4

Crustacea Amphipoda : Lysianassoids from Philippine and Indonesian waters

James K. LOWRY & Helen E. STODDART

Australian Museum
P.O. Box A285, Sydney South
SW 2000, Australia

ABSTRACT

Ten genera and fourteen species of lysianassoid amphipods are reported from Philippine and Indonesian waters. Nine of these are new species (*Aristias coriolis, A. verdensis, Eucallisoma barnardi, Figorella corindon, Onesimoides castellatus, O. mindoro, Paracentromedon pacificus, Pseudamaryllis andresi* and *Trischizostoma crosnieri*). Five of the genera (*Eucallisoma, Figorella, Paracentromedon, Pseudamaryllis* and *Trischizostoma*) are new records for the south-east Asian area. Only four species (*Cyphocaris anonyx* Boeck, 1871, *Ichnopus wardi* Lowry & Stoddart, 1992, *Onesimoides castellatus* and *O. mindoro*) are recorded from both areas.

RÉSUMÉ

Crustacea Amphipoda : Lysianassoides des Philippines et d'Indonésie.

Dix genres et 14 espèces d'Amphipodes Lysianassoides sont signalés des Philippines et d'Indonésie. Neuf de ces espèces sont nouvelles (*Aristias coriolis, A. verdensis, Eucallisoma barnardi, Figorella corindon, Onesimoides castellatus, O. mindoro, Paracentromedon pacificus, Pseudamaryllis andresi* and *Trischizostoma crosnieri*). Cinq genres (*Eucallisoma, Figorella, Paracentromedon, Pseudamaryllis* and *Trischizostoma*) sont signalés pour la première fois du Sud-Est asiatique. Seules quatre espèces ont été récoltées aussi bien aux Philippines qu'en Indonésie.

INTRODUCTION

There have been few records of lysianassoid amphipods from the Philippine area. DAHL (1959), BIRSTEIN & VINOGRADOV (1963) and HESSLER *et al.* (1978) have recorded four species from the Philippine Trench, and LOWRY & STODDART (1992) recently recorded *Ichnopus wardi* from Mindanao. The Indonesian area is slightly better known with sixteen species recorded, mainly from the reports of the *Siboga* Expedition (PIRLOT, 1933, 1936).

LOWRY, J. K., & STODDART, H. E., 1993. — Crustacea Amphipoda : Lysianassoids from Philippine and Indonesian waters. *In* : A. CROSNIER (ed.), Résultats des Campagnes MUSORSTOM, Volume 10. *Mém. Mus. natn. Hist. nat.*, **156** : 55-109. Paris ISBN 2-85653-206-3.

The French expeditions (MUSORSTOM 1 in 1976, MUSORSTOM 2 in 1980 and MUSORSTOM 3 in 1985) to the Philippines (see reports of FOREST, 1981, 1985 and 1989) and the French-Indonesian expedition CORINDON 2 to Indonesia were searching mainly for the glypheid decapod *Neoglyphea inopinata* Forest & de Saint Laurent. However they also produced a small, but very interesting collection of lysianassoid amphipods. Based on these collections we add seven new species to the Philippine fauna and six new species and two new records to the Indonesian fauna. There are now twelve species known from the Philippines and twenty two species from Indonesia (see list).

Five of the genera are new records for the south-east Asian area. *Eucallisoma* was previously recorded only from the eastern South Atlantic Ocean, *Figorella corindon* sp. nov. is the first record of a pachynid from the tropics, *Paracentromedon pacificus* sp. nov. is the first confirmed record of that genus outside the Atlantic Ocean, *Pseudamaryllis* was previously recorded from the Red Sea and the south-western Indian Ocean and *Trischizostoma*, although widespread, has not been previously recorded from the western Pacific Ocean.

Most of the new species are large and live in specialized habitats. *Aristias* is usually considered to be associated with sedentary invertebrates such as sponges and ascidians (VADER, 1970, 1985). Both species of *Eucallisoma* have a highly modified gnathopod 1 which indicates some kind of predatory life style. Species of *Onesimoides* are generally considered to be associated with dead plant material on the sea floor (PIRLOT, 1933; J. L. BARNARD, 1961; BELLAN-SANTINI, 1974; WOLFF, 1979). Species in *Trischizostoma* are mainly considered to be ectoparasites on fish (VADER & ROMPPAINEN, 1985). *Figorella corindon* sp. nov. and *Paracentromedon pacificus* sp. nov. are the only representatives of benthic infaunal lysianassoids. There are no representatives of algal-dwelling lysianassoids or the very diverse scavenging group. Overall it must be considered that this is only a fraction of a largely unknown lysianassoid fauna and indicates a general lack of knowledge about the amphipods of the Indo-Pacific area, a point also made several times by J. L. BARNARD (1965, 1976).

In this paper we introduce a modified scheme for delineating setae on the mandibular palp. KARAMAN (1969) originally used letters to distinguish setae at different positions on the third article of the mandibular palp.

There are two problems associated with the definitions of these setae, both of which have caused confusion among subsequent users of the scheme. KARAMAN (1969 : 196) described the A-setae as being on the outer edge ("Aussenrande") of the third article. KARAMAN (1971 : 23) changed the description of A-setae so that they occur on the outer surface ("Aussenfläche"). KARAMAN (*in litt.*, 1992) confirmed that this was his original intention - he had never seen setae on the anterior margin and suggested that such setae would need a new letter designation.

The second problem concerns B- and C-setae. There is a discrepancy between the text on page 196 and figure 3 on page 197 of KARAMAN (1969). The text places both B- and C-setae on the inner face, but the figure shows them on opposing faces. However, figure 35 on page 203 of the same paper shows B- and C-setae on the same face, as stated in the text. Unfortunately KARAMAN's figure 3 has been used as the standard in major works such as BARNARD & BARNARD (1983) and WILLIAMS & BARNARD (1990). KARAMAN (*in litt.*, 1992) confirmed that both B- and C-setae are on the inner surface as originally published.

We expand the original scheme by introducing one new letter designation and extending the scheme to mandibular palp articles 1 and 2. For example the setae on the posterior margin of mandibular palp article 3 are referred to as D3-setae. We think the most important areas to identify are the anterior and posterior margins, the inner and outer surfaces and the apex. The location of setae on any surface or margin can be described with qualifiers, for example "one proximal A3-seta" or "a vertical row of 4 B2-setae". Consequently the C-setae are simply submarginal B-setae. In the expanded scheme (fig. 1) :

A = setae on the lateral surface;
B = setae on medial surface, usually in horizontal or vertical rows (C = submarginal B-setae);
D = setae on posterior margin;
E = apical or terminal setae, usually longer than D-setae;
F = setae on anterior margin.

The main difference from previous schemes is that the medial and lateral surfaces and the anterior and posterior margins are each designated by a letter and each designation is followed by a number representing the article being discussed.

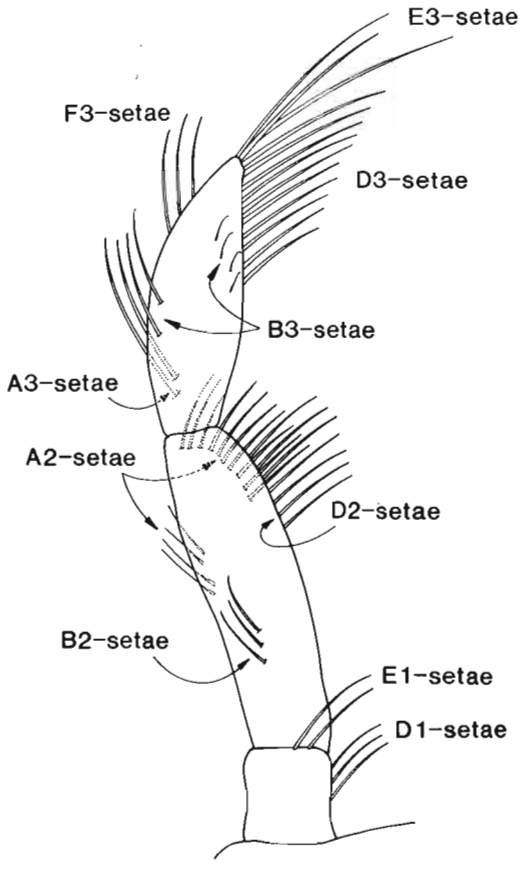

FIG. 1. — Mandibular palp setal designations (medial view) for lysianassoid amphipods.

The individual spine-teeth on the outer plate of maxilla 1 are designated by an ST code. The primitive arrangement of the spine-teeth (known as a 7/4 arrangement) is one in which eleven distal spine-teeth occur in two rows, an apical or outer row of seven spine-teeth (ST1 to ST7) and a subapical or inner row of four spine-teeth (STA to STD). In other lysianassoid groups this arrangement is modified in various ways, but by using this coding system it is usually possible to identify homologous spine-teeth in most arrangements. Examples of the 7/4 arrangement in this paper occur in *Eucallisoma* and *Figorella*. In many lysianassoids the outer plate is slightly narrowed and the ST1 is displaced onto the inner row, displacing in turn the STA. This is known as a 6/5 arrangement and in this paper it occurs in the genera *Onesimoides, Paracentromedon* and *Pseudamaryllis*. Another arrangement, known as the 7/4 crown, occurs in the uristid group and is discussed by LOWRY & STODDART (1992). The aristiid spine-tooth arrangement differs from other lysianassoids in such a way that, although the spine-teeth occur in two subparallel rows, we cannot yet trace their homologies. Consequently the aristiid spine-teeth are not coded.

Because of pending changes to the familial classification of this group all species are reported here in the superfamily Lysianassoidea. Descriptions have been generated from the taxonomic data base program DELTA (DALLWITZ & PAINE, 1986). Material is lodged in the Muséum national d'Histoire naturelle, Paris (**MNHN**), the Australian Museum, Sydney (**AM**), the Queensland Museum, Brisbane (**QM**) and the Zoologisk Museum, Copenhagen (**ZMC**). Material from the KARUBAR cruise in 1991 will be lodged in the Pusat Penelitian dan Pengembangan Oseanologi, Djakarta (**PPPO**), the Muséum national d'Histoire naturelle and the Australian Museum

The following abbreviations are used on the plates : **A**, antenna; **E**, epistome and upper lip; **EP**, epimeron; **G**, gnathopod; **H**, head; **MD**, mandible; **MDP**, mandibular palp; **MP**, maxilliped; **MPIP**, maxilliped inner plate; **MPOP**, maxilliped outer plate; **MPP**, maxilliped palp; **MX**, maxilla; **MX1IP**, maxilla 1 inner plate; **MX1OP**, maxilla 1 outer pate; **MX1P**, maxilla 1 palp; **P**, peraeopod; **ST**, spine-tooth; **T**, telson; **U**, uropod; **UR**, urosome; **l**, left; **r**, right; **lat**, lateral.

LIST OF RECORDED SPECIES

Philippines.

Aristias coriolis sp. nov.
Aristias verdensis sp. nov.
Crybelocephalus barnardi Birstein & Vinogradov, 1963.
Cyphocaris anonyx Boeck, 1871 (recorded by BIRSTEIN & VINOGRADOV, 1963).
Eucallisoma barnardi sp. nov.
Hirondellea gigas (Birstein & Vinogradov, 1955) (recorded by DAHL, 1959; HESSLER, *et al.*, 1978).
Ichnopus wardi Lowry & Stoddart, 1992.
Onesimoides castellatus sp. nov.
Onesimoides mindoro sp. nov.
Paracyphocaris distinctus Birstein & Vinogradov, 1963.
Pseudamaryllis andresi sp. nov.
Trischizostoma crosnieri sp. nov.

Indonesia.

Arugella heterodonta Pirlot, 1936.
Bathyamaryllis perezii Pirlot, 1933.
Cyphocaris anonyx Boeck, 1871 (recorded by PIRLOT, 1933).
Cyphocaris challengeri Stebbing, 1888 (recorded by PIRLOT, 1933).
Cyphocaris faurei K. H. Barnard, 1916 (recorded by PIRLOT, 1933).
Euonyx coecus Pirlot, 1933.
Eurythenes gryllus (Lichtenstein, 1822).
Figorella corindon sp. nov.
Hippomedon bandae Pirlot, 1933.
Ichnopus annasona Lowry & Stoddart, 1992.
Ichnopus wardi Lowry & Stoddart, 1992 (recorded as *Glycerina tenuicornis* by PIRLOT, 1936).
Onesimoides carinatus Stebbing, 1888 (recorded as *O. cavimanus* by PIRLOT, 1933).
Onesimoides castellatus sp. nov.
Onesimoides chelatus Pirlot, 1933.
Onesimoides mindoro sp. nov. (recorded as *O. cavimanus* by DAHL, 1959 and *O. chelatus* by J. L. BARNARD, 1961).
Paronesimoides lignivorous Pirlot, 1933.
Paracentromedon pacificus sp. nov.
Pseudambasia sp. (recorded as *Lysianassa* sp. by LEDOYER, 1979).
Tryphosella mucronata (Pirlot, 1936).
Waldeckia crenulata Pirlot, 1936.
Waldeckia enoei Stephensen, 1931.
Waldeckia kroyeri (White, 1847) (recorded by PIRLOT, 1936).

SYSTEMATICS

Genus *ARISTIAS* Boeck, 1871

Aristias coriolis sp. nov.

Figs 2-4

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 2 : stn CP 38, 12°53.5'N, 122°26.6'E, Sibuyan Sea, south-east of Marinduque, 1650-1660 m, 25 November 1980 : 1 ♀, 6.5 mm, with non-setose oostegites (MNHN-Am 4453).

TYPES. — The unique specimen is the holotype.

DIAGNOSIS. — Eyes apparently absent. Antenna 1 : accessory flagellum 4-articulate. Mandible : incisors symmetrical, margins smooth; left lacinia mobilis a small spine. Maxilla 1 : outer plate with 12 spine-teeth; inner plate with 7 plumose setae along inner margin. Peraeopods 5 and 6 : coxae strongly lobate posteriorly. Peraeopods 3 to 7 : propodus without distal spurs. Epimeron 3 : posteroventral corner subquadrate. Uropod 3 : outer ramus with short article 2. Telson deeply cleft.

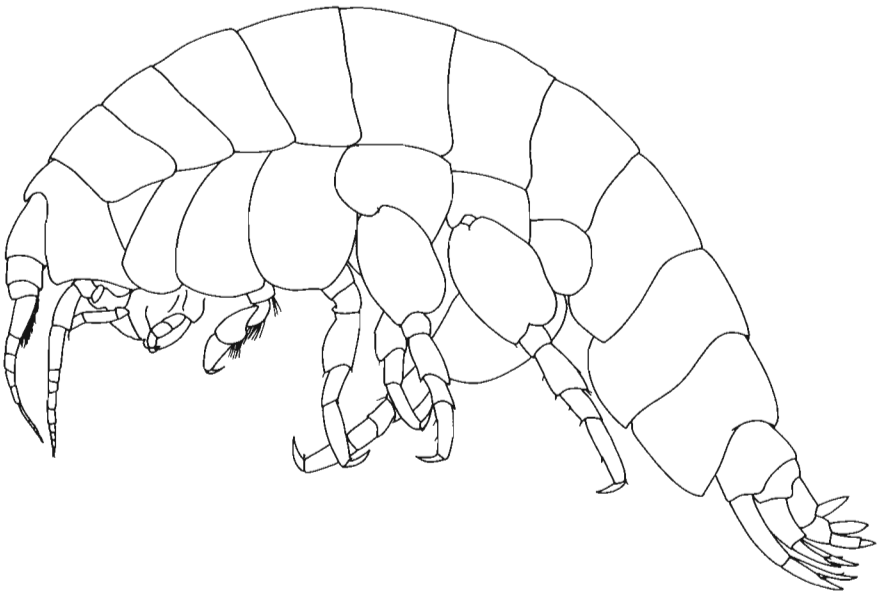

FIG. 2. — *Aristias coriolis* sp. nov., holotype female, 6.5 mm (MNHN-Am 4453), south-east of Marinduque, Sibuyan Sea, Philippine Islands.

DESCRIPTION. — Based on holotype female, 6.5 mm; male not known. *Head* : exposed, deeper than long; lateral cephalic lobe large, broad, subacute; rostrum absent; eyes apparently absent. *Antenna 1* : medium length, 0.25 times body; peduncular article 1 short, length 1.4 times breadth; peduncular article 2 short, 0.37 times article 1; peduncular article 3 short, 0.17 times article 1; accessory flagellum medium length, 0.41 times primary flagellum, 4-articulate, article 1 long, 1.6 times article 2, not forming cap; flagellum 7-articulate, callynophore strong 2-field in female, without posterodistal setae or spines, without flagellar spines, calceoli absent in female. *Antenna 2* : subequal in length to antenna 1; peduncle without brush setae in female, weakly geniculate, article 3 short, 0.5 times article 4, articles 4 and 5 not enlarged in female; flagellum 7-articulate, calceoli absent in female.

Mouthpart bundle : subquadrate. *Epistome* and *upper lip* : fused, with central notch. *Mandible* : incisors symmetrical, large, with straight margins; left lacinia mobilis present, a small spine; accessory spine row without distal setal tuft or accessory spines, with a row of simple fine setae; molar a reduced smooth flap with setose margins; mandibular palp attached midway, article 1 short, length 0.9 times breadth; article 2 elongate, slender, length 2.9 times breadth, 1.1 times article 3, with 4 posterodistal A2-setae, without D2-setae; article 3 falcate, long, length 3.9 times breadth, without A3-setae, with 9 D3-setae along most of posterior margin and 2 apical E3-setae. *Maxilla 1* : inner plate tapering distally, at least half of inner margin setose, with 7 large plumose setae;

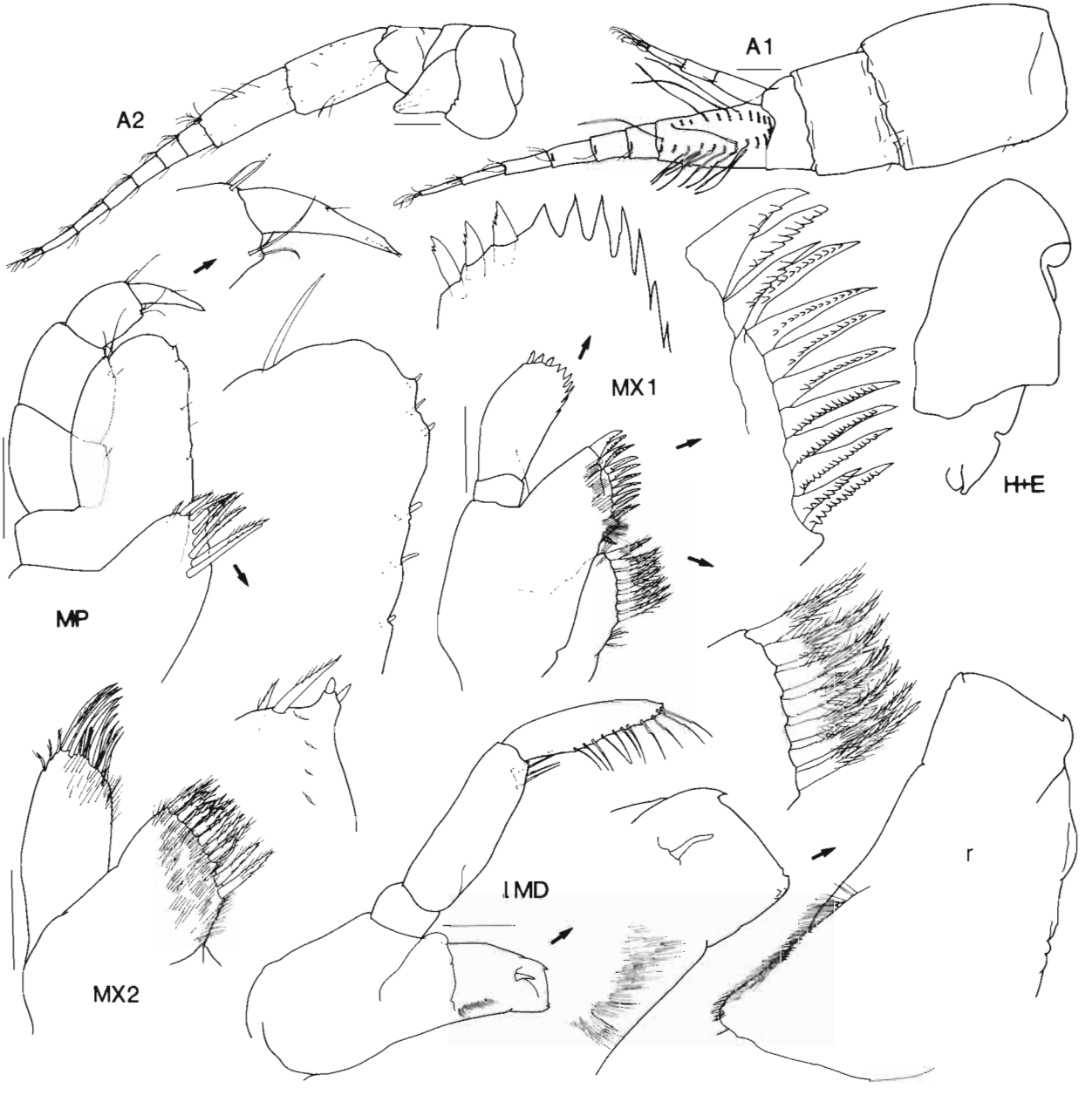

FIG. 3. — *Aristias coriolis* sp. nov., holotype female, 6.5 mm (MNHN-Am 4453), south-east of Marinduque, Sibuyan Sea, Philippine Islands. Scales represent 0.1 mm.

outer plate extremely broad with 12 spine-teeth in two rows, outer row with 10 large, slender, multicuspidate spine-teeth; inner row with 2 spine-teeth, one large, slender, multicuspidate, one short, slender, multicuspidate; palp large, 2-articulate, with serrate apical margin and 2 short terminal spines, without subterminal setae, flag spine present on distolateral corner, distomedial margin serrate. *Maxilla 2* : inner plate broad, outer plate narrow, subequal in length. *Maxilliped* : inner plate small, subrectangular, with 2 apical nodular spines, oblique setal row strong with 8 plumose setae; outer plate medium size, subovate, without subapical notch, with 1 apical simple seta, without apical spines, medial spines present, small, without submarginal setae; palp large, 4-articulate, article 2 very broad, length 1 times breadth, 1.3 times article 3; article 3 short, broad, length 1.4 times breadth; dactylus well developed, with 2 subterminal setae, unguis absent.

Gnathopod 1 : parachelate; coxa vestigial; basis long, slender, length 3.6 times breadth, anterior margin smooth, with simple setae; ischium short, length 1 times breadth; merus, posterior margin lined with long simple setae; carpus wedge-shaped, produced anteriorly, short, length 1.4 times breadth, subequal in length to propodus, with patch of very fine setae near posterior margin; propodus large, subtriangular, length 1.6 times breadth, tapering distally, posterior margin serrate, slightly concave, with 1 spine, without denticulate patch near posterior margin, palm slightly acute, margin jagged, serrate, posterodistal corner with 1 medial spine; dactylus simple, without subterminal teeth or spines. *Gnathopod 2* : minutely chelate; coxa large, subequal in size to coxa 3; ischium long, length 2.8 times breadth; carpus long, length 3.8 times breadth, posterior margin straight; propodus subrectangular, long, length 2.6 times breadth, palm obtuse, with straight, serrate margin, posterodistal corner with 1 medial spine; dactylus reaching corner of palm; posterior margin smooth.

Peraeopod 3 : coxa large; merus weakly expanded anteriorly, female merus-carpus without plumose setae; propodus without distal spur, with 2 spines along posterior margin and 2 distal locking spines; dactylus short, slender. *Peraeopod 4* : coxa deeper than wide, with weak posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly, female merus-carpus without plumose setae; propodus without distal spur, with 2 spines along posterior margin and 2 distal locking spines; dactylus short, slender. *Peraeopod 5* : coxa bilobate, posterior lobe strongly produced ventrally; basis expanded with posterior margin smooth; merus not expanded posteriorly; propodus with weak minutely denticulate surface, without distal spur, with 2 spines along anterior margin and 2 distal locking spines; dactylus short, slender. *Peraeopod 6* : coxa small, strongly lobate posteriorly; basis expanded posteriorly with smooth posterior margin; merus slightly expanded posteriorly; propodus with weak minutely denticulate surface, without distal spur, with 3 spines along anterior margin and 2 distal locking spines; dactylus short, slender. *Peraeopod 7* : basis expanded posteriorly, posterior margin almost straight, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus slightly expanded, convex posterior margin with 2 spines; propodus with minutely denticulate surface, without distal spur, with 4 spines along anterior margin and 2 distal locking spines; dactylus short, slender.

Oostegites from gnathopod 2 to peraeopod 5. *Gills* from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1 to 3 dorsally smooth. *Epimeron 1* : anteroventral corner rounded. *Epimeron 3* : posteroventral corner subquadrate. *Urosomites* : 1 to 3 dorsally smooth; urosomite 3 with small dorsolateral spine. *Uropod 1* : peduncle with 4 dorsolateral, 1 apicolateral, 1 dorsomedial and 1 apicomedial spines, without spines along distal margin; rami subequal in length; outer ramus with 1 lateral spine; inner ramus with 1 medial and 4 lateral spines. *Uropod 2* : peduncle without dorsolateral flange, with 3 dorsolateral, 1 apicolateral and 1 apicomedial spines, without spines along distal margin; outer ramus 0.8 times as long as inner ramus, outer ramus with 1 lateral spine in weak acclivity; inner ramus with 1 medial and 3 lateral spines, without constriction. *Uropod 3* : peduncle short, length 1.2 times breadth, without dorsolateral flange, with 1 apicolateral and 1 apicomedial spines, without midlateral spines or setae, with 2 distoventral spines, without plumose setae; rami lanceolate, inner ramus reduced, about 0.8 times outer ramus, outer ramus 2-articulate, article 2 short, article 1 with 1 lateral spine; inner ramus without spines; plumose setae absent in female. *Telson* : as long as broad, deeply cleft (64%), with 1 dorsal spine on each lobe, without dorsal simple setae; distal margins incised, without marginal penicillate setae, with 1 simple marginal seta and 1 marginal spine on each lobe.

ETYMOLOGY. — The specific name refers to the R.V. "*Coriolis*".

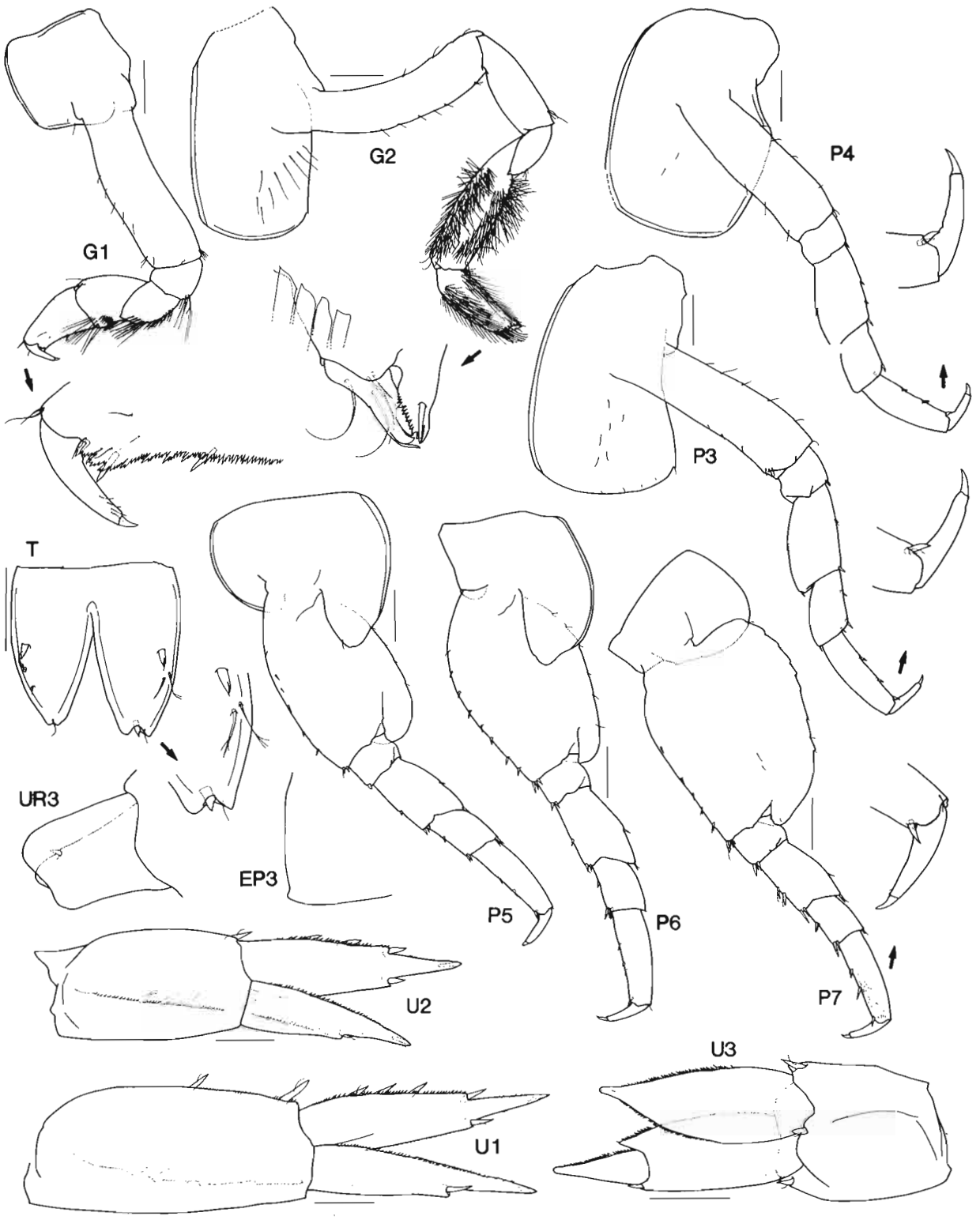

FIG. 4. — *Aristias coriolis* sp. nov., holotype female, 6.5 mm (MNHN-Am 4453), south-east of Marinduque, Sibuyan Sea, Philippine Islands. Scales for U1-3, T represent 0.1 mm, remainder represent 0.2 mm.

