

## Crustacea Decapoda: Review of the genera and species of the family Polychelidae Wood-Mason, 1874

*Bella S. GALIL*

Israel Oceanographic & Limnological Research  
National Institute of Oceanography  
P.O.B. 8030, Haifa 31080, Israel

### ABSTRACT

The polychelids are large, uncommon, primitive decapods that inhabit the depths of the world oceans down to 5000 m, between latitudes 50°N and 55°S. A study of major deep-sea collections led to a revision of the family. All genera and species are redescribed and extended synonymies given. Two new genera are established: *Cardus*, for *Polycheles crucifer* (Thomson, 1873) and *Homeryon*, for *Polycheles asper* Rathbun, 1906 and a new species, *H. armarium*. The genus *Pentacheles* Bate, 1878, is revived to include polychelids in which the epipod on third maxilliped is longer than the ischium: *P. gibbus* Alcock, 1894, *P. laevis* Bate, 1878, *P. obscurus* Bate, 1878, *P. synderi* (Rathbun, 1906) and *P. validus* A. Milne Edwards, 1880. *Stereomastis* Bate, 1888 is considered a synonym of *Polycheles* Heller, 1862. *Willemoesia* Grote, 1873 is retained with but four species: *W. forceps* A. Milne Edwards, 1880, *W. inornata* Faxon, 1893, *W. leptodactyla* (Willemoes-Suhm, 1875), and *W. pacifica* Sund, 1920. In all, thirty-two species are recognized, including six new species. The bathymetric and geographic ranges are amended and discussed. A key to the genera and species of the family is provided.

### RÉSUMÉ

**Crustacea Decapoda : Revue des genres et des espèces de la famille Polychelidae Wood-Mason, 1874.**

Les Polychelidae sont des crustacés décapodes primitifs de grande taille et peu communs, qui vivent dans les profondeurs des océans jusqu'à 5000 m et entre les latitudes 50°N et 55°S. Une étude des principales collections faites en eau profonde a conduit à une révision de la famille. Tous les genres et espèces sont redécrits et leurs synonymies complètes sont indiquées. Deux nouveaux genres sont créés: *Cardus* pour *Polycheles crucifer* (Thompson, 1873) et *Homeryon* pour *Polycheles asper* Rathbun, 1906; une espèce nouvelle, *Homerion armarium* sp. nov., est décrite. Le genre *Pentacheles* Bate, 1878, est ressuscité pour accueillir les espèces dont l'épipode des troisièmes maxillipèdes est plus long

que l'ischion : *P. gibbus* Alcock, 1894, *P. laevis* Bate, 1878, *P. obscurus* Bate, 1878, *P. synderi* (Rathbun, 1906) et *P. validus* A. Milne Edwards, 1880. *Stereomastis* Bate, 1888, est considéré comme étant synonyme de *Polycheles* Heller, 1862. *Willemoesia* Grote, 1873, est conservé mais avec quatre espèces seulement: *W. forceps* A. Milne Edwards, 1880, *W. inornata* Faxon, 1893, *W. leptodactyla* (Willemoes-Suhm, 1875), et *W. pacifica* Sund, 1920. Au total 32 espèces sont reconnues, dont six sont nouvelles. Les répartitions bathymétriques et géographiques sont revues et discutées. Une clé des genres et espèces est proposée.

## INTRODUCTION

The depths of the world ocean are home to the eyeless, claw-footed polychelids, "living fossils", kin to the long vanished eryonids, tracing their ancestry back as far as the Mesozoic.

BATE (1888: 100) described his excitement following the finding of polychelids by the "Challenger" Expedition: "The great depth from which it was dredged, a depth that was previously believed to be barren, if not of all life, certainly of animals so high in the scale of existence, the apparent absence of the power of vision, and the relationship of the animal to forms of Crustacea that were supposed to have been extinct since the period of the Upper White Jura of Bavaria, gave a considerable degree of interest to the discovery".

