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Thoracic Cirripeds from the MUSORSTOM 2 Expedition

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ABSTRACT

The Thoracic Cirripeds collected by MUSORSTOM 2 consist of 24 species reported under 17 genera and 9 families. One species, *Arcoscalpellum foresti* sp. nov. is new to science. In addition to the new species herein described, 9 species, viz : *Scalpellum gracile* Hoek, 1907 ; *Arcoscapellum poculum* (Hoek, 1907) ; *A. michelottianum* (Seguenza, 1876) ; *Smilium acutum* (Hoek, 1883) ; *Paralepas morula* (Hoek, 1907) ; *Poecilasma kaempferi dubium* (Hoek, 1907) ; *Verruca (Altiverruca) cristallina* Gruvel, 1907 ; *V. (A.) quadrangularis* Hoek, 1883 and *Pachylasma chinense* Pilsbry, 1912 are reported for the first time from Philippine waters.

RÉSUMÉ

Cirripèdes Thoraciques (MUSORSTOM 2)

La collection de Cirripèdes Thoraciques récoltés lors de la campagne MUSORSTOM 2 comprend 24 espèces, appartenant, à 17 genres et à 9 familles. Une espèce *Arcoscalpellum foresti* sp. nov., est nouvelle pour la science et 9 espèces sont signalées ici pour la première fois des Philippines, à savoir : *Scalpellum gracile* Hoek, 1907 ; *Arcoscalpellum poculum* (Hoek 1907) ; *A. michelottianum* (Seguenza, 1876) ; *Smilium acutum* (Hoek, 1883) ; *Paralepas morula* (Hoek, 1907) ; *Poecilasma kaempferi dubium* (Hoek, 1907) ; *Verruca (Altiverruca) cristallina* Gruvel, 1907 ; *V. (A.) quadrangularis* Hoek, 1883, et *Pachylasma chinense* Pilsbry, 1912.

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INTRODUCTION

Cirripeds collected and reported in MUSORSTOM 1 numbered 29 species (ROSELL, 1981). Of the 24 species herein reported for MUSORSTOM 2, 9 species were previously encountered in MUSORSTOM 1, 5 species had been previously reported as present in Philippine waters, by other authors, 10 species are recorded for the first time from these waters. The total species collected and reported by MUSORSTOM 1 and 2 is 44 species.

One species, *Calantica trispinosa* (Hoek, 1883), is recollected from the type locality (Philippines) 102 years after it was first reported.

The taxonomic and systematic arrangements herein presented are based on the schemes of NEWMAN *et. al.* (1969) and NEWMAN & ROSS (1976). A camera lucida was used, whenever possible, for making the accompanying illustrations. The identified specimens are deposited in the Museum national d'Histoire naturelle, Paris, France (MNHN) and in the Invertebrate Museum of the Institute of Biology, College of Science, University of the Philippines at Diliman (UPD).

In the following list of species, those bearing an asterisk (*) are reported for the first time from Philippine waters :

1. *Scalpellum stearnsii* Pilsbry, 1890
*2. *Sc. gracile* Hoek, 1907
*3. *Arcoscalpellum poculum* (Hoek, 1907)
*4. *A. foresti* sp. nov.
5. *A. sociabile* Annandale, 1905
*6. *A. michelottianum* (Seguenza, 1876)
7. *Calantica trispinosa* (Hoek, 1883)
*8. *Smilium acutum* (Hoek, 1883)
*9. *Paralepas morula* (Hoek, 1907)
10. *Conchoderma virgatum* (Spengler, 1790)
11. *Oxynaspis bocki* Nilsson-Cantell, 1921.
*12. *Poecilasma kaempferi dubium* (Hoek, 1907)
13. *Trilasmis (Temnaspis) tridens* (Aurivillius, 1894)
14. *Megalasma (Megalasma) striatum* Hoek, 1883
15. *Octolasmis (Dichelaspis) weberi* (Hoek, 1907)
*16. *Verruca (Altiverruca) cristallina* Gruvel, 1907
*17. *V. (A.) quadrangularis* Hoek, 1883
18. *V. (Rostratoverruca) intexta* Pilsbry, 1912
*19. *Pachylasma chinense* Pilsbry, 1912
20. *Balanus amphitrite amphitrite* Darwin, 1854
21. *Chirona (Striatobalanus) amaryllis* Darwin, 1854
22. *C. (Striato-) tenuis* (Hoek, 1883)
23. *Solidobalanus (Solidobalanus) maldivensis* (Borradaile, 1903)
24. *Acasta fenestrata* Darwin, 1854

LIST OF SPECIES PER STATION

Station 2. — 20.11.80, 14°01.0′ N, 120°17.1′ E, 186-184 m : *Chirona (Striatobalanus) tenuis.*

Station 11. — 21.11.80, 14°00.4′ N, 120°19.7′ E, 196-194 m : *Trilasmis (Temnaspis) tridens.*

Station 15. — 21.11.80, 13°55.1′ N, 120°28.4′ E, 330-326 m : *Scalpellum stearnsii ; C. (Striato-) tenuis.*

Station 17. — 28.11.80, 14°00.0′ N, 120°17.1′ E, 174-193 m : *C. (Striato-) tenuis.*

Station 20. — 22.11.80, 14°00.9′ N, 120°18.1′ E, 192-185 m : *Poecilasma kaempferi dubium.*

Station 26. — 23.11.80, 13°49.6′ N, 120°51.0′ E, 299-320 m : *C. (Striato-) tenuis ; Balanus amphitrite amphitrite.*

Station 32. — 24.11.80, 13°40.5′ N, 120°53.9′ E, 220-192 m : *Calantica trispinosa ; Pachylasma chinense ; C. (Striato-) tenuis.*

Station 36. — 24.11.80, 13°31.4′ N, 121°23.9′ E, 595-569 m : *Sc. stearnsii* f. *gemina ; Arcoscalpellum foresti* sp. nov. ; *A. sociabile ; Octolasmis (Dichelaspis) weberi ; Verruca (Altiverruca) cristallina.*

Station 40. — 25.11.80, 13°07.7′ N, 122°39.1′ E, 440-340 m : *Sc. gracile* non *Sc. gracile* Pilsbry, 1907.

Station 41. — 25.11.80, 13°15.3′ N, 122°45.9′ E, 166-172 m : *T. (T.) tridens ; Conchoderma virgatum.*

Station 47. — 26.11.80, 13°33.0′ N, 122°10.1′ E, 84-81 m : *Acasta fenestrata.*

Station 51. — 27.11.80, 13°59.3′ N, 120°16.4′ E, 170-187 m : *Oxynaspis bocki.*

Station 64. — 29.11.80, 14°01.5′ N, 120°18.9′ E, 195-191 m : *C. (Striato-) amaryllis.*
Station 66. — 29.11.80, 14°00.6′ N, 120°20.3′ E, 209-192 m : *C. (Striato-) tenuis ; Solidobalanus (Solidobalanus) maldivensis.*
Station 68. — 29.11.80, 14°01.9′ N, 120°18.8′ E, 199-195 m : *C. (Striato-) tenuis.*
Station 71. — 30.11.80, 14°00.1′ N, 120°17.8′ E, 189-197 m : *S. (Solido-) maldivensis.*
Station 74. — 30.11.80, 13°53.2′ N, 120°26.2′ E, 300-370 m : *C. (Striato-) tenuis.*
Station 78. — 01.12.80, 13°49.1′ N, 120°28.0′ E, 441-550 m : *A. poculum ; C. (Striato-) amaryllis ; C. (Striato-) tenuis ; B. a. amphitrite.*
Station 79. — 01.12.80, 13°44.6′ N, 120°31.6′ E, 682-770 m : *A. michelottianum ; Smilium acutum ; Paralepas morula ; Megalasma striatum ; Verruca (A.) quadrangularis ; V. (Rostratoverruca) intexta ; C. (Striato-) tenuis.*
Station 82. — 02.12.80, 13°46.1′ N, 120°28.4′ E, 550-550 m : *C. (Striato-) amaryllis.*

SYSTEMATIC ACCOUNT

Order *Thoracica* Darwin, 1854

Suborder *Lepadomorpha* Pilsbry, 1916

Family Scalpellidae Pilsbry, 1916

Genus *Scalpellum* Leach, 1817

1. *Scalpellum stearnsii* Pilsbry, 1890

(Pl. 10, a, b)

Scalpellum stearnsii Pilsbry, 1890 : 441 ; Broch, 1922 : 235, text-fig. 6 ; 1931 : 16 ; Hiro, 1939 a : 237 ; Rosell, 1981 : 279, pl. 1, e.
Scalpellum stearnsi : Gruvel, 1905 : 44 fig. 46.
Scalpellum stearnsi var. *inerme* Nilsson-Cantell, 1928 : 2, text-fig. 1 ; 1934 : 33.
Scalpellum stearnsi var. *robusta* and var. *gemina* Hoek, 1907 : 69, pl. 6, figs. 1-12.

Material

St. 15, 330-326 m : one specimen unattached. — St. 36, 595-569 m : nineteen specimens all dislodged from their substrate of attachment.
UPD Crust. Coll. N°. 346.

The specimen taken from St. 15 is of the typical form (Pl. 10, a), the size of which is as follows ; length of capitulum 55.8 mm, length of peduncle, 55.0 mm. The specimens from. — St. 36 are of the forma *gemina* (Hoek, 1907) (Pl. 10, b), they range in size from 54.5 mm to 76.8 mm total length.

Remarks

This species has been reported at different depths from the Phillipines : 184-193 m (Rosell, 1981), 457-500 m (Broch, 1922, 1931), and 326-595 m (present material). Its known bathymetric range is 146-2,048 m.

2. *Scalpellum gracile* Hoek, 1907

(Pl. 1, d-k)

Scalpellum gracile Hoek, 1907 : 105, pl. 8, fig. 8 ; *non Sc.gracile* Pilsbry, 1907 : 60, text-fig. 23.

Material

St. 40, 440-280 m : three specimens attached to a segmented tube-like transparent material, probably a dead Tubularian (?) stem.
UPD Crust. Coll. N°. 347.

The specimen are similar to Hoek's (1907) form, pl. 8. fig. 8. Capitulum laterally flattened, clothed with very fine hairs specially towards the carinal side (Pl. 1, g), valves 13, rostrum absent, upper latus triangular, umbo subapical ; inframedian latus small, triangular, umbo apical. Size : length of capitulum from 8.5-10.3 mm ; length of peduncle from 3.0-3.3 mm.

