protuberance between medial eye and upper lip bifurcate (Figure 8*h*).

Copulatory organ: Each organ with small spines and bristles (Figure 8*g, i*).

DESCRIPTION OF FEMALE.—Shape of carapace differs from male in having less pronounced caudal process (Figure 9*b*).

Ornamentation: Small projection on inferior corner of rostrum slightly larger than that on carapace of male.

Infold: Area behind rostrum with more bristles than on male (Figure 9*a*). Infold along anteroventral margin with about 28 double bristles, the longer bristle of the two, spinous (Figure 9*c*). List on infold of caudal process with minute spines (Figure 9*b*). Bristle present at ventral end of list on infold of caudal process of left valve as on male. Bristles present on vestment proximal to anteroventral infold.

Selvage: Similar to that of male (Figure 9*a*).

Size: USNM 125498, shell extremely distorted, approximate length 1.61 mm; approximate height 0.98 mm.

First antenna: Second joint with spines in clusters along dorsal and ventral margins and on medial surface; ventral and dorsal bristle on 3rd and 4th joints longer than on male; sensory bristle of 5th joint similar to that on male; b- and c-bristles without sucker disks; f- and g-bristles without numerous slender proximal filaments.

Second antenna (Figure 9*d, e*): Similar to that of male, except for medial bristle of protopodite and 2 bristles of exopodite which are longer.

Mandible (Figure 9*k*): Similar to male except teeth not observed on dorsal claw of end joint.

Maxilla and fifth limb: Similar to that of male.

Sixth limb: Four bristles in place of epipodial appendage on each limb; endites I-III with same number of bristles as on male; end joint with 14 bristles on left limb and 13 on right.

Right 7th limb: Limb not coiled as on male; 16 bristles present, 10 distal, 6 proximal; comb with few more teeth than in that of male; jaw opposite comb

with row of 4 small teeth on one side of jaw and 3 on other side (Figure 9j).

Medial eye, rod-shaped organ (Figure 9i), upper lip (Figure 9j): In general, similar to male.

Furca (Figure 9g): Same number of claws as on male.

Lateral eye: About two-thirds diameter of male (Figure 9h).

DISCUSSION OF SEXUAL DIMORPHISM.—As the male and female in the collection were in the same sample and many of their appendages are similar, they are considered to be conspecific. The female contained small unextruded eggs within its body, which indicates

that it is either an adult or in the penultimate stage of development. The first antennae have the usual sexual differences. Differences between the sexes that may be unusual are the presence of a much larger number of bristles on the infold of the rostrum of the female, the presence of many more teeth on the jaw opposite the comb of the 7th limb of the female, and the presence of more bristles in place of the epipodial appendage of the 6th limb of the female. Because only a single specimen of each sex was collected it is not possible to investigate the variability of these features.

COMPARISONS.—*S. menezii*, new species, is very closely related to *Skogsbergia curvata* Poulsen (1962,

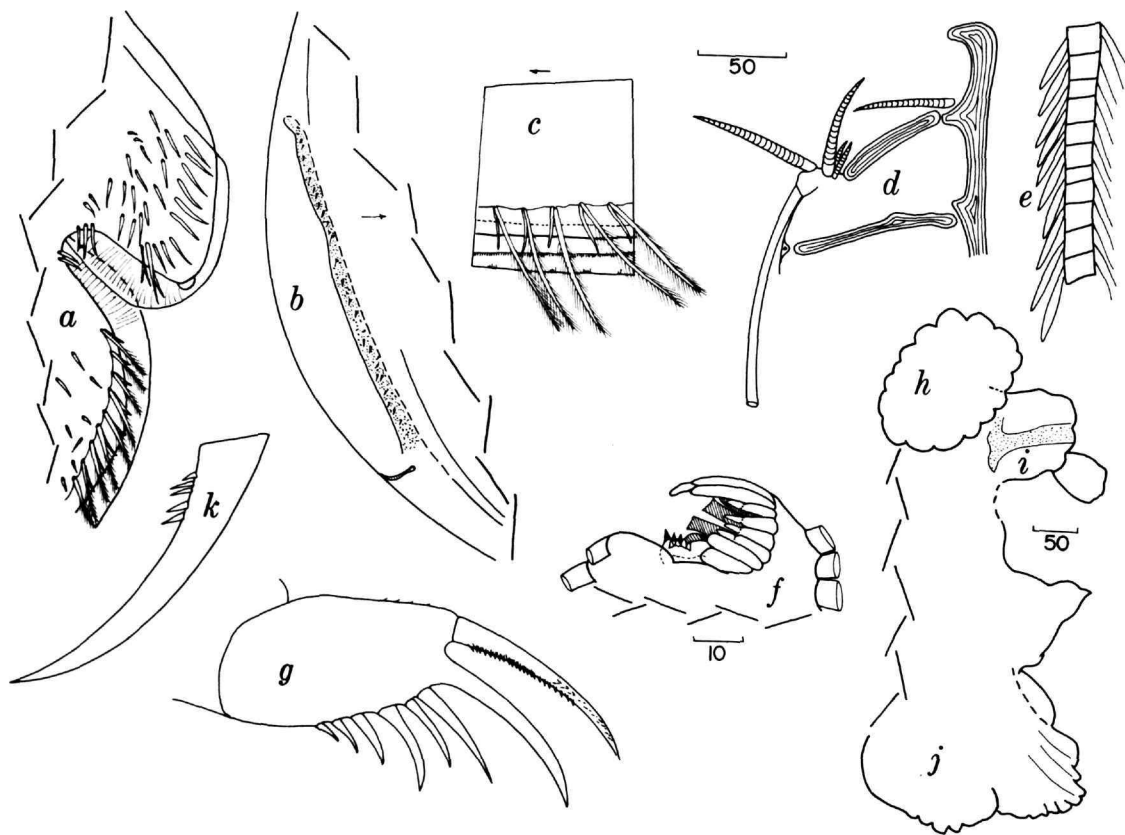


FIGURE 9.—*Skogsbergia menezii* Kornicker, USNM 125498, ♀, carapace: *a*, anterior left valve, medial view; *b*, caudal process left valve, medial view; *c*, segment anteroventral margin right valve, medial view. Second antenna: *d*, endopodite and bristle of protopodite; *e*, segment of bristle on 3rd exopodite joint, ventral side to left. 7th limb and furca: *f*, terminus of 7th limb. *g*, right lamella of furca, lateral view. Anterior of body: *h*, lateral eye, ommatophores not shown; *i*, medial eye and rod-shaped organ; *j*, upper lip. *k*, central lateral claw on end joint of right mandible. Same magnification in microns: *a*, *b*, *g*, *h*–*j*; *c*, *d*; *e*, *f*, *k*.

p. 167). The latter species was quite abundant in collections examined by Poulsen from the Kei Islands near the Philippines. Some of the differences between males which lead me to establish a new species for the Philippine specimens are listed in Table 4.

Skogsbergia minuta Poulsen (1962, p. 164) also has been reported from the Kei Islands. It is smaller than *S. menezii*, new species, and has fewer bristles on the 6th limb.

TABLE 4

	<i>S. curvata</i> *	<i>S. menezii</i>
1st antenna: number of filaments on sensory bristle of 5th joint (long proximal filaments—short distal filaments)	7-3	9-4
ratio of diameter of sucker on c-bristle to that on b-bristle	>2:1	1.3:1
number of small suckers on filaments of b- and c-bristles	3	2
Mandible: number of pectinate claws on end joint	0	3
6th limb: number of bristles on end joint	18	14
7th limb: number of teeth on jaw opposite comb	0	2

*Data on *S. curvata* is based on description and figures by Poulsen (1962).

Genus *Cypridinodes* Brady, 1902

Cypridinodes species

FIGURES 10-12

MATERIAL.—USNM 125659, juvenile.

LOCALITY.—Station M-9, Great Santa Cruz Island, Zamboanga Province, Philippines, water depth 1 m, Lat. 06°52' N, Long. 122°04'22" E.

DESCRIPTION OF JUVENILE.—Carapace oval in lateral view with small caudal process (Figure 10a); ventral and anterior margins of rostrum joining to form acute tip; small lateral process present on each side of rostrum (Figures 10c, d, f; 11a, b); right valve with lunate process on anterior margin below incisor (Figures 10d-f; 11c, d); central muscle scars consisting of about 19 small individual scars (Figure 10b); valve surface scale-like with scattered normal pores and mi-

nute hairs (Figures 10d, g); prolongation of selvage with smooth margin except behind lunate process of right valve where margin bears long spines (Figure 10e). Size of carapace, USNM 125659: length 1.24 mm, height 0.88 mm.

First antenna: Dorsal margin of 2nd joint spinous; 3rd joint shorter than 4th joint and with single dorsal bristle; pigmented cells extending through 2nd and 3rd joints; 4th joint with 2 terminal bristles, 1 ventral 1 dorsal; sensory bristle of 5th joint with 6 long proximal filaments and 3 short distal filaments; 6th joint with 1 terminal bristle on dorsal margin; d- and e-bristles bare, shorter than sensory bristle of 5th limb; b-bristle with 3 filaments, 2 proximal filaments with marginal spines; marginal spines present on filaments of remaining bristles.