Subsequent deep-sea expeditions added new species and extended the range of known ones. However, many species were known from few, damaged, or juvenile specimens, confusing workers searching for valid taxonomic characters. BATE (1888: 141) recognized the problem: "It is highly probable that many of the animals that we determine as specifically distinct, because they are found in widely separated localities, and exhibit some greater or less deviation from each other, would cease to be considered such if they lived side by side, and there can, I think, be little doubt that many of our museum specimens are not really species". A century later, it has remained unsolved: "The taxonomy of the Polychelidae, especially of the generic level, is still very unsettled" (HOLTHUIS, 1991: 88).

The revision comprises adult forms only as "The larval forms of the Polychelidae are incompletely known" (FIRTH & PEQUEGNAT, 1971: 14). A polychelid larva was collected by WILLEMOES-SUHM early on the "Challenger" Expedition, and labelled by him "Zoea of Brachyura", but the specimen was recorded by BATE (1882) as a new genus, *Eryoneicus*. Recognized by WOOD-MASON & ALCOCK (1891: 199) as "an immature form of some species of *Pentacheles*", "the question of whether the peculiar forms known as *Eryonicus* are larvae of the crayfish-like deep-sea crustaceans *Polycheles*" (SUND, 1915: 372) was long subject of debate - DE SAINT LAURENT (1979) still argued they are adults secondarily adapted to the bathypelagic existence. Though SUND (1915) tried to match larval forms with adult species using carapacial spine formula, only a few of the nearly 40 larval forms known (GORDON, 1960), are firmly correlated with the adult.

Much of the material examined in this study was collected by the following cruises: MUSORSTOM 1, Philippine Islands, April 1976; MUSORSTOM 2, Philippine Islands, November-December 1980; MUSORSTOM 3, Philippine Islands, May-June 1985; MUSORSTOM 4, New Caledonia, September-October 1985; MUSORSTOM 5, Chesterfield Islands, October 1986; MUSORSTOM 6, Loyalty Islands, February 1989; MUSORSTOM 7, Wallis and Futuna Islands, May 1992; MUSORSTOM 8, Vanuatu Archipelago, September-October 1994; BIOCAL, New Caledonia and Loyalty Islands, August-September 1985; BIOGEOCAL, New Caledonia and Loyalty Islands, April-May 1987; VOLSMAR, Matthew and Hunter Islands, May-June 1989; KARUBAR, Indonesia, October-November 1991; BERYX 2, Norfolk Ridge, Loyalty Islands, October 1991. BATHUS 1-4, New Caledonia, March 1993-1994; HALIPRO 1, New Caledonia, March 1994; (FOREST, 1981, 1985, 1989; RICHER DE FORGES, 1990, 1993; RICHER DE FORGES & MENOUE, 1993; RICHER DE FORGES & CHEVILLON, 1996; RICHER DE FORGES *et al.*, 1996; CROSNIER *et al.*, 1997).

A study of the extensive collections of the Muséum national d'Histoire naturelle, Paris (MNHN), National Natuurhistorische Museum, Leiden (formerly Rijksmuseum van Natuurlijke History) (RMNH), National Museum of Natural History, Smithsonian Institution, Washington (USNM), The Natural History Museum, London (NHM), together with material made available by the Australian Museum, Sydney (AM), American Museum of Natural History, New York (AMNH), Indian Museum, Calcutta (IM), Institut royal des Sciences naturelles de Belgique, Bruxelles (IRScNB), Kitakyushu Museum & Institute of Natural History, Kitakyushu (KMNH), Natural