Labrum (Pl. 1, i) not bulbous with numerous small denticles on crest. Palpus small, club-shaped with few setae on its inner apical margin. Mandible (Pl. 1, d, j) with 3 teeth, inferior angle blunt supporting few sharp denticles. Maxilla I (Pl. 1, f) frontal margin with a small notch, margin superior to notch supporting 4 spines, the uppermost two are the longest and largest ; margin inferior to notch supporting about 12

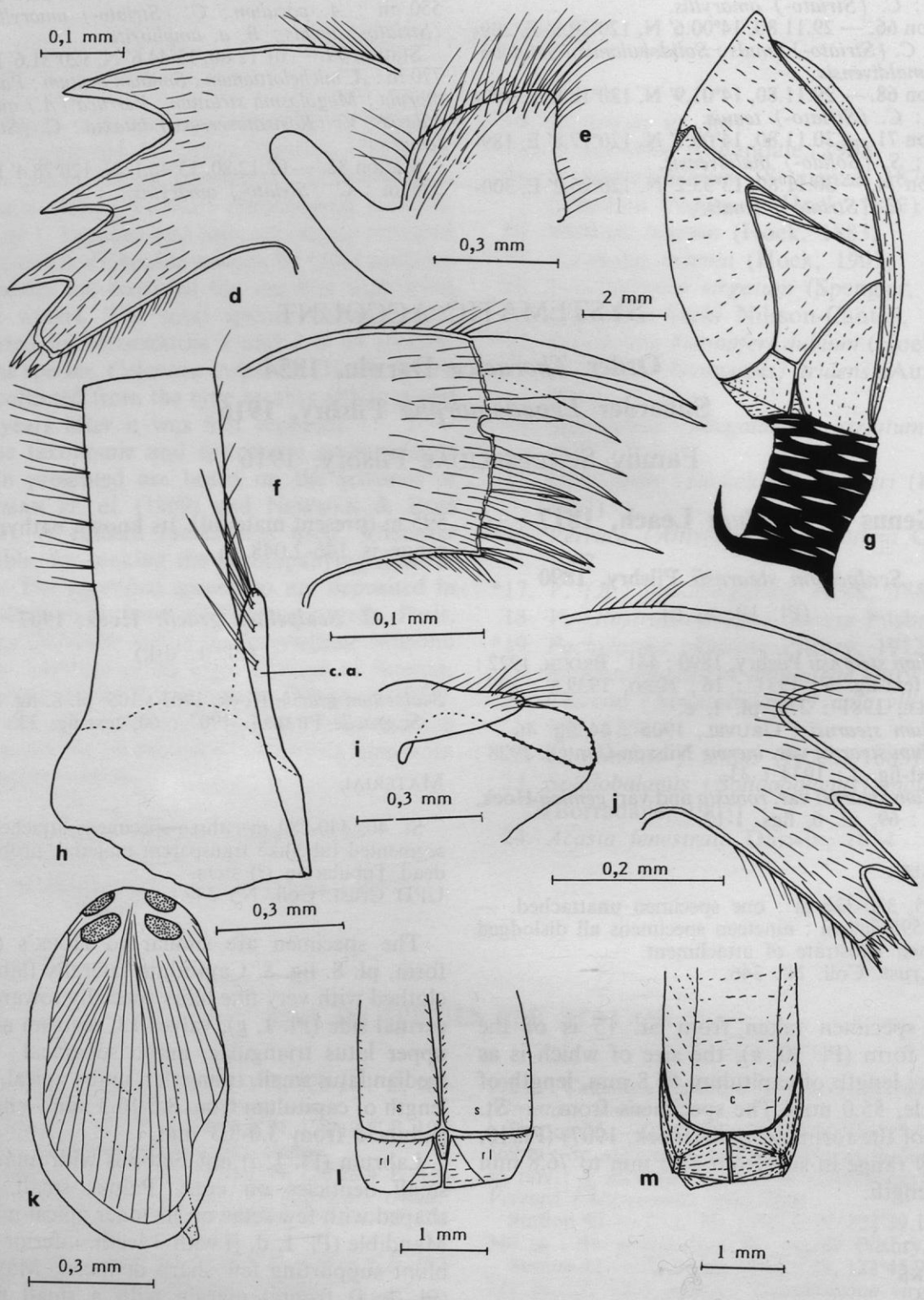

PLATE 1. — *Scalpellum gracile* Hoek, 1907. d, Mandible ; e, Maxilla II ; f, Maxilla I ; g, whole animal lateral view ; h, cirrus VI (part) showing caudal appendage ; i, labrum and palpus ; j, Mandible ; k, dwarf male.
Arcoscalpellum poculum (Hoek, 1907). l, rostral side ; m, carinal side. (c, carina ; rl, rostrolatera ; s, scutum).

moderate sized spines. Maxilla II (Pl. 1, e) fan-shaped, margins highly setose especially posteriorly, a distinct long lobe present on posterior basal region.

Posterior margin of the basal segment of the anterior rami of cirri II-VI with 4-5 long setae, proximal setae small. Frontal margin of intermediate segments of rami of cirri IV-VI bears 4 or 5 pairs of subequal setae ; proximal pair minute. Caudal appendages uniarticulate (Pl. 1, h) with few small setae on side and apex.

Four dwarf males (Pl. 1, k) were recovered on the innerside of scuta close to the attachment of adductor muscles.

Remarks

This is the second world record but first for the Philippines since Hoek (1907) described the species 78 years ago from specimen obtained from somewhere south of Celebes (Flores Sea) at coordinates 5°40.7′ S 120°45.5′ E ; 1,158 meters deep. With this sample the zoogeographic range of the species is extended to the northwest by several thousand kilometers.

Genus *Arcoscalpellum* Hoek, 1907

3. *Arcoscalpellum poculum* (Hoek, 1907)

(Pl. 1. 1, m ; Pl. 2, d-k)

Scalpellum poculum Hoek, 1907 : 100, pl. 8, figs. 4, 4 a.

Material

St. 78, 441-550 m : two specimens on a pumice (?) stone.
UPD Crust. Coll. N°. 348.

Capitulum with 14 valves, laterally flattened, white, sparsely clothed with very fine short hairs. The largest specimen has a total length of 16 mm ; 4.5 mm is the peduncle length. Rostrum minute (Pl. 1. 1) ovate, basally pointed but does not reach the level of the basal margins of rostral latera. Peduncle short, covered with moderate sized scales more or less arranged into overlapping parallel rows.

External morphology is similar to Hoek's (1907) species and nothing important could be added to the original description.

Labrum not bullate, tongue-shaped. Palpus (Pl. 2, i) club-shaped, superior and apical margins setose. Mandible (Pl. 2, e) with 3 teeth, margin inferior to the 3rd tooth, pectinated, inferior angle rounded bearing two prominent spines. Maxilla I (Pl. 2, c, g) notched on its cutting edge, margin superior to notch bears 4-5 spines, two of these are the largest and longest ; margin inferior to notch more or less protuberant particularly near the inferior angle where smaller shorter spines are seated. Maxilla II (Pl. 2, j) fan-shaped, anterior and posterior margins setose, postero-basal angle with a prominent paddle-shaped lobe.

Intermediate segment of rami of cirri VI bears 4 pairs of subequal setae, proximal pair minute. Lateral surface of segments with short, more or less randomly dispersed setae. Setae on the postero-distal angle of segments finely pinnate. Caudal appendages (Pl. 2, f) multiarticulate, 12 segments on each, setae finely pinnate.

Two dwarf males (Pl. 2, h, k) were recovered from the larger specimen. They were lodged in a depression on the left scutum more or less forming an externally distinct bulge.

Remarks

This is the second world record but first for the Philippines since Hoek (1907) obtained the type specimen from somewhere in Savu Sea, West of Timor Island at coordinates 10°48.6′ S 123°23.1′ E, 918 meters deep. The present record extends the zoogeographic range of the species by several thousand kilometers.

4. *Arcoscalpellum foresti* sp. nov.

(Pl. 3, d-n)

Material

St. 36, 595-569 m : three specimens, one was on the scutum of *Sc. stearnsii* which was attached to the spicules of a hexactinellid sponge, the others were dislodged from their substrate.
UPD Crust. Coll. N°. 362.

Capitulum white, laterally flattened, valves 14 (Pl. 3, i) covered with a thin membrane, hirsute including peduncle. Valves of the lower whorl well developmed.

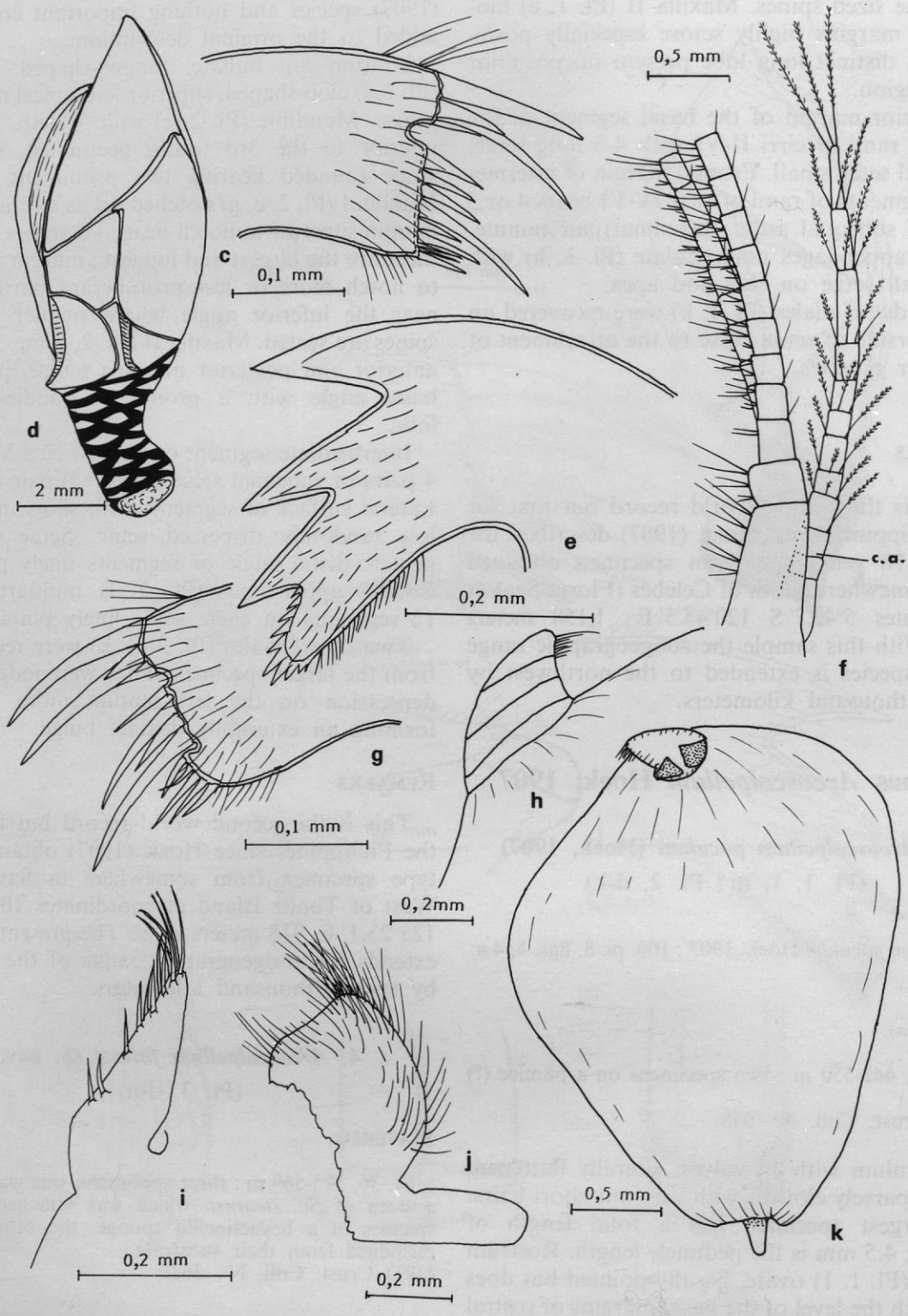

PLATE 2. — *Arcoscalpellum poculum* (Hoek, 1907). c, Maxilla I ; d, whole animal lateral view ; e, Mandible ; f, cirrus VI (part) showing caudal appendage ; g, Maxilla I ; h, proximal end of dwarf male, enlarged ; i, palpus ; j, Maxilla II ; k, dwarf male.

Tergum triangular, carinal margin longest, faintly convex, scutal margin truncate on side opposite the tergal margin of upper latus, occludent margin shortest, apex produced ; umbo apical. Scutum quadrangular, basal margin straight, carinal margin indented at its upper angle where apex of upper latus is directed, occludent margin more or less straight ; umbo apical. Carina moderately bowed, distal half thicker ; umbo apical.