REMARKS. — According to BARNARD & KARAMAN (1991) there are 21 species of *Aristias*. The differences between them appear to be subtle. From material we have examined there are good differences in mouthpart morphology, particularly in the number of spine-teeth on maxilla 1, but this is not well documented in the literature. Only five species of *Aristias* do not have eyes : *A. adrogans* J.L. Barnard, 1964, *A. expers* J. L. Barnard, 1967, *A. falcatus* Stephensen, 1923, *A. stenopodus* Ledoyer, 1986 and *A. topsenti* Chevreux, 1900. Four of these species, *A. adrogans, A. falcatus, A. stenopodus* and *A. topsenti* have a well developed spur on the propodus of peraeopods 3 to 7. Only *A. expers* and *A. coriolis* do not have spurs. *Aristias expers* differs from *A. coriolis* in having four plumose setae on the inner plate of maxilla 1, a narrowly rounded posteroventral corner on epimeron 3 and a slightly cleft telson.

DISTRIBUTION. — *Aristias coriolis* is known only from the Sibuyan Sea, Philippine Islands, in 1650 to 1680 m depth.

Aristias verdensis sp. nov.

Figs 5-7

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 2 : stn DR 33, 13°32.3'N, 121°07.5'E, Verde Island Passage, off the western side of Verde Island, 130-137 m, 24 November 1980 : 1 ♀, 2 mm, ovigerous (2 large eggs) (MNHN-Am 4451).

TYPES. — The unique specimen is the holotype.

DIAGNOSIS. — Eyes large, oval. Antenna 1 : accessory flagellum 2-articulate. Mandible : incisors asymmetrical, left margin minutely serrate; left lacinia mobilis a short, smooth peg. Maxilla 1 : outer plate with 8 spine-teeth; inner plate with 4 plumose setae along inner margin. Peraeopods 5 and 6 : coxae strongly lobate posteriorly. Peraeopods 3 to 6 (peraeopod 7 not known) : propodus with distal spurs. Epimeron 3 : posteroventral corner narrowly rounded. Uropod 3 : outer ramus with short article 2. Telson deeply cleft.

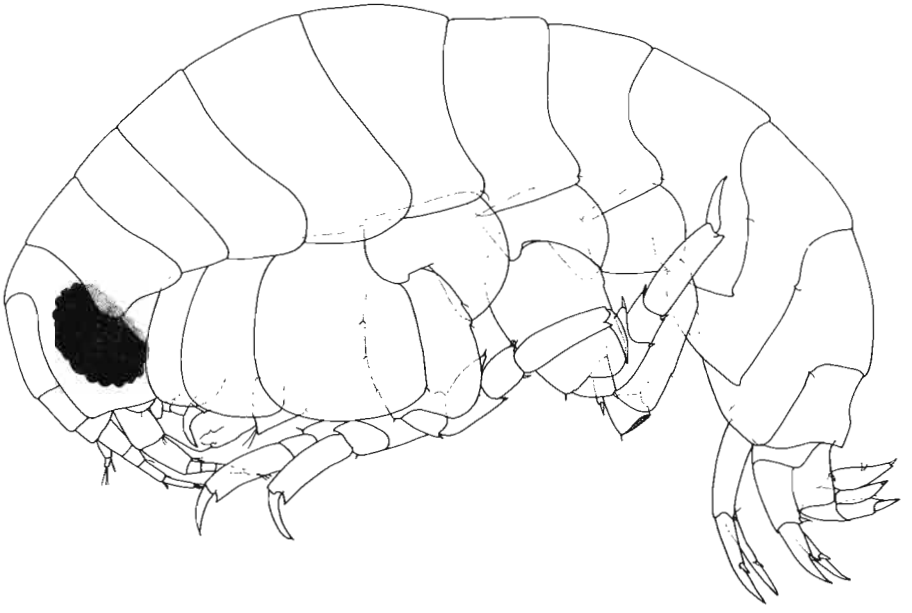

FIG. 5. — *Aristias verdensis* sp. nov., holotype female, 2 mm (MNHN-Am 4451), off western side of Verde Island, Verde Island Passage, Philippine Islands.

DESCRIPTION. — Based on holotype female, 2 mm; male not known. *Head* : exposed, deeper than long; lateral cephalic lobe large, broad, subacute; rostrum absent; eyes oval (brown in alcohol). *Antenna 1* : medium length, 0.23 times body; peduncular article 1 short, length 1.4 times breadth; peduncular article 2 short, 0.39 times

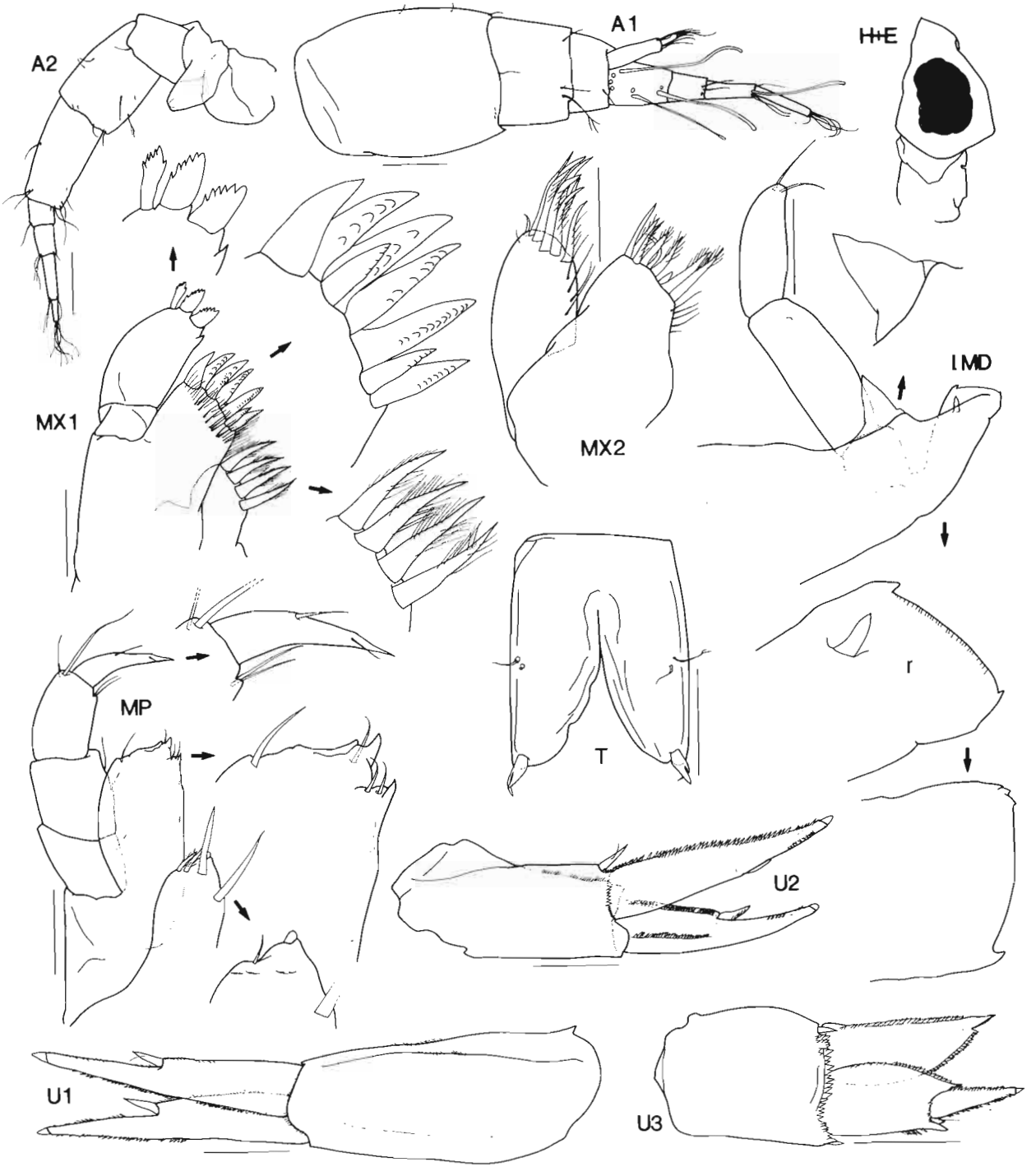

FIG. 6. — *Aristias verdensis* sp. nov., holotype female, 2 mm (MNHN-Am 4451), off western side of Verde Island, Verde Island Passage, Philippine Islands. Scales represent 0.05 mm.

article 1; peduncular article 3 long, 0.23 times article 1; accessory flagellum medium length, 0.37 times primary flagellum, 2-articulate, article 1 long, 3.2 times article 2, not forming cap; flagellum 4-articulate, callynophore weak 1-field in female, without posterodistal setae or spines, without flagellar spines, calceoli absent in female. *Antenna 2* : slightly longer than antenna 1; peduncle without brush setae in female, weakly geniculate, article 3 short, 0.55 times article 4, peduncular articles 4 and 5 not enlarged in female; flagellum 4-articulate, calceoli absent in female.

Mouthpart bundle : subquadrate. *Epistome* and *upper lip* : fused, with central notch. *Mandible* : incisors asymmetrical, large with straight margins, left margin minutely serrate, left lacinia mobilis present, a short smooth peg, accessory spine row absent; molar a reduced smooth flap without setose margins; mandibular palp attached midway; article 1 short, length 1 times breadth; article 2 elongate, slender, length 2.5 times breadth, 1.2 times article 3, with 1 posterodistal A2-seta (broken on left mandible), without D2-setae; article 3 falcate, long, length 2.9 times breadth, without A3- or D3-setae, with 2 apical E3-setae. *Maxilla 1* : inner plate tapering distally, at least half of inner margin setose, with 4 large plumose setae; outer plate extremely broad with 8 spine-teeth in two rows; outer row with 6 spine-teeth, first 3 large, stout, weakly to multicuspidate, remainder large, slender, multicuspidate; inner row with 2 spine-teeth, both large, slender, 5-cuspidate; palp large, 2-articulate, with 2 long terminal spines, without subterminal setae, flag spine present on distolateral corner, distomedial margin serrate (one cusp). *Maxilla 2* : inner plate broad, outer plate narrow, subequal in length. *Maxilliped* : inner plate small, subrectangular, with 1 apical nodular spine, oblique setal row reduced with 4 plumose setae; outer plate small, subrectangular, without subapical notch, with 1 apical simple seta, without apical or medial spines, submarginal setae short, simple; palp large, 4-articulate, article 2 very broad, length 1.1 times breadth, 0.9 times article 3, article 3 short, broad, length 1.7 times breadth, dactylus well developed, with 2 subterminal setae, unguis absent.

Gnathopod 1 : parachelate; coxa vestigial; basis long, slender, length 3.3 times breadth, anterior margin smooth, without setae; ischium short, length 1.3 times breadth; merus, posterior margin with patch of short setae; carpus wedge-shaped, produced anteriorly, short, length 1.1 times breadth, shorter than (0.73 times) propodus, with long simple setae along posterior margin; propodus large, subtriangular, length 1.7 times breadth, tapering distally, posterior margin serrate, slightly concave, with 2 spines, without denticulate patch near posterior margin, palm slightly acute, margin straight, serrate, posterodistal corner without spines; dactylus simple, without subterminal teeth or spines. *Gnathopod 2* : minutely chelate; coxa large, subequal in size to coxa 3; ischium long, length 2.7 times breadth; carpus long, length 2.8 times breadth, posterior margin straight; propodus sub-rectangular, long, length 2.1 times breadth, palm obtuse, with straight, serrate margin, posterodistal corner with 2 medial spines; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3 : coxa large; merus weakly expanded anteriorly, female merus-carpus without plumose setae; propodus with small posterodistal spur, without spines along anterior margin; dactylus short, slender. *Peraeopod 4* : coxa deeper than wide, with weak posteroventral lobe, anterior and posterior margins subparallel; merus weakly expanded anteriorly, female merus-carpus without plumose setae; propodus with small posterodistal spur, without spines along anterior margin; dactylus short, slender. *Peraeopod 5* : coxa bilobate, posterior lobe strongly produced ventrally; basis expanded with posterior margin smooth, slightly expanded posteriorly; propodus without minutely denticulate surface, with small anterodistal spur, without spines along anterior margin; dactylus short, slender. *Peraeopod 6* : coxa small, strongly lobate posteriorly; basis expanded posteriorly with smooth posterior margin; merus slightly expanded posteriorly; propodus without minutely denticulate surface, with small anterodistal spur, without spines along anterior margin; dactylus short, slender. *Peraeopod 7* : basis expanded posteriorly, posterior margin slightly rounded proximally, straight distally, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus expanded distally with straight posterior margin; propodus and dactylus not known.

Oostegites : from gnathopod 2 to peraeopod 5. *Gills* : from gnathopod 2 to peraeopod 6, not pleated.

Pleonites 1 to 3 : dorsally smooth. *Epimeron 1* : anteroventral corner rounded. *Epimeron 3* : posteroventral corner narrowly rounded. *Urosomites* : 1 to 3 dorsally smooth; urosomite 3 with small dorsolateral spine. *Uropod 1* : peduncle with 1 apicolateral and 1 apicomedial spines, without plumose setae or spines along distal margin; rami subequal in length; outer ramus and inner ramus each with 1 dorsal spine. *Uropod 2* : peduncle

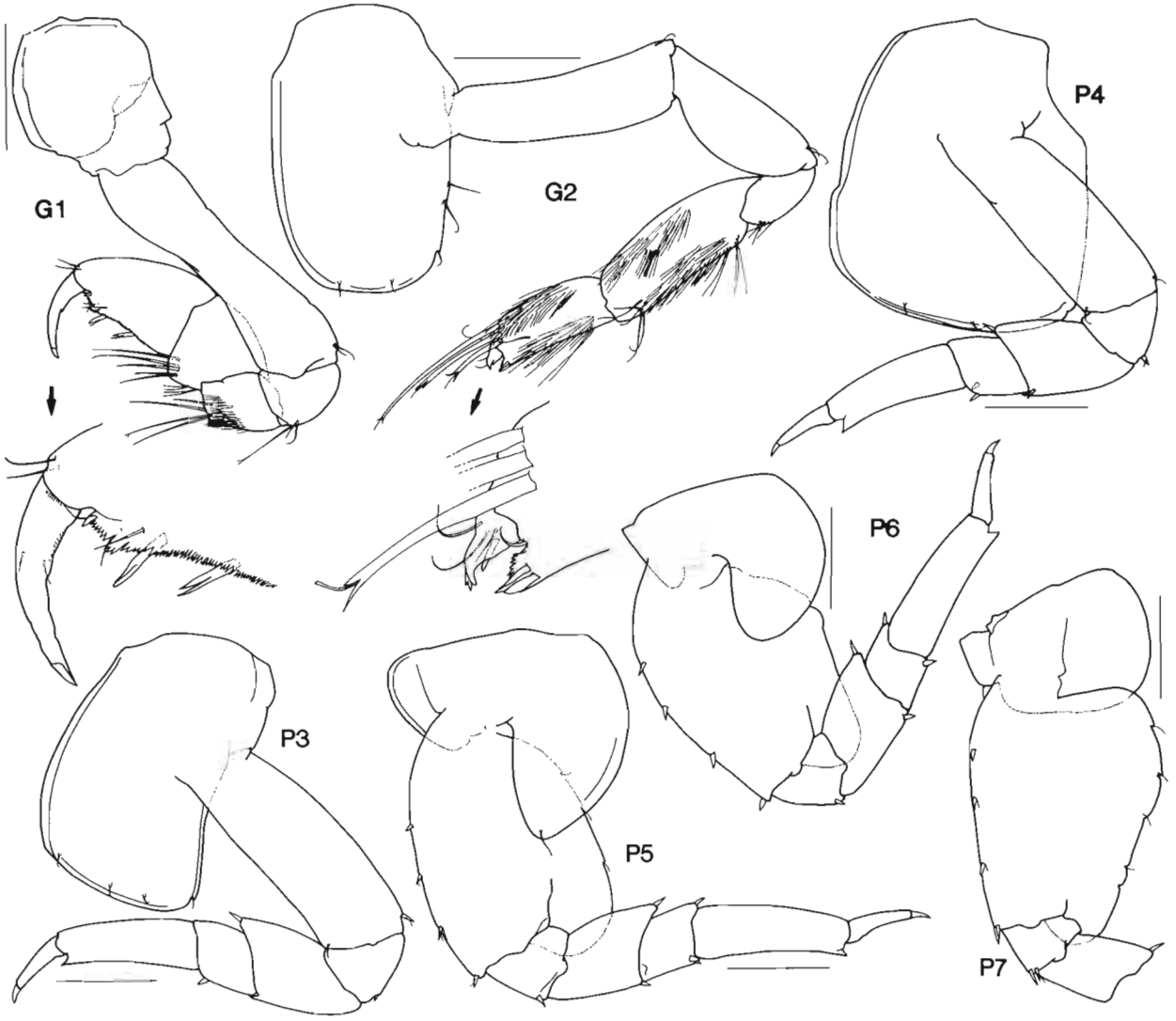

FIG. 7. — *Aristias verdensis* sp. nov., holotype female, 2 mm (MNHN-Am 4451), off western side of Verde Island, Verde Island Passage, Philippine Islands. Scales represent 0.1 mm.

without dorsolateral flange, with 1 apicolateral and 1 apicomedial spines, without plumose setae or spines along distal margin; outer ramus 0.86 times as long as inner ramus, outer and inner ramus each with 1 dorsal spine; inner ramus without constriction. *Uropod 3* : peduncle short, length 1.1 times breadth, without dorsolateral flange, with 1 apicolateral and 1 apicomedial spines, without midlateral spines or setae, without distoventral spines or plumose setae; rami lanceolate, subequal in length, outer ramus 2-articulate, article 2 short; rami without spines; plumose setae absent in female. *Telson* : 1.5 times as long as broad, deeply cleft (67%), without dorsal spines or simple setae; distal margins truncated, without marginal setae, with 1 marginal spine on each lobe.

ETYMOLOGY. — The specific name refers to the type locality.

REMARKS. — LEDOYER'S (1972) table and subsequent descriptions show that only seven species of *Aristias* have a small number of articles in the primary and accessory flagella of antenna 1, and of these species three have no eyes. Of the remaining four species with eyes, two (*A. megalops* Sars, 1891 and *A. microps* Sars, 1891) occur in the north-eastern Atlantic Ocean. *Aristias microps* differs from *A. verdensis* in its very poorly developed eyes

and less well developed posterior lobes on coxae 5 and 6. From what is known of *A. megalops* it appears to be very closely related to *A. verdensis*, but nothing is known of its mouthparts. *Aristias megalops* differs from *A. verdensis* in the posterior lobe on coxa 5 which is less well developed, the posteroventral corner of epimeron 3 which is acutely produced and the telson which is shorter. The remaining two species (*A. nonspinus* Hirayama, 1985 and *A. tropicus* Schellenberg, 1938) occur in the Pacific Ocean. *Aristias nonspinus* differs from *A. verdensis* in the left mandible which has no lacinia mobilis, maxilla 1 which has two setae on the inner plate and six spine-teeth on the outer plate, coxa 5 which is equilobate, the posteroventral corner of epimeron 3 which has a minute tooth and the telson which has no terminal spines. Geographically, the closest species is *A. tropicus* from the Bismarck Archipelago off northern New Guinea. This species is not well known, but differs from *A. verdensis* in having the posteroventral corner of epimeron 3 subacute and the second article of the ramus of uropod 3 as long as the first.

DISTRIBUTION. — *Aristias verdensis* is known only from the Verde Island Passage, Philippine Islands in 130-135 m depth.

Genus ***CYPHOCARIS*** Boeck, 1871

Cyphocaris faurei K. H. Barnard, 1916

Cyphocaris faurei K. H. Barnard, 1916 : 117, pl. 26, fig. 4. — PIRLOT, 1933 : 128. — LOWRY & BULLOCK, 1976 : 88. — LEDOYER, 1986 : 738, fig. 284.

MATERIAL EXAMINED. — **Indonesia.** CORINDON 2 : stn CH 220, 0°14'N, 118°12'E, northern Makassar Strait, 2350 m, 2 November 1980 : 1 ♀, 22 mm, ovigerous (MNHN-Am 4454).
KARUBAR : stn CC 21, 05°14'S, 133°00'E, Kai Islands, 688-694 m, 25 October 1991 : 1 ♀.

REMARKS. — This is the second record of *C. faurei* from Indonesian waters. PIRLOT (1933) recorded it from the Molucca Strait.

DISTRIBUTION. — Cosmopolitan in bathyal and abyssal depths.

Genus ***EUCALLISOMA*** J. L. Barnard, 1961

Eucallisoma J. L. Barnard, 1961 : 32. — BARNARD & KARAMAN, 1991 : 484.

DIAGNOSIS. — Mandible : left lacinia mobilis present; molar a small articulating flap at base of large excavate corpus mandibularis; palp attached midway. Maxilla 1 : spine-teeth on outer plate in 7/4 arrangement; palp large, 2-articulate. Maxilla 2 : inner plate broad, outer plate narrow. Maxilliped : inner plate with well developed apical nodular spines; outer plate with apical setae and large medial spines. Gnathopod 1 simple; basis swollen, glandular; dactylus reduced. Peraeopod 5 : coxa broader than deep; basis subovate. Uropod 3 short, rami with plumose setae, outer ramus 2-articulate. Telson deeply cleft.

TYPE SPECIES. — *Eucallisoma glandulosa* J.L. Barmard, 1961 by original designation.

REMARKS. — *Eucallisoma* differs from all genera in the scopelocheirid group in having a glandular basis on gnathopod 1. *Eucallisoma* has a similar maxilla 1 spine-tooth arrangement to *Aroui, Paracallisoma* and *Scopelocheirus*. *Aroui* and *Scopelocheirus* both differ from *Eucallisoma* in having a triturating molar and *Aroui* has a unique second maxilla. *Paracallisoma* and *Eucallisoma* are very similar. Aside from gnathopod 1, *Paracallisoma* has a better developed lacinia mobilis than does *Eucallisoma*.

DISTRIBUTION. — *Eucallisoma* is known from the South Atlantic Ocean and the south-western Pacific Ocean in 800 to 4000 m depth.

Eucallisoma barnardi sp. nov.

Figs 8-10

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 2 : stn CP 50, 13°36.7-38.1'N, 120°33.7-32.3'E, eastern entrance to Verde Island Passage, 810-820 m, 27 November 1980 : 1 ♀, 40 mm, with non-setose oostegites (MNHN-Am 4449).

TYPES. — The unique specimen is the holotype.

DIAGNOSIS. — Head with lateral cephalic lobe large, broad, subacute. Antenna 1 : accessory flagellum with well developed article 2. Maxilliped : palp article 1 enlarged, articles 2 to 4 reduced. Gnathopod 1 : carpus and propodus very long and slender. Coxa 4 : posteroventral lobe acutely produced. Epimeron 3 : posteroventral corner broadly rounded.

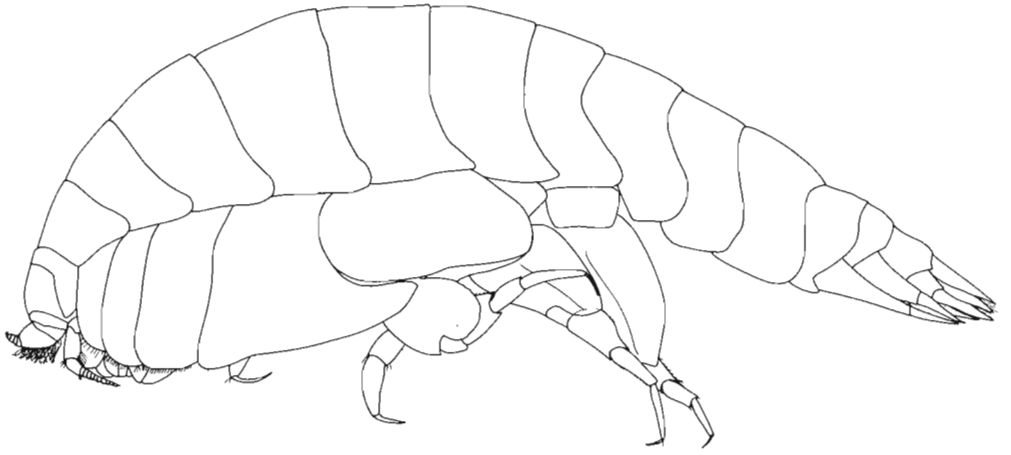

FIG. 8. — *Eucallisoma barnardi* sp. nov., holotype female, 40 mm (MNHN-Am 4449), eastern entrance to Verde Island Passage, Philippine Islands.

DESCRIPTION. — Based on holotype female, 40 mm; male not known. *Head* : exposed, deeper than long; lateral cephalic lobe large, broad, subacute; rostrum absent; eyes apparently absent. *Antenna 1* : short, 0.1 times body; peduncular article 1 short, length 0.8 times breadth, with small midmedial swelling, with short posterodistal tooth; peduncular article 2 short, 0.25 times article 1; peduncular article 3 short, 0.13 times article 1; accessory flagellum medium length, 0.37 times primary flagellum, 2-articulate, article 1 long, 1.5 times article 2, not forming cap; flagellum at least 7-articulate, callynophore strong 2-field in female, without posterodistal setae or spines, without flagellar spines, calceoli absent in female. *Antenna 2* : slightly longer than antenna 1; peduncle without brush setae in female, article 1 greatly enlarged, not covering article 2, peduncle in female weakly geniculate, article 3 short, 0.31 times article 4, articles 4 and 5 not enlarged in female; flagellum 12-articulate, calceoli absent in female.

Mouthpart bundle : subquadrate. *Epistome* and *upper lip* : separate, epistome strongly produced, rounded, upper lip not produced, straight. *Mandible* : incisors symmetrical, large, with straight margins, left lacinia mobilis present, a cuspidate peg; accessory spine row without distal setal tuft, left and right with 3 short, stout, simple spines, without intermediate setae; molar a small articulating flap at base of large excavate corpus mandibularis; mandibular palp attached midway, article 1 short, length 0.8 times breadth; article 2 broadened proximally, length

3.9 times breadth, 1.4 times article 3, without A2-setae, with many D2-setae along most of posterior margin; article 3 broadened medially, long, length 3.6 times breadth, without A3-setae, with 37 distal D3-setae and 3 apical

FIG. 9. — *Eucallisoma barnardi* sp. nov., holotype female, 40 mm (MNHN-Am 4449), eastern entrance to Verde Island Passage, Philippine Islands. Scales represent 0.5 mm.

E3-setae. *Maxilla 1* : inner plate tapering distally, inner margin fully setose, with 26 plumose setae; outer plate broad with 11 spine-teeth in 7/4 arrangement; outer row with ST1 large, slender, without cusps, ST2-ST6, large, slender, 1-cuspidate, ST7 slightly displaced from ST6, large, slender, without cusps; inner row with STA large, slender, displaced from STB-STD, without cusps, STB-STC long, slender, apically bifurcate, STD long, slender, without cusps; palp large, 2-articulate, with 4 short terminal spines, with 1 subterminal seta, flag spine present on distolateral corner, distomedial margin smooth. *Maxilla 2* : inner plate broad, outer plate narrow, inner plate 0.88 times length outer plate. *Maxilliped* : inner plate large, subrectangular, with 3 apical nodular spines and 2 subapical spines, oblique setal row strong with 21 plumose setae; outer plate large, subovate, with 14 apical plumose setae, without apical spines, medial spines present, large, submarginal setae short, simple; palp large, 4-articulate, article 1 enlarged, articles 2 to 4 reduced; article 2 extremely slender, length 3.3 times breadth, 1.9 times article 3, article 3 short, slender, length 2.8 times breadth; dactylus vestigial, with 2 subterminal setae, unguis present.