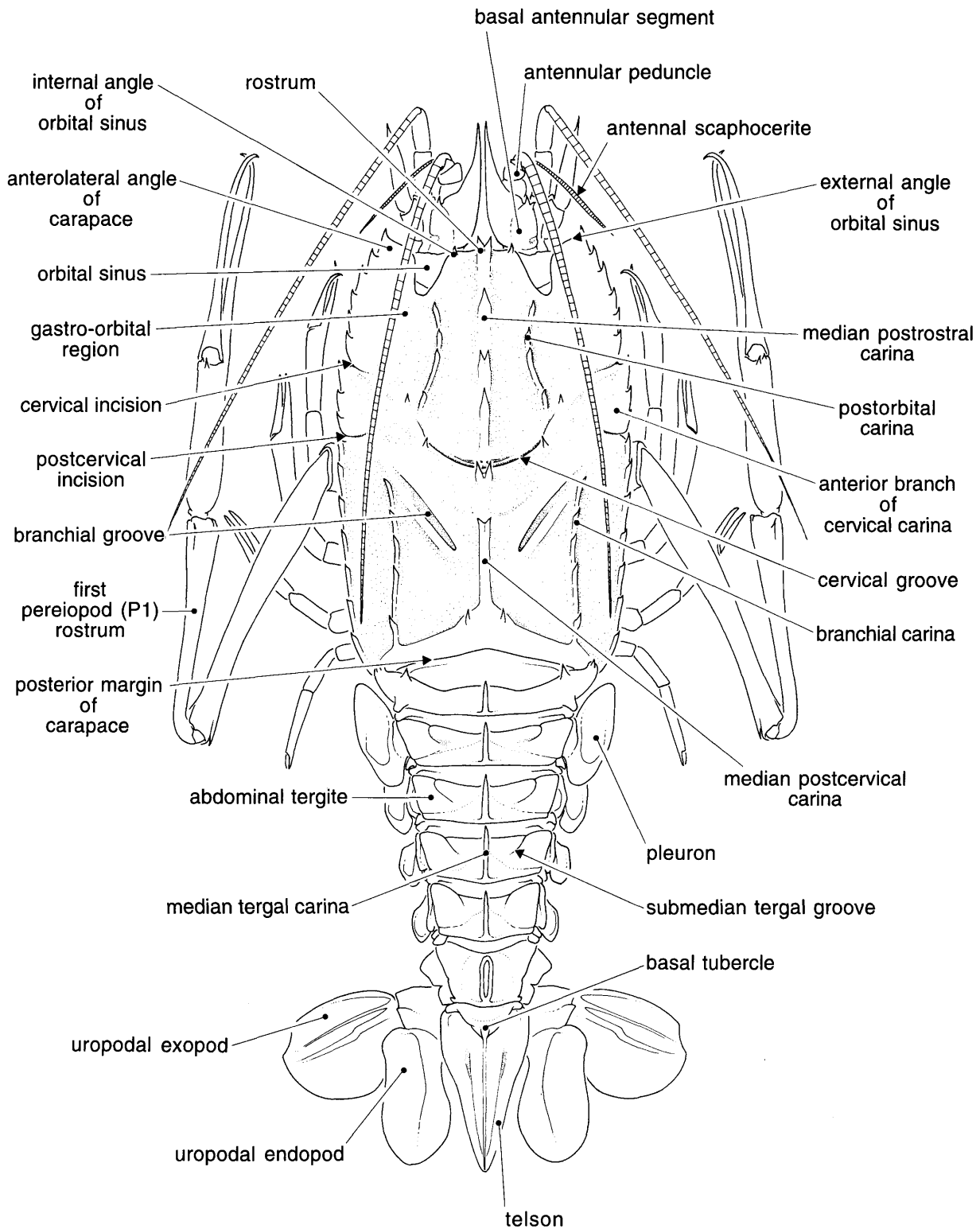


FIG. 1. — Diagrammatic polychelid.