Upper latus large, more or less quadrangular, however basi-scutal angle seems to be truncated ; umbo apical. Inframedian latus (Pl. 3, f.) triangular, apex rounded and curving towards basi-carinal angle of scutum ; umbo apical. Rostrum (Pl. 3, g, h,) small, triangular, basal margin reaching and coinciding with basal margins of rostral latera ; umbo apical. Rostral latera (Pl. 3, j) wing-like, scutal margin straight, rostral and carinal margins convex, basi-rostral angle projecting, tooth-like. Carinolatera large, posterior margin rounded protruding beyond basal end of carina.

Peduncle shorter than capitulum covered with scales ; likes capitulum, hirsute.

TABLE I. — Sizes of types (in mm)

	Length		Width	
	capitulum	peduncle	capitulum	peduncle
Holotype	5.5	2.1	3.3	1.4
Paratype	7.1	4.3	4.8	2.8

Labrum not bullate, without a median notch, crest with numerous minute denticles. Palpus (Pl. 3, m) club-shaped, superior and apical margins setose, apical setae longer. Mandible (Pl. 3, e) with 3 teeth, upper margin of third tooth pectinated ; inferior angle produced where a single moderate sized spine lies, outer and inner margins of inferior angle pectinated. Maxilla I (Pl. 3, d) without notch on its cutting edge, two uppermost spines largest and longest ; towards the inferior angle a protuberant part of cutting edge present, supporting moderate sized spines. Maxilla II (Pl. 3, k) bilobed, lower lobe smaller, posterior and apical margins of larger lobe setose.

TABLE II. — Number of segments of the cirri (Holotype).

	I	II	III	IV	V	VI
Right	7 *	* 11	17 18	17 19	18 20	21 20
Left	* 9	16 18	18 18	18 18	20 20	21 21

* Cut.

Intermediate segments of rami cirri II-VI bears 4 pairs of subequal setae with spinules between bases, proximal pair minute (Pl. 3, n). Setae on postero-distal angle tuft-like, some longer than the succeeding segments. Caudal appendages (Pl. 3, l) uniarticulate, not exceeding halfway the length of the first pedicel of protopodite of cirrus VI, apex and posterior margins bear very scanty fine, short setae. Penis present but deteriorated due its poor preservation and could not be described.

REMARKS

The present form is closely allied to *Sc. portoricanum* Pilsbry, 1907 with respect to the shape of the rostrum and inframedian latera (text fig. 8, a, b). Likewise, to subspecies *Sc. p. intosum* Pilsbry, 1907 with regard to the shape of the upper latus, inframedian latus and carinolatera (text fig. 8, e). It is with great pleasure and honour that I name this new species after Prof. Jacques FOREST, of the Museum national d'Histoire naturelle, Paris, France who was the expedition leader of MUSORSTOM 2.

5. *Arcoscalpellum sociabile* (Annandale, 1905)

(Pl. 4, c-f ; Pl. 10, c)

Scalpellum sociabile : NILSSON-CANTELL, 1928 : 4, text-fig. 2 ; 1934 : 34, text fig. 1).
Scalpellum pellicatum Hoek, 1907 : 91, pl. 7, figs. 18, 18 a, 19).

MATERIAL

St. 36, 595-569 m : two specimens detached from their object of attachment.
UPD Crust. Coll. N°. 349.

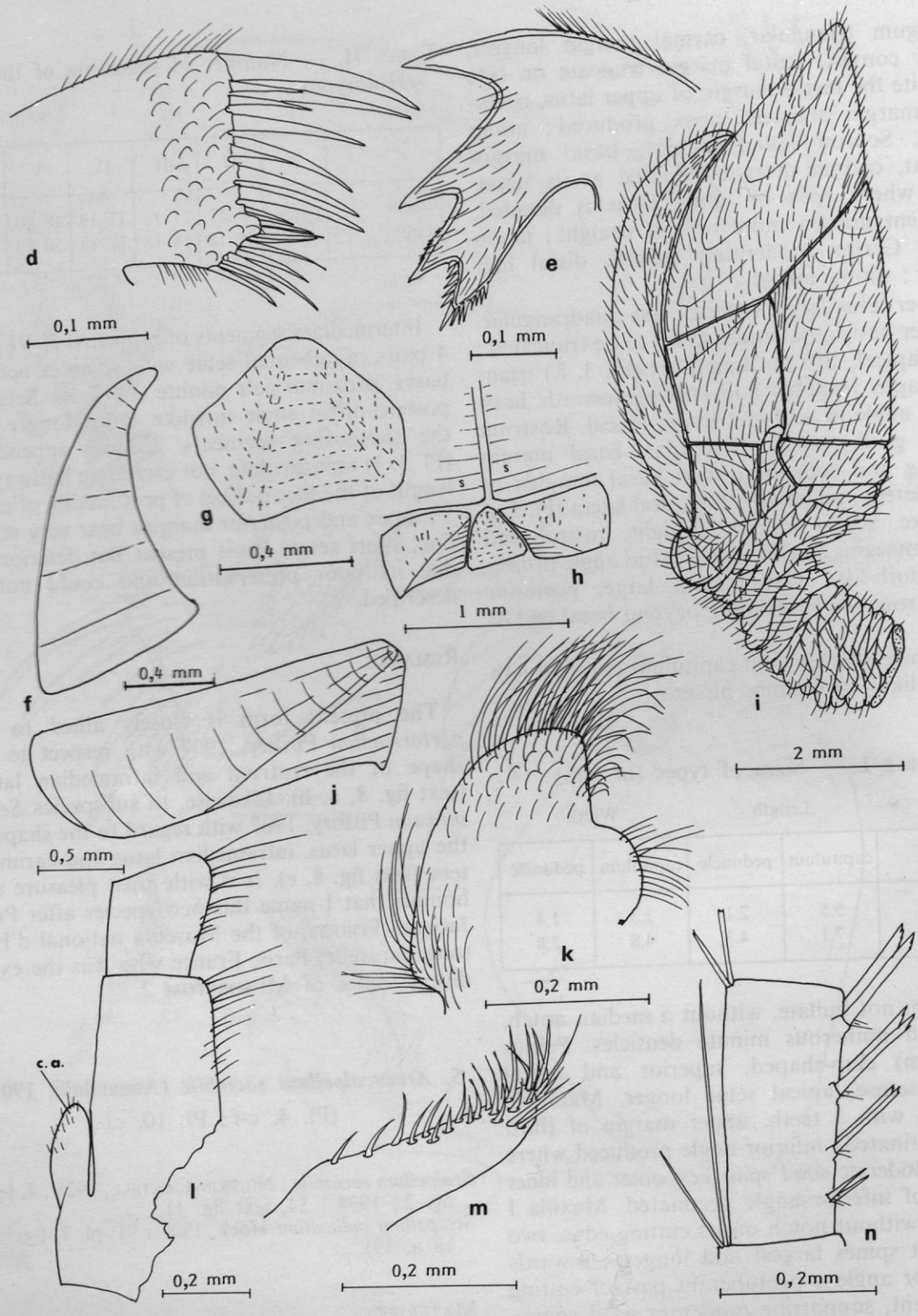

PLATE 3. — *Arcoscalpellum foresti* sp. nov. d, Maxilla I ; e, Mandible ; f, inframedian latus ; g, rostrum ; h, rostral side ; i, whole animal lateral view ; j, rostral latus ; k, Maxilla II ; l, cirrus VI (part) showing caudal appendage ; m, palpus ; n, 11th segment of cirrus VI. (rl, rostral latera ; r, rostrum ; s, scutum), holotype.

Capitulum with 14 valves, rostrum (Pl. 4, e) small, triangular, umbo apical. Mandible (Pl. 4, c) with three teeth, inferior angle produced, inner margin pectinated. Maxilla I (Pl. 4, f) without notch on its cutting edge, however inferior angle protuberant bearing moderate sized setae which are longer than the intermediate setae. Caudal appendages multiarticulate, segments 6, basal segment long and broad bearing sparse fine short setae, remaining upper segments very narrow with circlet of minute spines on its distal margin (Pl. 4, d). Penis long and tapering clothed with fine hairs. No complemental male observed.

I subscribe to the opinion of NILSSON-CANTELL (1928) placing HOEK's (1907) *Sc. pellicatum* in synonym with *A. sociabile*. Any observed differences between his *pellicatum* and *sociabile* are minor ones and do not warrant their separation as distinct species.

According to HOEK (1907), ANNANDALE obtained his material from Bali Strait (Indonesia) at a depth of 310 meters. Those of NILSSON-CANTELL (1928, 1934) were collected from the southeast of Great Nicobar at a depth between 1,903 and 2,050 meters and from north of Boeleleng, Bali at a depth of 548 meters. HOEK (1907) collected his material from Sulu, Philippines at coordinates 5°11.2′ N 119°35.4′ E at a depth of 450 meters and from Banda Sea (Indonesia) at coordinates 5°26.6′ N 132°32.5′ E, at a depth of 397 meters. The present material, taken northwest of Mindoro, Philippines extends the species zoogeographic range several degrees north northwest.

REMARKS

This is the second time the species is reported from the Philippines.

6. *Arcoscalpellum michelottianum* (Seguenza, 1876)

(Pl. 10, d, e)

Arcoscalpellum michelottianum : RAO & NEWMAN, 1972 : 76, fig. 11, A-B.
Scalpellum eximium Hoek, 1883 : 100, pl. 4, figs. 6, 7 ; pl. 9, fig. 10.

MATERIAL

St. 79, 682-770 m : two specimens attached to an echinoid spine in common with *Megalasma striatum*.
UPD Crust. Coll. N°. 350.

External morphology of the present material is closely similar to the above species when compared to those of RAO & NEWMAN (1972), text-fig. 11, A-B and also to HOEK's (1883) *Sc. eximium*, (pl. IV, 6, 7). No other characteristics of significance could be added to what has been previously mentioned.

REMARKS

The species has a wide zoogeographic distribution, from the South Atlantic Ocean (Tristan da Cunha), off Southwest Africa (HOEK, 1883) to the Mid-Pacific Ocean (Johnston Atoll), Southwest of Hawaii (RAO & NEWMAN, 1972). Bathymetric range 682-1,829 meters.

The species is reported for the first time from the Philippines.

Genus *Calantica* Gray, 1825

7. *Calantica trispinosa* (Hoek, 1883)

(Pl. 4, g ; Pl. 10, f)

Scalpellum trispinosa Hoek, 1883 : 72, pl. 6, figs. 15, 16.
Calantica trispinosa : PILSBRY, 1908 : 1067 ; BROCH, 1931 : 2.

MATERIAL

St. 32, 220-192 m : two specimens both dislodged from their substrate.
UPD Crust. Coll. N°. 351.