Second antenna: Protopodite with short medial bristle (Figure 10k). Endopodite 3-jointed (Figure 10k): 1st joint with 2 short bare proximal bristles and 1 longer distal bristle; 2nd joint without bristle; 3rd joint with long terminal filament. Exopodite with single basal spines on joints 2 to 8 and double lateral spine on 9th joint (Figure 10i); joints 2-8 with short spines forming row along distal margins; bristle of 2nd joint with 7 stout ventral spines and few slender dorsal spines (Figure 10j); long bristles of joints 3-8 with natatory hairs; 9th joint with 4 bristles, 1 short, 1 medium, 2 long, short bristle spinous, remaining bristles with natatory hairs; joint 1 with slender spines along dorsal margin.

Mandible: Spinous coxale endite with 2 fairly stout terminal spines and small bristle near base (Figure 10m). Ventral margin of basale with 2 short a-bristles, no b-bristle, 1 short and 1 long c-bristle, 1 short and 1 long d-bristle (Figure 10l); dorsal margin of basale with 1 long bristle with short marginal spines distal to middle of margin and 2 shorter spinous terminal bristles. Exopodite about same length as dorsal margin of 1st endopodite joint and with 2 subterminal bristles. Endopodite: 1st joint with 3 ventral bristles, 2 long, 1 short; ventral margin of 2d joint with 1 spine distal to middle of margin and pair of subterminal spines, medial spine of pair longer and broader than lateral spine (Figure 10n); slender hair-like spines present along ventral margin; dorsal margin of joint with 7 medium-to-long bristles and 3 short pectinate bristles. End joint with usual medial and lateral claw and in addition 1 dorsal bristle is claw-like; medial and lateral claws with small teeth along middle

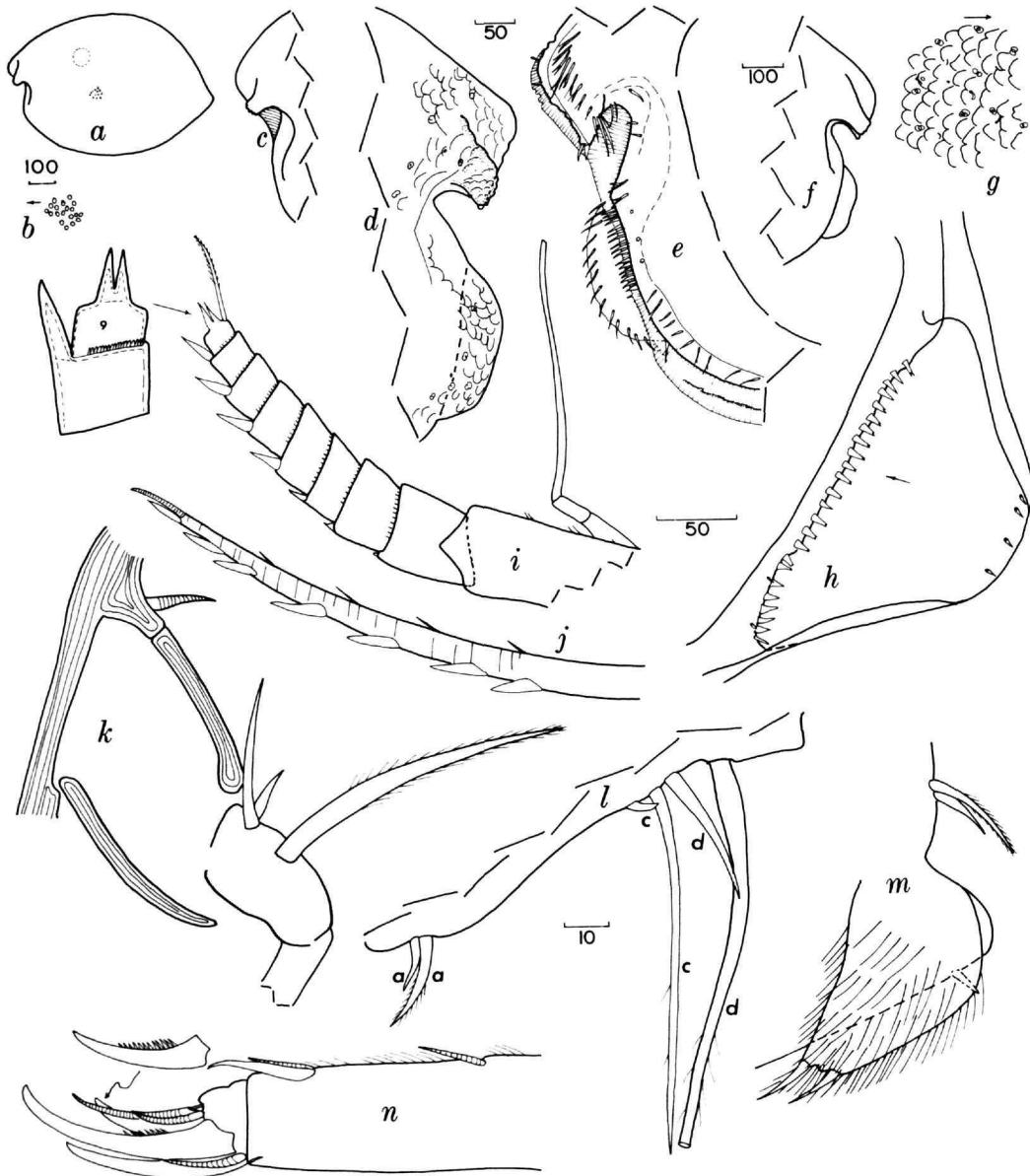


FIGURE 10.—*Cypridinodes* species, USNM 125659, juvenile, carapace: *a*, complete specimen, length 1.24 mm; *b*, central muscle scars left valve, lateral view; *c*, anterior left valve, lateral view; *d*, anterior right valve, lateral view; *e*, anterior right valve, medial view; *f*, anterior right valve, lateral view; *g*, scale-like surface ornamentation, right valve near valve middle above central muscle scars, lateral view, anterior to right; *h*, caudal process right valve, medial view. Appendages: *i*, exopodite and distal part of endopodite of right 2nd antenna, lateral view; *j*, bristle on 2nd exopodite joint of left 2nd antenna, ventral margin towards bottom; *k*, endopodite and bristle of protopodite of left limb, medial view; *l*, ventral margin of basale of left mandible, medial view, distal end to right. *m*, coxale endite of left mandible, medial view; *n*, 2nd and 3rd endopodite joints of left mandible, medial view. Same magnification in microns: *c*, *f*; *d*, *e*, *g*; *h*, *i*; *j*–*n*.

of concave margins; 3 additional bristles and small ventral spine also present on end joint (Figure 10n).

Maxilla: Typical for genus. Exopodite thumb-like, about one-fourth length of 1st endopodite joint.

Fifth limb (Figure 12a-c): Exopodite: 1st joint with 3 anterior bristles, 1 short, 2 long, spinous; main tooth consisting of peg and only 4 pectinate teeth; spinous bristle present proximal to peg (peg may have small spine near tip). Second joint with 3 pectinate a-bristles, 3 pectinate b'-bristles, 4 pectinate b''-bristles; proximal teeth of b''-bristles larger than distal teeth (Figure 12b); 1 spinous posterior bristle present on distal margin proximal to b'-bristles, bristle with long proximal and short distal spines; long spinous anterior bristle present near middle of distal margin. Third joint: inner lobe with 3 bristles, none with long spines; outer lobe with 2 bristles, lobe hirsute. Fourth + 5th joints not separated by suture, each joint with 2 bristles. Epipodial appendage with 48 bristles. Endites I, II, and III each with 5 or 6 bristles.

Sixth limb: Two bare bristles present in place of epipodial appendage; endite I with 1 long spinous terminal bristle and short medial bristle with long proximal spines; endites II, III, IV with 3 terminal bristles, 2 long spinous, 1 very short bare, and 1 short proximal bristle with long proximal spines; short terminal bristle of endites II, III, IV located between long bristles. End joint elongate, tapering distally, shape typical for genus; proximal ventral margin with 5 bristles, 3 short with short marginal spines, 2 longer with wreaths of long hairs proximally and short marginal spines distally; distal tip of joint with 2 long hirsute bristles; 2 short spinous bristles present on medial side near bases of the 2 hirsute bristles at tip. Medial surfaces of endites I-III and end joint and ventral margin of end joint hirsute. No bristles present on distal three-fourths of ventral margin of end joint.

Seventh limb (Figure 12d): Terminal comb with 5 teeth and spines proximally; movable jaw with inward pointing spines along distal margin; 2 bristles present on each side of jaw, each tapered and with 1 bell.

Furca (Figure 12e): Each lamella with 5 claws; claw 2 united to lamella, remaining claws separated from lamella by suture; each claw with teeth along posterior concave margin; lateral row of teeth on claw 1 consisting of large teeth alternating with several smaller teeth proximally and large teeth distally; medial row of teeth on claw 1 consisting of large distal teeth; anterior margin of lamella and medial surface at base of claw 1 with slender spines or hairs.