Coxae 1 to 4 : with setal fringe along ventral margin. *Gnathopod 1* : simple; coxa large, nearly as long as coxa 2, anterior margin slightly convex, anteroventral corner rounded, posterior margin angled towards anterior margin; basis swollen, glandular, length 1.7 times breadth, anterior margin smooth, without setae; ischium long, length 2.2 times breadth; merus, posterior margin without setae; carpus subrectangular, very long, length 4.7 times breadth, longer than (1.8 times) propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length 5.3 times breadth, tapering distally, posterior margin smooth, straight, without spines or setae, without denticulate patch near posterior margin, palm absent; dactylus complex, extremely reduced, blunt subterminal tooth with minute aperture. *Gnathopod 2* : minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length 3.6 times breadth; carpus very long, length 4.4 times breadth, posterior margin straight; propodus subrectangular, long, length 3 times breadth, palm transverse, with convex, rugose margin, posterodistal corner without spines; dactylus overreaching corner of palm, posterior margin serrate.

Peraeopod 3 : coxa large; merus not expanded anteriorly; female merus-carpus without plumose setae; propodus with 15 setae along posterior margin; dactylus long, slender. *Peraeopod 4* : coxa deeper than wide, with acutely produced posteroventral lobe, anterior margin straight, obtusely angled, posterior margin sloping anteriorly; merus not expanded anteriorly; female merus-carpus without plumose setae; propodus with 9 setae along posterior margin; dactylus long, slender. *Peraeopod 5* : coxa equilobate, broader than deep; basis expanded with posterior margin smooth; merus expanded with rounded posteroproximal shoulder and straight posterior margin; propodus with 15 spines along anterior margin; dactylus short, slender. *Peraeopod 6* : coxa small, not lobate posteriorly; basis expanded posteriorly with minutely crenate posterior margin; merus expanded with rounded posteroproximal shoulder, posterior margin straight proximally, excavate distally; propodus with 13 spines along anterior margin, 20 spines along posterior margin; dactylus not known. *Peraeopod 7*: basis expanded posteriorly, posterior margin almost straight, minutely crenate, posteroventral corner subquadrate, posteroventral margin rounded; merus expanded proximally, posterior margin straight, converging distally, with 12 setae; propodus with 15 spines along anterior margin; dactylus short, slender.

Oostegites from gnathopod 2 to peraeopod 5. *Gills* from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1 to 3 dorsally smooth. *Epimeron 1* : anteroventral corner subquadrate. *Epimeron 3* : posteroventral corner broadly rounded. *Urosomites* : 1 to 3 dorsally smooth. *Urosomite 3* : without dorsolateral spine. *Uropod 1* : peduncle with 17 dorsolateral, 1 apicolateral, 21 dorsomedial and 1 apicomedial spines, without spines along distal margin; rami subequal in length; outer ramus with 17 lateral and 9 medial spines; inner ramus with 18 medial and 10 lateral spines. *Uropod 2* : peduncle without dorsolateral flange, with 1 dorsolateral, 1 apicolateral, 17 dorsomedial and 1 apicomedial spines, without plumose setae, without spines along distal margin; outer ramus 0.9 times as long as inner ramus, outer ramus with 18 lateral and 13 medial spines; inner ramus with 19 medial and 13 lateral spines, without constriction. *Uropod 3* : peduncle short, length 1.2 times breadth, without dorsolateral flange, with 1 apicomedial spine, without midlateral or distoventral spines or setae, without plumose setae; rami lanceolate, inner ramus reduced, about 0.9 times outer ramus; outer ramus 2-articulate, article 2 short (tip broken), article 1 with 8 lateral and 8 medial spines; inner ramus with 3 lateral spines; plumose setae present in female. *Telson* : triangular, length 1.5 times breadth, deeply cleft (67%), without dorsal spines or simple setae; distal margins rounded, without marginal setae, with 1 marginal spine on each lobe.

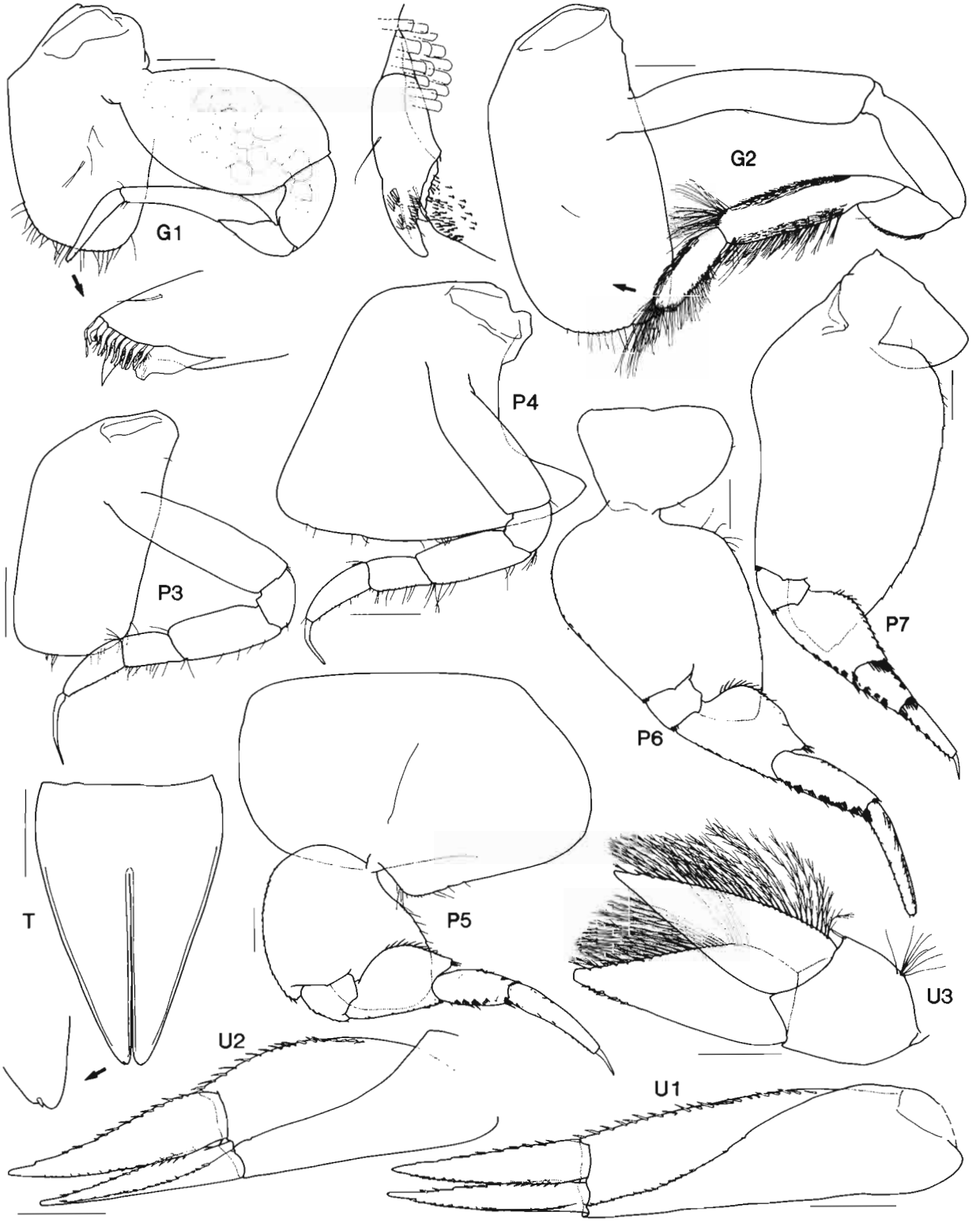

FIG. 10. — *Eucallisoma barnardi* sp. nov., holotype female, 40 mm (MNHN-Am 4449), eastern entrance to Verde Island Passage, Philippine Islands. Scales represent 1.0 mm.

ETYMOLOGY. — This species is named in remembrance of Jerry BARNARD, who, among his many distinguished accomplishments, originally described this extraordinary genus.

REMARKS. — This is only the second species described in the genus *Eucallisoma* and the first record of the genus outside the Atlantic Ocean. Although there is no doubt that this species belongs in *Eucallisoma* it shows strong differences from *E. glandulosa* J. L. Barnard, 1961. *Eucallisoma barnardi* has a much better developed lateral cephalic lobe, the maxilla 1 spine-teeth are less cuspidate, article 1 of the maxillipedal palp is grossly enlarged and article 2 is long and slender, on gnathopod 1 the articulation between the basis and merus is more conventional and the carpus and propodus are longer and more slender, the merus of peraeopods 5 to 7 is more broadly expanded posteriorly, uropod 3 is shorter and more robust and the telson is more triangular.

The basis of gnathopod 1 is large and filled with glandular tissue. It is possible to trace a duct from the distal section of this glandular tissue through the distal articles of the gnathopod. This duct appears to open through a minuscule aperture on the dactylus. The dactylus is greatly reduced, but the aperture appears to be placed on the subterminal tooth, proximal to the tip of the dactylus. *Eucallisoma glandulosa* also has glandular tissue in the basis of gnathopod 1.

DISTRIBUTION. — *Eucallisoma barnardi* is known only from Verde Island Passage, Philippine Islands, in 810 to 820 m depth.

Genus ***EURYTHENES*** Smith, 1882

Eurythenes gryllus (Lichtenstein, 1822)

Gammarus gryllus Lichtenstein, 1822 : 34. — J. L. BARNARD, 1961 : 35, figs 5-7. — LOWRY & BULLOCK, 1976 : 89.

MATERIAL EXAMINED. — **Indonesia**. KARUBAR : stn CC 57, 08°19'S, 131°53'E, Tanimbar Island, 603-620 m, 31 October 1991 : 1 ♀, 24 mm.

REMARKS. — BIRSTEIN and VINOGRADOV (1960) have reported *E. gryllus* from the Philippine Sea and from the Bougainville Trench, but this is the first record of the species in Indonesian waters.

DISTRIBUTION. — Cosmopolitan in the deep-sea.

Genus ***FIGORELLA*** J. L. Barnard, 1962

Figorella corindon sp. nov.

Figs 11-12

MATERIAL EXAMINED. — **Indonesia**. CORINDON 2 : stn B 236, 00°6.7'N, 119°45.5'E, south of Manimbaya, northern Makassar Strait, 1730 m, 4 November 1980 : 1 ♀, 3 mm, with oostegite buds (MNHN-Am 4457).

TYPES. — The unique specimen is the holotype.

DIAGNOSIS. — Maxilla 1 outer plate with 9 spine-teeth. Gnathopod 1 : posterodistal corner of propodus projecting with tiny spine. Peraeopod 5 : basis round. Uropod 3 : inner ramus reduced, as long as article 1 of outer ramus. Telson : emarginate with rounded posterior margin with penicillate setae.

DESCRIPTION. — Based on holotype female, 3 mm; male not known. *Head* : exposed, slightly longer than deep, ventrally truncated with straight ventral margin; lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes apparently absent. *Antenna 1* : short, 0.14 times body; peduncular article 1 short, length 1.25 times

breadth, without dorsal crest, tooth on distomedial margin, posterodistal tooth or anterodistal projection; peduncular article 2 short, 0.3 times article 1; peduncular article 3 long, 0.25 times article 1; accessory flagellum very short, 0.22 times primary flagellum, 2-articulate, article 1 short, 1.3 times article 2, not forming cap; flagellum 7-articulate, callynophore and calceoli absent in female. *Antenna 2* : subequal in length to antenna 1; peduncle without brush setae, strongly geniculate between peduncular articles 3-4, article 3 long, 0.77 times article 4, peduncular articles 4 and 5 not enlarged; flagellum 7-articulate, without thick setal brush, calceoli absent.

Mouthpart bundle : quadrate, projecting anteriorly. *Epistome* and *upper lip* : fused, straight. *Mandible* : incisors symmetrical, small, with slightly convex margins; left lacinia mobilis present, a short smooth peg; accessory spine row without distal setal tuft, left and right rows each with 3 short, slender, simple spines, without intermediate setae; lamina dentata absent; molar absent; mandibular palp attached midway, article 1 short, length 1 times breadth; article 2 short, broad, length 2 times breadth, 0.9 times article 3, without D2-setae, with 1 posterodistal A2-seta; article 3 slender, distally truncate, long, length 3 times breadth, without A3-setae, with 4 distal D3-setae on posterior margin and 2 apical E3-setae. *Maxilla 1* : inner plate narrow with 1 large and 2-4 small simple apical setae; outer plate narrow with 9 spine-teeth in modified 7/4 arrangement; outer row with ST1-ST3 large, stout, smooth to weakly cuspidate, ST4 small, stout, 1-cuspidate, ST5 small, stout, 3-cuspidate, ST6-ST7 absent; inner row with STA displaced from STB-STD, STA-STD small, slender, without cusps; palp moderate size, 2-articulate, with 2 apical setae, flag spine absent, distomedial margin smooth. *Maxilla 2* : inner and outer plates narrow; inner plate 0.64 times length outer plate. *Maxilliped* : inner plate small, subovate, without apical nodular spines, oblique setal row absent; outer plate large, subovate, without subapical notch, apical setae, apical spines or medial spines, submarginal setae vestigial; palp large, 4-articulate, article 2 broad, length 0.9 times breadth, 0.6 times article 3; article 3 short, slender, length 1.8 times breadth; dactylus well developed, with 2 subterminal setae, unguis absent.

Gnathopod 1 : chelate; coxa large, as long as coxa 2, anterior margin straight, diverging distally from posterior margin; basis short, broad, length 1.7 times breadth, anterior margin smooth, without setae; ischium short, length 1.1 times breadth; merus, posterior margin lined with setae; carpus extremely compressed, hidden by propodus; propodus massive, subrectangular, length 1.8 times breadth, margins subparallel, posterior margin smooth, concave, with setae, palm obtuse, margin convex, smooth, posterodistal corner produced with simple spine; dactylus simple, without subterminal teeth or spines. *Gnathopod 2* : minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length 2.9 times breadth; carpus long, length 2.7 times breadth, posterior margin straight; propodus subrectangular, long, length 2 times breadth, palm acute, with straight, serrate margin, posterodistal corner without spines; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3 : coxa large; female merus-carpus without plumose setae; propodus with 2 small setae and 1 distal spine along posterior margin; dactylus long, slender. *Peraeopod 4* : coxa with large posteroventral lobe, anterior margin rounded, posterior margin sloping anteriorly; female merus-carpus without plumose setae; propodus with 2 small setae and 1 spine along posterior margin; dactylus long, slender. *Peraeopod 5* : coxa equilobate; basis expanded with posterior margin smooth; merus broadly expanded with rounded posteroproximal shoulder and straight posterior margin; propodus with 2 small setae and 1 spine along anterior margin; dactylus long, slender. *Peraeopod 6* : coxa small, slightly lobate posteriorly, basis expanded posteriorly with smooth posterior margin; merus broadly expanded with rounded posteroproximal shoulder and straight posterior margin; propodus with 1 small seta and 1 distal spine along anterior margin; dactylus long, slender. *Peraeopod 7* : basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus distally expanded, slightly convex posterior margin with 2 setae; propodus without minutely denticulate surface, with 1 spine along anterior margin; dactylus long, slender.

Oostegites from gnathopod 2 to peraeopod 5. *Gills* from gnathopod 2 to peraeopod 6, not pleated.

Pleonites 1 to 3 dorsally smooth. *Epimeron 1* : anteroventral corner rounded. *Epimeron 3* : posteroventral corner broadly rounded. *Urosomites* : 1 to 3 dorsally smooth. *Urosomite 3* : without small dorsolateral spine. *Uropod 1* : peduncle with 1 apicolateral and 1 apicomedial spines; outer ramus slightly longer than inner ramus; rami without spines. *Uropod 2* : peduncle without large dorsolateral flange; peduncle with 1 apicolateral and 1 apicomedial spines; rami subequal in length, inner ramus without spines or constriction. *Uropod 3* : peduncle short, length 1.3 times breadth, without dorsolateral flange, without dorsal, midlateral or distoventral spines; rami

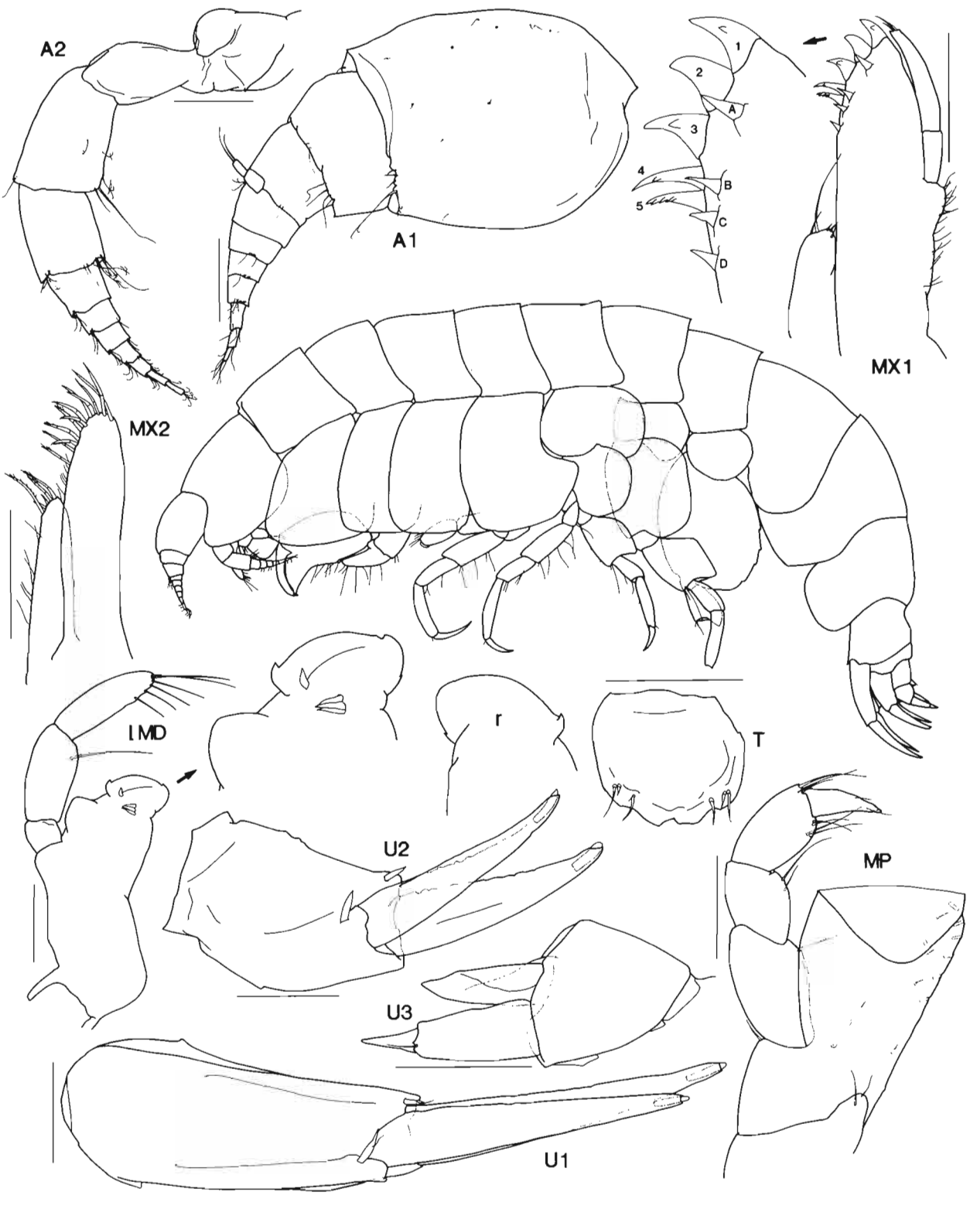

FIG. 11. — *Figorella corindon* sp. nov., holotype female, 3 mm (MNHN-Am 4457), south of Manimbaya, northern Makassar Strait, Indonesia. Scales represent 0.1 mm.

lanceolate, inner ramus reduced, about 0.67 times outer ramus; outer ramus 2-articulate, article 2 short; rami without spines; plumose setae absent. *Telson* : as long as broad, entire, without dorsal spines or simple setae; distal margin rounded, with 6 marginal penicillate setae, without simple marginal setae or spines.

ETYMOLOGY. — This species is named for the CORINDON Expedition which collected the type material.

REMARKS. — *Figorella corindon* is very closely related to *F. tasmanica* Lowry, 1984, but can be distinguished by the number of spine-teeth on maxilla 1, the produced posterodistal corner of gnathopod 1 propodus, and the shape of the basis of peraeopod 5. It is distinguished from *F. tanidea* by the shape of the merus of peraeopod 5 and the length of the posteroventral lobe on peraeopod 6.

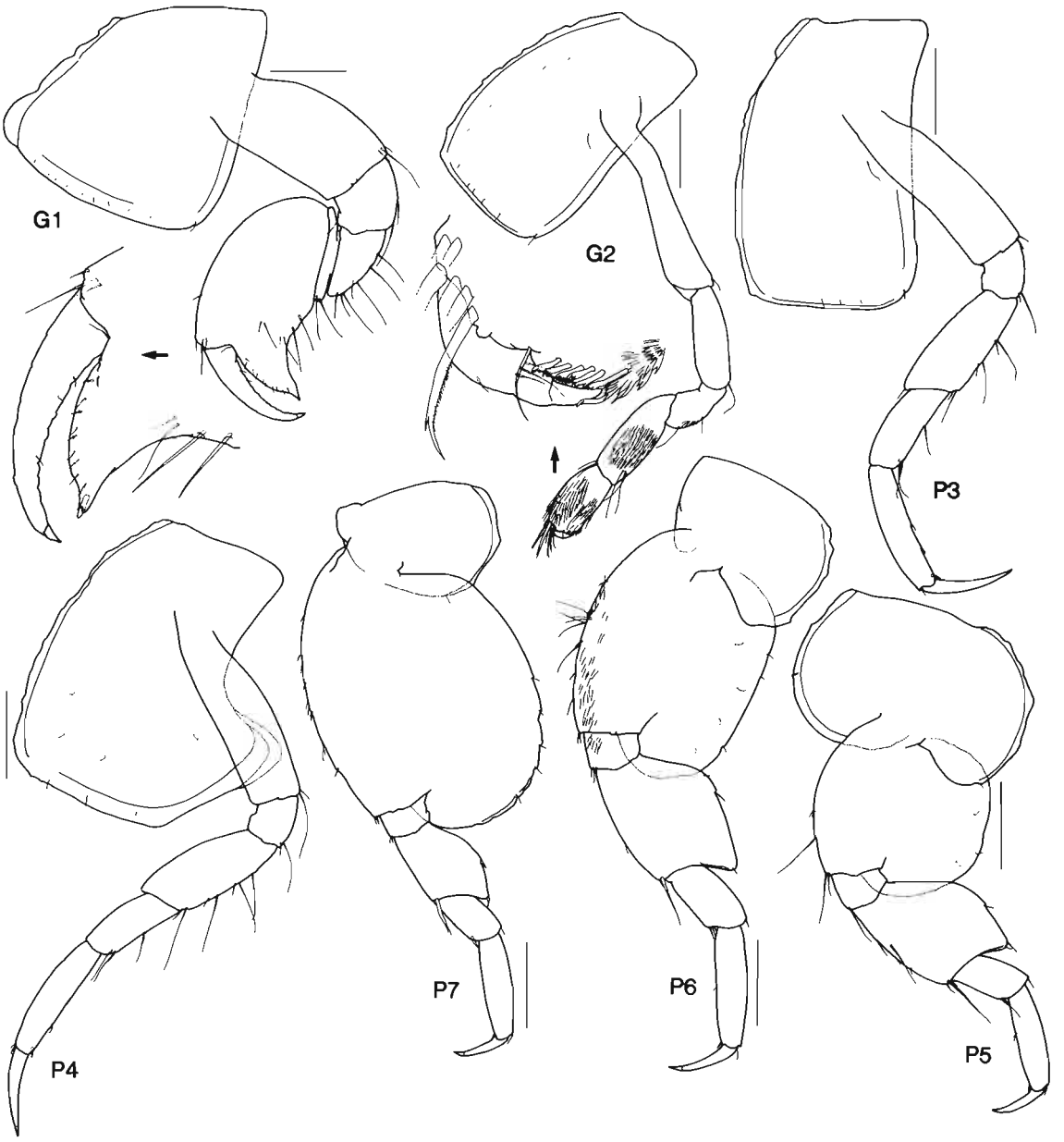

FIG. 12. — *Figorella corindon* sp. nov., holotype female, 3 mm (MNHN-Am 4457), south of Manimbaya, northern Makassar Strait, Indonesia. Scales represent 0.2 mm.

DISTRIBUTION. — *Figorella corindon* is known only from the Makassar Strait, Indonesia, in 1730 m depth.

Genus *ICHNOPUS* Costa, 1853

Ichnopus annasona Lowry & Stoddart, 1992

Ichnopus annasona Lowry & Stoddart, 1992 : 196, figs 4-5.

MATERIAL EXAMINED. — **Indonesia.** KARUBAR : stn DW 22, 05°22'S, 133°01'E, Kai Islands, 85-124 m, 25 October 1991 : 1 ♀, with oostegite buds.

DISTRIBUTION. — *Ichnopus annasona* is known from the Austral Isles, French Polynesia; Tasman Sea; New Caledonia; Kai Islands, Indonesia.

Ichnopus wardi Lowry & Stoddart, 1992

Glycerina tenuicornis - PIRLOT, 1936 : 271, figs 106, 107.
Ichnopus wardi Lowry & Stoddart, 1992 : 235, figs 33-35.

MATERIAL EXAMINED. — **Indonesia.** KARUBAR : stn DW 29, 05°36'S, 132°56'E, Kai Islands, 181-184 m, 26 October 1991 : 1 ♀, with oostegite buds.

REMARKS. — This female confirms LOWRY and STODDART's (1992) tentative identification of PIRLOT's (1936) material as *I. wardi*.

DISTRIBUTION. — *Ichnopus wardi* is known from north-western Australia, southern New Guinea, Indonesia and the Philippine Islands.

Genus *ONESIMOIDES* Stebbing, 1888

Onesimoides Stebbing, 1888 : 647. — PIRLOT, 1933 : 128. — BARNARD & KARAMAN, 1991 : 505.

DIAGNOSIS. — Antenna 1 : callynophore present in male and female; article 1 of accessory flagellum forming a cap covering callynophore. Antenna 2 not elongate in male. Mandible : left lacinia mobilis present; molar a reduced column with convex triturating surface; palp attached midway. Maxilla 1 : spine-teeth on outer plate large, robust, in 6/5 arrangement, ST7 slightly displaced from ST6; palp large, 2-articulate. Maxilla 2 : inner plate narrow, outer plate broad, subequal in length. Maxilliped : inner plate with well developed nodular spines; outer plate with small medial spines. Gnathopod 1 sexually dimorphic : female small, subchelate with an obtuse rounded palm; male large with an acute palm. Pleonite 3 with dorsal carina. Telson entire.

TYPE SPECIES. — *Onesimoides carinatus* Stebbing, 1888, by monotypy.

REMARKS. — This genus was based on the species *Onesimoides carinatus* Stebbing, 1888, known only from a single adult male from the Coral Sea. PIRLOT (1933) had limited material of *Onesimoides* from Indonesia. Without the combination of females and adult males he did not recognize the sexual dimorphism of gnathopod 1 and described two new species, *O. cavimanus* (based on a single adult male) and *O. chelatus* (based on a young male and several other small specimens). J.L. BARNARD (1961) first recognized sexual dimorphism in *Onesimoides*. He realized that males developed large subchelate first gnathopods which change with age. BELLAN-SANTINI (1974) also recognized this phenomenon in her material from the Mediterranean Sea.

We have studied relatively large collections of *Onesimoides* from the Philippines, Indonesia, New Caledonia and the Coral Sea. We now know that all females have very similar chelate first gnathopods and that young males look very much like females. We can recognize four distinct male gnathopod 1 transformation series in material from our study area. We believe that these series represent four distinct species. One of these species is *O. carinatus* (which includes *O. cavimanus*), now known from the Coral Sea and Indonesia. We redescribe *O. carinatus* and describe two new species, *O. castellatus* and *O. mindoro*. The fourth species, from New Caledonia, will be described in a later paper. Because *O. chelatus* was originally described from young specimens it cannot be identified with any adult forms, including the two species (*O. carinatus* and *O. mindoro*) known in the area from which it was described. Consequently we consider it to be an unrecognizable species.