Capitulum with 13 valves ; valves comprising the lower whorl consisting of a rostrum, rostrolatera, latera, carinolatera and a subcarina, are small compared to the upper whorl of scuta, terga and a carina which are large. The larger specimen has a total length of 25 mm ; 15 mm is the length of the capitulum. The smaller specimen has a total length of 10.5 mm ; 7.0 mm is the length of the capitulum. A complemental male

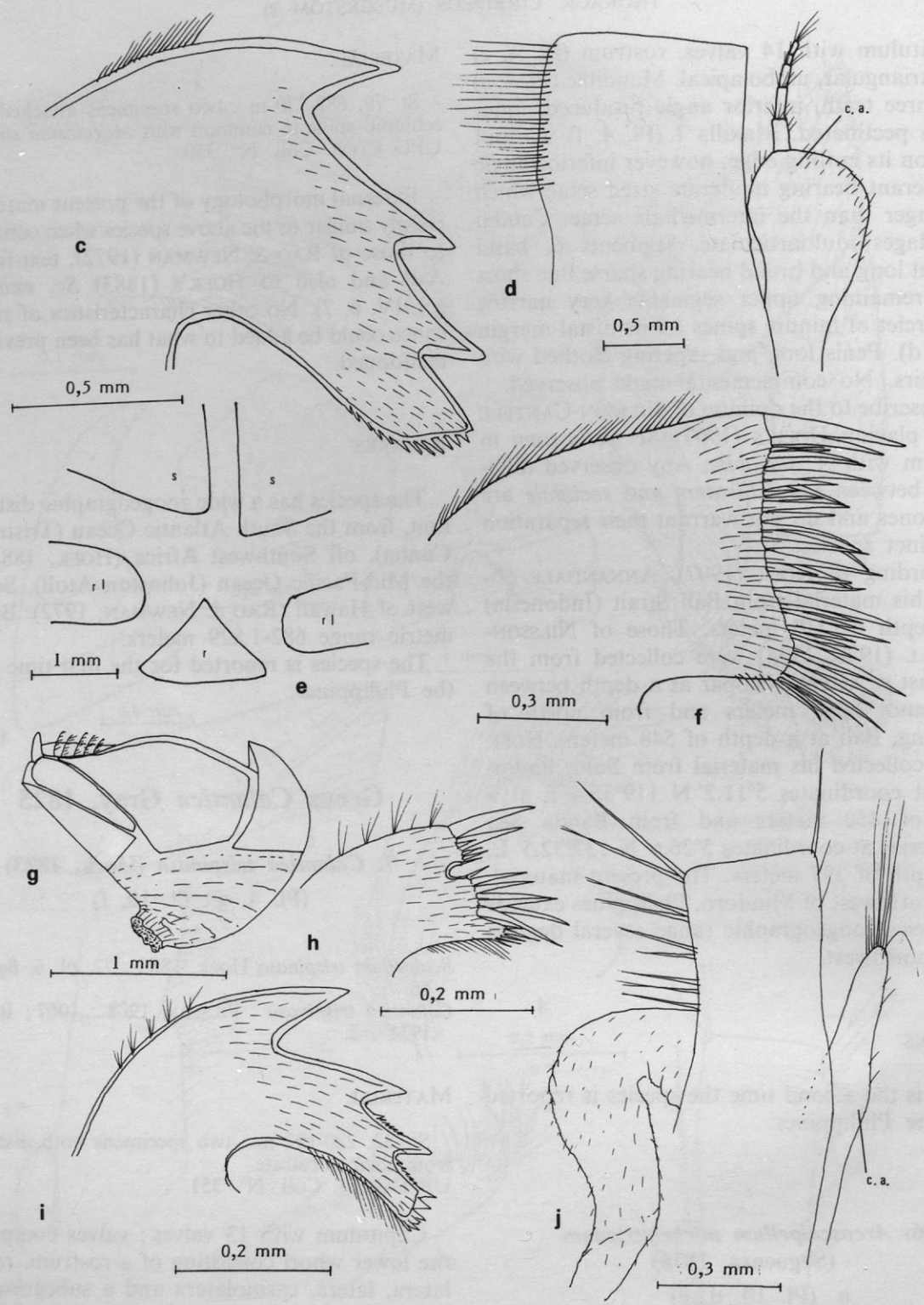

PLATE 4. — *Arcoscalpellum sociabile* (Annandale, 1905). c, Mandible ; d, cirrus VI (part) showing caudal appendage ; e, rostral side ; f, Maxilla I.

Calantica trispinosa (Hoek, 1883). g, complemental male.

Smilium acutum (Hoek, 1883). h, Maxilla I ; i, Mandible ; j, cirrus VI (part) showing caudal appendage. (r, rostrum ; r.l. rostral latera ; s, scutum).

(Pl. 4, g) was found, in the larger specimen, lodged at the basal angle of orifice.

REMARKS

This is the first time the species is recollected from the type locality (Philippines) since HOEK (1883) described it 102 years ago.

This species had been reported from South of Kagoshima, Japan (BROCH, 1931). The range distribution of the species is between 5°22.0′ N to 33°10.0′ N and 120°54.2′ E to 132°36.0′ E ; bathymetric range is 75-320 meters.

Genus *Smilium* Leach, 1825

8. *Smilium acutum* (Hoek, 1883)

(Pl. 4, h, i, j, ; Pl. 5, d, e)

Scalpellum acutum Hoek, 1883 : 30, pl. 3, fig. 19 ; pl. 18, fig. 12 ; 1907 : 64, pl. 7, fig. 1 ; NILSSON-CANTELL, 1921 : 170. text-fig. 23.
Scalpellum (Smilium) acutum : ANNANDALE, 1910 : 154.
Smilium acutum : BROCH, 1922 : 234, text fig. 5 ; 1931 : 14, text-fig. 5 ; UTINOMI, 1958 : 283.

MATERIAL

St. 79, 682-770 m : two specimens on an echinoid spine in common with *Megalasma striatum*.
Crust. Coll. N°. 352.

Capitulum flat, white, valves 13, valves of the lower whorl small, consisting of a rostrum, rostral latera, carinolatera and a subcarina. Scales on peduncle arranged in diagonal rows (Pl. 5, d). The specimen dissected has a total length of 11.5 mm ; 8.5 mm is the length of the capitulum.

Labrum not bullate, with numerous very minute denticles on crest. Palpus small, apex produced bearing small setae on upper and apical margins. Mandible (Pl. 5, i) with three teeth, outer margin of third tooth pectinated ; inferior angle protuberant with small denticles, outer margin pectinated. Maxilla I (Pl. 4, h) with a small notch on its cutting edge, uppermost two setae the largest ; inferior angle protuberant with small setae.

Intermediate segments of cirri III-VI bears 5 pairs of subequal setae with spinules between bases, proximal pair minute. Caudal appendages (Pl. 5, j) uniarticulate, not exceeding in length the first pedicel of the protopodite of cirrus VI, a tuft of long setae are seated apically. Penis, long and tapering, covered with few hairs. Complemental male (Pl. 5. e) present, attached to the innerside of the right scutum near the occludent margin close to the adductor muscle. Valves present are the terga, scuta, a carina and a rostrum.

REMARKS

The species is widely distributed. It has been reported from off Azores, Atlantic Ocean (HOEK, 1883), the Indian Ocean (ANNANDALE, 1910) and the Pacific Ocean, as far as Sagami (Japan) (NILSSON-CANTELL, 1921 ; BROCH, 1922) in the north, to Kermadec Island in the east ; bathymetric range is 225-829 meters. This species is reported for the first time from Philippine waters.

Family HETERALEPADIDAE Nilsson-Cantell, 1921

Genus *Paralepas* Pilsbry, 1907

9. *Paralepas morula* (Hoek, 1907)

(Pl. 5, f-i)

Alepas morula Hoek, 1907 : 35, pl. 14, figs. 9-12.
Heteralepas (Paralepas) morula : BROCH, 1922 : 281.

MATERIAL

St. 79, 682-770 m : twelve specimens attached to echinoid spines.
UPD Crust. Coll. N°. 353.

Capitulum globular, nodulose, carinal crest prominent. Orifice small, margin sinuous. Valves absent. Peduncle short, wrinkled with tubercles

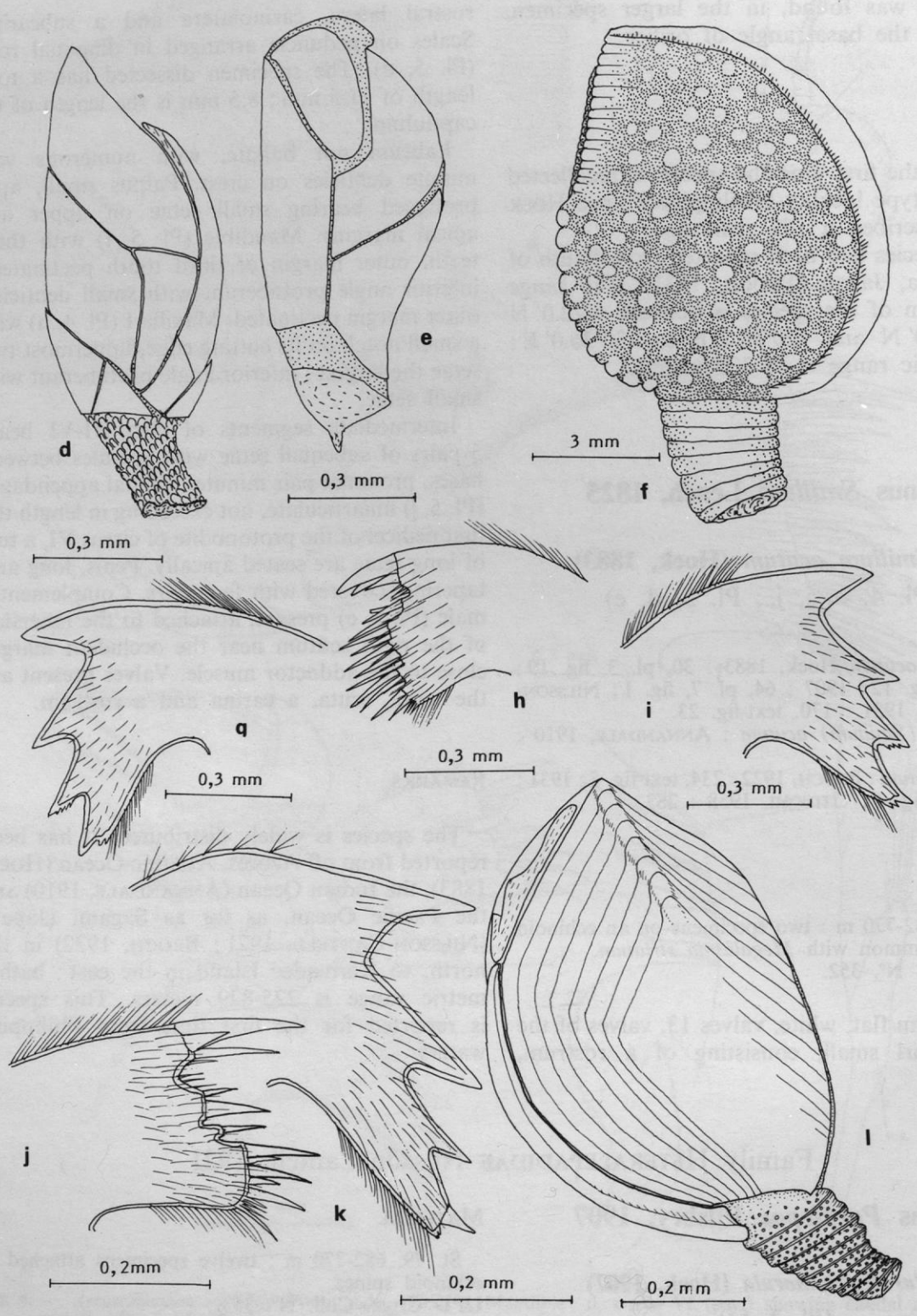

PLATE 5. — *Smilium acutum* (Hoek, 1907). d, whole animal, right side view of female ; e, complemental male. *Paralepas morula* (Hoek, 1907). f, right side view of hermaphrodite ; g, i, Mandibles ; h, Maxilla I. *Poecilasma kaempferi dubium* (Hoek, 1907). j, Maxilla I ; k, Mandible ; l, left side view of hermaphrodite.

especially the larger specimens, however tubercles not distinctive among the smaller ones (Pl. 5, f). Total length of the largest specimen 11.5 mm, 7.0 mm is the length of the capitulum and the breadth is 6.0 mm.

Labrum not bullate, with numerous prominent denticles on crest. Mandible (Pl. 5, g, i) with three teeth, inner margin of third tooth pectinated ; inferior angle produced bearing two small denticles on its inner margin. Maxilla I (Pl. 5, h) notched on its cutting edge, margin superior to notch bears 3 spines, upper most the largest ; margin inferior to notch more or less distinctly divided into steps (3 or, 4) bearing moderate sized spines.