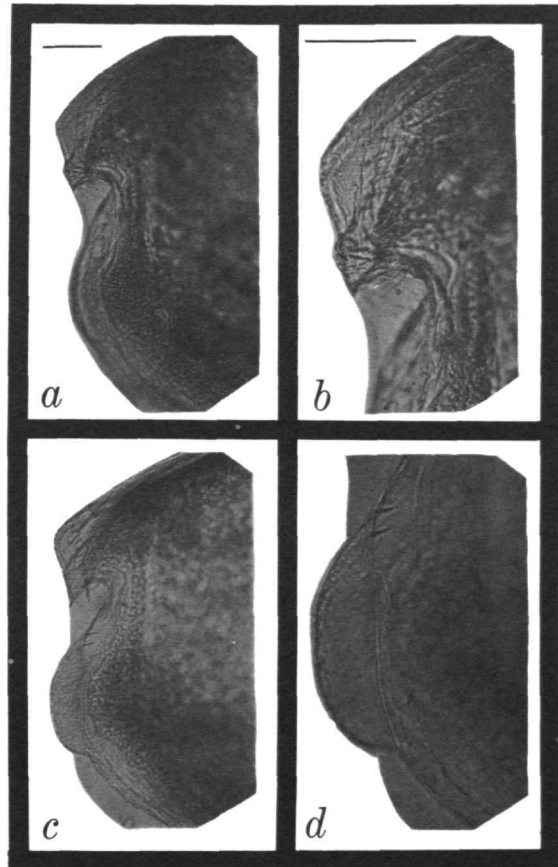


FIGURE 11.—*Cypridinodes* species, USNM 125659, juvenile carapace: a, anterior left valve, lateral view; b, rostrum left valve, lateral view; c, anterior right valve, medial view; d, crescent shaped process below incisure of right valve, medial view. Same scale in millimeters: a, c; b, d. (Both scales on figures equal 0.1 mm.)

Upper lip (Figure 12g): Lip consisting of unpaired anterior part and posterior pair of spinous tusks followed by lobes with 4 or 5 triangular processes.

Rod-shaped organ and medial eye: Rod-shaped organ lemon-shaped with small protuberance at tip (Figure 12f): Medial eye normal for genus.

Lateral eyes: Large with 15 ommatophores in lateral view.

Posterior of body: Weakly undulate in lateral view (Figure 12h).

Genitalia: Undeveloped.

REMARKS.—This species is probably new, but is not named formally because the available specimen is a

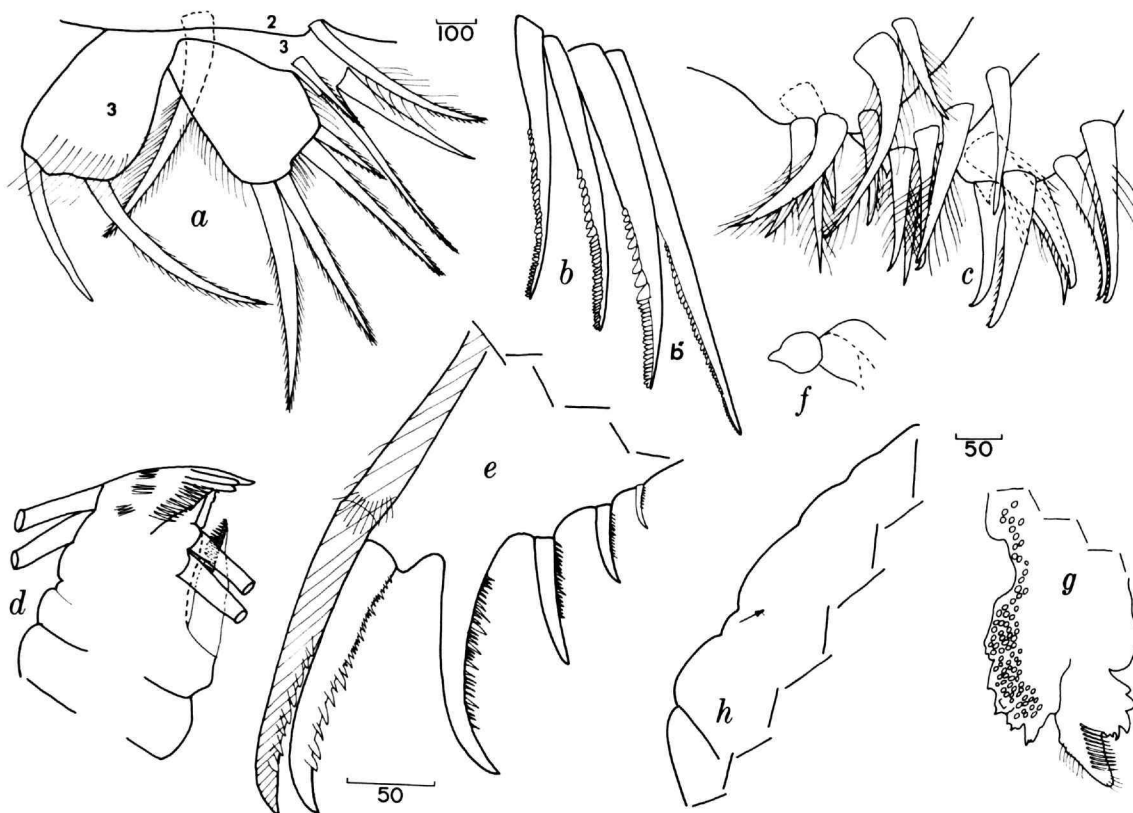


FIGURE 12.—*Cypridinodes* species, USNM 125659, juvenile: *a*, left 5th limb, posterior view; *b*, *b''* bristles of 2nd exopodite joint of left 5th limb, posterior view; *c*, endites of left 5th limb; *d*, terminus of 7th limb; *e*, left lamella and claw 1 of right lamella of furca; *f*, medial eye and rod-shaped organ; *g*, upper lip, anterior to left; *h*, posterior of body. Same scale in microns: *a*–*d*; *f*–*h*.

juvenile in an early stage of development. The species belongs in Poulsen's B-group (Poulsen, 1962, p. 280), which is comprised of 3 species: *Cypridinodes asymmetrica* (Müller, 1906), *Cypridinodes galatheae* Poulsen, 1962, and *Cypridinodes minuta* Poulsen, 1962. The Philippine species differs from *C. asymmetrica* in having the 2nd claw of the furca united to the lamella. It differs from *C. minuta* in having a large lunate process on the anterior margin below the incisure of the right valve. The spines on the margin of the lamellar prolongation of the selvage medial to the lunate process of the right valve are much longer on *Cypridinodes* species than they are on *C. galatheae*.

Monod (1932, p. 6, figs. 7–10) identified ostracods from the Indopacific area as *Cypridina asymmetrica*

Müller (= *Cypridinodes asymmetrica*). The surface of his specimens have scale-like structures similar to those on the specimen I have described. It is not possible to ascertain from the description and illustrations whether his specimens are conspecific either with the species described by Müller (1906) or that identified as *C. asymmetrica* by Poulsen (1962, p. 297). Monod described a mature male. It apparently differs from the species described in the present paper by having 2 instead of 3 joints on the endopodite of the 2nd antenna and in that the 2 distoventral spines on the 2nd joint of the endopodite of the mandible are equal in length.

The shape of the carapace of this species resembles

that of *Cypridina elongata* Brady (= *Cypridinodes bairdii*) described by Brady (1866) from the South China Seas, but the carapace of that species is coarsely punctate, not scale-like, and the 2nd claw of the furca is separated from the lamella.

Family CYLINDROLEBERIDIDAE

Subfamily CYLINDROLEBERIDINAE

Two juveniles from Station M-9 are not sufficiently mature to assign to genus. The dimensions of the larger specimen (USNM 125661) are length 0.63 mm, height 0.36 mm; the length of the smaller specimen (USNM 125662) is 0.47 mm.

Genus *Cylindroleberis* Brady, 1868

Cylindroleberis variabilis, new species

FIGURES 13, 14

HOLOTYPE.—USNM 125625, valves and some appendages in alcohol, remaining appendages on slides, ♀ with 6 eggs in marsupium.

PARATYPES.—USNM 125626, adult ♀; USNM 125627, juvenile ♂, length 0.80 mm (undissected); USNM 125628, juvenile ♂ (N-1 stage), length 1.23 mm, height 0.61 mm.

TYPE-LOCALITY.—Station M-10, Sacol Island, Zamboanga Province, Philippines, Lat. 06°56' N, Long. 122°11' E, water depth 1-2 m, sandy mud flat near mangrove area, corals abundant. USNM 125626 and 125627 from same sample as holotype.

OTHER LOCALITIES.—USNM 125628 from Station M-13, Cang-Alwang, Eiquijor Island, Negros Province, Philippines, Lat. 09°13' N, Long. 123°30' E, reef flat, water depth 1-3 m.

ETYMOLOGY.—The specific name "variabilis" refers to the variability in the number of midbristles on the dorsal margin of the basale of the mandible and in the number of dwarf bristles on the basale endite of the mandible.

DESCRIPTION OF FEMALE.—Carapace elongate with smooth surface and scattered minute pores and hairs (Figure 13a-c); anterior rounded with deep incisur slightly below valve middle; posterior rounded without caudal process.

Infold: Infold behind anterior margin broad with numerous bristles (Figure 13f). Posterior and posteroventral infold broad with list along inner margin bearing about 24 transparent flap-like bristles and 10 small bristles; approximately 6 transparent flap-like bristles present between posterior list and posterior margin of valve (Figure 13g). Ventral and posteroventral infold with about 15 bristles between ventral edge of valve and inner margin of infold; posterior 5 or 6 of the 15 longer than others (Figure 13h).

Size: Holotype, USNM 125625, length 1.37 mm, height 0.64 mm, height as percent of length 46; USNM 125626, length, 1.40 mm, height 0.62 mm, height as percent of length 44.