There are other unnamed species in the literature. Based on the illustrations in J.L. BARNARD (1961), particularly of gnathopod 1, we think that the material from the south-eastern Atlantic Ocean, attributed to *O. chelatus*, is an undescribed species. The same is true of the material from Madagascar which LEDOYER (1978, 1986) attributed to *O. cavimanus* and *O. chelatus*. In this case there are unusual changes in the distal articles of peraeopods 5 to 7 in addition to the shape of the first gnathopod. WOLFF (1979) mentioned an undescribed species and a related undescribed genus from the western North Atlantic Ocean in his review of plant utilization in the deep sea. We have seen a possible new shallow water species of *Onesimoides* in collections from Namibia.

DISTRIBUTION. — North and South Atlantic Ocean, Mediterranean Sea, western Indian Ocean, south-east Asia and the Coral Sea.

Onesimoides carinatus Stebbing, 1888

Figs 13-16

Onesimoides carinatus Stebbing, 1888 : 648, pl. 14. — DELLA VALLE, 1893 : 796, pl. 60, figs 39-41. — STEBBING, 1906 : 32, fig. 8. — THURSTON & ALLEN, 1969 : 363.
Onesimoides cavimanus Pirlot, 1933 : 129, figs 40-41.
not *Onesimoides cavimanus* - DAHL, 1959 : 214, fig. 3 (= *O. mindoro*).
not *Onesimoides cavimanus* - LEDOYER, 1978 : 375, figs 9-10b; 1986 : 794, fig. 309 (= *Onesimoides* sp.).

MATERIAL EXAMINED. — **Coral Sea.** Stn FNQ 79-33, 11°32'S, 144°10'E, 16-18 km north-east of Raine Island, Great Barrier Reef, trawl, specimen in wood, 900-1000 m, Australian Museum Fish Department, 12 February 1979 : 1 ♂, 8 mm, 1 juvenile, 5.4 mm (AM P41269). — Stn 06/88-11, 11°33.02'S, 145°19.34'E, east of Cape York, Australia, beam trawl, 1611-1584 m, P. HUTCHINGS, *et. al.* on R.V. "*Franklin*", 22 August 1988 : 2 ♀, 10 mm, 3 ♂, 7.4-13.5 mm, 8 juveniles (AM P41270). — Stn 06/88-16, 11°41.55'S, 145°36.6'E, east of Cape York, Australia, beam trawl, specimens in wood, 2006-2053 m, P. HUTCHINGS , *et. al.* on R.V. "*Franklin*", 23 August 1988 : 1 ♂, 9.5 mm, 1 juvenile, 4.5 mm, (AM P41271).

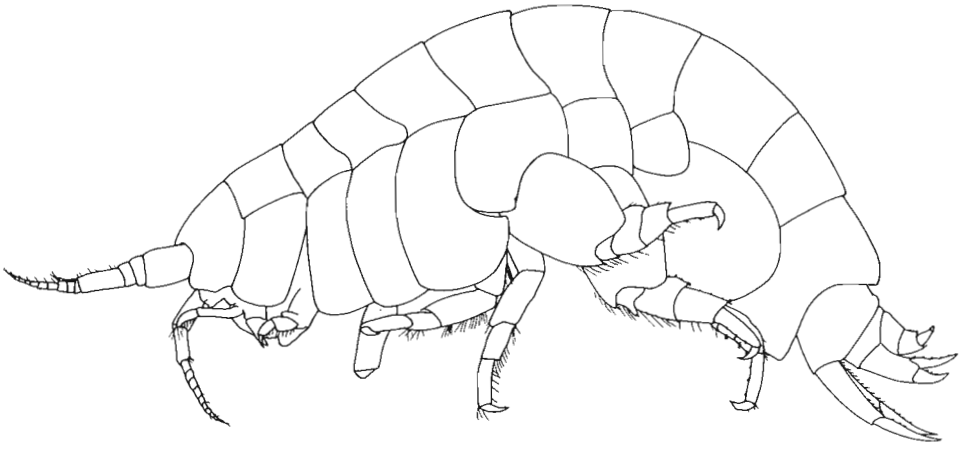

FIG. 13. — *Onesimoides carinatus* Stebbing, male, 8 mm (AM P41269), north-east of Raine Island, Coral Sea.

CIDARIS-1 : stn 35.4, 16°54.4'S, 147°14.35'E, beam trawl, specimens in wood, 1590-1473 m, M. PICHON, P.W. ARNOLD & R.A. BIRTLES on RV "*Franklin*", 14 May 1986 : 2 ♀, 15.5 and 16 mm (QM W17489).

DIAGNOSIS. — Antennae : calceoli present in adult male. Gnathopod 1 in male with large setal patch on merus and propodus, palm changing with age from transverse to obtuse to acute with small midpalmar tooth and posterior cavity. Pleonite 3 with slight to strong dorsal carina. Urosomite 1 without lateral flange. Uropod 3, inner ramus about 0.5 times outer ramus.

DESCRIPTION. — Based on female, 10 mm (AM P41270); male, 8 mm (AM P41269). *Head* : exposed, deeper than long; lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes apparently absent. *Antenna 1* : medium length, 0.2 times body; peduncular article 1 short, length 1.1 times breadth; peduncular article 2 short, 0.4 times article 1; peduncular article 3 long, 0.25 times article 1; accessory flagellum long, 0.74 times primary flagellum, 4-articulate, article 1 long, 6.4 times article 2, (male, long, 6.5 times article 2), forming cap covering callynophore; flagellum 14-articulate (male 11), callynophore, strong 2-field in female and male, without posterodistal setae or spines, without flagellar spines, calceoli absent in female (present in 12.5 mm male). *Antenna 2* : subequal in length to antenna 1, (same in male); peduncle without brush setae in female or male; in female weakly geniculate, article 3 short, 0.4 times article 4 (in male weakly geniculate between peduncular articles 3-4, article 3 short, 0.46 times article 4); peduncular articles 4 and 5 not enlarged in male or female; flagellum 12-articulate (male 11), calceoli absent in female (present in 12.5 mm male).

Mouthpart bundle : subquadrate. *Epistome* and *upper lip* : separate, epistome straight, upper lip slightly produced, rounded. *Mandible*: incisors symmetrical, small, with slightly convex margins; left lacinia mobilis present, a cuspidate peg; accessory spine row without distal setal tuft, left row with 2, right with 3 short, thin, simple spines, without intermediate setae; molar with reduced column and convex triturating surface; mandibular palp attached midway, article 1 short, length 1.1 times breadth; article 2 elongate, slender, length 3.4 times breadth, 1.2 times article 3, with 11 (male 10) distal submarginal A2-setae; article 3 slender, blade-like, long, length 3 times breadth, with 2 (male 1) proximal A3-setae, 14 (male 12) D3-setae along most of posterior margin, and 3 apical E3-setae. *Maxilla 1* : inner plate narrow with 2 plumose apical setae; outer plate with 11 spine-teeth in 6/5 arrangement; outer row with ST1-ST3 large, stout, weakly to multicuspidate, ST4-ST6 large, stout, 5-cuspidate, ST7 slightly displaced from ST6, large, broad, 5-cuspidate; inner row with STA large, slightly displaced from STB-STD, 4-cuspidate, STB-STD large, broad, 4-cuspidate; palp large, 2-articulate, with 8 (male 6) long terminal spines, with 1 subterminal seta, 1 (male 2) flag spine present on distolateral corner, distomedial margin smooth. *Maxilla 2* : inner plate narrow, outer plate broad, subequal in length. *Maxilliped* : inner plate very large, subrectangular, with 3 apical stout spines, with 1 distal spine on lateral face near inner margin, oblique setal row strong with 10 plumose setae; outer plate small, subovate, without subapical notch, with many fine apical setae, with 1 apical spine, medial spines present, small, submarginal setae long, simple; palp large, 4-articulate, article 2 broad, length 1.7 times breadth, 1.4 times article 3; article 3 short, broad, length 1.4 times breadth; dactylus well developed, with 4 subterminal setae, unguis present.

Gnathopod 1 : sexually dimorphic; chelate in female, coxa large, slightly shorter than coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin slightly convex; basis long, slender, length 2.7 times breadth, anterior margin smooth, with simple setae; ischium long, length 1.7 times breadth; merus, posterior margin lined with long simple setae; carpus subtriangular, short, length 1.7 times breadth, shorter than (0.7 times) propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length 1.9 times breadth, margins subparallel, posterior margin smooth, strongly sinusoidal, without spines, with setae, without denticulate patch near posterior margin, palm obtuse, margin convex, smooth, posterodistal corner with 1 medial and 1 lateral spines; dactylus simple, with subterminal tooth. Male, 8 mm, gnathopod 1 subchelate; basis long, slender, length 2.3 times breadth; merus with large brush of setae on medial face; carpus subtriangular, short, length 0.8 times breadth, shorter than (0.5 times) propodus; propodus massive, subrectangular, length 1.4 times breadth, margins subparallel, posterior margin smooth, straight, with dense brush of setae on medial face, palm acute, margin irregular with posterior cavity, posterodistal corner with 1 medial and 1 lateral spines; dactylus simple, strongly curved.

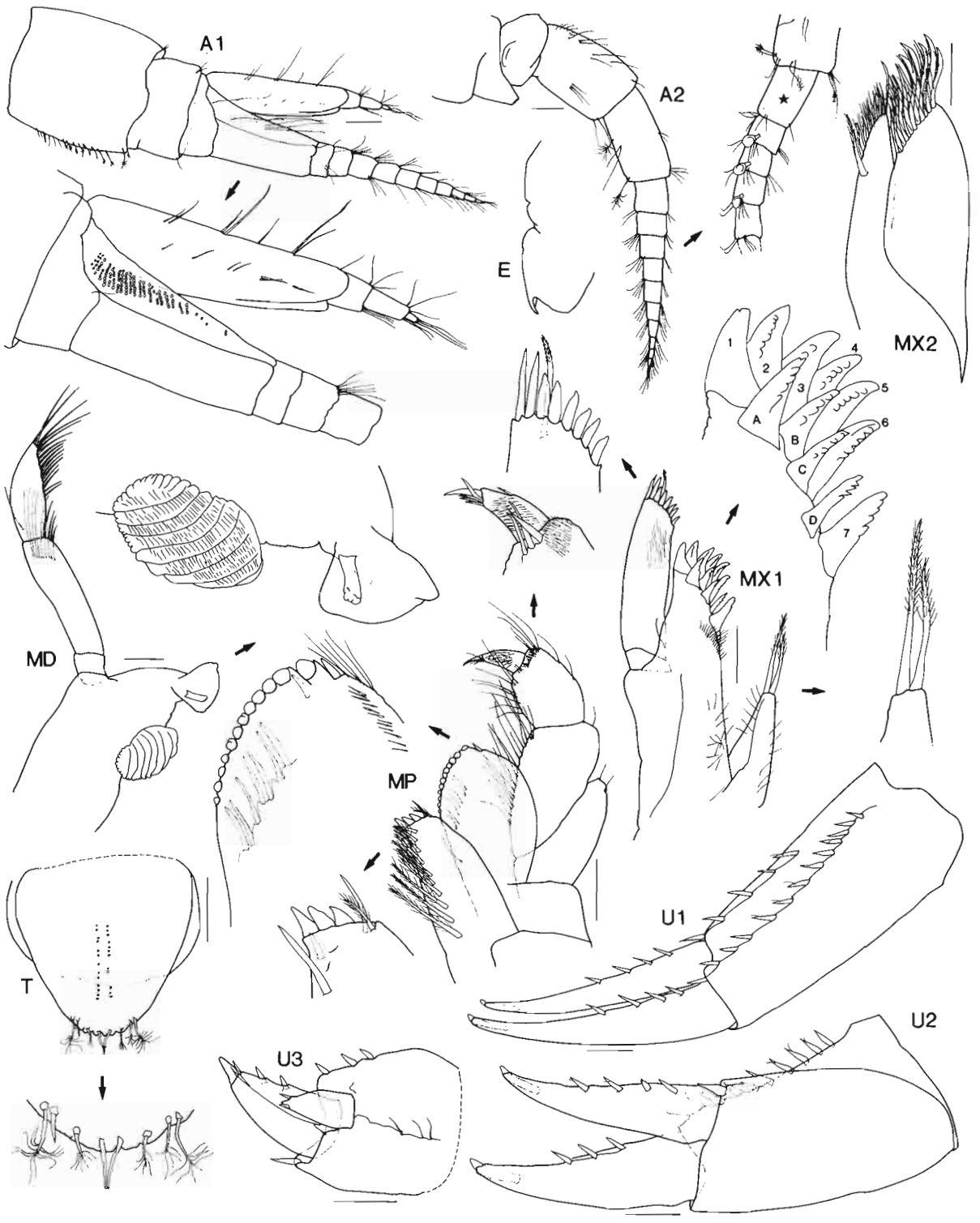

FIG. 14. — *Onesimoides carinatus* Stebbing, male, 8 mm (AM P41269), north-east of Raine Island, Coral Sea. A2 enlargement: male, 13.5 mm (AM P41270), east of Cape York, Coral Sea. Scales represent 0.1 mm.

Gnathopod 2 : minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length 2.3 times breadth; carpus long, length 2.3 times breadth, posterior margin broadly lobate; propodus subquadrate, short, length 1.4 times breadth, posterior margin without strong distal spines, palm obtuse, with straight, serrate margin, posterodistal corner with 1 (male 1) medial and 1 lateral (male 1) spines; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3 : coxa large; merus weakly expanded anteriorly, male and female merus-carpus without plumose setae; propodus with 7 (male 9) spines and 2 distal spines along posterior margin; dactylus short, stocky. *Peraeopod 4* : coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly, merus-carpus without plumose setae; propodus with 8 (male 7) spines and 2 distal spines along posterior margin; dactylus short, stocky. *Peraeopod 5* : coxa equilobate; basis expanded with posterior margin minutely crenate; merus expanded with rounded posterior margin; propodus with 5 (male 5) spines and 2 distal spines along anterior margin, dactylus short, stocky. *Peraeopod 6* : coxa small, slightly lobate posteriorly; basis expanded posteriorly with minutely crenate posterior margin; merus expanded with rounded posterior margin; propodus with 6 (male 6) spines and 2 distal spines along anterior margin; dactylus short, stocky. *Peraeopod 7* : basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus not expanded posteriorly, with 4 spines; propodus with 5 (male 6) spines and 2 distal spines along anterior margin and 2 (male 2) spines and 2 distal spines along posterior margin; dactylus short, stocky.

Oostegites from gnathopod 2 to peraeopod 5. *Gills* from gnathopod 2 to peraeopod 6, not pleated.

Pleonite 3 : with slight dorsal carina. *Epimeron 1* : anteroventral corner rounded. *Epimeron 3* : posteroventral corner subquadrate. *Urosomites* : urosomite 1 with anterodorsal notch and rounded boss with slight dorsal carina, without lateral flange; urosomite 3 without small dorsolateral spine. *Uropod 1* : peduncle with 4 (male 12) dorsolateral, 1 apicolateral, 4 dorsomedial and 1 apicomedial spines, without spines along distal margin; outer ramus slightly longer than inner ramus; outer ramus with 2 (male 4) dorsal spines; inner ramus with 2 (male 4) dorsal spines. *Uropod 2* : peduncle with 6 (male 9) dorsolateral, 1 apicolateral, 1 (male 0) dorsomedial and 1 (male 1) apicomedial spines, without spines along distal margin; rami subequal in length; outer ramus with 3 dorsal spines; inner ramus with 4 dorsal spines, without constriction. *Uropod 3* : peduncle short, length 1.1 times breadth, with dorsolateral flange, with 2 dorsolateral and 1 apicolateral spines, with 4 (male 3) midmedial setae, with 1 distoventral spine, without plumose setae; rami lanceolate, inner ramus reduced, about 0.5 times outer ramus; outer ramus 2-articulate, article 2 short, article 1 with 3 lateral and 1 medial spines; inner ramus with 1 medial and 0 (male 1) lateral spines; plumose setae absent in male and female. *Telson* : length subequal to breadth, entire, without dorsal simple spines; distal margin rounded, with 6 penicillate and 2 simple marginal setae, without marginal spines.

VARIATION. — The shape and size of male gnathopod 1 changes with age, although not as decisively as in other known species. In small males (around 7 mm) the propodus is subrectangular and relatively narrow, as in the female, with a transverse palm with a slightly convex margin (fig. 16A). In slightly larger males (around 8-10 mm) the propodus becomes broader, the palm becomes slightly obtuse and the margin is convex (fig. 16B). In the largest males we have seen (around 13 mm) the propodus continues to broaden, the palm becomes acute with a small midpalmar tooth and a posterior cavity (fig. 16C). As the gnathopod enlarges the basis lengthens to accommodate the larger propodus.

The carpus of peraeopods 6 and 7 in this species (fig. 16) varies from long and narrow to broad and nearly subquadrate. The variation might follow development with age, but we have not been able to confirm this and in several instances (such as illustrated in fig. 16C) the carpus is quite different between the left and right sides.

The dorsal carination is variable; although present in all the specimens examined, it is not as strong as described by STEBBING (1888).

REMARKS. — This is the first record of *O. carinatus* since it was originally described. The new material is from near the type locality in the Coral Sea. Based on the range of material we have studied and PIRLOT's (1933) drawings of the male gnathopod 1 in *O. cavimanus*, it is clear that this species is synonymous with *O. carinatus*. This synonymy extends the range of *O. carinatus* into Indonesian waters.

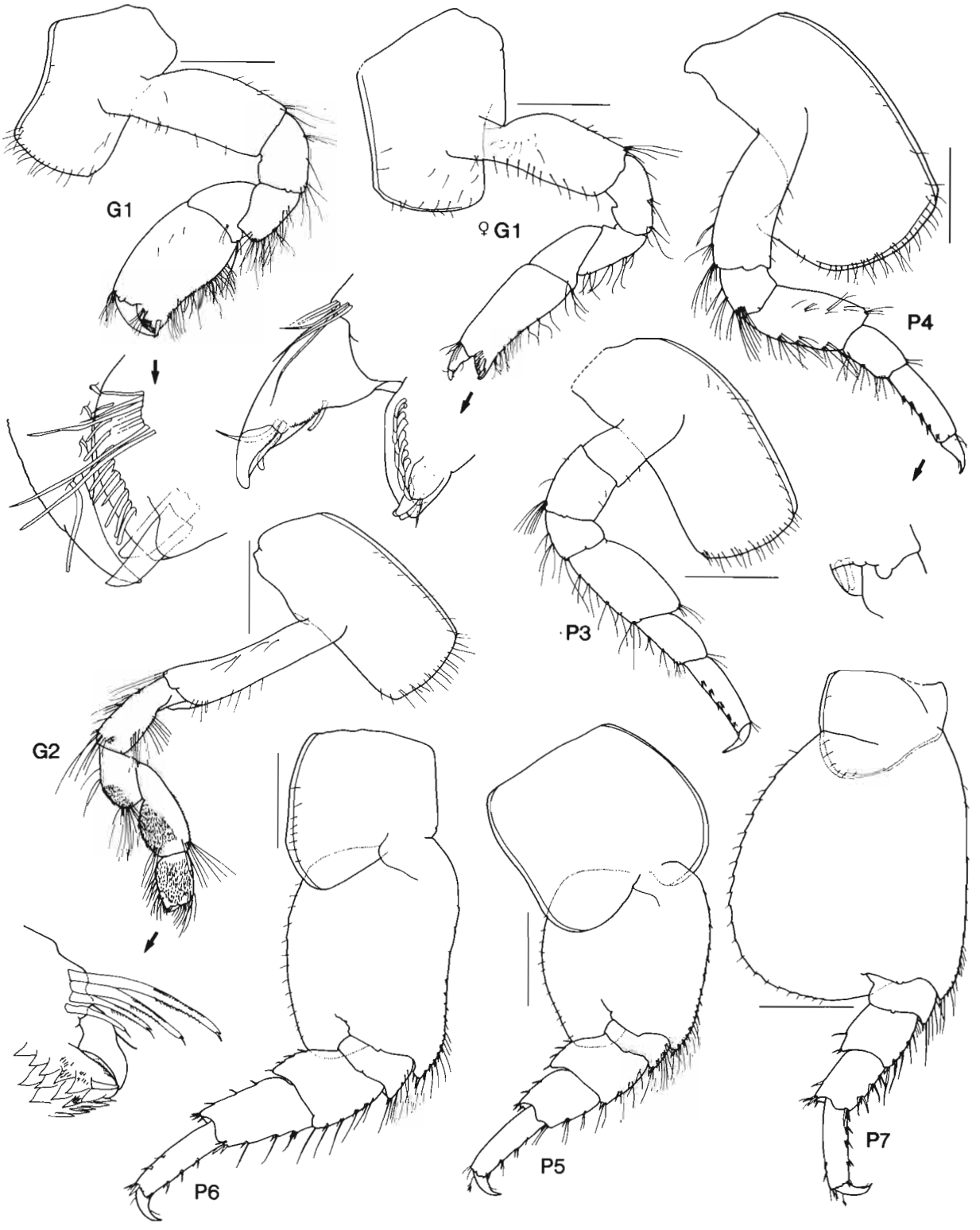

FIG. 15. — *Onesimoides carinatus* Stebbing, male, 8 mm (AM P41269), north-east of Raine Island, Coral Sea. Female, 10 mm (AM P41270), east of Cape York, Coral Sea. Scales represent 0.5 mm.

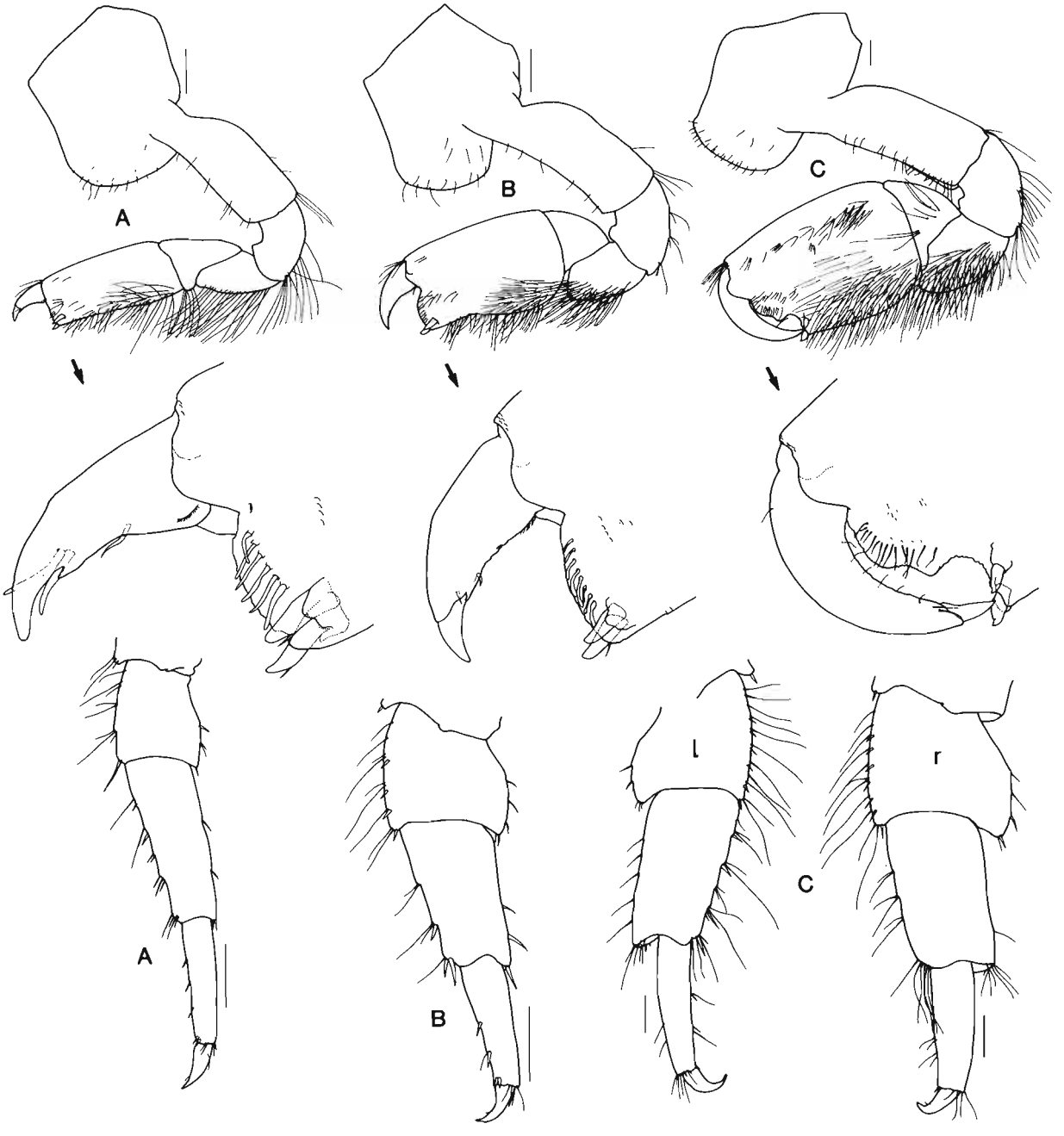

FIG. 16. — *Onesimoides carinatus* Stebbing, gnathopod 1 and distal articles of peraeopod 6 : **A**. male, 7.6 mm (AM P41270), east of Cape York, Coral Sea; **B**. male, 9.5 mm (AM P41271), east of Cape York, Coral Sea; **C**. male, 13.5 mm (AM P41270), east of Cape York, Coral Sea. Scales represent 0.2 mm.

We cannot distinguish females of *O. carinatus* from those of *O. mindoro*. Males are distinguished by the length to breadth ratios of the propodus in gnathopod 1 and the palm which becomes excavate in large males of *O. mindoro*. The palm of a large male of *O. carinatus* (fig. 16C) is similar to that of a small male of *O. mindoro* (fig. 24A), but the length to breadth ratio of the propodus is different and the *O. carinatus* specimen is twice as large as the comparable *O. mindoro* specimen.

DISTRIBUTION. — Coral Sea to Indonesia in 900 to 2560 m depth.

Onesimoides castellatus sp. nov.

Figs 17-20

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 2 : stn CP 17, 14°00'N, 120°18'E, north of Lubang Island, 174-193 m, 22 November 1980 : 1 ♀, 8.5 mm, ovigerous (approximately 22 eggs) (MNHN-Am 4456A); 1 ♂, 7.5 mm (MNHN-Am 4456B) and 1 ♀ (AM P41426).

MUSORSTOM 3 : stn CP 87, 14°00'N, 120°19'E, north of Lubang Island, 191-197 m, 31 May 1985 : 1 ♀ and 1 partial ♀ (MNHN-Am 4384). — Stn CP 101, 14°15'N, 120'19'E, north of Lubang Island, 195 m, 1 June 1985 : 23 ♀ and juveniles; 1 ♂; 1 partial ♀ (MNHN-Am 4452). — Stn 103, 14°00'N, 120°18'E, north of Lubang Island, 193-200 m, 1 June 1985 : 2 ♀ (MNHN-Am 4446); 1 ♂, 7.5 mm (AM P41427). — Stn 135, 11°58'N, 122°02'E, east of Boracay Island, Sibuyan Sea, 486-551 m, 5 June 1985 : 3 ♀ and 1 ♂ (MNHN-Am 4443). — Stn CP 139, 11°53'N, 122°14'E, off the north-west northern coast of Panay, Sibuyan Sea, 240-267 m, 6 June 1985 : 4 ♀ and juveniles; 7 ♂ (MNHN-Am 4437).

T. MORTENSEN EXPEDITION : approx. 6°N, 121°E, Mindanao, 15 miles west of Jolo, Sigsby trawl, soft bottom, 450 m, 27 March 1914 : 2 ♀, 9 and 11 mm; 1 ♂, 15 mm (ZMC).

Indonesia. KARUBAR : stn CC 10, 05°21'S, 132°30'E, Kai Islands, 329-389 m, 23 October 1991 : 1 ♂. — Stn CP 16, 05°17'S, 132°50'E, Kai Islands, 315-349 m, 24 October 1991 : 5 ♀.

TYPES. — The ovigerous female, 8.5 mm (MNHN-Am 4456A) is the holotype. The other specimens are paratypes.

TYPE LOCALITY. — Philippines Islands, north of Lubang Island, 14°00'N, 120°18'E, 174-193 m.

DIAGNOSIS. — Antennae : calceoli absent. Gnathopod 1 in male : without large setal patch on merus or propodus, palm changing with age from transverse to acute, but always with strong castellate margin. Pleonite 3 : with slight dorsal carina. Urosomite 1 with lateral flange. Uropod 3 : inner ramus subequal in length to outer ramus.