Cirrus I with well developed filamentary appendage on its posterior basal margin. Cirrus II separated from cirrus I by a wide gap. Setae on segments of rami of posterior cirri acanthopod, minute scales are present on rami which are highly distinctive on the posterior cirri. Caudal appendages multiarticulate, 13 and 9 segments, exceeding the length of protopodite of cirrus VI, segments bearing circlets of minute setae on distal margin, most distinctive on the distal segments. Penis moderately long, gradually tapering, annulated, clothed with long hairs.

REMARKS

This species is reported for the first time from the Philippines. Furthermore, its most northern distribution range is now extended. The two previous reports were from the southern hemisphere. From Flores Sea, at coordinates 7°19.4′ S 116°49.5′ E, at a depth of 538 m (HOEK, 1907) and from Bass Strait north of Tasmania at coordinates 38°12.0′ S 149°40.0′ E, at a depth of 182-1,097 m (BROCH, 1922). Bathymetric range is 182-1,097 meters.

Family LEPADIDAE Darwin, 1851

Genus *Conchoderma* Olfers, 1814

10. *Conchoderma virgatum* (Spengler, 1790)

Conchoderma virgatum : DARWIN, 1851 : 153, pl. 3, fig. 3 ; HOEK, 1883 : 55, pl. 2, figs. 13-15 ; PILSBRY, 1907 : 99, pl. 9, fig. 1 ; NILSSON-CANTELL, 1921 : 242 ; 1928 : 16, text-fig. 7 ; HIRO, 1935 : 215 ; 1936 : 623, text-fig. 2 ; 1937 : 46 ; 1937 b : 402 ; 1939 b : 248 ; STUBBINGS, 1936 : 4 ; 1961 a : 15 ; 1967 : 240 ; O'RIORDAN, 1967 : 290 ; UTINOMI, 1970 : 341 ; HASTINGS, 1972 : 274, text-figs. 1 and 2.

MATERIAL

St. 41, 166-172 m : one specimen, unattached.

REMARKS

This is a pelagic species attached to animate or inanimate objects, very common near surface waters. Most likely the substrate on which the animal was attached was caught when sampling gear, a Beam Bottom Trawl, was hauled. Total length of specimen, 8.0 mm ; 6.5 mm is the length of the capitulum.

Cosmopolitan distribution in tropical and temperate waters.

Family OXYNASPIDAE Pilsbry, 1907

Genus *Oxynaspis* Darwin, 1851

11. *Oxynaspis bocki* Nilsson-Cantell, 1921

Oxynaspis bocki Nilsson-Cantell, 1921 : 228, text-fig. 38 ; ROSELL, 1981 : 291, pl. 5, figs. k-o.

MATERIAL

St. 51, 170-187 m : one specimen attached to antipatherian coral.

REMARKS

This species has been previously described and illustrated (ROSELL, 1981) and nothing morpho-

logically significant be added to this description. However, the present sample was taken from shallower areas compared to those previously reported in MUSORSTOM 1 (ROSELL, *loc. cit.*) which were taken from depths ranging from 217-230 meters and to those from Kiushu, Japan (NILSSON-CANTELL, 1921) which were taken from a depth of 230 meters.

Family POECILASMATIDAE Nilsson-Cantell, 1921

Genus *Poecilasma* Darwin, 1851

12. *Poecilasma kaempferi dubium* (Hoek, 1907)

(Pl. 5, j-l)

Poecilasma kaempferi Hoek, 1907 : 6, pl. 1, figs. 2-4 ; pl. 10, figs. 1 a-1 d.
Poecilasma kaempferi subsp. *dubia* : ANNANDALE, 1909 : 91, pl. 7, fig. 8.

MATERIAL

St. 20, 192-185 m : one specimen dislodged from its substrate of attachment.
UPD Crust. Coll. N°. 355.

Capitulum, ovate, apex pointed, carinal margin more strongly arched than the occludent margin, considerably longer than the peduncle. Scutum with a prominent vertical ridge situated close to the occludent margin (Pl. 5, 1). Carina basally truncated. Tergum abnormal as in HOEK's (1907) form, Pl. 10, fig. 1 c. Peduncle short about 1/3 of capitulum length, with distinct chitinous rings and dots. Total length of specimen 8.8 mm, 6.8 mm is the length of the capitulum. Ovigerous with developing eggs inside mantle cavity.

Labrum not bullate, crest supporting numerous sharp denticles. Mandible (Pl. 5, k) with four teeth, second tooth widely separated from the first ; fourth tooth seated very close to the indistinctly bifurcate inferior angle. Maxilla I (Pl. 5, j) notched along its cutting edge ; margin superior to notch supports three spines, upper most the largest. Notched area bears spines of varying sizes, inferior margin more or less protuberant bearing moderate sized spines ; inferior angle rounded with few minute spines.

Cirrus I more or less equal in length, upper segments bullate. Cirrus II widely separated from cirrus I. Intermediate segments of rami from II-VI supports five pairs of subequal setae with spinules between bases, proximal pair minute. Setae on rami finely pinnate, prominently on the upper setae.

Caudal appendages uniarticulate, very short, apex with long finely pinnate setae. Penis very long, annulated, tapering, clothed with long hairs.

REMARKS

The present material, in most aspects, is similar to HOEK's (1907) form which according to him has an abnormal capitulum. However, in the present material, likewise in his illustrations, it seems only the terga and/or carina exhibit this abnormality, whereas, the other valves are regular as in other species.

This species is reported for the first time from Philippine waters. HOEK (1907) and ANNANDALE (1909) obtained their material from Banda Sea (Indonesia) and Gulf of Munar (India) at depths ranging from 204-914 meters. Occurrence of the species in the Philippines extends its zoogeographic range northward and also reduces its shallower bathymetric range from 204 meters to 185 meters.

Genus *Trilasmis* Hinds, 1844

Subgenus *Temnaspis* Fisher, 1884

13. *Trilasmis (Temnaspis) tridens* (Aurivillius, 1894)

Poecilasma tridens Aurivillius, 1894 : 14, pl. 1, fig. 13 ; pl. 6, fig. 12 ; pl. 8, figs. 13 and 29.
Dichelaspis tridens : ANNANDALE, 1909 : 107.
Dichelaspis (Dichelaspis) tridens : STUBBINGS, 1936 : 7, text fig. 2

Octolasmis tridens : NILSSON-CANTELL, 1934 : 43, figs. 5, 6 ; STUBBINGS, 1967 : 241.
Trilasmis tridens forma *asymmetrica* Broch, 1947 : 20.
Trilasmis (Temnaspis) tridens : BROCH, 1947 : 18, text-fig. 4 ; STUBBINGS, 1961 a : 17 ; ROSELL, 1981 : 292, pl. 6, figs. h-k.

MATERIAL

St. 11, 196-194 m : one specimen dislodged from its substrate of attachment. — St. 41, 166-172 m : one specimen dislodged from its substrate of attachment.

This species is widely distributed. It has been reported in the South Atlantic Ocean (STUBBINGS, 1961), Indian Ocean (ANNANDALE, 1909) and Southwest Pacific Ocean (AURIVILLIUS, 1894 ; NILSSON-CANTELL, 1934 ; BROCH, 1947 ; ROSELL, 1981). It is usually found attached to brachyuran and macruran decapod crustaceans. Type locality is the Philippines.

Genus *Megalasma* Hoek, 1883

Subgenus *Megalasma* Hoek, 1883

14. *Megalasma (Megalasma) striatum* Hoek, 1883

Megalasma striatum Hoek, 1883 : 51, pl. 2 figs. 5-9 ; pl. 6, figs. 8, 9 ; 1907 : 31 ; BROCH, 1922 : 270, text-figs. 29 and 30 ; 1931 : 33.
Megalasma (Megalasma) striatum : UTINOMI, 1958 : 292, text fig. 4 ; ROSELL, 1981 : 294, pl. 7, figs. g-l.

MATERIAL

St. 79, 682-770 m : numerous specimens attached to echinoid spines together with *Smilium acutum*.
UPD Crust. Coll. N°. 354.

REMARKS

This species is common in the southwest Pacific Ocean, i. e. in Indonesia, through Philippines as far as Japan (off Misaki). Commonly associated or attached to sea urchin spines but sometimes to silicious skeletons of sponges (HOEK, 1907). The reported bathymetric range of the species is from 183-984 meters. Type locality is the Philippines.

Genus *Octolasmis* Gray, 1825

Subgenus *Dichelaspis* Darwin, 1851

15. *Octolasmis (Dichelaspis) weberi* (Hoek, 1907)

Dichelaspis Weberi Hoek, 1907 : 20, pl. 3, figs. 2-7.
Octolasmis weberi : UTINOMI, 1970 : 343.
Octolasmis (Dichelaspis) weberi : ROSELL, 1981 : 297, pl. 8, figs. p-s.

MATERIAL

St. 36, 595-569 m : four specimens, one adult and three juveniles, attached to antipatherian coral.

This sample is of the typical form and nothing important can be added to the previous description. Like *Megalasma striatum*, for the present it has been reported only in the southwest Pacific region : in Banda Sea, Indonesia (HOEK, 1907), in northeastern South China Sea, off Lubang island Philippines (ROSELL, 1981), and to the north as far as Japan, off Sado Island (UTINOMI, 1970). The known bathymetric range of the species is 210-560 meters.

Suborder *Verrucomorpha* Pilsbry, 1916

Family VERRUCIDAE Darwin, 1854

Genus *Verruca* Schumacher, 1817

Subgenus *Altiverruca* Pilsbry, 1916

16. *Verruca (Altiverruca) cristallina* Gruvel, 1907

(Pl. 6, d-i)

Verruca cristallina Gruvel, 1907 : 2, pl. 1. figs. 9, 10 ; PILSBRY, 1916 : 41, listed only.
Verruca cassis Hoek, 1913 : 138, pl. 2 figs. 1-6 ; pl. 12, figs. 7, 8 ; pl. 13, figs. 8-10.

MATERIAL

St. 36, 595-569 m : three specimens, two adult and one juvenile. One specimen was attached to the base of the peduncle of *Sc. stearnsii* which was attached to the spicules of a hexactinellid sponge, the other two specimens were dislodged from their substrate of attachment.
UPD Crust. Coll. N°. 356.

Shell white, rostrum and carina with four interdigitating radial ribs, the fourth rostral rib being the shortest and the smallest (Plate 6, d). Movable tergum and scutum (Plate 6, f, i,) as in *V. cassis* (HOEK, 1913). Pit for adductor muscles prominent, both on the fixed and movable scutum. Apex of fixed tergum and scutum (Pl. 6, g) strongly recurving, most pronounced on the tergum.

Height of shell (Pl. 6, d) is 4.8 mm, measured from apex of tergum to the base of rostrum ; the distance between the apices of carina and rostrum is 4.0 mm.

Most of the rami of the cirri were severed, however, the intermediate segments of rami of cirrus VI bear three pairs of subequal setae ; proximal pair minute, Caudal appendages multiarticulate, 21 and 20 segments each, on the right and left respectively, reaching between the 12th and 13th segment of the rami of cirrus VI. Penis very long, tapering, annulated, clothed with hairs, especially towards its distal end where they become denser and longer.

Labrum without a median notch, crest supporting numerous small denticles on almost its entire length. Palpus small, apex produced, inner margin with few small setae, a tuft of longer setae seated apically. Mandible (Pl. 6, h) with three teeth, inferior angle supporting three short slender setae, outer margin more or less appearing as pectinated bearing several and moderately small setae. Maxilla I (Pl. 6, e) notched on its cutting edge, margin superior to notch bears four subequal setae, the two uppermost are the largest ; margin of notch with few small setae ; margin inferior to notch bears about four unequal setae, the lower two are larger ; inferior angle rounded where few small setae are seated.