First antenna: Medial surface of 1st and 2nd joints hirsute; 2nd joint with short distolateral bristle and spinous dorsal subterminal bristle; 3rd joint with short bare ventral bristle and 6 long dorsal bristles, all with short or long spines; 3rd and 4th joint not separated by distinct suture except near ventral and dorsal margins; 4th joint with long dorsal bristle with short marginal spines and 1 long and 1 short distoventral bristle (Figure 13i); sensory bristle with short proximal dorsal filament and 6 long terminal filaments; medial bristle of 6th joint with short marginal spines; a-claw bare except for few broad vague teeth along distoventral margin; 8th joint without d-bristle and with bare e-bristle; f-bristle at right angles to stem, with 5 interior spinose filaments and spines along distal anterior margin.

Second antenna: Protopodite with neither medial bristle nor marginal spines. Endopodite 3-jointed with terminal bristle about twice length of stem (Figure 13l). Exopodite: bristle of 2nd joint with numerous short slender ventral spines (Figure 13k); bristles of joints 3 to 8 with proximal ventral spines and natatory hairs; 9th joint with 4 bristles, 2 short, 2 long with proximal ventral spines and natatory hairs; joints 4 to 9 with basal spines (Figure 13j).

Mandible (Figure 13m): Tip of ventral branch of coxale endite with 2 stout teeth; small bristle present on dorsal branch near base of ventral branch (Figure 13n). Basale endite with glandular peg, 4 spinous end bristles and 3 triaenid bristles with 2 to 3 pairs of marginal spines; 1-2 dwarf bristles present at base of endite; 1 short tapered bristle present proximal to U-shaped glandular opening near ventral margin of basale (bristle triaenid type on ♀ paratype); dorsal margin of basale with 0 to 1 short bare midbristle and 2 long

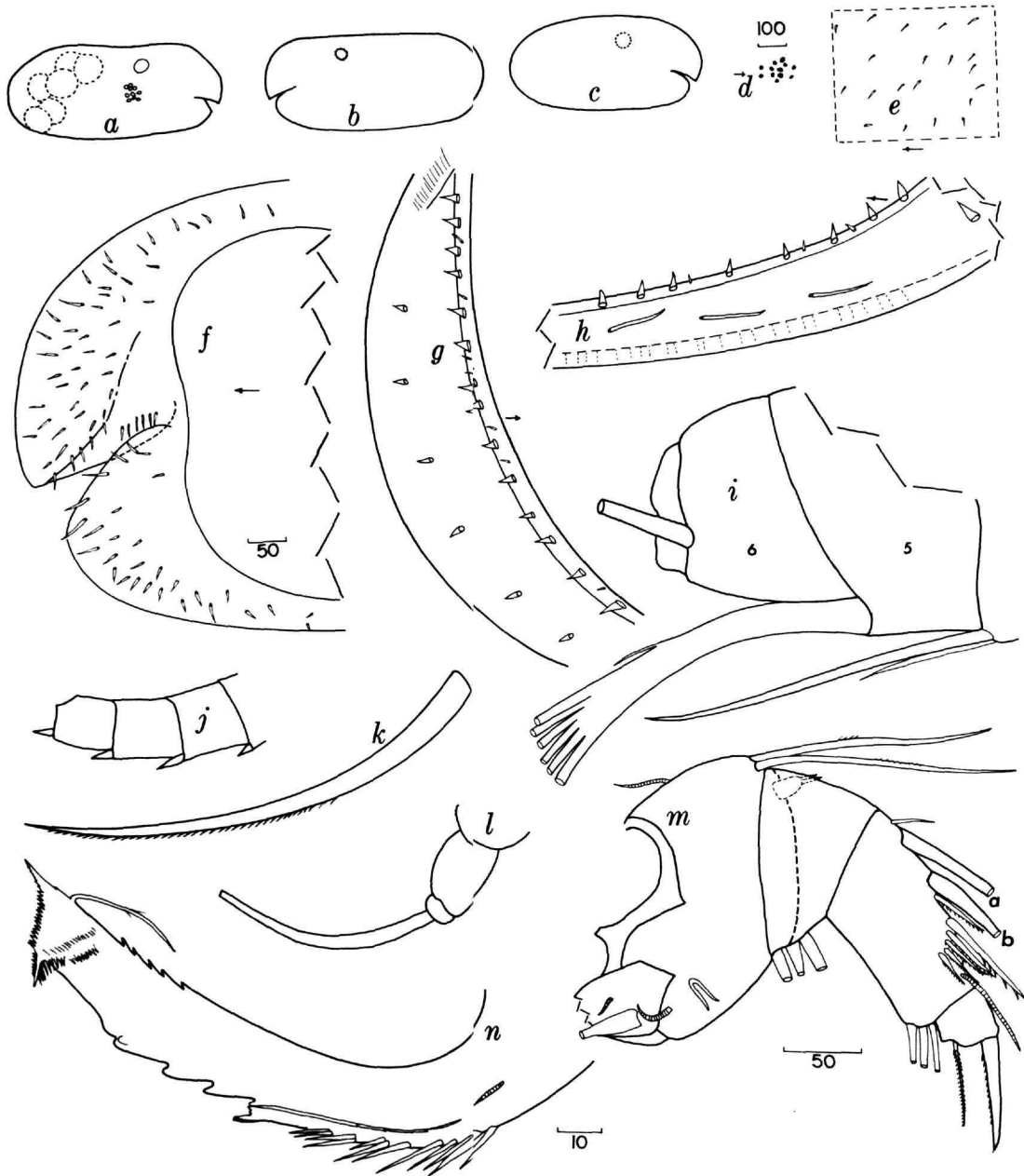


FIGURE 13.—*Cylindroleberis variabilis* Kornicker, carapace: *a*, complete specimen, length 1.37 mm; *b*, complete specimen, length, 1.40 mm; *c*, complete specimen, length 1.23 mm; *d*, muscle scars right valve, lateral view; *e*, detail of surface hairs, left valve, lateral view; *f*, anterior right valve, medial view; *g*, posterior left valve, medial view; *h*, posteroventral infold right valve, medial view; *i*, end joints right limb, medial view, distal parts of sensory bristle not shown; *j*, joints 7-9 of exopodite left 2nd antenna, medial view, bristles not shown; *k*, bristle on 2nd joint left 2nd antenna; *l*, endopodite left 2nd antenna; *m*, left mandible, medial view; *n*, coxale endite of left mandible, medial view. Same magnification in microns: *e*, *g*, *h*, *m*; *i*-*l*, *n*. [*a*, *f*-*n*, from USNM 125625, adult ♀; *b*, *e*, from USNM 125626, adult ♀; *c*, *d*, from USNM 125628, juvenile ♂.]