History Museum of Los Angeles (LAM), Museum of Comparative Zoology, Harvard University, Cambridge (MCZ); Museo Zoologico, Universita degli studi di Firenze (MF), Naturhistorisches Museum, Wien (NHMW), Nagasaki University Museum, Nagasaki (NUM), National Institute of Water & Atmospheric Research, New Zealand (NIWA), National Fisheries University, Shimonoseki (NFU), South African Museum, Cape Town (SAM), Senckenberg Museum, Frankfurt (SMF), National Collections, Tel Aviv University (TAU), Tasmanian Museum, Hobart (TM), Western Australian Museum, Perth (WAM), Zoologisk Museum, Copenhagen (ZMC), and Zoological Museum of Moscow University, Moscow (ZMMU) has enabled the reexamination of nearly all type specimens and much of the published material.

The present study divides the Polychelidae into five genera, two of which are new, and describes six new species. Descriptive and distributional information is presented as well as detailed references to literature. All taxa, but *Pentacheles gibbus*, have been photographed, and a key is presented for their identification.

In the lists of Material examined, the names of the cruises are in capital letters. The names of the vessels are in italic letters and quoted.

In the chapter Distribution, when the depth ranges are given without attribution, they are taken from the material examined in the present work, all other records are cited by author.

### TERMINOLOGY

The terminology used to describe the species of the family Polychelidae is illustrated on the figures 1-3.

Measurements refer to carapace length from the tip of the rostrum to the middle of the posterior border of the carapace and are given in millimeters.