REMARKS

This is the first record for the Philippines and consequently extends the known zoogeographic range of the species due north northeast. GRUVEL (1907) obtained his material of Andaman Island. Bathymetric range is 569-1,600 meters.

17. *Verruca (Altiverruca) quadrangularis* Hoek, 1883

(Pl. 7, A-E)

Verruca quadrangularis Hoek, 1883 : 140, pl. 11, figs. 10, 11 ; pl. 12. figs. 8-12.
Verruca (Altiverruca) quadrangularis : PILSBRY, 1916 ; 14, listed only.

MATERIAL

St. 79, 682-770 m : one specimen seated on a small coarse dark stone.
UPD Crust. Coll. N° 357.

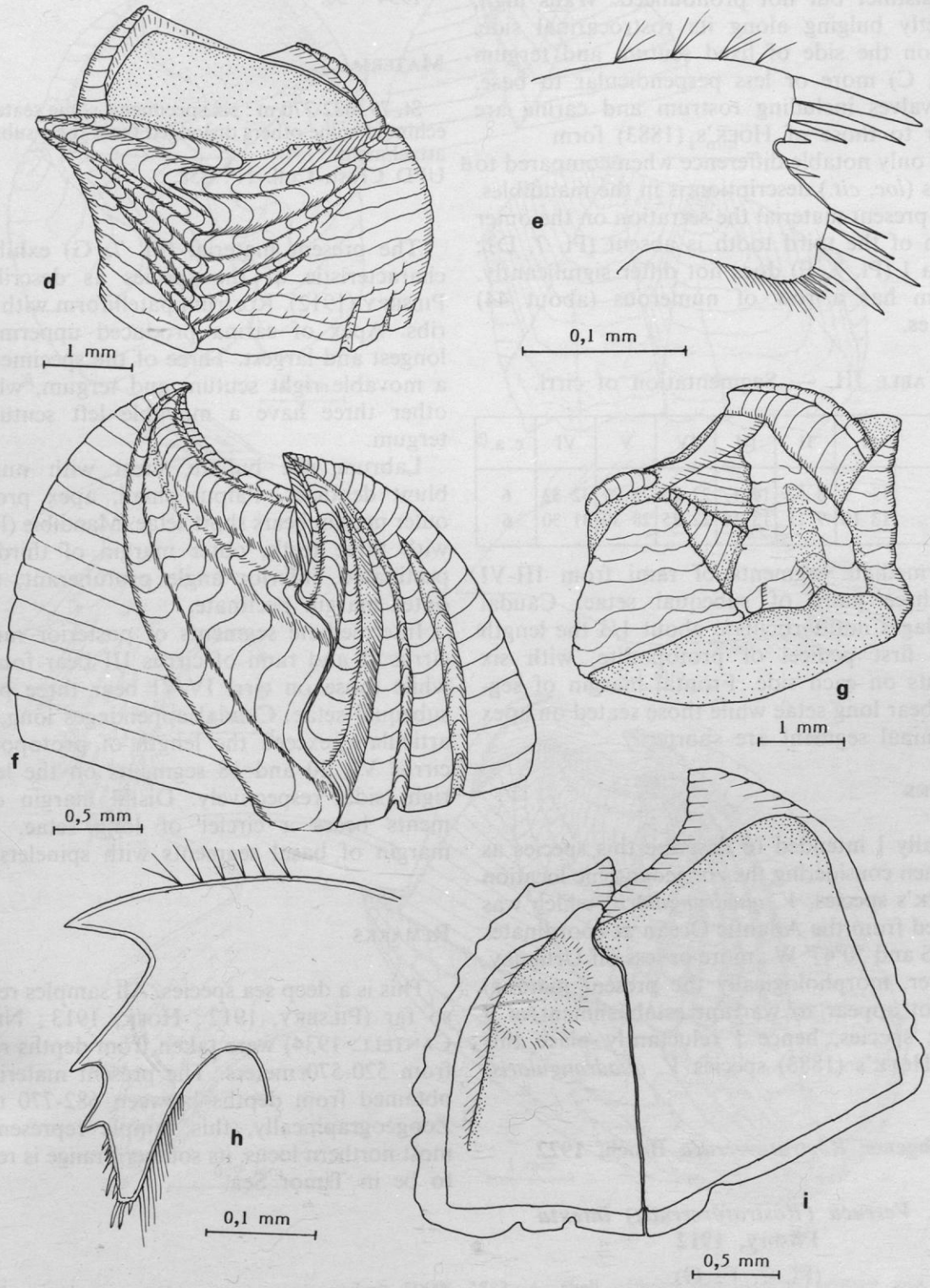

PLATE 6. — *Verruca (Altiverruca) cristallina* Gruvel, 1907. d, compartmental plates, rostrocarinal side ; e, Maxilla I ; f, movable tergum and scutum, outer side view ; g, compartmental plates, fixed tergum and scutum side ; h, Mandible ; i, movable tergum and scutum, innerside view.

Shell white, quite smooth in appearance, growth lines distinct but not pronounced. Walls high, distinctly bulging along its rostrocarinal side, walls on the side of fixed scutum and tergum (Pl. 7, C) more or less perpendicular to base, both valves including rostrum and carina are similar to those of HOEK's (1883) form.

The only notable difference when compared to HOEK's (*loc. cit.*) description is in the mandibles. In the present material the serration on the outer margin of the third tooth is absent (Pl. 7, D); maxilla I (Pl. 7, E) does not differ significantly. Labrum has a row of numerous (about 44) denticles.

TABLE III. — Segmentation of cirri.

	I	II	III	IV	V	VI	c. a.
Right	13 9	8 12	14 17	22 26	28 29	32 33	6
Left	13 10	9 11	13 16	22 25	28 30	31 30	6

Intermediate segments of rami from III-VI bear three pairs of subequal setae. Caudal appendages multiarticulate about 1/3 the length of the first pedicel of protopodite, with six segments on each side. Frontal margin of segments bear long setae while those seated on apex of terminal segment are shorter.

REMARKS

Initially I intended to describe this species as new when considering the zoogeographic location of HOEK's species, *V. quadrangularis*, which was obtained from the Atlantic Ocean at coordinates 35°39′ S and 50°47′ W ; more or less off Uruguay. However, morphologically the present material does not appear to warrant establishment of a distinct species, hence I reluctantly place this under HOEK's (1883) species *V. quadrangularis*.

Subgenus *Rostratoverruca* Broch, 1922

18. *Verruca (Rostratoverruca) intexta* Pilsbry, 1912

(Pl. 7, F, G)

Verruca intexta Pilsbry, 1912 : 292; 1916 : 47.
Verruca conchula Hoek, 1913 : 146, pl. 11 figs. 14-15.
Verruca (Rostratoverruca) intexta : NILSSON-CANTELL, 1934 : 50.

MATERIAL

St. 79, 682-770 m : six specimens, some seated on an echinoid spine others dislodged from their substrate of attachment.
UPD Crust. Coll. N°. 358.

The present material (Pl. 7, G) exhibits the characteristic of the species as described by PILSBRY (1912). Rostrum patelliform with several ribs. Apex of carina produced uppermost rib longest and largest. Three of the specimens with a movable right scutum and tergum, while the other three have a movable left scutum and tergum.

Labrum not bullate, crest with numerous blunt denticles. Palpus small, apex produced, outer margin bears short setae. Mandible (Pl. 7, F) with three teeth, outer margin of third tooth pectinated, inferior angle protuberant, trident, outer margin pectinate.

Intermediate segments of posterior ramus of cirrus II and rami of cirrus III bear four pairs while those on cirri IV-VI bear three pairs of subequal setae. Caudal appendages long, multiarticulate, exceed the length of protopodite of cirrus VI, 20 and 18 segments on the left and right side, respectively. Distal margin of segments bears a circlet of long setae, frontal margin of basal segments with spinelets.

REMARKS

This is a deep sea species. All samples reported so far (PILSBRY, 1912; HOEK, 1913; NILSSON-CANTELL, 1934) were taken from depths ranging from 520-570 meters. The present material was obtained from depths between 682-770 meters. Zoogeographically, this sample represents the most northern locus, its southern range is reported to be in Timor Sea.

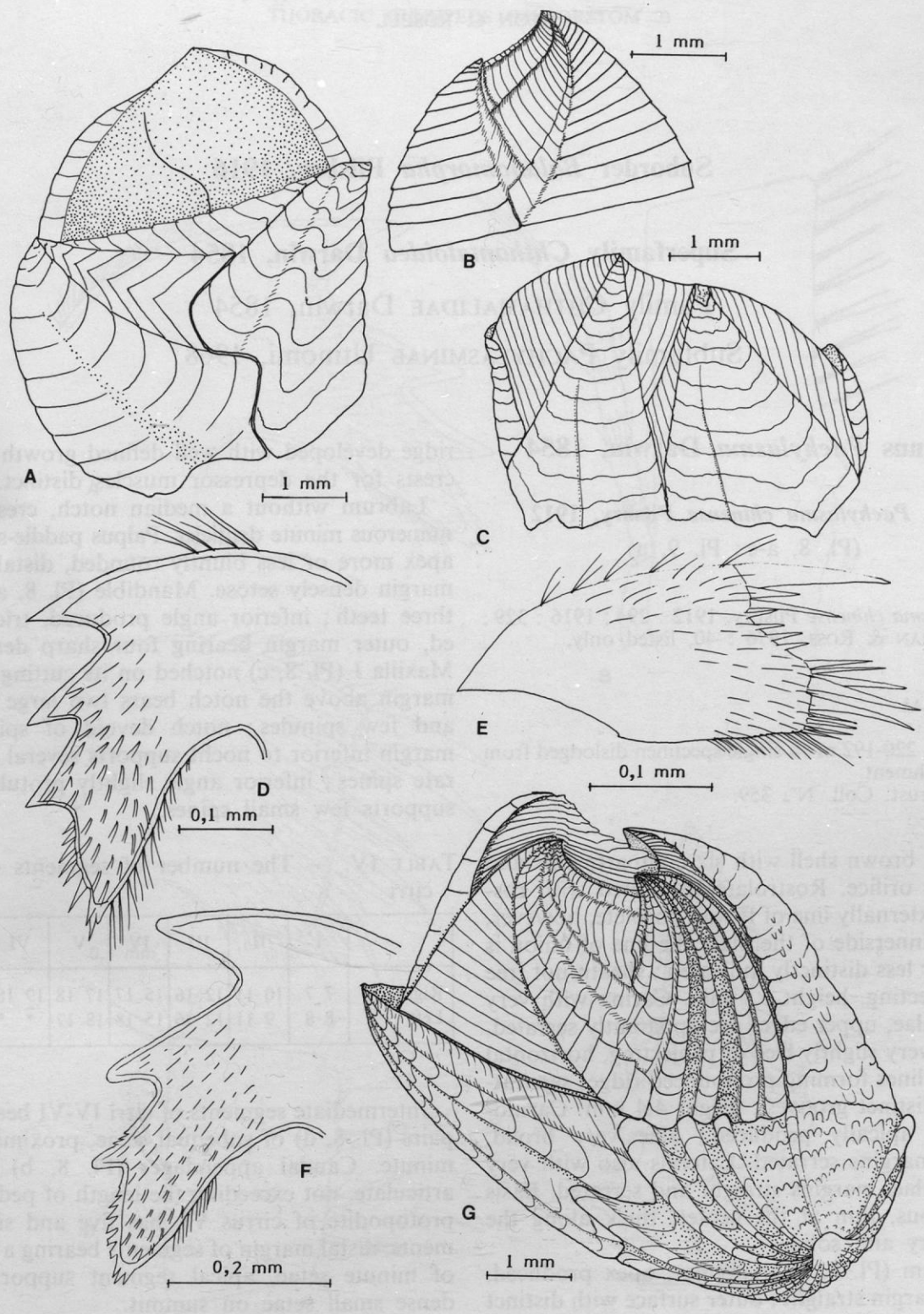

PLATE 7. — *Verruca (Altiverruca) quadrangularis* Hoek, 1883. A, shell without the movable scutum and tergum; B, Movable scutum and tergum, outer side view; C, Immovable scutum and tergum, outer side view; D, Mandible; E, Maxilla I.