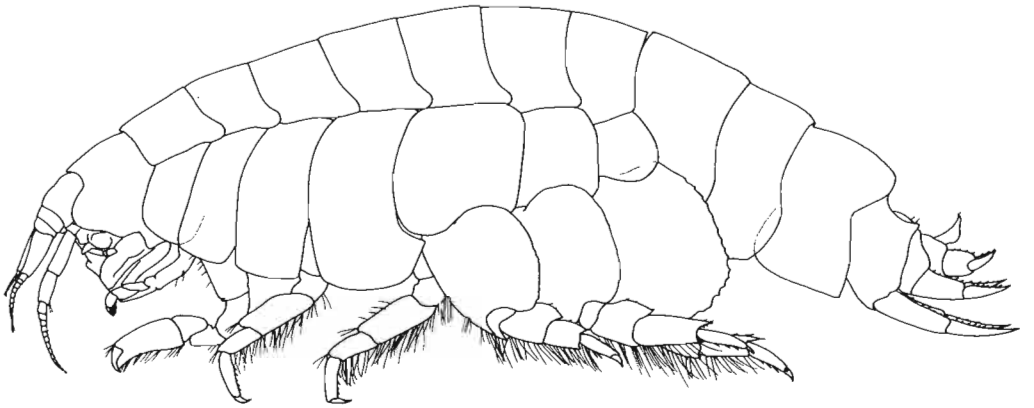

FIG. 17. — *Onesimoides castellatus* sp. nov., holotype female, 8.5 mm (MNHN-Am 4456A), north of Lubang Island, Philippine Islands.

DESCRIPTION. — Based on female holotype, 8.5 mm (MNHN-Am 4456A); male paratype, 7.5 mm (MNHN-Am 4456). *Head* : exposed, deeper than long; lateral cephalic lobe large, broadly rounded; rostrum absent; eyes apparently absent. *Antenna 1* : short, 0.18 times body; peduncular article 1 short, length 1.1 times breadth; peduncular article 2 short, 0.23 times article 1; peduncular article 3 short, 0.17 times article 1; accessory flagellum long, 0.73 times primary flagellum, 5-articulate, article 1 long, 8.5 times article 2, forming cap covering callynophore; flagellum 11-articulate (male 9), callynophore strong 2-field in female and male, without posterodistal setae or spines, without flagellar spines or aesthetascs, calceoli absent. *Antenna 2* : slightly longer than antenna 1, (same in male); peduncle without brush setae in male or female; in female weakly geniculate, article 3 short, 0.4 times article 4, (same in male); peduncular articles 4 and 5 not enlarged in male or female; flagellum 11-articulate (male 7), calceoli absent.

Mouthpart bundle : subquadrate. *Epistome* and *upper lip* : separate, epistome slightly produced, rounded, upper lip slightly produced, straight. *Mandible* : incisors symmetrical, small, with slightly convex margins; left lacinia mobilis present, a cuspidate peg; accessory spine row without distal setal tuft, left and right rows each with 3 short, slender, simple spines, without intermediate setae; molar with reduced column and convex triturating surface; mandibular palp attached midway, article 1 short, length 1.1 times breadth; article 2 elongate, slender, length 3.4 times breadth, 1.4 times article 3, with 12-14 (male 11-12) posterodistal A2-setae, without D2-setae; article 3 slender, blade-like, long, length 3.4 times breadth, with 1-2 (male 1) proximal A3-setae, 12 (male 12) D3-setae along most of posterior margin, and 3 apical E3-setae. *Maxilla 1* : inner plate narrow with 2 plumose apical setae; outer plate with 11 spine-teeth in 6/5 arrangement; outer row with ST1-ST3 large, stout, multicuspidate, ST4-ST5 large, stout, 4- to 5-cuspidate, ST6 large, stout, 8- to 9-cuspidate, ST7 slightly displaced from ST6, large, broad, 8- to 9-cuspidate; inner row with STA large, slightly displaced from STB-STD, 4-cuspidate, STB long, broad, 4-cuspidate, STC large, broad, 3- to 5-cuspidate, STD broad, 5-cuspidate; palp large, 2-articulate, with 8 long terminal spines, with 1 subterminal seta, flag spine present on distolateral corner, distomedial margin smooth. *Maxilla 2* : inner plate narrow, outer plate broad, inner plate 0.83 times length outer plate. *Maxilliped* : inner plate very large, subrectangular, with 3 apical nodular spines and 1 subapical lateral spine, oblique setal row strong with 9 plumose setae; outer plate small, subovate, without subapical notch, with many fine apical setae, with 1 apical spine, medial spines present, small, submarginal setae long, simple; palp large, 4-articulate, article 2 broad, length 2.5 times breadth, 1.6 times article 3; article 3 long, broad, length 2 times breadth; dactylus well developed, with 6 subterminal setae, unguis present.

Gnathopod 1 : sexually dimorphic; female chelate, coxa large, as long as coxa 2, anterior margin slightly concave, anteroventral corner rounded, posterior margin slightly convex; basis long, slender, length 2.5 times breadth, anterior margin smooth, with simple setae; ischium long, length 1.9 times breadth; merus, posterior margin without setae; carpus subtriangular, short, length 1.3 times breadth, 0.65 times as long as propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length 1.8 times breadth, tapering distally, posterior margin smooth, strongly sinusoidal with 5 groups of setae, without denticulate patch near posterior margin, palm obtuse, margin convex, smooth, posterodistal corner with 1 medial and 1 lateral spines; dactylus simple, without subterminal teeth or spines. Male (7.5 mm) gnathopod 1 subchelate; basis long, slender, length 2.2 times breadth; merus, posterior margin with a few simple setae; carpus subtriangular, short, length 0.7 times breadth, shorter than (0.3 times) propodus; propodus massive, subrectangular, length 1.3 times breadth, margins subparallel, posterior margin smooth, convex, with few setae, palm acute, margin convex, castellate, posterodistal corner with 1 medial and 1 lateral spines; dactylus simple, strongly curved. *Gnathopod 2* : minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length 2 times breadth; carpus long, length 2.6 times breadth, posterior margin broadly lobate; propodus subquadrate, short, length 1.3 times breadth, posterior margin without strong distal spines, palm transverse, with convex, serrate margin, posterodistal corner with 1 medial and 2 lateral spines; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3 : coxa large; merus weakly expanded anteriorly, male and female merus-carpus without plumose setae; propodus with 7 spines along posterior margin and 2 distal spines; dactylus short, stocky. *Peraeopod 4* : coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly, male and female merus-carpus without plumose setae; propodus with 7 spines along posterior margin and 2 distal spines; dactylus short, stocky. *Peraeopod 5* : coxa equilobate; basis expanded with posterior margin strongly crenate; merus expanded with rounded posterior margin; propodus with 3 spines along anterior margin and 2 distal spines; dactylus short, stocky. *Peraeopod 6* : coxa small, slightly lobate posteriorly; basis expanded posteriorly with crenate posterior margin; merus expanded with rounded posterior margin; propodus with 3 spines and 2 distal spines along anterior margin, with 3 spines on posterodistal margin; dactylus short, stocky. *Peraeopod 7* : basis expanded posteriorly, posterior margin slightly rounded, scalloped, posteroventral corner rounded, posteroventral margin rounded; merus not expanded posteriorly, with 4 spines; propodus with 3 setae and 2 distal spines along anterior margin, with 4 posterodistal spines; dactylus short, stocky.

Oostegites from gnathopod 2 to peraeopod 5. *Gills* from gnathopod 2 to peraeopod 6, not pleated.

FIG. 18.— *Onesimoides castellatus* sp. nov., holotype female, 8.5 mm (MNHN-Am 4456), north of Lubang Island, Philippine Islands. Scales represent 0.2 mm.

Pleonite 3 : with dorsal carina. *Epimeron 1* : anteroventral corner rounded. *Epimeron 3* : posteroventral corner subquadrate. *Urosomites* : urosomite 1 with anterodorsal notch and rounded boss with slight dorsal carina, with lateral flange; urosomite 3 without dorsolateral spine. *Uropod 1* : peduncle with 9 dorsolateral, 2 apicolateral, 7 dorsomedial and 1 apicomedial spines, without spines along distal margin; outer ramus slightly longer than inner ramus; outer ramus with 7 dorsal spines; inner ramus with 5 dorsal spines. *Uropod 2* : peduncle with

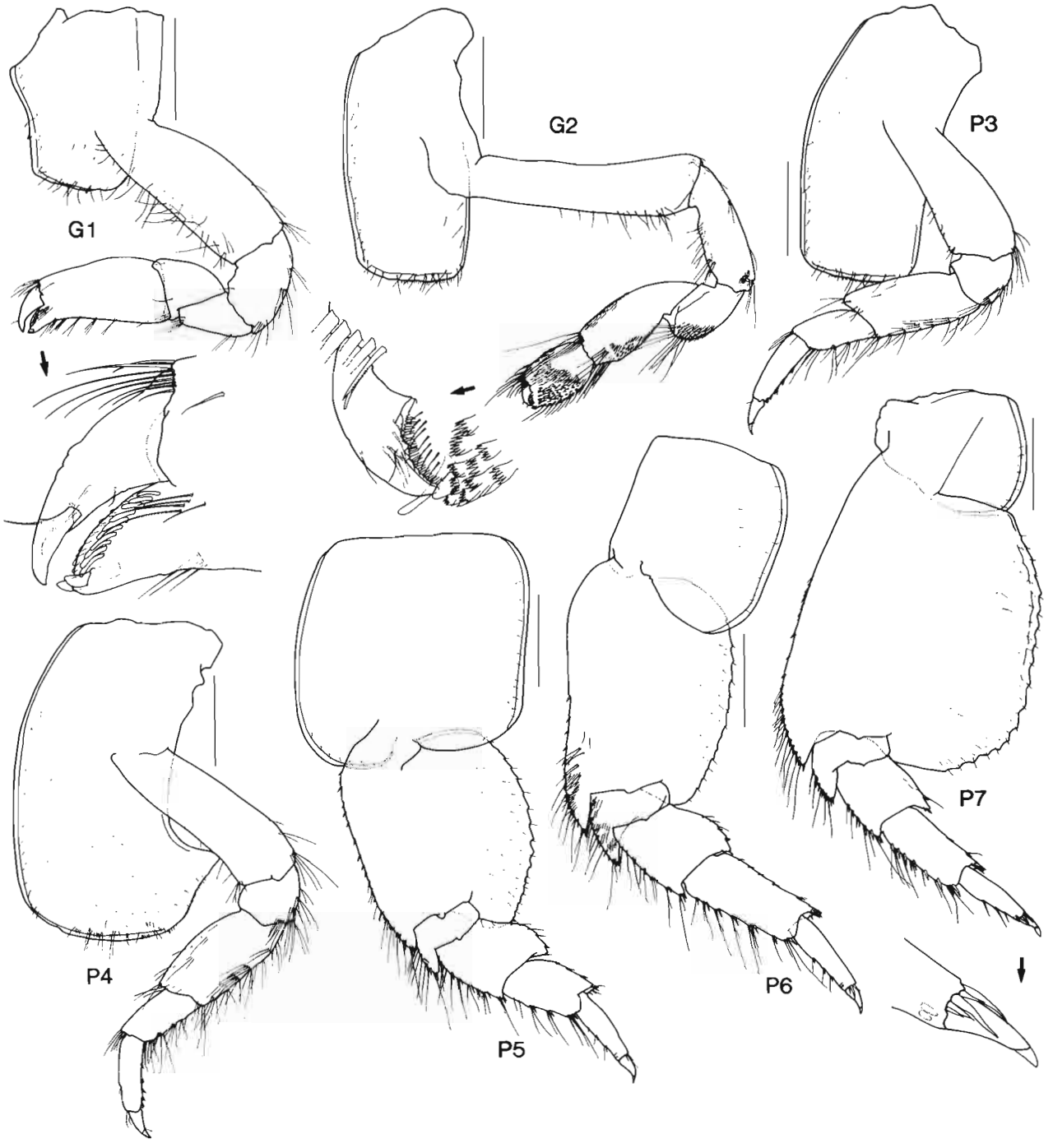

FIG. 19. — *Onesimoides castellatus* sp. nov., holotype female, 8.5 mm, (MNHN-Am 4456A), north of Lubang Island, Philippine Islands. Scales represent 0.5 mm.

7 dorsolateral, 1 apicolateral and 1 apicomedial spines, without spines along distal margin; rami subequal in length; outer ramus with 6 lateral spines; inner ramus with 1 medial and 4 lateral spines, without constriction. *Uropod 3* : peduncle short, length 1.3 times breadth, with dorsolateral flange, with 4 dorsolateral spines, with 1 midlateral setae, with 1 distoventral spine, without plumose setae; rami lanceolate, subequal in length; outer ramus 2-articulate, article 2 short, without spines; inner ramus with 1 lateral spine; plumose setae absent in male and female. *Telson* : length 1.1 times breadth, entire, without dorsal simple spines; distal margin truncated, with 6 penicillate and 2 simple marginal setae, without marginal spines.

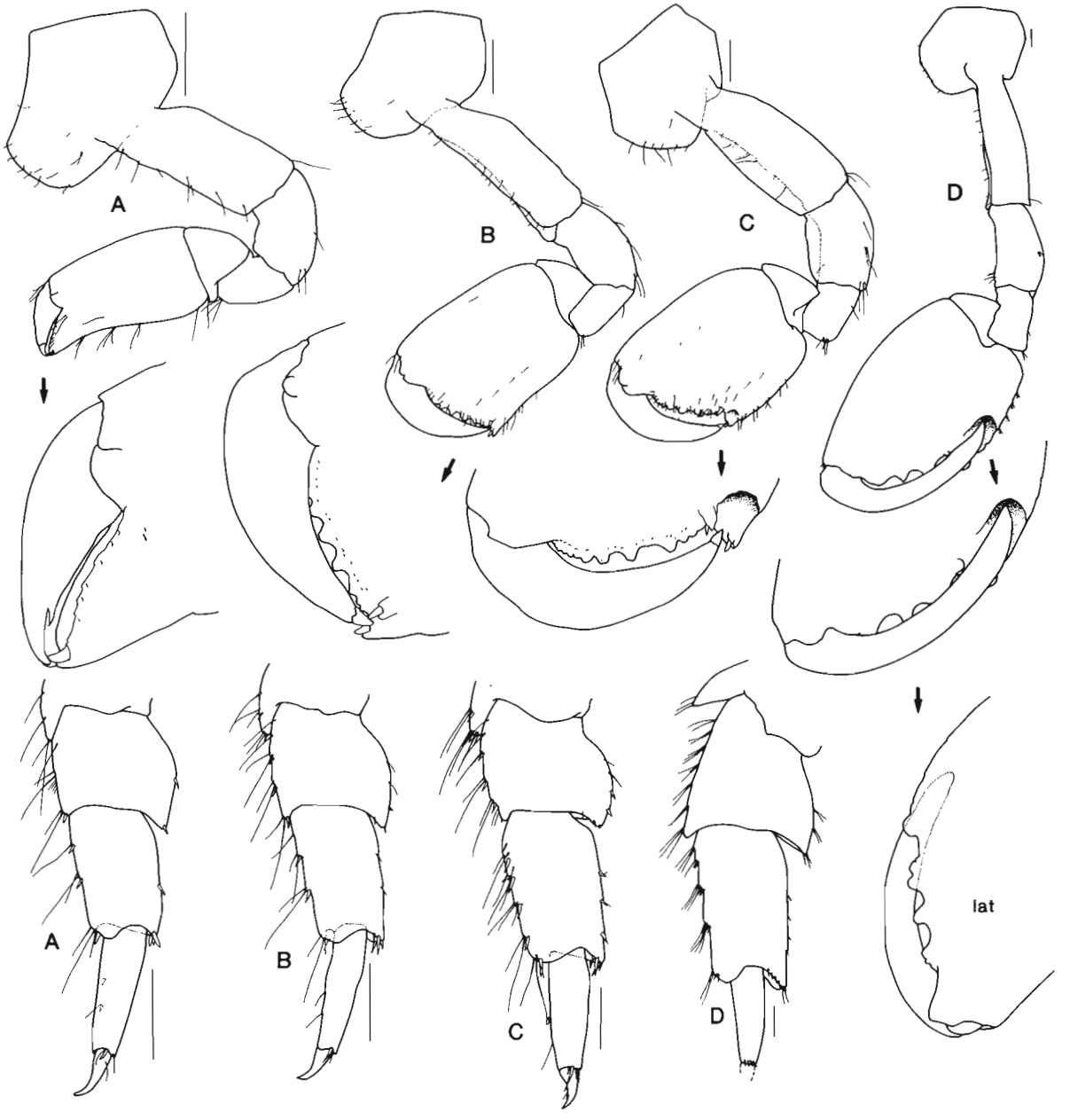

FIG. 20. — *Onesimoides castellatus* sp. nov., gnathopod 1 and distal articles of peraeopod 6 : **A**. paratype male, 4.5 mm, **B**. paratype male, 6.2 mm (MNHN-Am 4437), off Panay, Sibuyan Sea, Philippine Islands; **C**. paratype male, 7.5 mm (MNHN-Am 4456B), north of Lubang Island, Philippine Islands. **D**. paratype male, 15 mm (ZMC), off Mindanao, Philippine Islands. Scales represent 0.2 mm.

VARIATION. — The shape and size of male gnathopod 1 changes significantly with age. In small males around 4.5 mm the propodus is subrectangular and relatively narrow, the palm is obtuse as in a female and not castellate (fig. 20A). In slightly larger males, around 6 mm, the propodus becomes broader, the palm becomes transverse and forms a strongly castellate margin (fig. 20B). In males around 7.5 mm the propodus remains broad, the palm remains castellate and becomes acute with the tip of the dactylus fitting into a small medial posterodistal cavity on the propodus (fig. 20C). In very large males, around 15 mm, the propodus remains broad but lengthens, the palm becomes strongly castellate and extremely acute and the medial posterodistal cavity is enlarged (fig. 20D). The medial surface of the propodus does not develop the strong brush of setae seen in other species of *Onesimoides*. As the gnathopod enlarges the basis lengthens to accommodate the larger propodus.

The carpus of peraeopods 6 and 7 does not change much with size except in very large animals where it becomes longer in relation to its breadth.

ETYMOLOGY. — The specific name refers to the castellations on the palm of gnathopod 1 in the adult male.

REMARKS. — Males and females of *O. castellatus* can be distinguished from other species in the genus by the lateral flange on urosomite 1. Males never develop the large brush of setae on the merus and propodus of gnathopod 1 that is so distinctive in *O. carinatus* and *O. mindoro*, nor do they develop the enlarged carpus of peraeopods 6 and 7 seen in the western Indian Ocean species referred to as *O. cavimanus* by LEDOYER (1978, 1986).

DISTRIBUTION. — *Onesimoides castellatus* is known from the central Philippines in 174 to 551 m depth and the Kai Islands, Indonesia in 315 to 389 m depth.

Onesimoides chelatus Pirlot, 1933

Onesimoides chelatus Pirlot, 1933 : 134, figs 43-45.
not *Onesimoides chelatus* - J. L. BARNARD, 1961 : 43, figs 12-14 (part = *O. mindoro*; part = *Onesimoides* sp.).
not *Onesimoides chelatus* - LEDOYER, 1978 : 381, fig. 10a; 1986 : 796, fig. 310 (= *Onesimoides* sp.).

REMARKS. — PIRLOT (1933) had two lots of material from Indonesia which he attributed to this species. One lot was in bad condition and not used in his description. The other lot contained 9 small specimens from which he described a young (3.5 mm) male. The first gnathopod of this male still has the shape of a female first gnathopod. There are two taxa known from this area, but we can only recognize them by the shape of gnathopod 1 in mature males. Consequently *O. chelatus* must be considered as an unrecognizable species. We consider the Indonesian part of the material which J. L. BARNARD (1961) attributed to *O. chelatus*, to be *O. mindoro* based on his illustrations of male first gnathopods. The other part of this material, an adult male from the Gulf of Guinea, western Africa, is probably an undescribed species for this same reason. Similarly the material from Madagascar which LEDOYER (1978, 1986) attributed to *O. chelatus* may be the female of the undescribed species he attributed to *O. cavimanus*.

Onesimoides mindoro sp. nov.

Figs 21-24

Onesimoides chelatus - J. L. BARNARD, 1961 : 43, figs 12, 14 (in part, part, fig. 13 = *Onesimoides* sp.).

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 2 : stn CP 15, 13°55'N, 120°29'E, between Lubang Island and Matabungkay, 326-330 m, 21 November 1980 : 1 ♀ (MNHN-Am 4455).

MUSORSTOM 3 : stn 105, 13°52'N, 120°30'E, north-east of Lubang Island, 398-417 m, 1 June 1985 : 1 ♀ (MNHN-Am 4439). — Stn CP 116, 12°32'N, 120°47'E, Mindoro Strait, 804-812 m, inside an old piece of wood, 3 June 1985 : 1 ♀, 10 mm (MNHN-Am 4445A); 1 ♂, 12 mm and 2 ♀ (MNHN-Am 4445B); 1 ♀ (AM P41430). — Stn CP 139, 11°53'N, 122°14'E, Sibuyan Sea, off the north-west northern coast of Panay, 240-267 m, 6 June 1985 : 1 ♂ and 4 juveniles (MNHN-Am 4603); 1 ♂ (AM P41431).

T. MORTENSEN EXPEDITION : approx. 6°N, 121°E, Mindanao, 15 miles west of Jolo, Sigsby trawl, soft bottom, 450 m, 27 March, 1914 : 1 ♂, 8 mm (ZMC).

Indonesia. CORINDON 2 : stn CP 231, 0°04.9'N, 119°47.8'E, Makassar Strait, off Manimbaya, Sulawesi, 980-1080 m, 4 November, 1980 : 1 ♂, 20 mm (MNHN-Am 4448).

KARUBAR : stn CP 25, 05°30'S, 132°52'E, Kai Islands, 336-346 m, in a piece of wood, 26 October 1991 : 3 ♂ and 4 ♀.

TYPES. — The female, 10 mm, (MNHN-Am 4445A) is the holotype. The other specimens are paratypes.

TYPE LOCALITY. — Philippine Islands, Mindoro Strait, 12°32'N, 120°47'E, 804-812 m.

DIAGNOSIS. — Antennae : calceoli present in adult male. Gnathopod 1 in male with large setal patch on merus and propodus, propodus longer than broad, becoming proximally bulbous in adult male, palm excavate with small midpalmar tooth. Pleonite 3 with slight dorsal carina. Urosomite 1 without lateral flange. Uropod 3 : inner ramus about 0.7 times outer ramus.

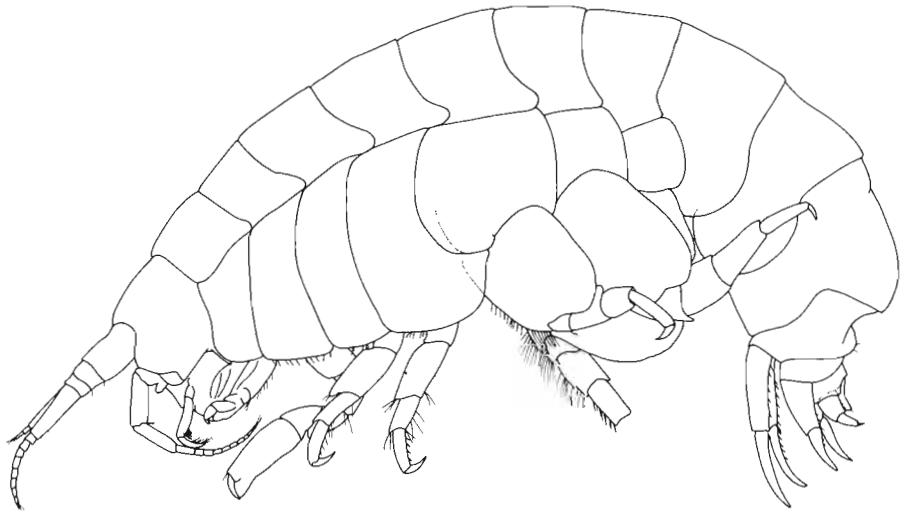

FIG. 21. — *Onesimoides mindoro* sp. nov., holotype female, 10 mm (MNHN-Am 4445A), Mindoro Strait, Philippine Islands.

DESCRIPTION. — Based on holotype female, 10 mm (MNHN-Am 4445A); paratype male, 12 mm (MNHN-Am 4445B). *Head* : exposed, deeper than long; lateral cephalic lobe large, broadly rounded; rostrum absent; eyes apparently absent. *Antenna 1* : medium length, 0.2 times body; peduncular article 1 short, length 1.3 times breadth; peduncular article 2 short, 0.24 times article 1; peduncular article 3 short, 0.18 times article 1; accessory flagellum long, 0.56 times primary flagellum, 4-articulate, article 1 long, 8.1 times article 2, (male long, 8.4 times article 2), forming cap covering callynophore; flagellum 14-articulate (male 11), callynophore strong 2-field in female and male, without posterodistal setae or spines, without flagellar spines, calceoli absent in female (present in 8 mm male). *Antenna 2* : slightly longer than antenna 1, (same in male); peduncle without brush setae in male or female; in female weakly geniculate, article 3 short, 0.3 times article 4, (in male weakly geniculate, article 3 short, 0.4 times article 4); peduncular articles 4 and 5 not enlarged in male or female; flagellum 9-articulate (male 14), calceoli absent in female (present in 8 mm male).

Mouthpart bundle : subquadrate. *Epistome* and *upper lip* : separate, epistome straight, upper lip slightly produced, rounded. *Mandible* : incisors symmetrical, small, with slightly convex margins; left lacinia mobilis present, a cuspidate peg; accessory spine row without distal setal tuft, left and right rows each with 3 short, thin, simple spines, without intermediate setae; molar with reduced column and convex triturating surface; mandibular palp attached midway, article 1 short, length 1.3 times breadth; article 2 elongate, slender, length 3.7 times breadth, 1.2 times article 3, with 15 (male 19) posterodistal A2-setae, without D2-setae; article 3 slender, blade-like, long, length 3.2 times breadth, with 1 (male 2) proximal A3-setae, 13 (male 18) D3-setae along most of posterior margin and 3 apical E3-setae. *Maxilla 1* : inner plate narrow with 2 plumose apical setae; outer plate

with 11 spine-teeth in 6/5 arrangement; outer row with ST1-ST3 large, stout, multicuspidate, ST4-ST5 large, stout, 5-cuspidate, ST6 large, stout, 8-cuspidate, ST7 slightly displaced from ST6, large, broad, 8-cuspidate; inner row with STA large, slightly displaced from STB-STD, 3-cuspidate, STB long, broad, 5-cuspidate, STC large,

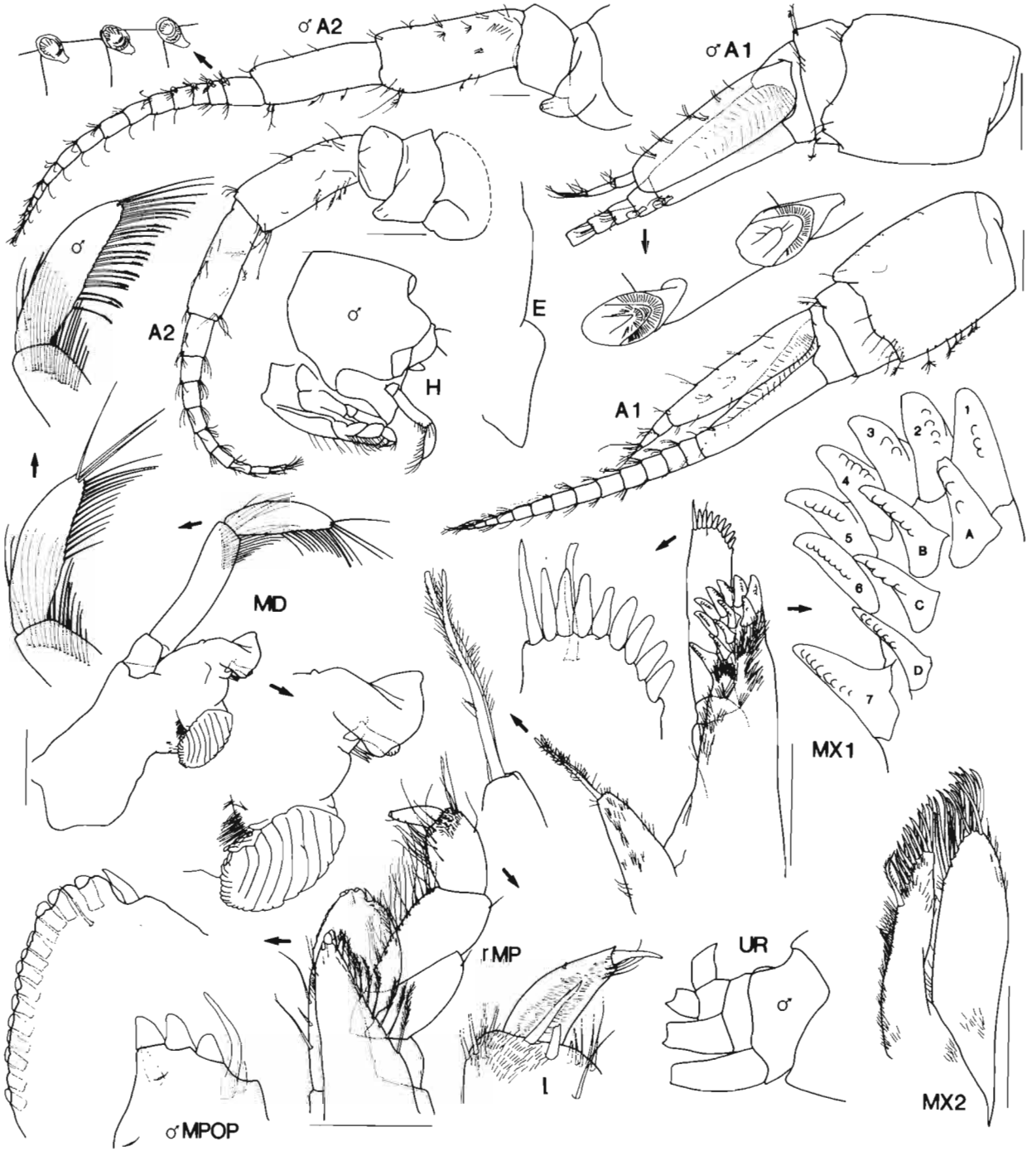

FIG. 22. — *Onesimoides mindoro* sp. nov., holotype female, 10 mm (MNHN-Am 4445A); A1, MDP: paratype male, 12 mm (MNHN-Am 4445B); Mindoro Strait, Philippine Islands; H, UR: paratype male, 8 mm, ZMC, off Mindanao, Philippine Islands. Scales represent 0.2 mm.

broad, 4-cuspidate, STD large, broad, 6-cuspidate; palp large, 2-articulate, with 8 long terminal spines, with 1 subterminal seta, flag spine present on distolateral corner, distomedial margin smooth. *Maxilla 2* : inner plate narrow, outer plate broad, subequal in length. *Maxilliped* : inner plate very large, subrectangular, with 3 apical nodular spines, with 1 apicolateral spine, oblique setal row strong with 10 plumose setae; outer plate small, subovate, without subapical notch, with many fine apical setae, with 1 apical spine, medial spines present, small, submarginal setae long, simple; palp large, 4-articulate, article 2 broad, length 1.7 times breadth, 1.4 times article 3; article 3 short, broad, length 1.6 times breadth; dactylus well developed, with 4 subterminal setae, unguis present.