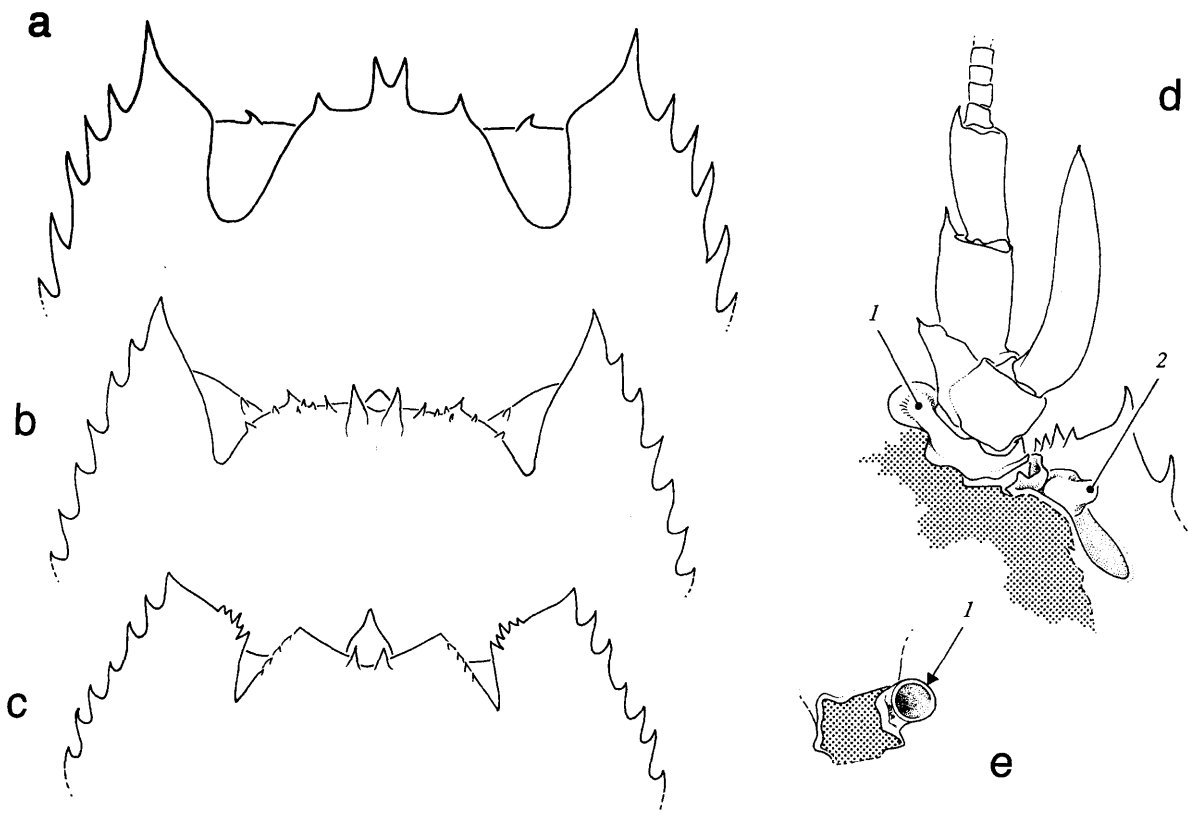


FIG. 2. — a-c, frontal margin of carapace: a, rostrum bifid; b, rostral spines separate; c, frontal subterminal tooth prominent, longer than separate rostral spines. — d, ventral view showing the renal process of the antenna (1) and the eyestalk (2); e, dorsal view showing the aperture of the renal process.