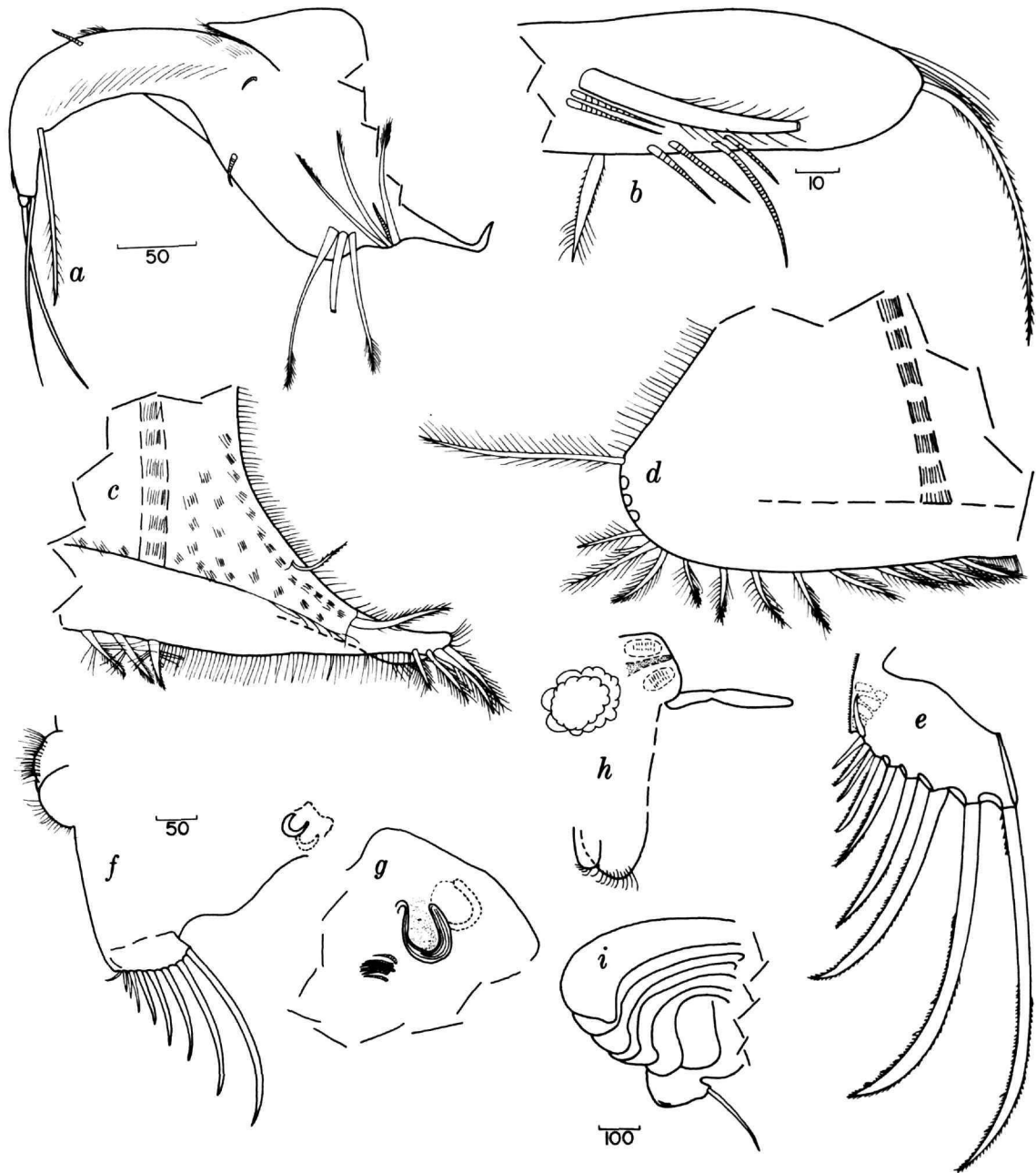


FIGURE 14.—*Cylindroleberis variabilis* Kornicker: *a*, right maxilla, medial view; *b*, comb of 5th limb, not all bristles shown; *c*, anterior left 6th limb, medial view; *d*, posterior right 6th limb, lateral view; *e*, right lamella of furca, lateral view; *f*, furca, posterior, and genitalia; *g*, genitalia and brushlike organ; *h*, anterior of animal showing lateral eye, medial eye, rod-shaped organ and lips, ommatophores of lateral eye not shown; *i*, gill-like organs and furca showing only first and last claws. Same scale in microns: *a*, *c*–*e*, *g*; *f*, *h*. [*a*–*h*, from USNM 125625, adult ♀; *i*, from USNM 125626, adult ♀].

terminal bristles (holotype with midbristle on left mandible and none on right; ♀ paratype without midbristle). Exopodite short with 2 small subterminal bristles. Endopodite: 1st joint with 3 long spinous ventral bristles; ventral margin of 2nd joint with 1 medium and 2 long terminal bristles, all with spines; dorsal margin of 2nd joint with 1 short proximal bristle and stout a-, b-, c-, d-bristles, c-bristle stouter than others, d-bristle with marginal spines; short spinous bristle present between b- and c-bristles; medial surface with 5 spinous bristles forming row near base of c-bristle; 1 short bristle present on medial side near base of d-bristle; 1 long spinous bristle present on lateral side near base of c-bristle. End joint with short dorsal claw with small spines along ventral margin, 3 stout bristles and 2 slender bristles, all with marginal spines (see Table 5).

TABLE 5.—Distribution of bristles on basale

	Holotype (USNM 125625)		Paratype (USNM 125626)	
	left limb	right limb	left limb	right limb
Number of midbristles on dorsal margin of basale	1	0	0	0
Number of dwarf bristles on basale endite	1	1	2	2
Ventral bristle with tapered tip (T) or triaenid type (U)	T	T	U	U

Maxilla (Figure 14a): First endite with 3 long and 1 short bristle; 2nd endite with 3 long bristles; epipodial appendage rather short and with hirsute tip; dorsal margin of basale hirsute, with short proximal and distal bristle; ventral margin of basale with short proximal bristle and long spinous terminal bristle. Endopodite: 1st joint with minute bare anterior bristle and long bare beta-bristle; end joint with bare terminal bristle slightly longer than beta-bristle.

Fifth limb: Lateral surface of comb with long spinose bristle, 2 short bristles near base of long bristle and 4 short bristles near ventral margin (Figure 14b); distal bristle but one longer than others.

Sixth limb (Figure 14c, d): Upper bristle of an-

terior margin slender with few faint marginal spines; lower bristle fairly stout, spinous. Anteroventral margin with 4 spinous bristles; posteroventral margin with 16 spinous bristles; posteroventral corner evenly rounded; anterior, posterior, anteroventral margins including lateral flap, hirsute; medial surface proximal to horizontal bar with spines forming clusters.

Seventh limb: Twelve bristles present: 6 in distal group, 3 on each side; 6 in proximal group, 3 on each side; each bristle with 3 to 5 bells. Terminus with opposing combs, each comb with about 15 spinous teeth.

Furca (Figure 14e, f): Each lamella with 10 claws, posterior 2 or 3 secondary; primary claws pectinate along posterior margin, few larger teeth being separated by series of smaller teeth; most claws with slender distal spines along anterior margin; claw 1 with 6–8 minute proximal teeth along posterior margin. Claw 1 of right lamella more slender than claw 2, but on left lamella both claws same width. Fused posterior margin of lamellae forming ventral process, ornamented with short spines.

Medial eye and rod-shaped organ (Figure 14h): Medial eye large pigmented. Rod-shaped organ weakly 2-jointed, broadest near middle, rounded at tip.

Lateral eye (Figure 14h): Eye well developed with numerous ommatophores.

Upper lip (Figure 14h): Rounded with ventral hairs; a posterior flap with hirsute margin present on each side.

Brush-like organ (Figure 14g): Organ consisting of about 8 minute bristles dorsal to genitalia.

Genitalia (Figure 14f, g): Consisting of U-shaped sclerotized process, 1 on each side.

Posterior (Figure 14f): Dorsum rounded, hirsute.

COMPARISONS.—*Cylindroleberis variabilis*, new species, resembles *Cylindroleberis grimaldi* (Skogsberg, 1920), *Cylindroleberis grimaldi vicina* (Skogsberg, 1920), and *Cylindroleberis nodulifera* (Poulsen, 1965). Its carapace differs in having large transparent flap-like bristles on the infold between the list and posterior margin of each valve. *C. grimaldi*, *C. grimaldi vicina*, and *C. nodulifera* have only broad pores in that location. *C. variabilis* also has only 4 anteroventral bristles on the 6th limb compared to 7 on *C. grimaldi* and *C. grimaldi vicina*. *C. variabilis* also differs from *C. nodulifera* in not having a node on the 5th joint of the 1st antenna and in having 4 bristles on the 1st endite of the maxilla.

Genus *Parasterope* Poulsen, 1965*Parasterope zamboangae*, new species

FIGURES 15, 16

HOLOTYPE.—USNM 125561, valves and some appendages in alcohol, remaining appendages on slides, ♀ with 10 eggs in marsupium.

TYPE-LOCALITY.—Station M-10, Sacol Island, Zamboanga Province, Philippines, Lat. 06°56' N, Long. 122°11' E, 19 Sept. 1967, water depth 1-2 m, sandy muddy flat near mangrove area.

ETYMOLOGY.—Specific name from Zamboanga Province where specimen was collected.

DESCRIPTION OF FEMALE.—Carapace oval in lateral view with greatest height near middle; anterior and posterior evenly rounded (Figure 15*a*); anterior with slit-like incisure below shell middle. Size of holotype: length 1.21 mm, height 0.80 mm, height as percent of length 66.

Infold: Infold behind rostrum with about 7 bristles along list, 3 bristles below list and about 39 bristles above list (Figure 15*d*); area below incisure with about 32 bristles; about 18 bristles present on infold along ventral margin; infold along posterior margin with list bearing about 20 broad transparent flap-like spines (Figure 15*c*); spines separated by small bristles on posterior part of list; area between list and posterior margin of carapace with about 15 bristles on ventral half of infold.

First antenna (Figure 15*e*): Second joint with spines in clusters along ventral and dorsal margins and along distal medial margin; dorsal bristle of 2nd joint with long spines along anterior margin decreasing in length distally along margin; lateral bristle short with a few faint spines near tip; 3rd joint with short ventral bristle and 6 dorsal bristles, 5 with long spines, 1 with short spines; 4th joint with 2 short ventral bristles, 1 long spinous dorsal bristle and short spines along ventral margin; lateral suture between 4th and 5th joints faint and deeply concave; medial suture distinct and also deeply concave; sensory bristle of 5th joint with 6 filaments, 5th and 6th filaments with common stem; medial bristle of 6th joint long spinous. Seventh joint: a-claw with about 40 minute teeth along middle of concave dorsal margin (Figure 15*f*); b-bristle with 2 short proximal filaments and 3 long distal filaments; c-bristle with 5 marginal filaments. Eighth joint (Figure 15*h*): d-bristle represented by small stump; e-

bristle bare, longer than a-claw; f-bristle at right angles to joint, with 4 marginal filaments; g-bristle with 5 marginal filaments.

Second antenna (Figure 15*g, i*): Protodopite with short medial bristle, spines forming clusters on medial surface and dorsal margin, minute spines along ventral margin. Endopodite not strongly jointed, with long terminal bristle. Exopodite: basal spines well developed, spine on 8th joint not quite as long as 9th joint; bristles of 2nd joint reaching past 9th joint and with numerous hairs along ventral margin; bristles on joints 3 and 4 with proximal ventral spines and long natatory hairs; bristles of joints 5 to 8 with natatory hairs; 9th joint with 4 bristles, 1 short bare, 1 medium with short spines, 2 long with natatory hairs.