Verruca (Rostratoverruca) intexta Pilsbry, 1912. F, Mandible; G, whole animal, on movable scutum and tergum side.

Suborder *Balanomorpha* Pilsbry, 1916

Superfamily *Chthamaloidea* Darwin, 1854

Family CHTHAMALIDAE Darwin, 1854

Subfamily PACHYLASMINAE Utinomi, 1968

Genus *Pachylasma* Darwin, 1854

19. *Pachylasma chinense* Pilsbry, 1912

(Pl. 8, a-e ; Pl. 9, a)

Pachylasma chinense Pilsbry, 1912 : 294 ; 1916 : 329 ; NEWMAN & ROSS, 1976 : 40, listed only.

MATERIAL

St. 32, 220-192 m : a single specimen dislodged from its attachment.
UPD Crust. Coll. N°. 359.

Light brown shell with six compartments and toothed orifice. Rostrolaterals united with rostrum, externally line of fusion obsolete, however, on the innerside of the plate the line of union is more or less distinctly indicated ; sheath not free or projecting, height 5.1 mm. Carina with very broad alae, upper edges are apparently serrated, sheath very slightly free or projecting, horizontal growth lines forming pronounced ridges separated by distinct grooves ; height 4.4 mm. Carinolaterals apically produced ; alae very broad, apical margins serrated. Laterals also with very broad alae, margins straight and serrated. Basis calcareous, thin at the center, thick along the periphery and solid.

Scutum (Pl. 8, e) triangular, apex produced, basal margin straight ; outer surface with distinct growth ridges without radial striations ; inner surface with the adductor ridge, the pit for adductor muscle and the crests for the depressor muscles not indicated ; articular ridge pronounced.

Tergum (Pl. 9, a) has an abbreviated spur without any trace of spur fasciole ; articular ridge developed with well defined growth lines ; crests for the depressor muscles distinct.

Labrum without a median notch, crest with numerous minute denticles. Palpus paddle-shaped, apex more or less bluntly rounded, distal outer margin densely setose. Mandible (Pl. 8, a) with three teeth ; inferior angle produced, tridentated, outer margin bearing four sharp denticles. Maxilla I (Pl. 8, c) notched on its cutting edge ; margin above the notch bears two large spines and few spinules ; notch devoid of spinules ; margin inferior to nocht supports several moderate spines ; inferior angle slightly protuberant, supports few small spines.

TABLE IV. — The number of segments of the cirri

	I	II	III	IV	V	VI	c. a.
Right	7 7	10 11	12 16	15 17	17 18	19 18	6
Left	8 8	9 11	12 16	15 18	18 17	* *	5

* Cut.

Intermediate segments of cirri IV-VI bear four pairs (Pl. 8, d) of subequal setae, proximal pair minute. Caudal appendages (Pl. 8, b) multiarticulate, not exceeding the length of pedicel of protopodite of cirrus VI, has five and six segments, distal margin of segments bearing a circlet of minute setae, apical segment supporting a dense small setae on summit.

REMARKS

PILSBRY (1912) noted only the characteristics of the hard parts when he described the species

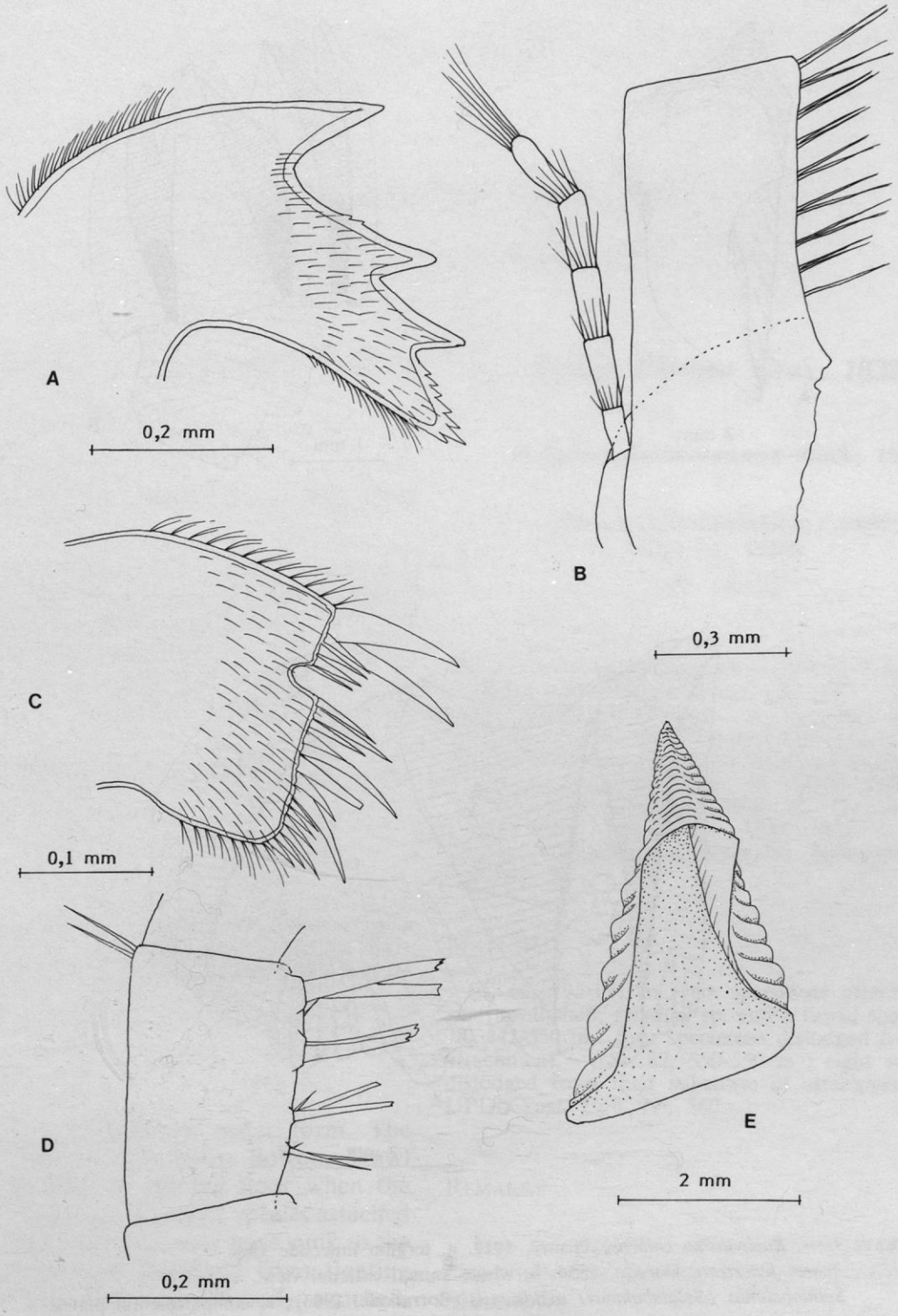

PLATE 8. — *Pachylasma chinense* Pilsbry, 1912. a, Mandible ; b, protopodite of cirrus VI showing caudal appendage ; c, Maxilla I ; d, 11th segment of anterior ramus of cirrus VI showing arrangement of setae ; e, scutum innerside view.

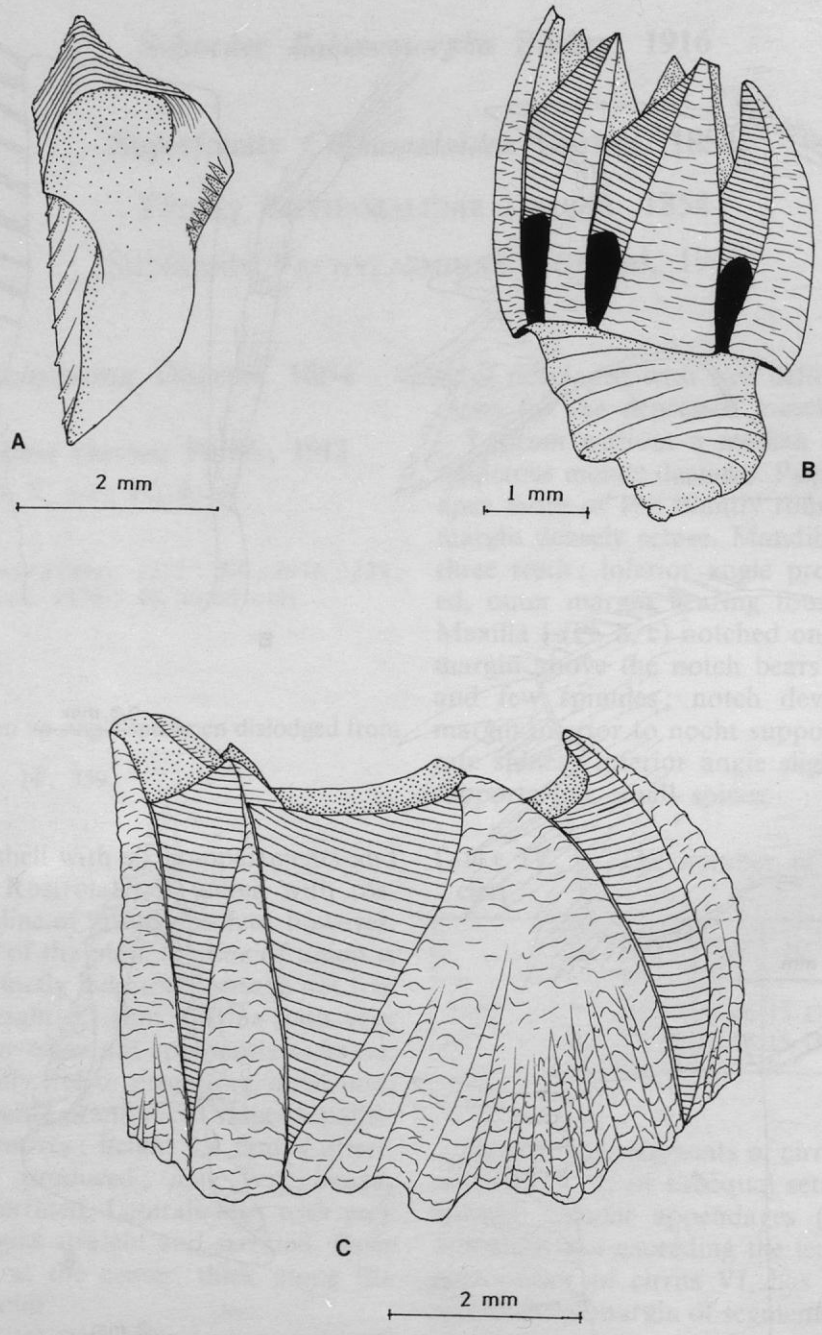

PLATE 9. — *Pachylasma chinense* Pilsbry, 1912. a, tergum innerside view.
Acasta fenestrata Darwin, 1854. b, whole animal external view.
Solidobalanus (Solidobalanus) maldivensis (Borradaile, 1903); c, compartmental plates.

as new to science. To augment his characterization a description of the internal soft body parts of present material is given. His specimens were obtained from the South China Sea near Hong Kong at coordinates 20°37′ N 115°43′ E, at a depth 380 meters. The present sample from northeast Philippines off Lubang island extends the species distribution range to the southeast. This species is reported for first time from the Philippine waters.