Gnathopod 1 : sexually dimorphic; female chelate, coxa large, almost as long as coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin slightly concave; basis long, slender, length 2.6 times breadth, anterior margin smooth, with simple setae; ischium long, length 2 times breadth; merus, posterior margin lined with long simple setae; carpus subtriangular, short, length 1.2 times breadth, shorter than (0.62 times) propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length 1.8 times breadth, margins slightly converging distally, posterior margin smooth, strongly sinusoidal, with 5 groups of setae, without denticulate patch near posterior margin, palm obtuse, margin convex, smooth, posterodistal corner with 1 medial and 1 lateral spines; dactylus simple, with subterminal tooth. Male gnathopod 1 subchelate; basis long, slender, length 3.1 times breadth; merus with large brush of setae on medial face, carpus subtriangular, short, length 0.9 times breadth, shorter than (0.4 times) propodus; propodus massive, subrectangular, length 1.9 times breadth, margins tapering distally, posterior margin smooth, convex, with dense brush of setae on medial face, palm acute, margin with 2 blunt teeth and slight posterodistal cavity, posterodistal corner with 1 medial and 1 lateral spines; dactylus simple, strongly curved. *Gnathopod 2* : minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length 3 times breadth; carpus short, length 1.5 times breadth, posterior margin broadly lobate; propodus subquadrate, short, length 1.5 times breadth, posterior margin without strong distal spines, palm obtuse, with straight, serrate margin, posterodistal corner with 1 medial spine (male 1) and 1 lateral spine (male 1); dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3 : coxa large; merus weakly expanded anteriorly, male and female merus-carpus without plumose setae; propodus with 5 spines along posterior margin and 1 distal spine; dactylus short, stocky. *Peraeopod 4* : coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly, male and female merus-carpus without plumose setae; propodus with 4 spines along posterior margin and 2 distal spines; dactylus short, stocky. *Peraeopod 5* : coxa equilobate; basis expanded with posterior margin minutely crenate; merus expanded with rounded posterior margin; propodus with 5 setae along anterior margin and 2 distal spines; dactylus short, stocky. *Peraeopod 6* : coxa small, slightly lobate posteriorly; basis expanded posteriorly with minutely crenate posterior margin; merus expanded with rounded posterior margin; propodus with 6 setae along anterior margin and 2 distal spines; dactylus short, stocky. *Peraeopod 7* : basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus not expanded posteriorly, with 3 spines; propodus and dactylus not known.

Oostegites from gnathopod 2 to peraeopod 5. *Gills* from gnathopod 2 to peraeopod 6, not pleated.

Pleonite 3 : with slight dorsal carina. *Epimeron 1* : anteroventral corner rounded. *Epimeron 3* : posteroventral corner subquadrate. *Urosomites* : urosomite 1 with anterodorsal notch and low rounded boss with slight dorsal carina, without lateral flange; urosomite 3 without small dorsolateral spine. *Uropod 1* : peduncle with 9 dorsolateral, 1 apicolateral, 7 dorsomedial and 1 apicomedial spines, without spines along distal margin; outer ramus with 6 dorsal spines; inner ramus with 4 dorsal spines. *Uropod 2* : peduncle with 8 dorsolateral, 1 apicolateral, 1 dorsomedial and 1 apicomedial spines, without spines along distal margin; rami subequal in length; outer ramus with 5 dorsal spines; inner ramus with 4 dorsal spines, without constriction. *Uropod 3* : peduncle short, length 1.2 times breadth, with dorsolateral flange, with 5 dorsolateral, 1 apicolateral and 1 distoventral spines, with 4 midlateral setae; without plumose setae; rami lanceolate, inner ramus reduced, about 0.68 times outer ramus; outer ramus 2-articulate, article 2 short, article 1 with 3 lateral and 1 medial spines; inner ramus with 1 lateral spine; plumose setae absent in male and female. *Telson* : length 1 times breadth, entire, without dorsal spines or simple setae; distal margin truncated, with 6 penicillate and 2 simple marginal setae, without marginal spines.

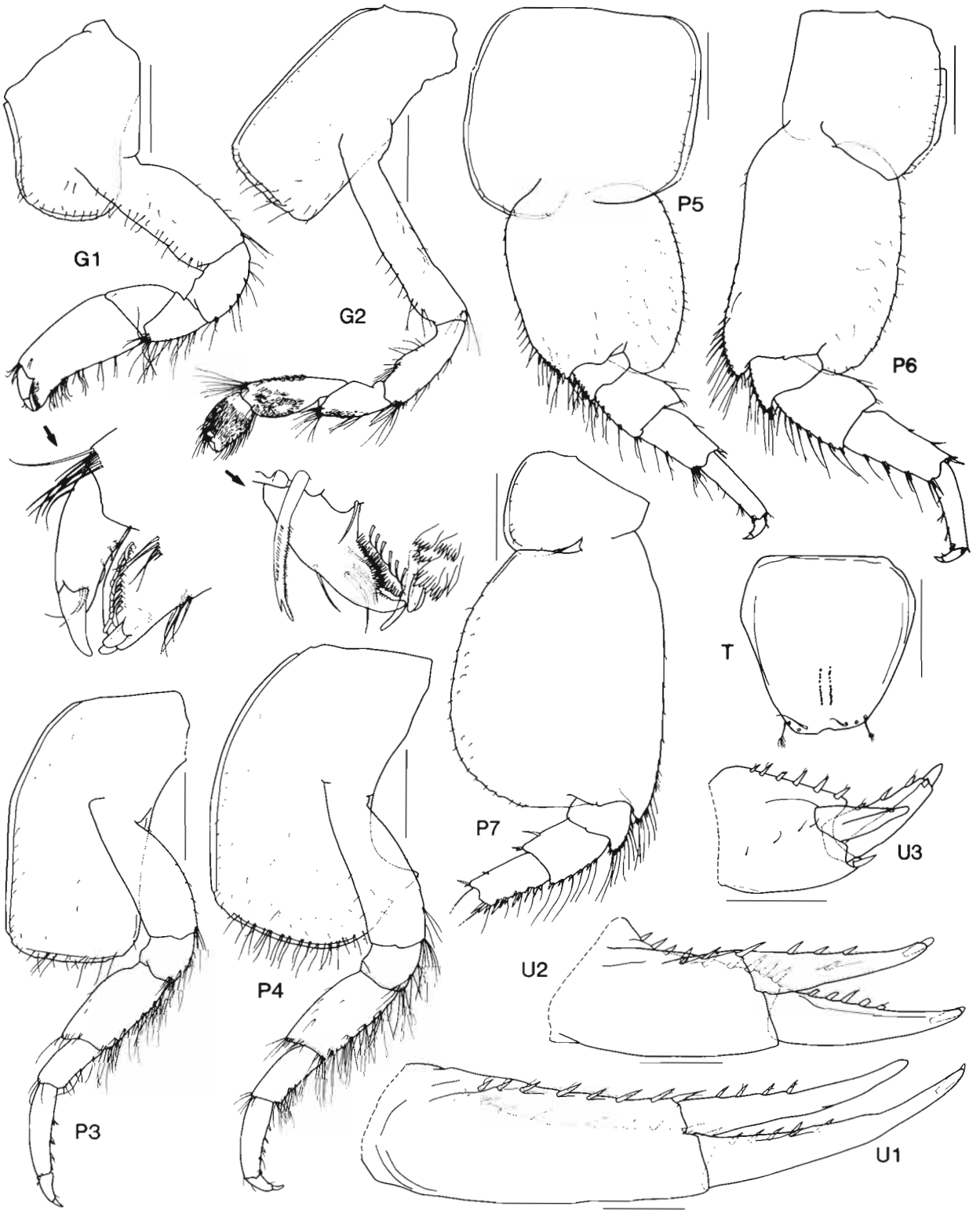

FIG. 23. — *Onesimoides mindoro* sp. nov., holotype female, 10 mm (MNHN-Am 4445A), Mindoro Strait, Philippine Islands. Scales represent 0.5 mm.

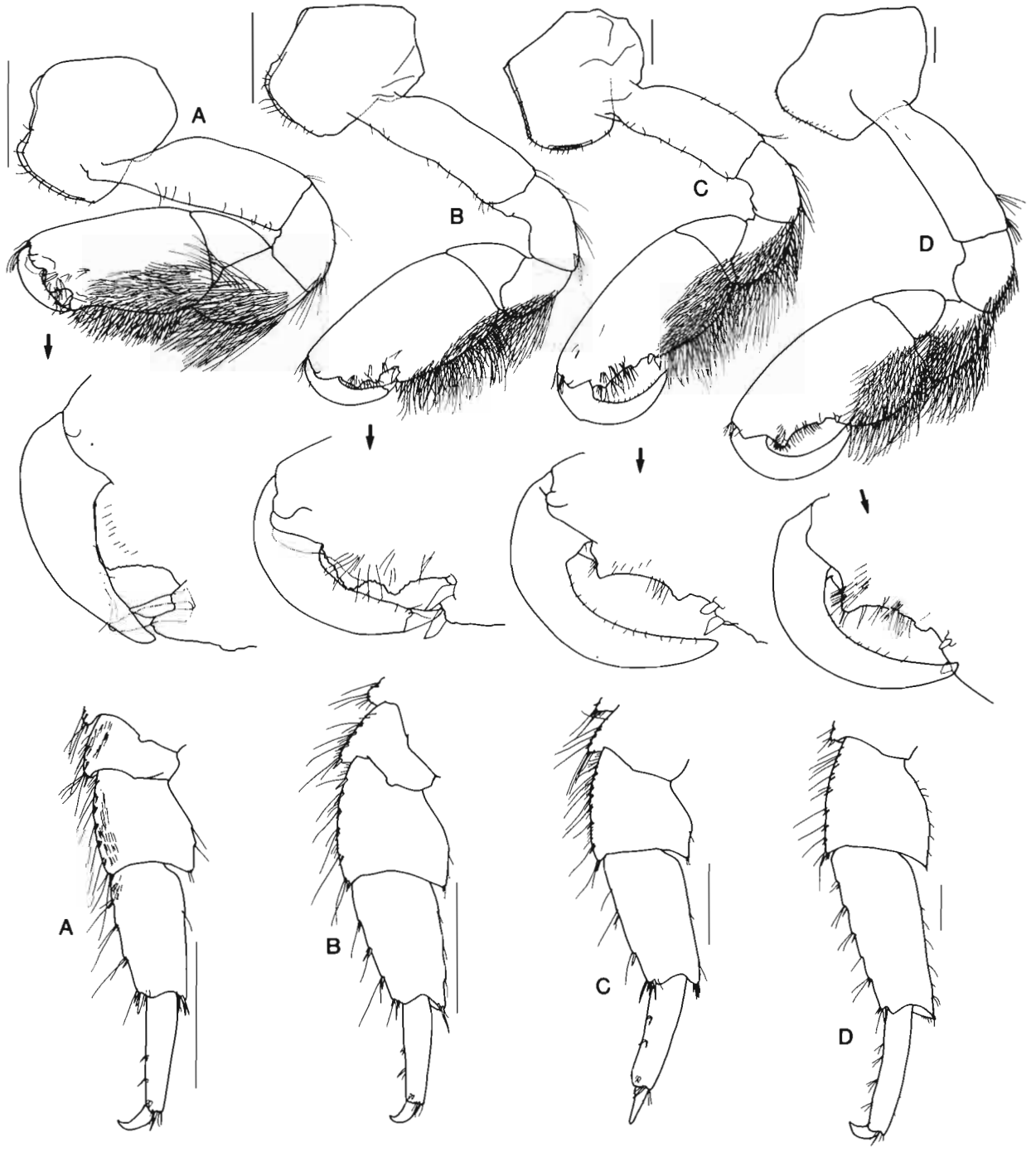

FIG. 24. — *Onesimoides mindoro* sp. nov., gnathopod 1 and distal articles of peraeopod 6 : **A**. paratype male, 7.5 mm (MNHN-Am 4603), Sibuyan Sea, Philippine Islands; **B**. paratype male, 8 mm (ZMC), off Mindanao, Philippine Islands; **C**. paratype male, 12 mm, (MNHN-Am 4445B), Mindoro Strait, Philippine Islands; **D**. paratype male, 20 mm (MNHN-Am 4448), Makassar Strait, Indonesia. Scales represent 0.5 mm.

VARIATION. — As in the two previous species the shape and size of male gnathopod 1 change significantly with age. We have not seen juvenile males in this species, but assume that the propodus is similar in shape to the propodus in the female. In larger males, around 7.5 mm, the propodus is broad, the palm forms a large, broad

anterior tooth and a small posterodistal cavity (fig. 24A). In slightly larger males, around 8 mm, the propodus remains broad, but lengthens, the palm becomes acute, the broad anterior tooth and the posterodistal cavity remain and a small midpalmar tooth develops (fig. 24B). The palm then changes only slightly, so that in males of about 12 mm it is longer and slightly concave, the midpalmar tooth moves more towards the posterior corner and the posterodistal cavity is reduced (fig. 24C). In very large animals the palm does not change but the posterior margin becomes convex and the proximal end of the propodus appears bulbous (fig. 24D).

The carpus of peraeopods 6 and 7 does not change much with size except in very large animals where it becomes longer in relation to its breadth.

ETYMOLOGY. — The specific name refers to the type locality.

REMARKS. — *Onesimoides mindoro* is distinguished from *O. castellatus* by the lack of a flange on urosomite 1, the length of the inner ramus on uropod 3, and the large setose brush and the shape of the palm on the propodus of male gnathopod 1. *Onesimoides mindoro* differs from *O. carinatus* in the length to breadth ratio and the shape of the palm on the propodus of male gnathopod 1. *Onesimoides mindoro* appears to be closely related to the *O. cavimanus* of LEDOYER (1978). The main morphological differences between these species occur in the males and appear to be the shape of the palm in gnathopod 1 and the development of the carpus in peraeopods 6 and 7 which becomes greatly enlarged in the species from Madagascar.

DISTRIBUTION. — *Onesimoides mindoro* occurs from Indonesia to the Philippine Islands in depths of 240-812 m.

Genus ***PARACENTROMEDON*** Chevreux & Fage, 1925

Paracentromedon pacificus sp. nov.

Figs 25-27

MATERIAL EXAMINED. — **Indonesia.** CORINDON 2 : stn B 236, 00°06.7'N, 119°45.5'E, northern Makassar Strait, south of Manimbaya, 1730 m, 4 November 1980 : 1 specimen, sex not known, 7 mm (MNHN-Am 4602).

TYPES. — The unique specimen is the holotype.

DIAGNOSIS. — Maxilla 1 : inner plate with at least half of inner margin setose, with 6 plumose setae. Epimeron 3 with posteroventral corner produced into broad tooth. Telson long, narrow, deeply cleft.

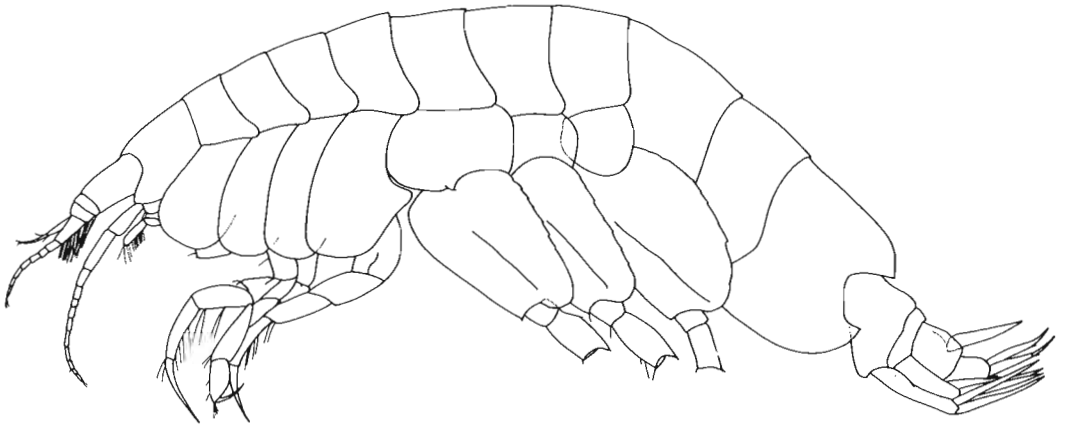

FIG. 25. — *Paracentromedon pacificus* sp. nov., holotype, sex not known, 7 mm (MNHN-Am 4602), south of Manimbaya, northern Makassar Strait, Indonesia.

DESCRIPTION. — Based on holotype, sex not known. *Head* : exposed, deeper than long; lateral cephalic lobe large, acute; rostrum absent; eyes apparently absent. *Antenna 1* : medium length, 0.2 times body; peduncular article 1 short, length 1.3 times breadth, without dorsal crest, tooth on distomedial margin, posterodistal tooth or anterodistal projection; peduncular article 2 short, 0.2 times article 1, with short anterodistal projection; peduncular article 3 short, 0.13 times article 1; accessory flagellum long, 0.54 times primary flagellum, 3-articulate, article 1 long, 2.1 times article 2, not forming cap; flagellum 9-articulate, callynophore strong 2-field, without posterodistal setae or spines, without flagellar spines, calceoli absent. *Antenna 2* : slightly longer than antenna 1; peduncle without brush setae, weakly geniculate, article 3 short, 0.43 times article 4, articles 4 and 5 not enlarged; flagellum 10-articulate, calceoli absent.

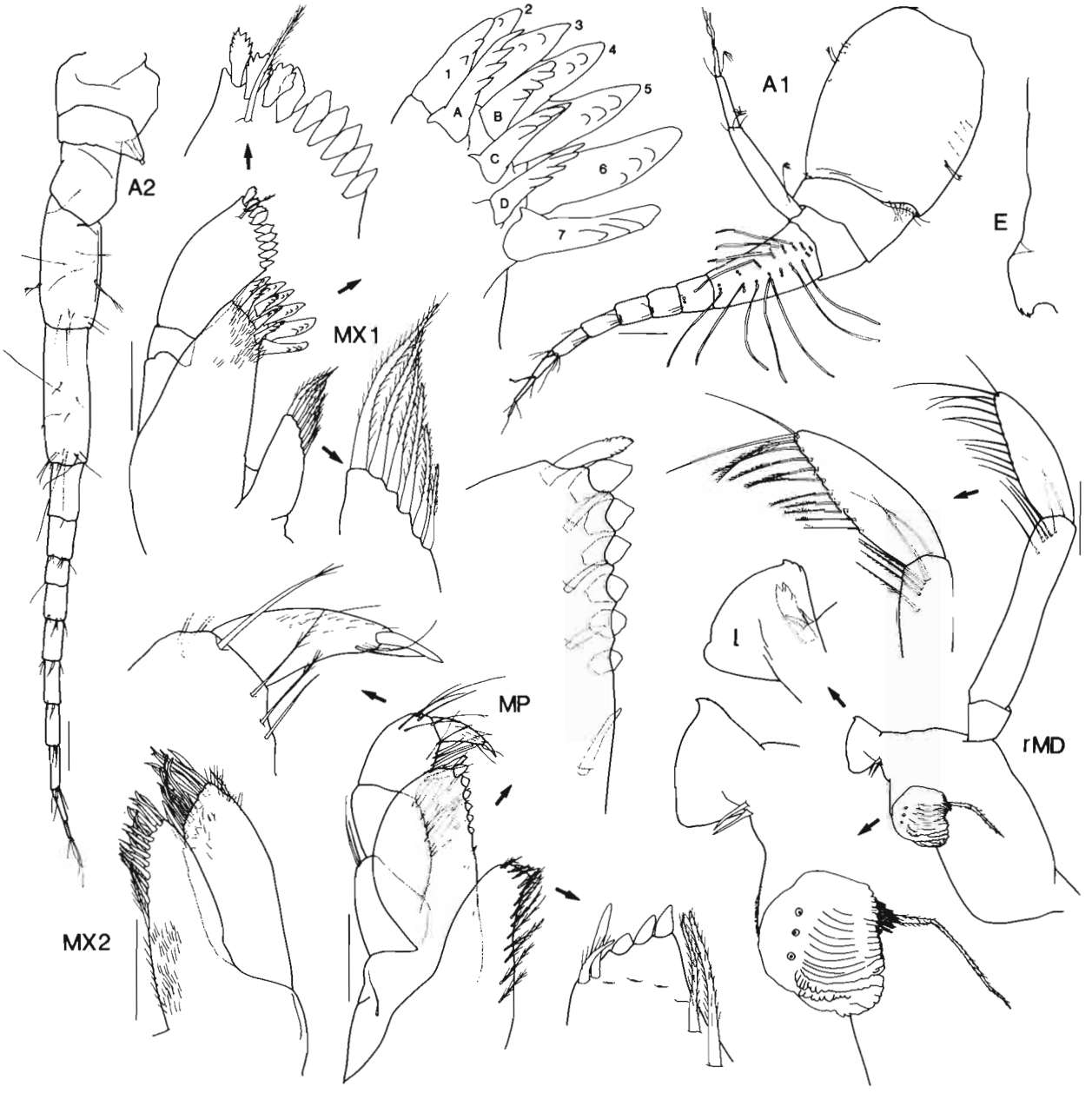

FIG. 26. — *Paracentromedon pacificus* sp. nov., holotype, sex not known, 7 mm (MNHN-Am 4602), south of Manimbaya, northern Makassar Strait, Indonesia. Scales represent 0.1 mm.

Mouthpart bundle : subquadrate. *Epistome* and *upper lip* : separate, epistome straight, upper lip slightly produced, rounded. *Mandible* : incisors symmetrical, small, with slightly convex margins, left lacinia mobilis present, a stemmed distally serrate blade; accessory spine row without distal setal tuft, left and right rows each with 2 short, slender, simple spines, without intermediate setae; molar columnar with fully triturating surface, large plumose seta present on right molar; mandibular palp attached distally, article 1 short, length 0.9 times breadth, without setae; article 2 elongate, slender, length 4.9 times breadth, 1.3 times article 3, with 5 posterodistal submarginal A2-setae, without D2-setae; article 3 falcate, long, length 3.3 times breadth, with 1 proximal A3-seta, with 10 distal D3-setae on posterior margin and 2 apical E3-setae. *Maxilla 1* : inner plate tapering distally, at least half of inner margin setose with 6 plumose setae; outer plate with 11 spine-teeth in 6/5 arrangement; outer row with ST1-ST3 large, stout, weakly cuspidate, ST4 large, stout, 1- to 2-cuspidate, ST5-ST6 large, stout, 2- to 3-cuspidate, ST7 contiguous with ST6, large, broad, 2- to 3-cuspidate; inner row with STA large, slightly displaced from STB-STD, 3-cuspidate, STB-STC large broad, 3-cuspidate, STD large, broad, 2- to 3-cuspidate; palp large, 2-articulate, with 8 short terminal spines and 1 subterminal seta, flag spine present on distolateral corner, distomedial margin smooth. *Maxilla 2* : inner and outer plates narrow, subequal in length. *Maxilliped* : inner plate large, subrectangular, with 3 apical nodular spines, oblique setal row strong with 14 plumose setae; outer plate medium size, subovate, without subapical notch or apical setae, with 1 apical spine, medial spines present, large, submarginal setae short, simple; palp large, 4-articulate, article 2 broad, length 1.6 times breadth, 1.1 times article 3; article 3 short, broad, length 1.6 times breadth; dactylus well developed, with 2 subterminal setae, unguis present.

Gnathopod 1 : subchelate; coxa large with tiny posterodistal hook, anterior margin slightly concave, anteroventral corner produced, rounded, posterior margin slightly convex; basis long, slender, length 4.5 times breadth, anterior margin smooth, with simple setae; ischium short, length 1.3 times breadth; merus, posterior margin with a few simple setae; carpus subrectangular, long, length 2.9 times breadth, longer than (1.4 times) propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length 2.2 times breadth, margins subparallel, posterior margin smooth, straight, with setae, without denticulate patch near posterior margin, palm extremely acute, margin convex, serrate, posterodistal corner with 2 medial and 1 lateral spines; dactylus simple, without subterminal teeth or spines. *Gnathopod 2* : minutely subchelate; coxa large, subequal in size to coxa 3, with tiny posterodistal hook; ischium long, length 2.9 times breadth; carpus long, length 3.1 times breadth, posterior margin straight; propodus subrectangular, short, length 1.8 times breadth, posterior margin with strong serrate spines distally, palm transverse, with straight, serrate margin, posterodistal corner with 1 medial spine; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3 : coxa large; merus not expanded anteriorly, merus-carpus without plumose setae; propodus with 7 setae along posterior margin; dactylus long, slender, with vestigial apical nail. *Peraeopod 4* : coxa deeper than wide, with large posteroventral lobe, anterior margin rounded, posterior margin sloping anteriorly; merus not expanded anteriorly, merus-carpus without plumose setae; propodus with 5 setae along posterior margin; dactylus long, slender with vestigial apical nail. *Peraeopod 5* : coxa equilobate; basis expanded with posterior margin minutely crenate; merus not expanded posteriorly; propodus and dactylus not known. *Peraeopod 6* : coxa small, not lobate posteriorly; basis expanded posteriorly with minutely crenate posterior margin; merus not expanded posteriorly; propodus and dactylus not known. *Peraeopod 7* : basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus not expanded posteriorly, with 1 spine; propodus and dactylus not known.