Mandible (Figure 15*j*): Short bristle with few marginal spines present at base of ventral branch of coxale endite; ventral branch with spines forming 4 rows and slender tip with 3 slender spines and 1 short dorsal spine (Figure 15*l*); ventral margin of dorsal branch with series of nodes and short main spine (Figure 15*k*); margin distal to main spine spinous; long bristle present dorsal to main spine. Basale endite with 4 bristles with 6 to 9 pairs of stout proximal marginal spines and numerous slender distal spines, and 3 triaenid bristles with up to 6 pairs of marginal spines. Ventral margin of basale near endite with additional triaenid bristle with 3 pairs of marginal spines; single dwarf bristle at base of endite. Dorsal margin of basale with short bare midbristle and 2 terminal bristles with few spines; medial surface of basale with few clusters of faint spines. Exopodite about three-fourths length of dorsal margin of 1st endopodite joint and with 2 short bristles and hirsute tip. Ventral margin of 1st endopodite joint with 3 long spinous bristles. Dorsal margin of 2nd endopodite joint with 1 short proximal bristle, bare a-bristle, b-bristle with a few spines along middle of dorsal margin, c-bristle with spines along middle of ventral margin and a few spines along dorsal margin, d-bristles with spines at middle of both ventral and dorsal margins; long bristle present between b- and c-bristles. Three short spinous medial bristles present distal to base of b-bristle; 6 spinous medial bristles present forming row proximal to base of c-bristle; 1 spinous medial bristle present at base of d-bristle; 1 long spinous lateral bristle present at base of c-bristle. Ventral margin of 2nd endopodite joint with 3 terminal bristles. End joint with dorsal claw and about 5 bristles; claw with about 16 rather flat teeth along ventral mar-

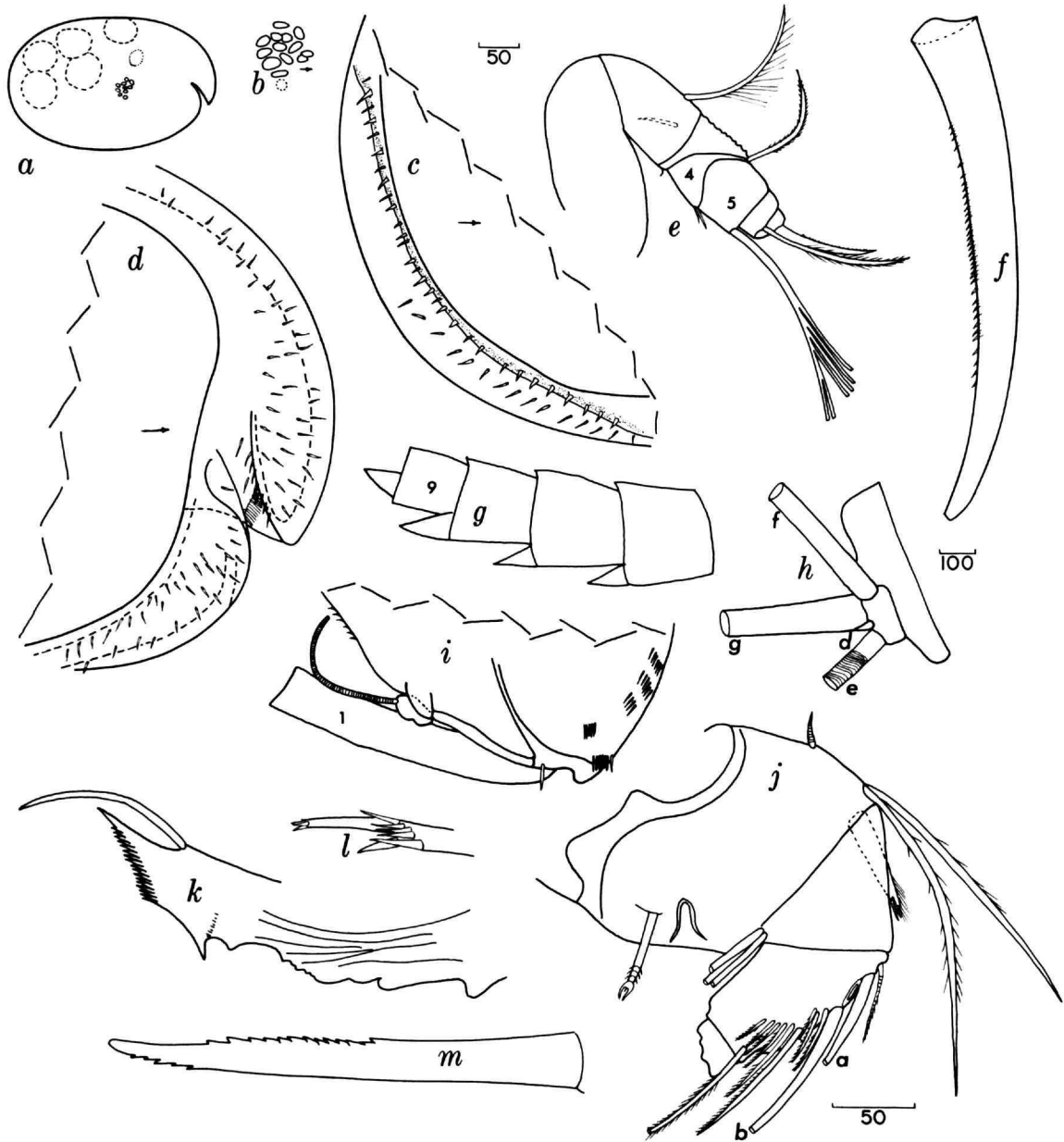


FIGURE 15.—*Parasterope zamboangae* Kornicker, USNM 125561, adult ♀, carapace: *a*, complete specimen, length 1.21 mm; *b*, central muscle scars right valve, lateral view; *c*, posterior left valve, medial view; *d*, anterior left valve, medial view. Appendages: *e*, left 1st antenna, medial view, all bristles not shown; *f*, detail of dorsal claw on end joint of "e", lateral view; *g*, joints 6-9 exopodite of left 2nd antenna, medial view, bristles not shown; *h*, bristles on 8th joint of left 1st antenna, lateral view; *i*, protopodite, endopodite, and 1st joint of exopodite of left 2nd antenna, medial view; *j*, left mandible, medial view, all bristles not shown; *k*, dorsal branch of coxale endite of mandible; *l*, tip of ventral branch of coxale endite of mandible; *m*, dorsal claw of left mandible, medial view. Same magnification in microns: *c-e*; *f-h*, *k-m*; *i*, *j*.

gin and about 5 flat teeth near tip on dorsal margin (Figure 15*m*).

Maxilla (Figure 16*a*): Proximal endite of right maxilla with 3 long and 1 short bristle (Figure 16*b*); same endite of left maxilla with only 3 long bristles; distal endite with 3 long bristles. Basale with proximal and distal dorsal bristle; ventral margin with short bare proximal bristle and long spinous distal bristle (spines very faint); dorsal margin with thin spines forming row. Endopodite: 1st joint with short dorsal

bristle and long terminal bristle, both bare; 2nd joint with long bare terminal bristle. Tip of epipodial appendage hirsute.

Fifth limb: Epipodial appendage with 56 bristles. Comb (Figure 16*c*): dorsal margin bare; distal tip with fairly long faint hairs; bristles of ventral margin longer near distal end. Exopodite consisting of 1 long and 6 short bristles: long bristle spinous and extending past tip of comb; 1 short bristle near base of long bristle, others located near ventral margin of comb; bristle