Superfamily *Balanoidea* Leach, 1817

Subfamily Balaninae Leach, 1817

Genus *Balanus* Da Costa, 1778

Subgenus *Balanus* Da Costa, 1778

20. ***Balanus amphitrite amphitrite* Darwin, 1854**

Balanus amphitrite Darwin, 1854 : 240, pl. 5, figs. 2 e, h, l ; Hoek, 1913 : 167, pl. 14, figs. 8-17 ; Pilsbry, 1916 : 89 ; 1927 : 312 ; Utinomi, 1969 : 86.
Balanus amphitrite communis Gruvel, 1907 : 6 ; Nilsson-Cantell, 1921 : 311 ; 1934 : 56 ; Broch, 1922 : 314 ; Hiro, 1937 b : 432 ; 1939 b : 263 ; Utinomi, 1960 : 43 ; 1962 : 216 ; Stubbings, 1936 : 41 ; 1961 a : 22 ; 1961 b : 173.
Balanus amphitrite amphitrite : Utinomi, 1967 : 200 ; 1970 : 355 ; Stubbings, 1967 : 271 ; Rosell, 1973 : 79 ; 1981 : 302.

Material

St. 26, 299-320 m : one empty shell attached to a disarticuled scutum of *Lepas* sp. — St. 78, 441-550 m : ten empty shells dislodged from their substrate of attachment.

Remarks

This species is a shallow water form. The empty shells taken by a Beam Bottom Trawl must have dropped to the sea floor when the host animal, *Lepas* sp. (a pelagic species attached to floating objects) died, or may have sunk to the sea floor having been dislodged from floating objects on which they were formerly attached.

Genus *Chirona* Gray, 1835

Subgenus *Striatobalanus* Hoek, 1913

21. ***Chirona (Striatobalanus) amaryllis* (Darwin, 1954)**

(Pl. 10, h)

Balanus amaryllis Darwin, 1854 : 279, pl. 7, figs. 6 a-c ; Hoek, 1883 : 153, pl. 7, figs. 4,5 ; 1913 : 179, pl. 15, figs. 17-21, pl. 16, figs. 1-4 ; Gruvel, 1907 : 7 ; Pilsbry, 1916 : 217 ; Nilsson-Cantell, 1931 : 10.
Balanus (Chirona) amaryllis : Nilsson-Cantell, 1921 : 329, pl. 3, fig. 9 ; 1934 : 58 ; Hiro, 1936 : 624 ; 1939 a : 243 ; Stubbings, 1936 : 41 ; Utinomi, 1968 : 174 ; 1969 : 88 ; Rosell, 1981 : 302.
Chirona (Striatobalanus) amaryllis : Newman & Ross, 1976 : 50.

Material

St. 64, 195-191 m : six specimens attached to a gastropod shell, *Phalium* sp. and a turrid shell. — St. 78, 441-550 m : four specimens dislodged from their attachment. — St. 82, 550-550 m : eight specimens dislodged from their substrate of attachment.
UPD Crust. Coll. N°. 360.

Remarks

This is a common deep sea species in Philippine waters. Its known bathymetric range is 187-550 meters.

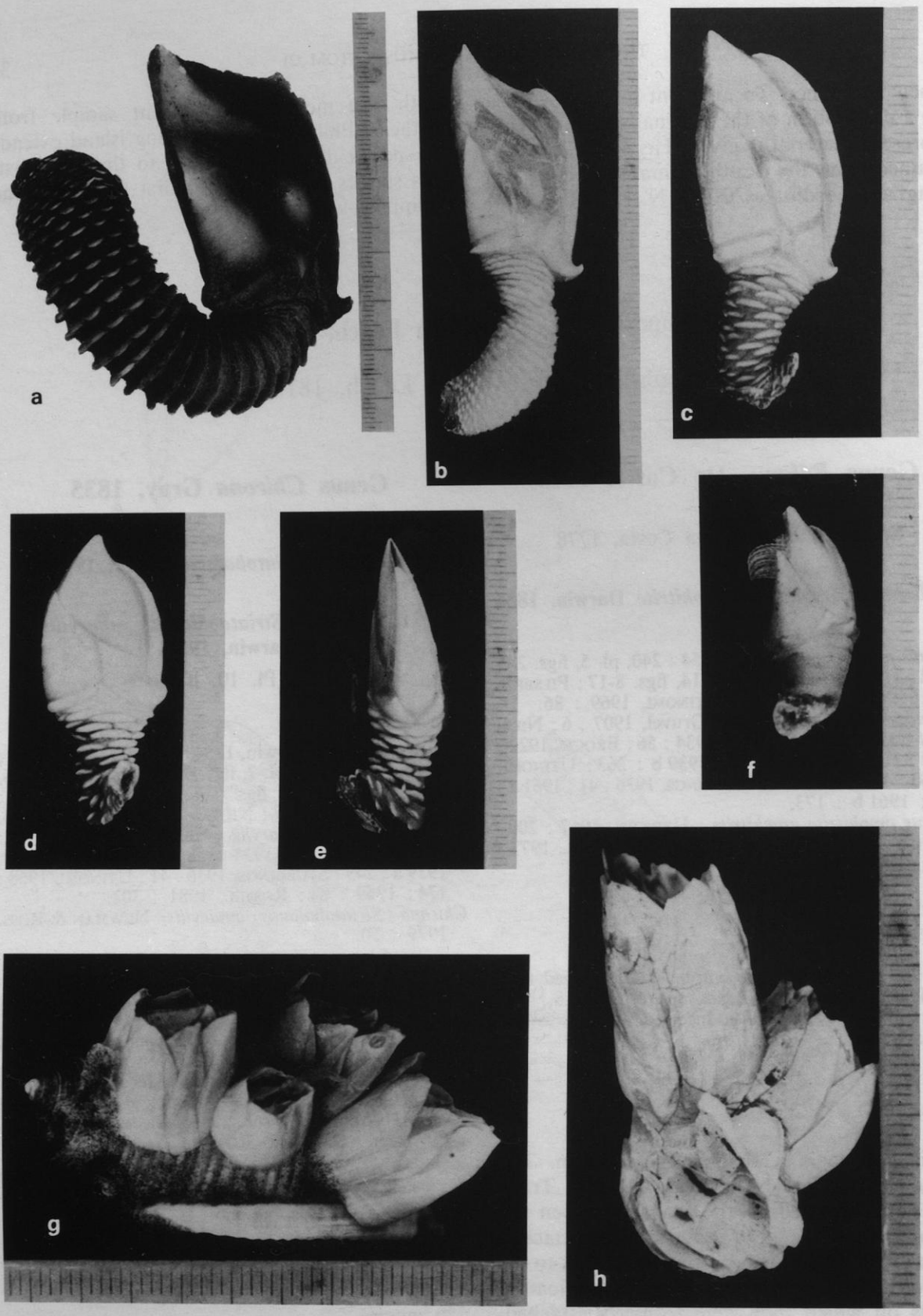

PLATE 10. — a, *Scalpellum stearnsii* Pilsbry, 1890, right side view of female. b, *Sc. stearnsii* f, *gemina* Hoek, 1907, right side view of female ; c, *Arcoscalpellum sociabile* (Annandale, 1905), right side view of hermaphrodite ; d, *A. michelottianum* (Seguenza, 1876), right side view of female ; e, *A. michelottianum* (Seguenza, 1876), carinal view of same individual ; f, *Calantica trispinosa* (Hoek, 1883), right side view of female ; g, *Chirona (Striatobalanus) tenuis* (Hoek, 1883) ; h, *C. (Striato-) amaryllis* (Darwin, 1854).

22. *Chirona (Striatobalanus) tenuis* (Hoek, 1883)

(Pl. 10, g)

Balanus tenuis Hoek, 1883 : 154, pl. 13, figs. 29-33 ; 1913 : 190, pl. 17, figs. 14-19, pl. 18, figs. 1 ; 1913 : 185 (as *Balanus albus* n. sp.), pl. 16, figs. 12-13, pl. 17, figs. 1-6.
Balanus (Chirona) tenuis : Pilsbry, 1916 : 216 ; Nilsson-Cantell, 1925 : 34, pls. 1, 5, 6, text fig. 13 ; Broch, 1931 : 70 ; Hiro, 1937 b : 439, text fig. 24 ; Utinomi, 1962 : 216 ; 1968 : 174 ; 1969 : 88, fig. 6 ; Rosell, 1981 : 302.
Chirona (Striatobalanus) tenuis : Newman & Ross, 1976 : 50.

Material

St. 2, 186-184 m : two specimens dislodged from their attachment. — St. 15, 330-326 m : one specimen dislodged from its attachment. — St. 17, 174-193 m : one specimen dislodged from its attachment. — St. 26, 299-320 m : one specimen seated on a broken bivalve shell, *Cassostrea* sp. (?). — St. 32, 220-192 m : five specimens, some are attached to a piece of black stone, others to the base of an antipatherian skeleton. — St. 66, 209-192 m : five specimens dislodged from their attachment. — St. 68, 199-195 m : five specimens, four attached to a broken gastropod shell *Phalium* sp. and one to *Biplex perca*. — St. 74, 300-370 m : two specimens attached to a gastropod, *B. perca*. — St. 78, 441-550 m : four specimens on a gastropod, *Phalium* sp. — St. 79, 682-770 m : two speciems dislodged from their attachment.
UPD Crust. Coll. N°. 365.

Remarks

This species is very common in deep waters of the southwest Pacific region and extends northwards as far as southern Japan. Its western limit is the Gulf of Oman in the Indian Ocean and its southeastern limit is the Arafura Sea, North of Australia. The species has a wide bathymetric distribution range, between 40-446 meters. Type locality is West of Mindoro, Philippines (Hoek, 1883).

Genus *Solidobalanus* Hoek, 1913

Subgenus *Solidobalanus* Hoek, 1913

23. *Solidobalanus (Solidobalanus) maldivensis* (Borradaile, 1903)

(Pl. 9 c)

Balanus maldivensis : Hoek, 1913 : 195, pl. 18 figs. 13-19.
Balanus (Solidobalanus) maldivensis : Rosell, 1981 : 303.
Solidobalanus (Solidobalanus) maldivensis : Newman & Ross, 1976 : 51.

Material

St. 66, 209-192 m : three dead specimens, only the compartmental plates are present and they are devoid of any opercular valves ; attached to sea-urchin spines. — St. 71, 189-197 m : several dead specimens with compartmental plates only and without any opercular valves.

Remarks

The compartmental plates (Pl. 9, c) are undoubtly of the above species when compared to Hoek's (1913) drawings and those obtained in Musorstom 1 Philippines 1976 (Rosell, 1981).

The species is limited to the Indo-Pacific region ; known bathymetric distribution is 189-209 meters.

Genus *Acasta* Leach, 1817

24. *Acasta fenestrata* Darwin, 1854

(Pl. 9, b)

Acasta fenestrata Darwin, 1854 : 316, pl. 9, fig. 7 a-c ; Hoek, 1883 : 160 ; Hiro, 1939 : 243 ; Utinomi, 1958 : 297, text fig. 6 a-c, 7 a-f ; Rosell, 1972 : 194, pl. 21, figs. 1-8, pl. 22, figs. 1-3, pl. 23, figs. 1-2.

Material

St. 47, 84-81 m : two specimens dislodged from a host sponge.

Remarks

The external morphology of the present material is undoubtedly of this species, especially due to the presence of membrane covered apertures between the compartmental plates (Pl. 9. b). Previous specimens of this species were taken embedded in a sponge and most likely the present material too must have come from a sponge.

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