Oostegites not known. *Gills* from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1 to 3 : dorsally smooth. *Epimeron 1* : produced, narrowly rounded. *Epimeron 3* : posteroventral corner produced into strong tooth. *Urosomites* : 1 to 3 dorsally smooth; urosomite 3 with small dorsolateral spine. *Uropod 1* : peduncle with 2 dorsolateral, 1 apicolateral, 2 dorsomedial and 1 apicomedial spines, without spines along distal margin; outer ramus slightly shorter than inner ramus; outer ramus without spines; inner ramus with 3 lateral spines. *Uropod 2* : peduncle without dorsolateral flange, with 1 apicolateral, 5 dorsomedial and 1 apicomedial spines; rami subequal in length; outer ramus with 2 dorsal spines; inner ramus with 5 dorsal spines, without constriction. *Uropod 3* : peduncle short, length 1.7 times breadth, without dorsolateral flange, with 1 apicomedial spine, without midlateral spines or setae, with 3 distoventral spines, without plumose setae;

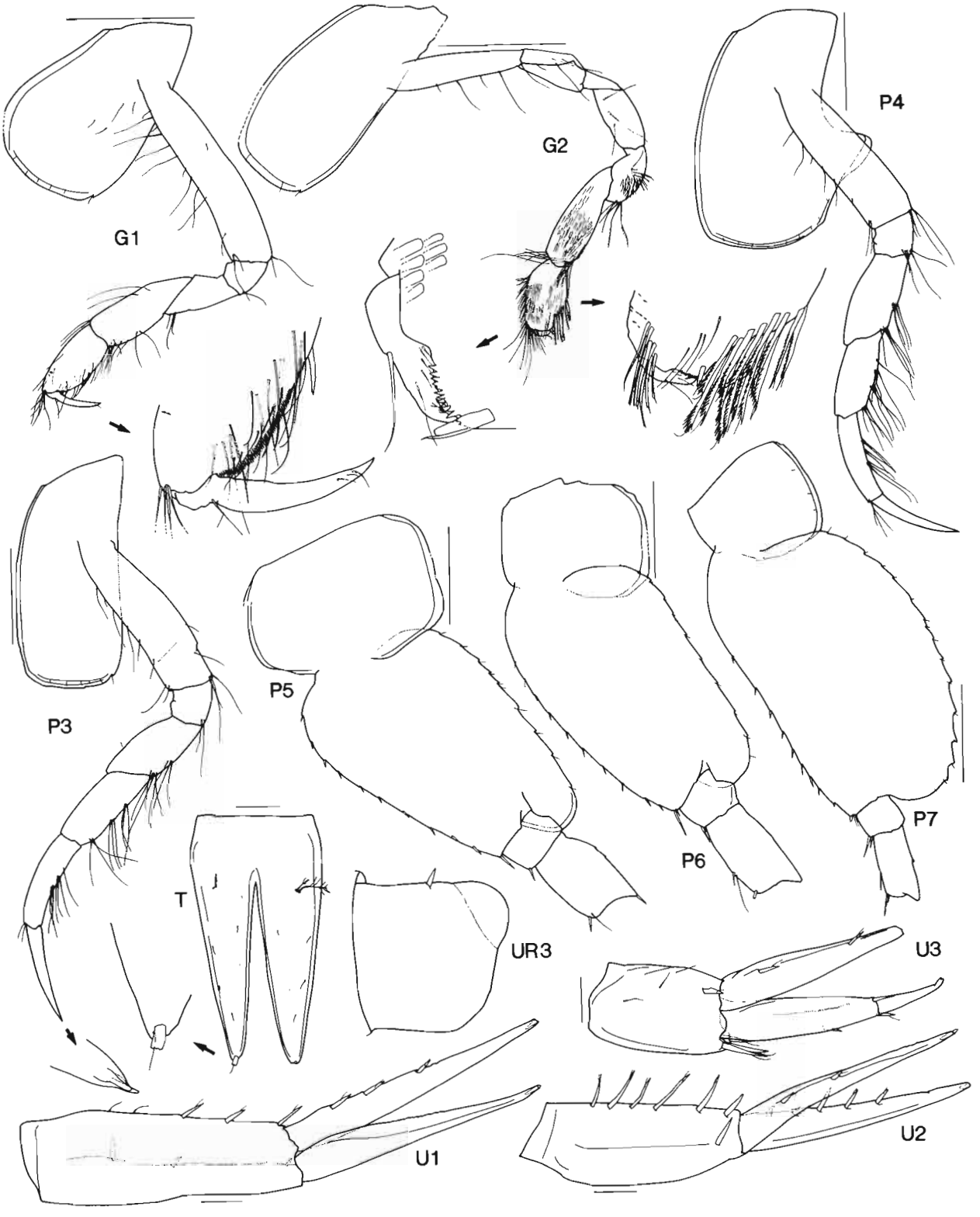

FIG. 27. — *Paracentromedon pacificus* sp. nov., holotype, sex not known, 7 mm (MNHN-Am 4602), south of Manimbaya, northern Makassar Strait, Indonesia. Scales for U1-3, T represent 0.1 mm, remainder represent 0.5 mm.

rami lanceolate, subequal in length; outer ramus 2-articulate, article 2 short, with 2 lateral and 1 medial spines; inner ramus with 2 lateral spines; plumose setae absent. *Telson* : length 1.8 times breadth, deeply cleft (73%), without dorsal spines, with sparse dorsal simple setae; distal margins truncated, without marginal penicillate setae, with 1 simple marginal seta and 1 marginal spine on each lobe.

ETYMOLOGY. — The species is named *pacificus* because of its occurrence in the Pacific Ocean.

REMARKS. — The genera of the hippomedontine lysianassoid group are not well understood. This taxon appears to fit best in *Paracentromedon*, previously known only from the Atlantic Ocean, although BARNARD and KARAMAN (1991) considered that the New Zealand species *Hippomedon manene* Lowry & Stoddart (1983), *H. matikuku* Lowry & Stoddart (1983) and *H. whero* Fenwick (1983) belonged here.

Paracentromedon pacificus shares with *P. crenulatum* Chevreux (1900), a strong group of raker spines on the posterior margin of the propodus of gnathopod 2, but the species differ in the following ways : *P. pacificus* has more plumose setae on the maxilla 1 inner plate; less serrate bases on peraeopods 5 to 7; a broader tooth on epimeron 3; and a longer telson.

Paracentromedon pacificus is also very similar to *Hippomedon bandae* Pirlot, 1933. However *H. bandae* has: a large spine on the posterodistal corner of the callynophore; a broader propodus on gnathopod 1; few, if any, raker spines on the propodus of gnathopod 2; a smaller posteroventral lobe on coxa 4; and a shorter telson.

DISTRIBUTION. — *Paracentromedon pacificus* is known from the northern Makassar Strait, Indonesia, in 1730 m depth.

Genus ***PSEUDAMARYLLIS*** Andres, 1981

Pseudamaryllis Andres, 1981 : 436. — BARNARD & KARAMAN, 1991 : 521.

DIAGNOSIS. — Head deeper than long with weak midanterior notch, rostrum insignificant. Eyes reniform. Antenna 1 : peduncular article 2 short, 2-field callynophore present in female and male. Antenna 2 slightly longer than antenna 1 in female and male. Mouthpart bundle subquadrate. Mandible : lacinia mobilis broad; molar a setose flap. Maxilla 1 : spine-teeth on outer plate in 6/5 arrangement; palp absent. Maxilliped : inner plate with

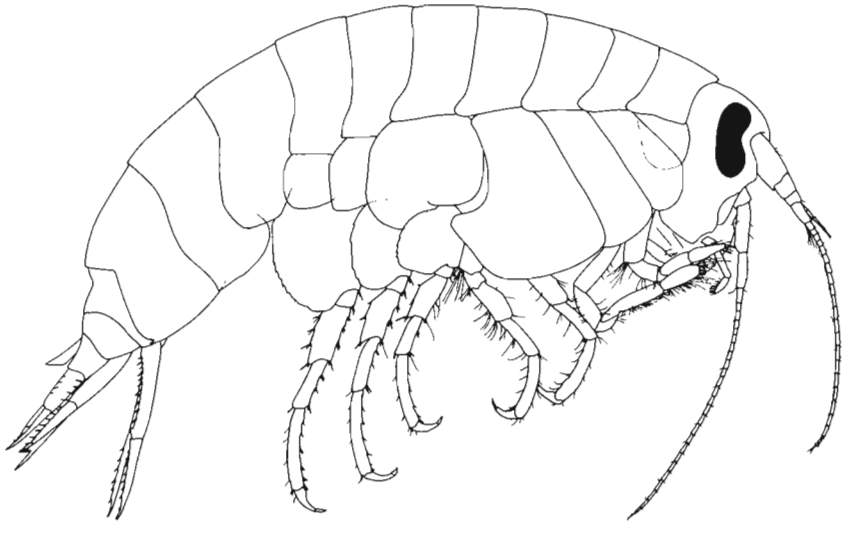

FIG. 28. — *Pseudamaryllis andresi* sp. nov., paratype female, 7 mm (MNHN-Am 4379), off Sablayan, Mindoro, Philippine Islands.

oblique setal row vestigial or absent; palp article 4 reduced with 1 terminal and 1 subterminal seta. Gnathopod 1 : coxa vestigial; propodus with serrate posterior margin and several strong spines. Peraeopods 3 and 4 without plumose setae in male and female. Peraeopod 4 : coxa with large posteroventral lobe, anterior margin straight, posterior margin slightly sloping anteriorly. Epimeron 3 with notch on posteroventral corner. Uropod 3 : plumose setae absent in male and female.

TYPE SPECIES. — *Pseudamaryllis nonconstricta* Andres, 1981, by original designation.

REMARKS. — LEDOYER (1986) considered *Pseudamaryllis* as a subgenus of *Amaryllis*. Species of *Amaryllis* have a strong midanterior head notch extended into a slit, subconical mouthpart bundle and posterior margin of gnathopod 1 without spines. We consider these to be generic level characters. *Pseudamaryllis* appears to be more closely related to *Bathyamaryllis* and *Vijaya*. The main difference is that neither *Bathyamaryllis* nor *Vijaya* has a callynophore in the female. In addition *Vijaya* has a uniquely flared coxa 4.

DISTRIBUTION. — *Pseudamaryllis* is known from the Red Sea, the western Indian Ocean and south-east Asia in 90 to 1544 m depth.

Pseudamaryllis andresi sp. nov.

Figs 28-30

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 1 : stn CP 72, 14°11.8'N, 120°28.7'E, off Manila Bay, 122-127 m, 28 March 1976 : 1 ♂, 8 mm (MNHN-Am 4377).

MUSORSTOM 2 : stn CP 28, 13°14.3'N, 120°50.5'E, Mindoro, off Sablayan, 90-110 m, on a coconut, 23 November 1980 : 21 specimens (MNHN-Am 4379), 2 specimens (AM P41434).

MUSORSTOM 3: stn CP 131, 11°37'N, 121°43'E, northern Sulu Sea, off Maniquin Island, 120-122 m, 5 June 1985 : 3 juveniles (MNHN-Am 4462).

TYPES. — The male, 8 mm (MNHN-Am 4377), is the holotype. The other specimens are paratypes.

TYPE LOCALITY. — Philippine Islands, off Manila Bay, 14°11.8'N, 120°28.7'E, 122-127 m.

DIAGNOSIS. — Peraeopod 5 : basis with posteroventral corner quadrate. Peraeopod 7 : basis with posteroventral corner rounded. Epimeron 3 : strongly notched. Uropod 2 : inner ramus with weak constriction.

DESCRIPTION. — Based on holotype male, 8 mm; paratype female 7 mm (MNHN-Am 4379). *Head* : exposed, much deeper than long, extending below insertion of antenna 2 with notch at level of insertion; lateral cephalic lobe weak, broadly rounded; rostrum small; eyes reniform, not enlarged in reproductive male. *Antenna 1* : medium length, 0.37 times body; peduncular article 1 short, length 1.3 times breadth, not ball-shaped proximally, with medium sized midmedial tooth; peduncular article 2 short, 0.4 times article 1; peduncular article 3 short, 0.19 times article 1; accessory flagellum very short 0.18 times primary flagellum, 4-articulate, article 1 long, 1.2 times article 2 (male long, 2 times article 2), not forming cap; flagellum 18-articulate (male 22), callynophore weak 2-field in female (strong 2-field in male), without posterodistal setae or spines, without flagellar spines or aesthetascs, calceoli absent in female (about 16 present in reproductive male). *Antenna 2* : slightly longer than antenna 1 (same in male), peduncle without brush setae (weak in male), in female weakly geniculate, article 3 short, 0.35 times article 4 (in male weakly geniculate between peduncular articles 3-4, article 3 short, 0.40 times article 4), article 4 enlarged in male; flagellum 12-articulate (male 43), calceoli absent in female (about 35 present in reproductive male).

Mouthpart bundle : subquadrate. *Epistome* and *upper lip* : fused, bilobate. *Mandible* : incisors symmetrical, small, with slightly convex margins; left lacinia mobilis present, a stemmed smooth blade; accessory spine row with weak distal setal tuft, left and right rows each with 9 short, slender, simple spines, with simple intermediate setae; molar a small, smooth setose flap; mandibular palp attached proximally, article 1 short, length 0.8 times

breadth; article 2 elongate, slender, length 4.9 times breadth, 1.5 times article 3, without D2-setae, with 4 (male 21) submarginal A2-setae; article 3 slender, blade-like, long, length 3.1 times breadth, with 1 (male 1) proximal A3-seta, 7 (male 17) D3-setae along most of posterior margin and 2 apical E3-setae. *Maxilla 1* : inner plate broad with 2 plumose apical setae; outer plate broad with 11 spine-teeth in 6/5 arrangement; outer row with ST1-ST3 large, stout, weakly cuspidate, ST4-ST5 large, stout, 3- to 4-cuspidate, ST6 large, stout, 5- to 6-cuspidate, ST7 contiguous with ST6, large, slender, curved, 16-cuspidate medially; inner row with STA large,

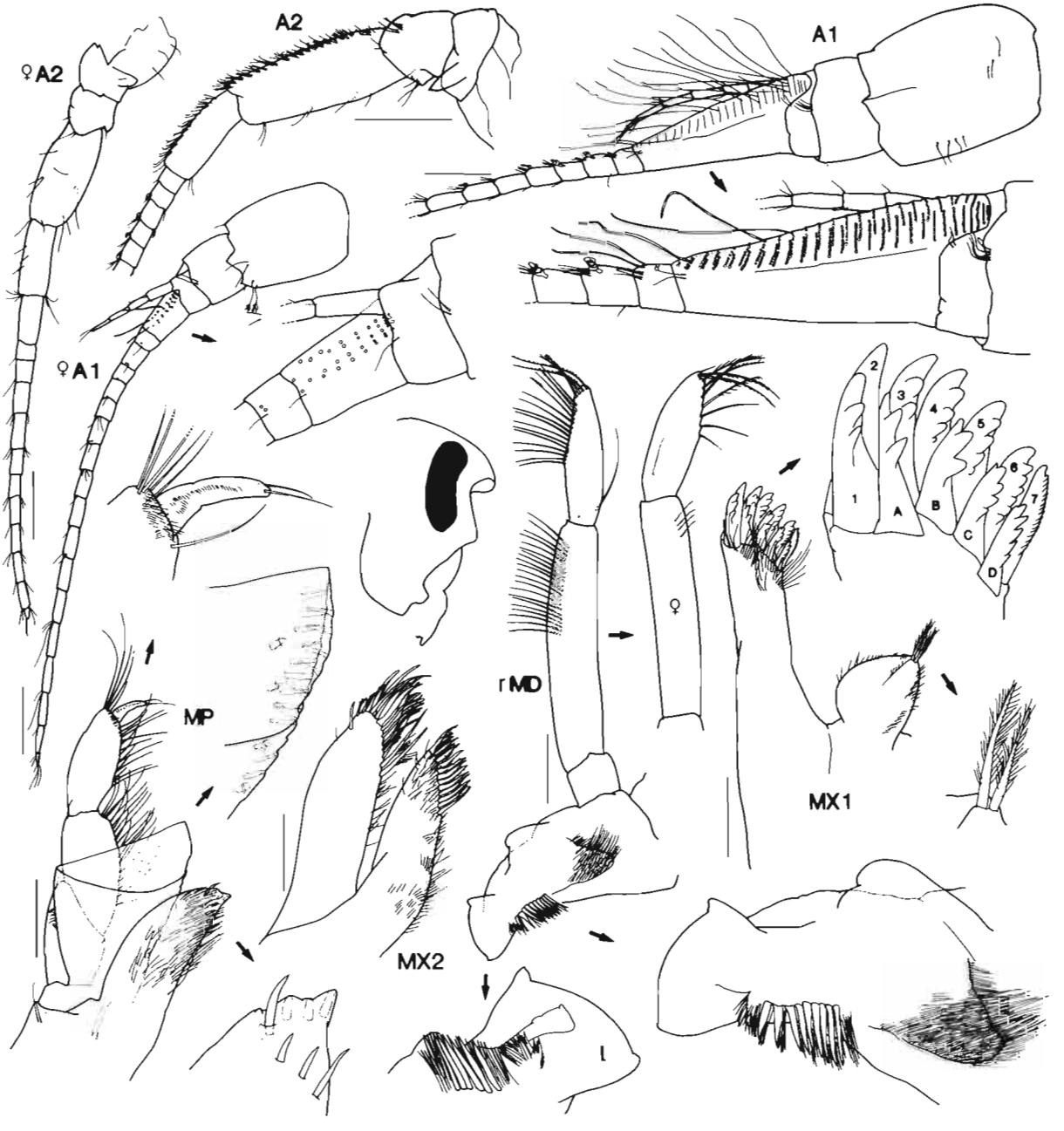

FIG. 29. — *Pseudamaryllis andresi* sp. nov., holotype male, 8 mm (MNHN-Am 4377), off Manila Bay, Philippine Islands; paratype female, 7 mm (MNHN Am 4379), off Sablayan, Mindoro, Philippine Islands. Scales for A1, 2 represent 0.2 mm, remainder represent 0.1 mm.

slightly displaced from STB-STD, 2-cuspidate, STB long, broad, 2-cuspidate, STC large, broad, 4-cuspidate, STD large, broad, 5-cuspidate; palp absent. *Maxilla 2* : inner plate narrow, outer plate broader, subequal in length. *Maxilliped* : inner plate large, subrectangular, with 3 vestigial apical nodular spines, oblique setal row reduced with 4 simple setae; outer plate medium size, subovate, without subapical notch, without apical setae, apical spines or medial spines; submarginal setae vestigial; palp large, 4-articulate; article 2 slender, length 2.2 times breadth, 1.1 times article 3; article 3 long, slender, length 2.6 times breadth; dactylus reduced, with 1 terminal and 1 subterminal seta, unguis absent.

Gnathopod 1 : simple; coxa vestigial; basis long, slender, length 4.9 times breadth, anterior margin smooth, with simple setae; ischium long, length 2 times breadth; merus, posterior margin lined with long simple setae, carpus subrectangular, long, length 2 times breadth, shorter than (0.84 times) propodus, with long simple setae along posterior margin; propodus large, subrectangular, length 2.7 times breadth, margins slightly converging distally, posterior margin serrate, subtly sinusoidal, with 5 spines and 5 groups of setae, without denticulate patch near posterior margin, palm absent; dactylus simple, with subterminal tooth and 2 rows of denticles along posterior margin. *Gnathopod 2* : minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length 2.8 times breadth; carpus very long, length 4.8 times breadth, posterior margin straight; propodus subrectangular, long, length 2.9 times breadth, palm slightly acute, with convex, minutely serrate margin, posterodistal corner without spines; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3 : coxa large; merus weakly expanded anteriorly, male and female merus-carpus without plumose setae; propodus with 1 spine and row of setae along posterior margin and 2 distal locking spines; dactylus short, slender. *Peraeopod 4* : coxa with large posteroventral lobe, anterior margin straight, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly, male and female merus-carpus without plumose setae; propodus with 1 spine and row of setae along posterior margin and 2 distal locking spines; dactylus short, slender. *Peraeopod 5* : coxa bilobate, posterior lobe produced ventrally; basis expanded with posterior margin crenate; merus slightly expanded posteriorly; propodus with 7 spines along anterior margin and 2 distal locking spines; dactylus short, slender. *Peraeopod 6* : coxa small, not lobate posteriorly; basis expanded posteriorly with crenate posterior margin; merus slightly expanded and rounded posteroproximally, straight posterodistally with 5 setae; propodus and dactylus not known. *Peraeopod 7* : basis expanded posteriorly, posterior margin slightly rounded, crenate, posteroventral corner rounded, posteroventral margin rounded; merus not expanded posteriorly with 9 spines; propodus with 10 spines along anterior margin and 2 distal locking spines; dactylus short, slender.

Oostegites from gnathopod 2 to peraeopod 5. *Gills* from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1 to 3 dorsally smooth. *Epimeron 1* : anteroventral corner rounded. *Epimeron 3* : posteroventral corner strongly notched. *Urosomites*: urosomites 1 to 3 dorsally smooth; urosomite 3 without small dorsolateral spine. *Uropod 1*: peduncle with 10 dorsolateral (male 19), 1 apicolateral (male 1), 4 dorsomedial (male 5) and 1 apicomedial (male 1) spines, without plumose setae or spines along distal margin; rami subequal in length, male outer ramus with 9 lateral spines, inner ramus with 5 medial and 7 lateral spines (female not known). *Uropod 2* : peduncle with 2 (male 5) dorsolateral, 1 apicolateral and 1 apicomedial spines, without spines along distal margin; outer ramus 0.8 times as long as inner ramus; outer ramus with 4 (male 8) lateral spines; inner ramus with 2 (male 6) medial and 4 (male 8,1) lateral spines, with weak constriction. *Uropod 3* : peduncle long, without dorsolateral flange, with 6 (male 6) dorsomedial, 0 (male 6) dorsolateral and 1 apicomedial spines, without plumose setae; rami lanceolate, subequal in length, with minutely serrate margins; outer ramus 1-articulate, with 3 (male 4) lateral and 1 (male 6) medial spines; inner ramus with 1 (male 4) medial and 4 (male 9) lateral spines; plumose setae absent in male and female. *Telson* : length 1.3 times breadth, slightly cleft (27%), without dorsal spines or simple setae; distal margins truncated, with 1 marginal penicillate and 1 simple seta on each lobe, without marginal spines.

ETYMOLOGY. — This species is named for Hans Georg ANDRES, who originally described the genus *Pseudamaryllis*, in recognition of his fine systematic studies of lysianassoid amphipods.

REMARKS. — Until now *Pseudamaryllis* has been a monotypic genus known from the Red Sea (ANDRES, 1981) and the western Indian Ocean (LEDOYER, 1986). This new species differs significantly from *P. nonconstricta*

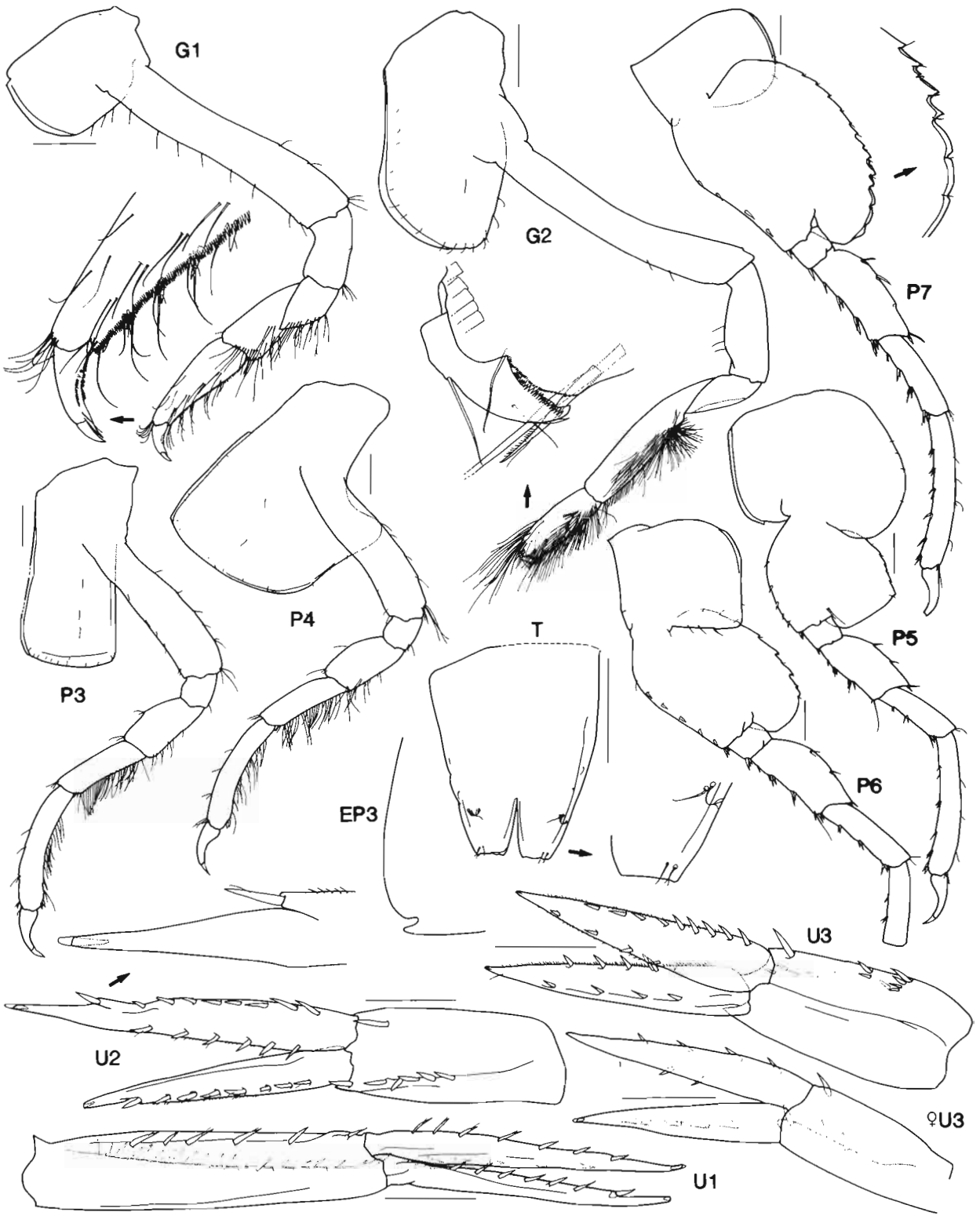

FIG. 30. — *Pseudamaryllis andresi* sp. nov., holotype male, 8 mm (MNHN-Am 4377), off Manila Bay, Philippine Islands; paratype female, 7 mm (MNHN-Am 4379), off Sablayan, Mindoro, Philippine Islands. Scales represent 0.2 mm.

as follows : basis of peraeopod 5 with a subacute corner; basis of peraeopod 7 with evenly rounded posteroventral corner and inner ramus of uropod 2 weakly constricted.

DISTRIBUTION. — *Pseudamaryllis andresi* is known from the waters of south-eastern Luzon and northern Mindoro, Philippine Islands, in 90 to 127 m depth.

Genus ***TRISCHIZOSTOMA*** Boeck, 1861

Trischizostoma crosnieri sp. nov.

Figs 31-33

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 2 : stn CP 79, 13°44'N, 120°32'E, north-eastern entrance to Verde Island Passage, 682-770 m, 1 December 1980 : 1 ♀, 29 mm, with about 22 young (MNHN-Am 4450).

TYPES. — The unique specimen is the holotype.

DIAGNOSIS. — Maxilliped: palp 4-articulate, much longer than outer plate. Gnathopod 1 : propodus oval, broader than long. Telson slightly cleft (less than one third).

DESCRIPTION. — Based on holotype female, 29 mm; male not known. *Head* : exposed, deeper than long; lateral cephalic lobe absent; rostrum large; eyes covering most of head, expanded dorsally and nearly confluent. *Antenna 1* : short, about 0.14 times body; peduncular article 1 short, length 1 times breadth; peduncular article 2 short, 0.3 times article 1, without anterodistal projection; peduncular article 3 short, 0.15 times article 1; accessory flagellum medium length, 0.42 times primary flagellum, 5-articulate, article 1 long, 13.8 times article 2, forming cap partially covering callynophore; flagellum 11-articulate, callynophore strong 2-field in female, without posterodistal setae or spines, with 1 spine on article 3, calceoli absent in female. *Antenna 2* : length 2 times antenna 1; peduncle with weak brush setae in female, peduncular article 1 greatly enlarged, not covering article 2, in female weakly geniculate, article 3 short, 0.27 times article 4, peduncular articles 4 and 5 not enlarged in female; flagellum 25-articulate, calceoli absent in female.