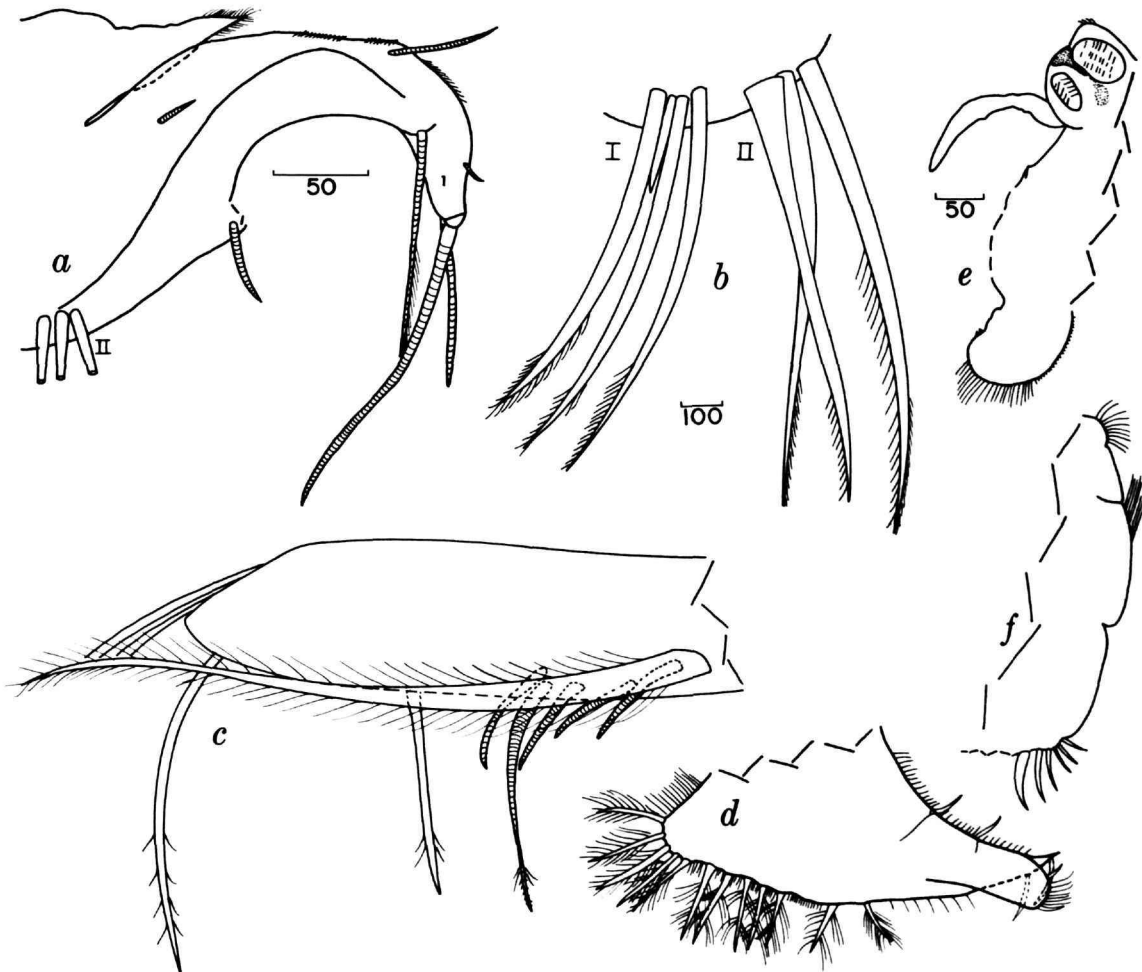


FIGURE 16.—*Parasterope zamboangae* Kornicker, USNM 125561, adult ♀: *a*, right maxilla, lateral view; *b*, endites of left maxilla, medial view; *c*, comb of 5th limb, all bristles not shown; *d*, right 6th limb, lateral view; *e*, anterior of body showing medial eye, rod-shaped organ and upper lip; *f*, posterior of body showing proximal 6 claws of left lamella of furca. Same magnification in microns: *b*, *c*; *d*–*f*.

next to most distal of short bristles about twice length of remaining 5 short bristles and with few distal spines.

Sixth limb (Figure 16d): Each limb with 11 to 12 spinous posteroventral bristles; anterior corner with 2 bristles; anterior margin of lateral sole with long hairs and 2 short slender bristles; anterior margin of limb hirsute and with upper and lower bristle; posterior and ventral margins and medial surface of limb hirsute.

Seventh limb: Terminal with opposing combs, each with 11 spinous teeth; 6 bristles present in proximal and distal groups, each with 3 to 4 bells.

Furca: Each lamella with 6 claws followed by 3 short bristles (Figure 16f); all claws with teeth along concave margins; claw 1-3 with hairs along distal convex margin.

Rod-shaped organ and medial eye (Figure 16e): Rod-shaped organ elongate, 1-jointed and with round tip. Medial eye large pigmented with a few dorsal hairs.

Upper lip (Figure 16e): Lip helmet-shaped with long ventral hairs and short posterior hairs; 1 or 2 small anterior spines present.

Lateral eye: Eye well developed with about 19 ommatophores.

Posterior (Figure 16f): Hirsute (details could not be discerned on prepared specimen.)

Eggs: Ten eggs present in marsupium of holotype.

COMPARISONS:—*Parasterope zamboangae* differs from *P. obesa* Poulsen, 1965, *P. muelleri* (Skogsberg, 1920), *P. pectinata* Poulsen, 1965, *P. skogsbergi* Poulsen, 1965, *P. jenseni* Poulsen, 1965, *P. corrugata* Poulsen, 1965, *P. longungues* Poulsen, 1965 *P. pollex* Kornicker, 1967, *P. Curta* (Skogsberg, 1920) and *P. ohlini* (Skogsberg, 1920), in having a midbristle on the dorsal margin of the mandibular basale. With the exceptions of *P. muelleri*, *P. curta*, and *P. longungues*, the above species also differ from *P. zamboangae* in not having small spines along the dorsal margin of the a-claw of the 1st antenna. *Parasterope nana* Poulsen, 1965, and *Parasterope aberrata* (Skogsberg, 1920) differ from *P. zamboangae* in having fewer bristles on the end joint of the 6th limb.

Parasterope mckenziei, new species

FIGURES 17, 18

HOLOTYPE.—USNM 125670, valves and some appendages in alcohol, remaining appendages on slides,

♀ with 7 well-developed but unextruded eggs in body.

PARATYPE.—USNM 125671, valves and most appendages in alcohol, mandible on slide, ♀ with minute ?eggs within body (probably N-1 instar), length 0.87 mm, height 0.62 mm.

TYPE-LOCALITY.—Station M-5, coral reefs southwest of Botic Island, Salcedo, Samar Province, Philippines, water depth 1 m, Lat. 11°05' N, Long. 125°41' E. Paratype from same locality as holotype.

ETYMOLOGY.—The species is named after Dr. Kenneth G. McKenzie.

DESCRIPTION OF FEMALE.—Carapace with greatest height posterior to middle; anterior and posterior evenly rounded; anterior with slit-like incisor below shell middle (Figure 17a). Size of holotype (USNM 125670): length 1.14 mm, height 0.78 mm, height as percent of length 68.

Infold: Infold behind rostrum with 2 or 3 bristles along list, 6 bristles below list and about 26 bristles above list; area below incisor with about 29 bristles (Figure 17d); infold along posterior margin with list bearing about 22 broad transparent flap-like spines and 15 small bristles (Figure 17c); area between list and posterior margin of carapace with about 21 bristles: 8 bristles on dorsal half of infold, 13 bristles on ventral half.

First antenna: First joint with spines forming clusters on lateral surface near posterior margin; a spinous bulbous process present distolaterally (Figure 17e); 2nd joint with spines along dorsal margin and distolateral margin; lateral bristle with a few faint spines near tip. Dorsal bristle of 2nd joint and bristles of 3rd joint similar to those on *P. zamboangae*. Fourth joint with long spinous dorsal bristle, 2 ventral bristles, and spines along ventral margin (Figure 17f); shorter of ventral bristles almost reaching distal margin of 6th joint, longer of ventral bristles reaching past end of limb. Sensory bristle of 5th limb with 6 filaments; medial bristle of 6th joint spinous, about equal in length to a-claw of 7th joint. Seventh joint: a-claw with lateral and medial row of minute spines near dorsal margin; b-bristle stout with 4 marginal filaments; c-bristle with 5 short marginal filaments; bare d-bristle reaching end of sensory bristle on 5th joint; e-bristle not present, but represented by minute protuberance; f-bristle at right angles to limb, with 4 marginal filaments; g-bristle with 5 marginal filaments. Margin between 4th and 5th joints concave.

Second antenna (Figure 18i): Limb essentially

same as that on *P. zamboangae*. Bristle on endopodite reaching to about 8th joint of exopodite.

Mandible (Figure 18a): Short slender bristle present at base of ventral branch of coxale endite; ventral branch with slender spines forming 3 rows and tip with 2 slender spines and 1 or 2 shorter spines (Figure 18d);

ventral margin of dorsal branch with series of nodes and spines and short main spine; margin distal to main spines spinous (Figure 18c); dorsal bristle near tip of branch with faint marginal hairs. Basale endite with 4 end bristles with up to 4 pairs of stout marginal spines proximally and numerous slender dis-

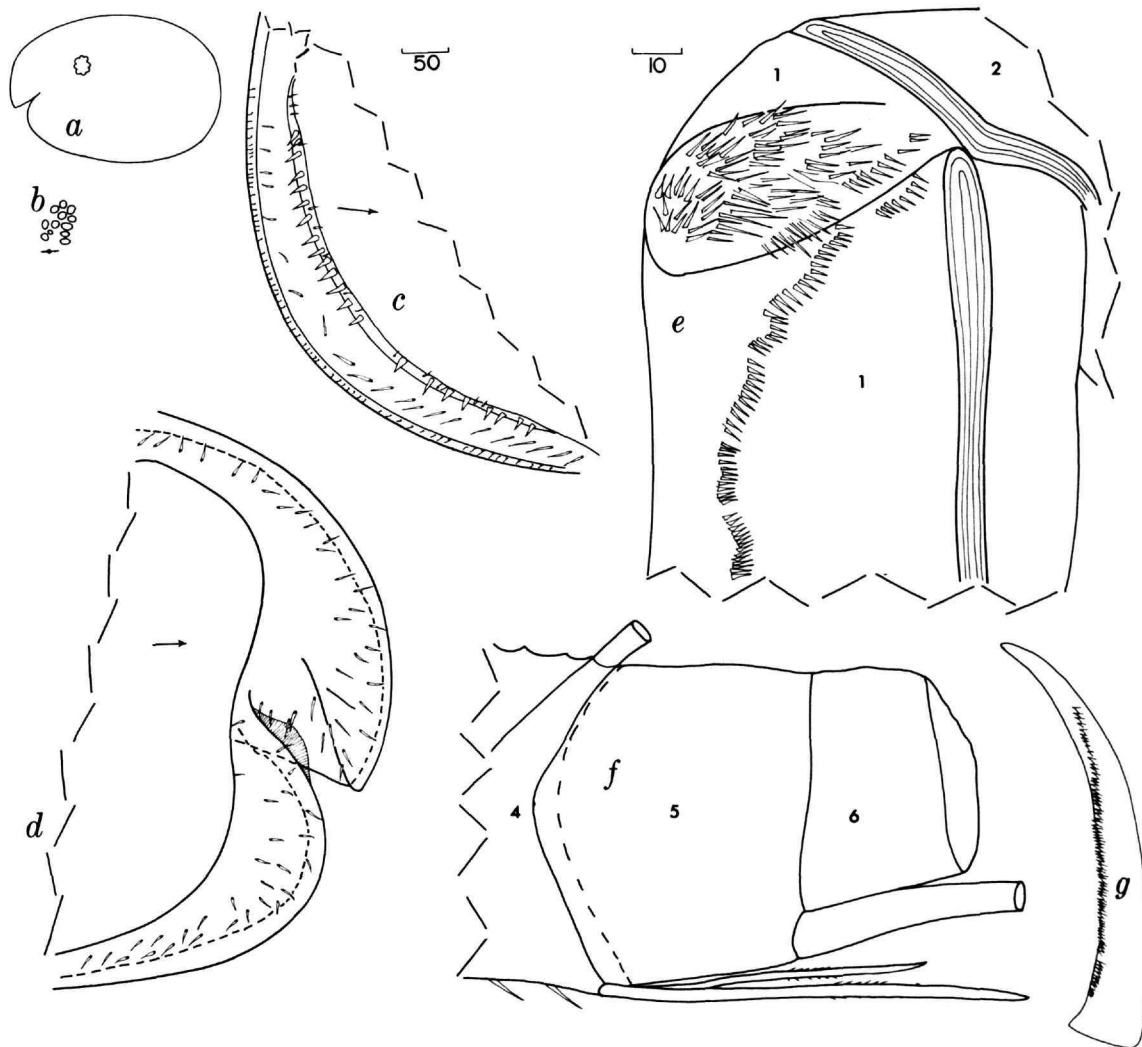


FIGURE 17.—*Parasterope mckenziei* Kornicker, USNM 125670, ♀ carapace: *a*, complete specimen, length 1.14 mm; *b*, central muscle scars left valve, lateral view; *c*, posterior left valve, medial view; *d*, anterior left valve, medial view. Appendages: *e*, 1st joint of 1st antenna, lateral view, anterior to right; *f*, distal end of 2nd joint of right 1st antenna showing bristles of 4th joint; *g*, a-claw of right 1st antenna, lateral view, ventral margin to right. Same magnification in microns: *c*, *d*; *e*–*g*.

tal spines, and 3 triaenid bristles with up to 4 pairs of marginal spines; 1 dwarf bristle and small peg present at base of endite. Ventral margin of basale with additional triaenid bristle with 4 marginal spines. Dorsal margin of basale with cluster of spines near middle (Figure 18*b*); additional clusters numerous on medial surface; 2 long spinous bristles present terminally. Ex-

opodite about equal in length to dorsal margin of 1st endopodite joint and with 2 short bristles and hirsute tip. Ventral margin of 1st endopodite joint with 3 long spinous bristles. Dorsal margin of 2nd endopodite joint with 1 short proximal bristle, a-bristle with a few spines along dorsal margin, b-bristle with a few spines along dorsal margin and many along ventral margin,

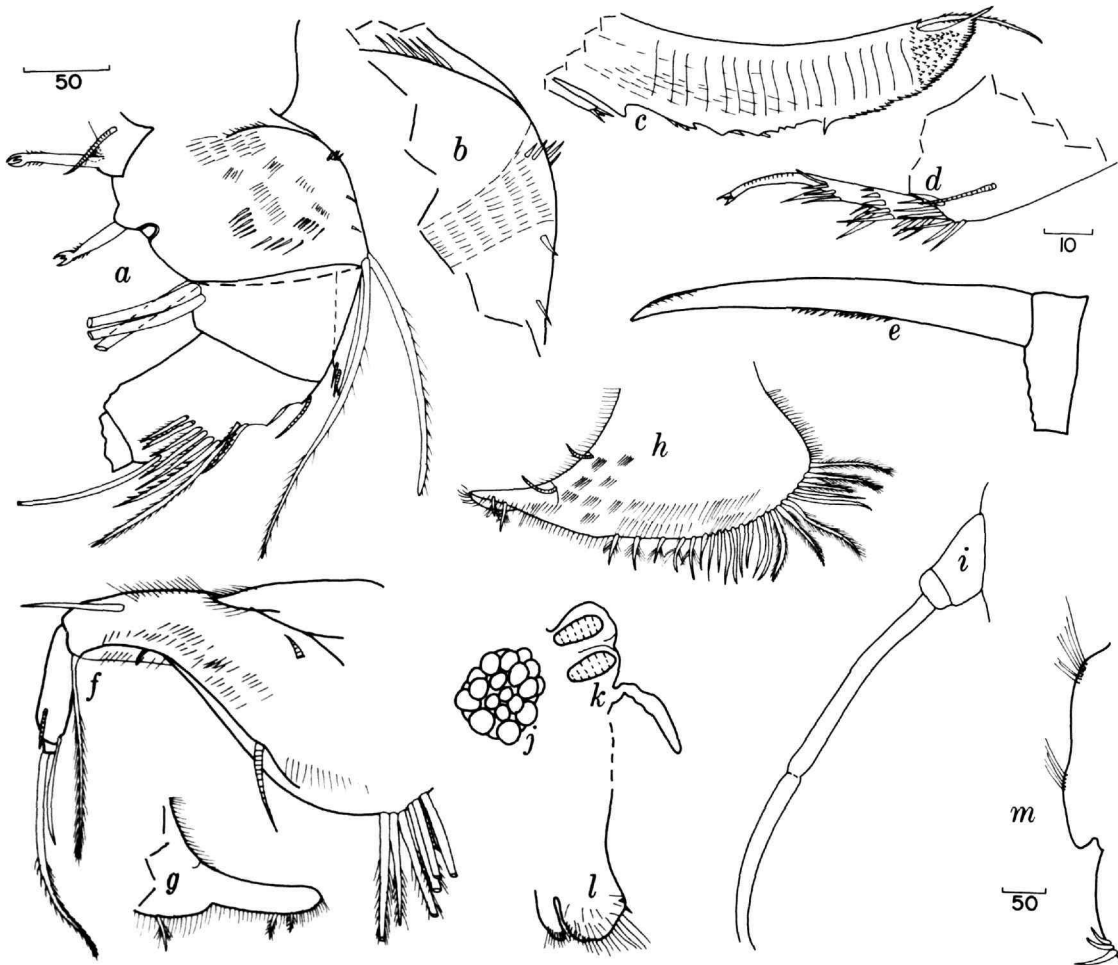


FIGURE 18.—*Parasterope mckenziei* Kornicker, USNM 125670, ♀ appendages: *a*, left mandible, medial view; *b*, detail of dorsal margin of basale of mandible shown in *a*; *c*, dorsal branch and tip of ventral branch of coxale endite of right mandible, medial view; *d*, ventral branch of coxale endite and bristle at its base of left mandible, medial view; *e*, claw of end joint of right mandible, medial view; *f*, maxilla; *g*, anterior of left 6th limb, lateral view; *h*, right 6th limb, medial view; *i*, endopodite of right 2nd antenna, distal part not shown; *j*, lateral eye, *k*, medial eye and rod-shaped organ; *l*, lips; *m*, posterior and proximal 3 bristles of right lamella of furca. Same magnification in microns; *a*, *f*; *b*–*e*, *i*; *g*, *h*, *j*–*m*.

c- and d-bristles with spines along ventral margin; c-bristle slightly stouter than other bristles; bristle about equal in length to c-bristle present between b- and c-bristles. Two short spinous medial bristles present forming transverse row proximal to base of c-bristle; 1 long spinous bristle present near base of d-bristle; 1 long spinous lateral bristle present between base of c- and d-bristles. Ventral margin of 2nd endopodite joint with 3 long spinous terminal bristles. End joint with dorsal claw and 5 bristles; claw with teeth along concave ventral margin and near tip of dorsal margin (Figure 18e).

Maxilla (Figure 18f): Proximal endite with 4 bristles, 3 long, 1 short; distal endite with 3 long bristles. Dorsal margin of basale with proximal and distal bristle; ventral margin with medium proximal bristle, short bristle distal to middle, and long spinous terminal bristle. Endopodite: 1st joint with short dorsal bristle and long ventral bristle, both bare; 2nd joint with long spinous terminal bristle. Surface of basale, including dorsal margin, and tip of epipodial appendage hirsute.

Fifth limb: Limb similar to that of *P. zamboangae*. Epipodial appendage also with 56 bristles.

Sixth limb (Figure 18g, h): Each limb with 22 spinous posteroventral bristles: 5 posterior bristles with long marginal hairs; 17 anterior bristles with long hairs proximally and short spines distally. Anterior corner with 2 bristles. Anterior margin with upper and lower bristle. Anterior, ventral, and posterior margins, and medial surface hirsute.

Seventh limb, furca, rod-shaped organ (Figure 18k) medial and lateral eyes (Figure 18j), posterior (Figure 17m): Similar to that on *P. Zamboangae*.

Furca: Each lamella with 7 claws follows by 3 short bristles; all claws with teeth along concave margins; claws 1-4 with hairs distally along convex margin.

Upper and lower lips (Figure 18l): Upper lip helmet-shaped with long ventral hairs and 2 minute anterior spines on each side. Lower lip consisting of 2 flaps with marginal hairs.

Eggs: Seven large unextruded eggs in ovaries.

COMPARISONS.—This species differs from the preceding species, *P. zamboangae* in not having a midbristle on the dorsal margin of the mandibular basale and having in its place several slender spines. It also differs in having longer ventral bristles on the 4th joint of

the 1st antenna and in having bristles present in the dorsal half of the space between the list and the posterior margin of the caudal process. The spinosity of the basale also distinguishes this species from *P. muelleri* and *P. ohlini*.

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