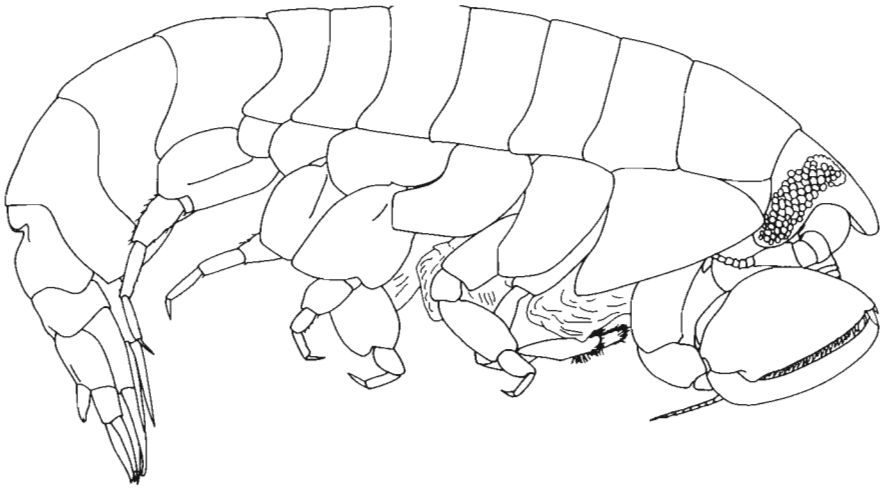

FIG. 31. — *Trischizostoma crosnieri* sp. nov., holotype female, 29 mm (MNHN-Am 4450), north-eastern entrance to Verde Island Passage, Philippine Islands.

Mouthpart bundle : conical. *Epistome* and *upper lip* : fused, sinusoidal. *Mandible* : incisors symmetrical, very small, at tip of styliform projection; laciniae mobilis absent; accessory spine row absent; molar absent; mandibular palp attached proximally, article 1 short, length 0.74 times breadth; article 2 elongate, broad, length 3.1 times breadth, 1 times article 3, with 28 posterodistal A2-setae, with about 10 D2-setae on distal half of posterior margin; article 3 falcate, long, length 3.2 times breadth, without A3-setae, with 16 D3-setae on distal half of posterior margin and 3 apical E3-setae. *Maxilla 1* : inner plate narrow with 1 simple apical seta; outer plate narrow with 8 spine-teeth in modified 8/3 crown arrangement; outer row with 5 large, slender spine-teeth without cusps, hooked distally; inner row with STA absent, STB-STD short, slender, without cusps; palp small, 1-articulate, with 2 apical setae, without subterminal setae, flag spine absent, distomedial margin smooth. *Maxilla 2* : inner and outer plates narrow, subequal in length. *Maxilliped* : inner plate very large, styliform, with 4 subapical vestigial spines, oblique setal row absent; outer plate small, subovate, without subapical notch, apical setae, apical spines or medial spines, submarginal setae vestigial; palp large, 4-articulate, styliform, geniculate between articles 2-3, article 2 broad, length 1.9 times breadth, 1 times article 3; article 3 long, broad, length 2.4 times breadth; dactylus longest of all, slender, lanceolate with minutely serrate anterior margin, with 2 subterminal setae; unguis absent.

Peraeonites : 1 to 7 dorsally smooth. *Gnathopod 1* : subchelate; coxa vestigial; basis long, slender, length 4.1 times breadth, anterior margin smooth, without setae; ischium short, length 1.5 times breadth; merus and carpus rotated, propodus and dactylus inverted in adult; merus, posterior margin without setae, carpus subtriangular, compressed, length 1.8 times breadth, shorter than propodus, without denticulate patch near posterodistal margin; propodus massive, subrectangular, length 0.57 times breadth, margins diverging distally, posterior margin smooth, convex, without spines or setae, without denticulate patch near posterior margin, palm slightly obtuse, margin convex, lined with row of short, thick spines, posterodistal corner with 2 medial and 2 lateral spines; dactylus simple, without subterminal teeth or spines. *Gnathopod 2* : minutely subchelate; coxa large, larger than coxa 3, adze-shaped; ischium very long, length 4 times breadth; carpus long, length 3 times breadth, posterior margin broadly lobate; propodus produced anterodistally beyond dactylus, short, length 1.2 times breadth, posterior margin without strong distal spines, palm slightly acute, with concave, smooth margin, posterodistal corner with at least 1 medial spine; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3 : coxa large; merus weakly expanded anteriorly; female merus-carpus without plumose setae; propodus without spines along minutely serrate posterior margin; dactylus short, slender, with minutely serrate posterior margin. *Peraeopod 4* : coxa deeper than wide, with large posteroventral lobe, anterior margin broadly rounded, posterior margin slightly sloping anteriorly; merus expanded anteriorly and posteriorly, female merus-carpus without plumose setae; propodus with 4 spines along minutely serrate posterior margin; dactylus short, slender, with minutely serrate posterior margin. *Peraeopod 5* : coxa bilobate, posterior lobe produced ventrally; basis expanded with posterior margin smooth; merus expanded with rounded posterior margin; propodus with 3 spines along minutely serrate anterior margin; dactylus short, slender, with minute serrations. *Peraeopod 6* : coxa small, slightly lobate posteriorly; basis expanded with broad posteroventral lobe; merus expanded proximally, posterior margin straight, converging distally, with 3 spines; propodus with 3 spines along minutely serrate anterior margin; dactylus short, slender, with minutely serrate anterior margin. *Peraeopod 7* : basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral margin rounded; merus slightly expanded proximally with 10 spines along posterior margin; propodus with 3 spines along minutely serrate anterior margin; dactylus long, slender, with minute serrations.

Oostegites from gnathopod 2 to peraeopod 5. *Gills* from gnathopod 2 to peraeopod 7, with strong horizontal pleating.

Pleonites 1 to 3 dorsally smooth. *Epimeron 1* : anteroventral corner narrowly rounded. *Epimeron 3* : posteroventral corner subquadrate. *Urosomites* : urosomite 1 with anterodorsal notch; urosomite 3 without dorsolateral spine. *Uropod 1* : peduncle with 9 dorsomedial and 1 apicomedial spines, without plumose setae or spines along distal margin; outer ramus slightly shorter than inner ramus; outer ramus without lateral or medial spines; inner ramus with 7 lateral spines. *Uropod 2* : peduncle without dorsolateral flange, with 1 apicolateral spine, without plumose setae, without spines along distal margin; rami subequal in length, without spines, inner ramus without constriction. *Uropod 3* : peduncle short, length 0.88 times breadth, without dorsolateral flange,

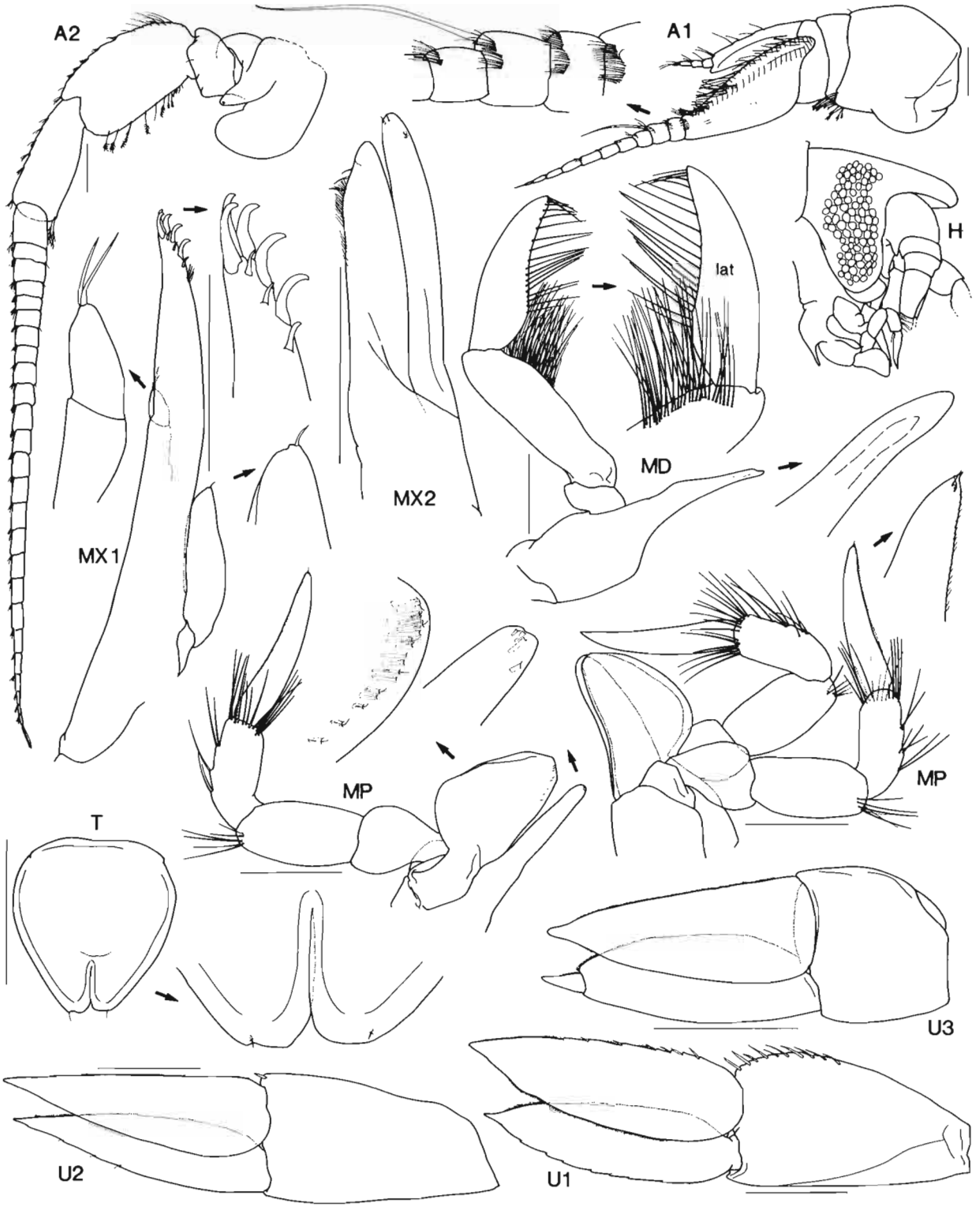

FIG. 32. — *Trischizostoma crosnieri* sp. nov., holotype female, 29 mm (MNHN-Am 4450), north-eastern entrance to Verde Island Passage, Philippine Islands. Scales for U1-3, T represent 1.0 mm, remainder represent 0.5 mm.

without dorsal spines, without midlateral spines or setae, without distoventral spines, without plumose setae; rami lanceolate, subequal in length, with minutely serrate margins, outer ramus 2-articulate, article 2 short, rami without spines, plumose setae absent in female. *Telson* : length 1.1 times breadth, slightly cleft (27%) without dorsal spines or setae, distal margins truncated, without marginal penicillate setae, with 1 simple marginal seta on each lobe.

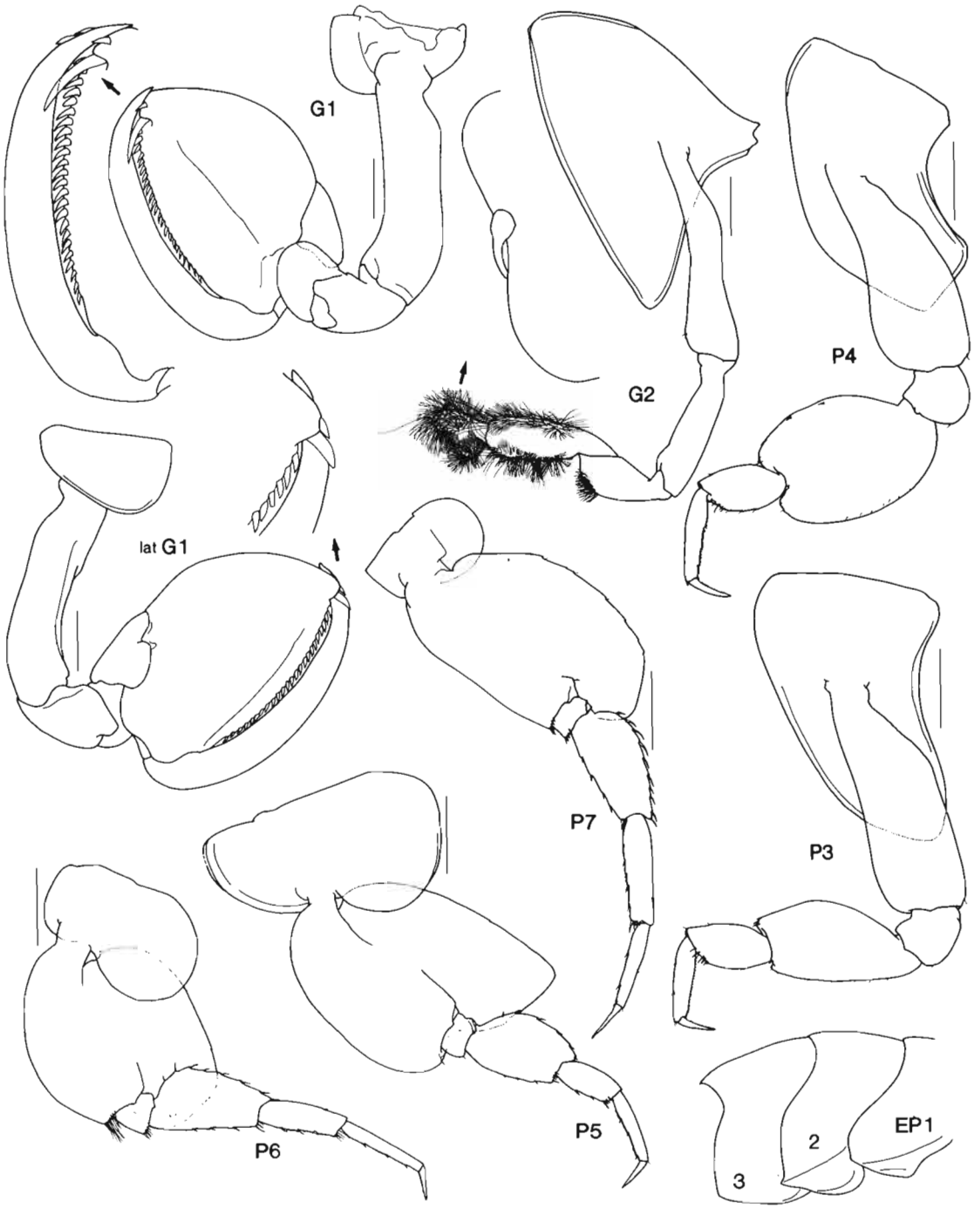

FIG. 33. — *Trischizostoma crosnieri* sp. nov., holotype female, 29 mm (MNHN-Am 4450), north-eastern entrance to Verde Island Passage, Philippine Islands. Scales represent 1.0 mm.

ETYMOLOGY. — This species is named for Alain CROSNIER, who has done so much for the description of the Indo-Pacific marine fauna and encouraged our work on these collections.

REMARKS. — *Trischizostoma crosnieri* and *T. raschi* are closely related. *Trischizostoma crosnieri* differs as follows : gnathopod 1, margin of palm convex with fewer spines guarding palm; peraeopod 6 basis with broad posteroventral lobe; and slightly cleft telson.

Trischizostoma crosnieri confounds the key of VINOGRADOV (1991). Although the telson is slightly cleft it must be considered with the entire-telson group. In this group the shape of the gnathopod 1 propodus in *T. crosnieri* also confounds the key. The oval-shaped propodus splits *T. crosnieri* from the *T. raschi* group and puts it again with species to which it is clearly not closely related. For these reasons we think that *T. crosnieri* is a valid species. However, characters such as the overall shape of the mandible, the spine-tooth arrangement on the outer plate of maxilla 1 and the overall shape of the maxilliped and coxae indicate the close relationship between *T. crosnieri* and *T. raschi*.

DISTRIBUTION. — *Trischizostoma crosnieri* is known only from the Verde Island Passage, Philippine Islands in 682-770 m depth.

ACKNOWLEDGEMENTS

We are particularly grateful to Alain CROSNIER who originally encouraged us to study the amphipods from the MUSORSTOM Expeditions and who arranged for one of us to come to Paris and sort the collections. We thank Hans Georg ANDRES and Mike THURSTON who critically read our manuscript; Stephen KEABLE who illustrated the species and Roger SPRINGTHORPE who composed and inked the plates; the Australian Museum Trust who provided travel money for the project; and the Australian Research Council who funded parts of the study.

REFERENCES

ANDRES, H. G., 1981. — Lysianassidae aus dem Abyssal des Roten Meeres. Bearbeitung der Köderfänge von FS "Sonne" - MESEDA I. (1977) (Crustacea: Amphipoda: Gammaridea). *Senckenbergiana Biol.*, **61** (5/6) : 429-443.

BARNARD, J. L., 1961. — Gammaridean Amphipoda from depths of 400 to 6000 meters. *Galathea Rep.*, **5** : 23-128.

BARNARD, J. L., 1964. — Some bathyal Pacific Amphipoda collected by the U.S.S. Albatross. *Pacif. Sci.*, **18** (3) : 315-335.

BARNARD, J. L., 1965. — Marine Amphipoda of atolls in Micronesia. *Proc. U.S. nat. Mus.*, **117** : 459-552.

BARNARD, J. L., 1967. — Bathyal and abyssal gammaridean Amphipoda of Cedros Trench, Baja California. *U.S. nat. Mus. Bull.*, **260** : 1-205.

BARNARD, J. L., 1976. — Amphipoda from the Indo-Pacific tropics: a review. *Micronesia*, **12** : 169-181.

BARNARD, J. L. & BARNARD, C. M., 1983. — *Freshwater Amphipoda of the World. I. Evolutionary Patterns. II. Handbook and Bibliography*. Hayfield Associates, Mount Vernon, Virginia. 830 pp.

BARNARD, J. L. & KARAMAN, G. S., 1991. — The families and genera of marine gammaridean Amphipoda. *Rec. Aust. Mus.* Suppl., **13** : 1-866.

BARNARD, K. H., 1916. — Contributions to the crustacean fauna of South Africa. 5. - The Amphipoda. *Ann. S. Afr. Mus.*, **15** : 105-302, pls 26-28.

BELLAN-SANTINI, D., 1974. — Contributions à l'étude bionomique de la Méditerranée occidentale (Côte du Var et des Alpes maritimes - côte occidentale de Corse). Fascicule 11, Amphipodes bathyaux de Méditerranée. *Bull. Inst. océanogr. Monaco*, **71** (1427) : 1020.

BIRSTEIN, J. A. & M. E. VINOGRADOV, 1955. — [Pelagic gammarids (Amphipoda-Gammaridea) of the Kurile-Kamchatka Trench.] *Akad. Nauk SSSR, Inst. Okeano. Trudy*, **12** : 210-287 (in Russian).

BIRSTEIN, J. A. & M. E. VINOGRADOV, 1960. — [Pelagic gammarids from the tropical Pacific Ocean.] *Akad. Nauk SSSR, Inst. Okeano. Trudy*, **34** : 165-241. (in Russian).

BIRSTEIN, J. A. & M. E. VINOGRADOV, 1963. — [The deep-sea pelagic amphipods of the Philippine Trench.] *Akad. Nauk SSSR, Inst. Okeano. Trudy*, **71** : 81-93 (in Russian).

BOECK, A., 1861. — Bemaerkninger angaaende de ved de norske kyster forekommende Amphipoder. *Forh. skand. Naturf. Møte*, **8** : 631-677.

BOECK, A, 1871. — Crustacea Amphipoda borealia et arctica. *Forh. VidenskSelsk. Khrist.*, Aar 1870 : 83-280, i-viii [index].

CHEVREUX, E., 1900. — Amphipodes provenant des campagnes de l'*Hirondelle* (1885-1888). *Résult. Camp. scient. Prince Albert I Monaco*, **16** : i-iv, 1-195, pls I-XVIII.

CHEVREUX, E. & FAGE, L. 1925. — Amphipodes. *Faune de France* , **9** : 1-488.

COSTA, A., 1853. — Relazione sulla memoria del Dottor Achille Costa, di ricerche su' crostacei amfipodi del regno di Napoli. *Rc. Accad. Sci. fis. mat., Naple*, **2** : 167-178.

DAHL, E., 1959. — Amphipoda from depths exceeding 6000 meters. *Galathea Rep.*, **1** : 211-240.

DALLWITZ, M. J. & PAINE, T. A. 1986. — User's guide to the DELTA system. A general system for processing taxonomic descriptions. *CSIRO Div. Entom. Rep.*, (13) : 1-106.

FENWICK, G. D., 1983. — Two new sand-dwelling amphipods from Kaikoura, New Zealand (Oedicerotidae and Lysianassidae). *N.Z. J. Zool.*, **10** : 133-145.

FOREST, J., 1981. — Compte rendu et remarques générales. *In* : Résultats des Campagnes MUSORSTOM. 1 Philippines (18-28 Mars, 1976), Volume 1. *Mém. ORSTOM*, (91) : 9-50.

FOREST, J., 1985. — La Campagne MUSORSTOM 2 (1980). Compte rendu et liste des stations. *In* : Résultats des Campagnes MUSORSTOM 1 et 2 - Philippines (1976, 1980), Volume 2. *Mém. Mus. natn. Hist. nat.*, (A), **133** : 7-30.

FOREST, J., 1989. — Compte rendu de la Campagne MUSORSTOM 3 aux Philippines (31 mai-7 juin 1985). *In* : J. FOREST (ed.), Résultats des Campagnes MUSORSTOM, Volume 4. *Mém. Mus. natn. Hist. nat.*, (A), **143** : 9-23.

HESSLER, R. R., INGRAM, C. L., YAYANOS, A. A. & BURNETT, B. R., 1978. — Scavenging amphipods from the floor of the Philippine Trench. *Deep-Sea Res.*, **25** (11) : 1029-1047.

HIRAYAMA, A., 1985. — Taxonomic studies on the shallow water gammaridean Amphipoda of West Kyushu, Japan. V. Leucothoidae, Liljeborgiidae, Lysianassidae (*Prachynella, Aristias, Waldeckia, Ensayara, Lepidepecreum, Hippomedon* and *Anonyx*). *Publs Seto mar. biol. Lab.*, **30** : 167-212.

KARAMAN, G. S., 1969. — XXII Beitrag zur kenntnis der Amphipoden. Über einige neue Formen des Genus *Sarothrogammarus* (Gammaridae) aus Afghanistan. *Acta Mus. maced. Sci. nat.*, **11** (11) : 195-208.

KARAMAN, G. S., 1971. — XXX. Beitrag zur kenntnis der Amphipoden. °ber enigen Amphipoden aus Griechenland und Kleinasien. *Acta Mus. maced. Sci. nat.*, **12** (2) : 21-40.

LEDOYER, M., 1972. — Amphipodes gammariens vivant dans les alvéoles des constrictions organogènes récifales intertidales de la région de Tuléar (Madagascar). Etude systématique et écologique. *Téthys*, Suppl. 3 : 165-285.

LEDOYER, M., 1978. — Contribution à l'étude des amphipodes gammariens profonds de Madagascar (Crustacea). *Téthys*, **8** (4) : 365-382.

LEDOYER, M., 1979. — Expédition Rumphius II (1975). Crustacés parasites, commensaux, etc. (Th. Monod et R. Serène, ed.) VI. Crustacés Amphipodes Gammariens. *Bull. Mus. natn. Hist. nat.*, Ser. 4, **7**, Sect. A, (1) : 137-181.

LEDOYER, M., 1986. — Crustacés Amphipodes Gammariens. Familles des Haustoriidae & Vitjazianidae. *Faune de Madagascar*, **59** (2) : 599-1112.

LICHTENSTEIN, H., 1822. — pp. 31-37. *In* : M.W. MANDT, Observation in historiam naturalem et anatomiam comparatam in itinere Groenlandico factae. Dissertatio inauguralis quam consnesu et auctoritate gratiosi micorum ordinis in universitate literaria berolinensi ut summi in medicina et chirurgia honores rite sibi concedantur die XXII. M. Julii A MDCCCXXII H.L.Q.S., publice defendet autor martinus Guilelmus Mandt Beyenburgensis. (opponentibus: J.th. v. Brandt Med. Cd. J Ollenroth Med. Cd., E. Gabler Med Cd.; Formis Brueschckianis). antecedent pp. + 1-40.

LOWRY, J. K., 1984. — Systematics of the pachynid group of lysianassoid Amphipoda (Crustacea). *Rec. Aust. Mus.*, **36** (2) : 51-105.

LOWRY, J. K. & BULLOCK, S., 1976. — Catalogue of the marine gammaridean Amphipoda of the Southern Ocean. *R. Soc. N.Z. Bull.*, **16** : 1-187.

LOWRY, J. K. & STODDART, H. E., 1983. — The shallow water gammaridean Amphipoda of the subantarctic islands of new Zealand and Australia: Lysianassoidea. *J. R. Soc. N.Z.*, **13** : 279-394.

LOWRY, J. K. & STODDART, H. E., 1992. — A revision of the genus *Ichnopus* (Crustacea: Amphipoda: Lysianassoidea: Uristidae). *Rec. Aust. Mus.*, **44** (2) : 185-245.

PIRLOT, J. M., 1933. — Les amphipodes de l'expédition du Siboga. Deuxième partie: Les amphipodes gammarides, II. - Les amphipodes de la mer profonde. 1 (Lysianassidae, Stegocephalidae, Stenothoidae, Pleustidae, Lepechenellidae). *Siboga-Exped.*, Monogr. **33c** : 115-167.

PIRLOT, J. M., 1936. — Les amphipodes de l'expédition du Siboga. Deuxième partie: Les amphipodes gammarides, II. - Les amphipodes de la mer profonde. 3: Addendum et partie générale. III. - Les amphipodes littoraux. 1: Lysianassidae, Ampeliscidae, Leucothoidae, Stenothoidae, Phliantidae, Colomastigidae, Ochlesidae, Liljeborgiidae, Oedicerotidae, Synopiidae, Eusiridae, Gammaridae. *Siboga-Exped.*, Monogr. **33e** : 237-328.

SARS, G. O., 1891. — An Account of the Crustacea of Norway, with Short Descriptions and Figures of all the Species. Vol. I. Amphipoda. Parts 4-9. Alb. Cammermeyer, Christiana : 69-212.

SCHELLENBERG, A., 1938. — Litorale Amphipoden des tropischen Pazifiks nach Sammlungen von Prof. Bock (Stockholm), Prof. Dahl (Berlin) und Prof. Pietschmann (Wein). *K. Svenska Vetensk-Akad. Handl.*, Ser. 3, **16** (6) : 1-105.

SMITH, S. I., 1882. — *In* : SCUDDER, S.H., Nomenclator zoologicus. An Alphabetical list of all generic Names that have been employed by Naturalists for recent and fossil Animals from the earliest times to the Close of the year 1879. I. Supplemental List. *Bull. U.S. nat. Mus.*, **19** : i-xxi, 1-376.

STEBBING, T. R. R., 1888. — Report on the Amphipoda collected by H.M.S. Challenger during the years 1873-1876. *Rep. scient. Results Challenger*, Zool., **29** : 1-1737, pls 1-210.

STEBBING, T. R. R., 1906. — Amphipoda. I. Gammaridea. *Das Tierreich*, **21** : 1-806.

STEPHENSEN, K., 1923. — Crustacea Malacostraca, V: (Amphipoda, I). *Dan. Ingolf-Exped.*, **3** (8) : 1-100.

STEPHENSEN, K., 1931. — Amphipoda. Résultats scientifiques du Voyage aux Indes Orientales Néerlandaises de LL. AA. RR. le Prince et la Princesse Léopold de Belgique *Mém. Mus. r. Hist. nat. Belg.*, Ser. 1, **3** (4) : 1-14.

THURSTON, M. H. & ALLEN, E., 1969. — Type material of the families Lysianassidae, Stegocephalidae, Ampeliscidae and Haustoriidae (Crustacea: Amphipoda) in the collections of the British Museum (Natural History). *Bull. Br. Mus. nat. Hist. (Zool.)*, **17** : 347-388.

WOLFF, T., 1979. — Macrofaunal utilization of plant remains in the deep sea. *Sarsia*, **64** : 117-136.

VADER, W., 1970. — The amphipod, *Aristias neglectus* Hansen, found in association with Brachiopoda. *Sarsia*, **43** : 13-14.

VADER, W., 1985. — Notes on Norwegian marine Amphipoda. 9. *Aristias megalops* Sars, 1895 (Lysianassoidea) rediscovered. *Fauna Norv.*, Ser. A, **6** : 1-2.

VADER, W. & ROMPPAINEN, K., 1985. — Notes on Norwegian marine Amphipoda. 10. Scavengers and fish associates. *Fauna Norv.*, Ser. A, **6** : 3-8.

VINOGRADOV, G. M., 1991. — [A new species of *Trischizostoma* (Amphipoda, Gammaridea) from the Indian Ocean (with a key to species)]. *Zool. Zh.*, **70** : 25-31 (in Russian).

WHITE, A., 1847. — Descriptions of new or little-known Crustacea in the collection at the British Museum. *Ann. Mag. nat. Hist.*, Ser. 2, **1** : 221-228.

WILLIAMS, W. D. & BARNARD, J. L., 1988. — The taxonomy of crangonyctoid Amphipoda (Crustacea) from Australian fresh waters: foundation studies. *Rec. Aust. Mus.*, Suppl. **10** : 1-180.