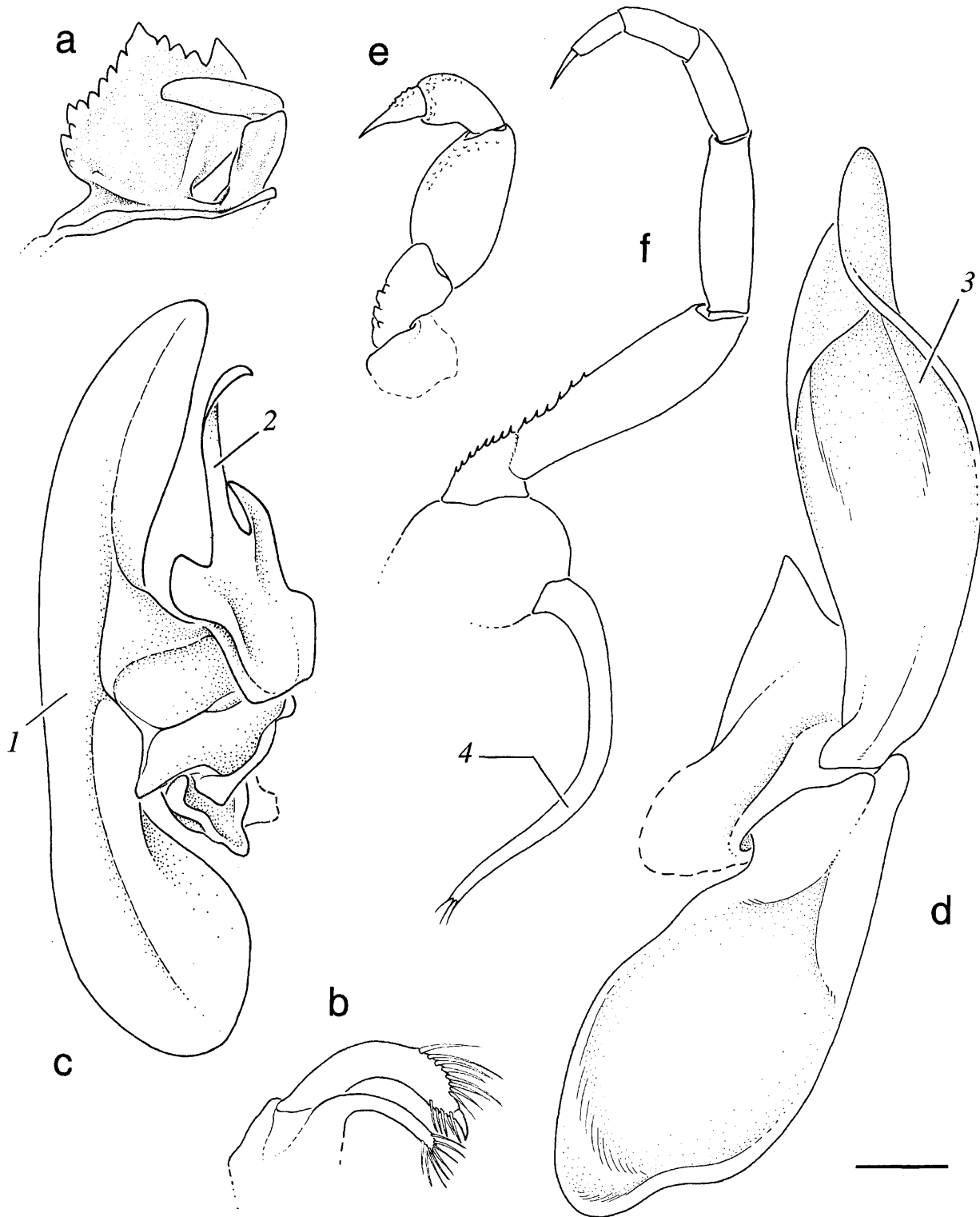


FIG. 3. — **a**, mandible; **b**, maxillula; **c**, maxilla (1, scaphognathite; 2, maxillar lobes); **d**, first maxilliped (3, exopodal lobe); **e**, second maxilliped; **f**, third maxilliped (4, epipod).

## Family POLYCHELIDAE Wood-Mason, 1874

Polychelidae Wood-Mason, 1874: 180; 1875: 132. — CARUS, 1885: 485. — BALSS, 1957: 1564. — ZARIQUIEY ALVAREZ, 1968: 208. — GLAESSNER, 1969: 470. — FIRTH & PEQUEGNAT, 1971: 5. — WENNER, 1979: 435. — ABELE & FELGENHAUER, 1982: 306. — RIEDL, 1983: 481. — SQUIRES, 1991: 354.

Eryonidae - BOAS, 1880: 157 (part). — BATE, 1888: 100 (part). — ORTMANN, 1896: 428 (part). — YOUNG, 1900: 439. — ALCOCK, 1901b: 164 (part). — STEBBING, 1902: 35 (part); 1910: 377 (part); 1917: 27 (part). — SELBIE, 1914: 8. — DE MAN, 1916: 1 (part). — BOUVIER, 1917: 26 (part). — PESTA, 1918: 161 (part). — STEPHENSEN, 1923: 65 (part). — BALSS, 1925: 5 (part). — BOONE, 1927: 90 (part). — RODRIGUEZ, 1980: 194 (part).

Eryontidae Smith, 1880a: 345 (part). — STEBBING, 1893: 199 (part). — SCHMITT, 1921: 105 (part).

Polychelida Scholtz & Richter, 1995: 296.

**DIAGNOSIS.** — Carapace dorso-ventrally flattened, subrectangular or ovate. Anterolateral angle of carapace produced, spiniform. Lateral margins well defined, spinose; cervical and postcervical incisions dividing margin into three parts. One or two rostral spines. Orbital sinus absent, reduced, or well defined. Eystalk present, lacking cornea.

Cervical groove marked, arcuate, laterally bifurcate. Median postrostral and postcervical carinae well defined, unarmed, granulate, or spinose. Postorbital and branchial carinae obsolescent or well defined, unarmed, granulate or spinose.

Abdomen narrow or broad, laterally or dorsoventrally depressed. First abdominal tergite narrow, pleura fused, abbreviated; latching into posterolateral margins of carapace. Abdominal tergites smooth or sculptured, medially carinate or binodal. Abdominal pleurae diminishing in size posteriorly, smooth or sculptured. Abdominal sternites with or without median knob. Telson lanceolate, bearing two submedian carinae. Uropods lacking transversal suture; uropodal exopod lamellar, endopod bearing denticle or lappet basally on interior margin.

Basal antennular segment flattened, mesial margin granulate or spinose; anterolateral angle with 1-2 spines or without. Outer antennular flagellum short, inner flagellum as long as antennal flagellum. Renal process well developed, tubular, fitting into hollow on underside of basal antennular segment. Antennal scaphocerite short, lingulate or lanceolate; antennal peduncle five-jointed, first segment not fused to epistome.

Buccal opening subquadrate. Mandible concave, cutting edge with triangular teeth of uneven size; mandibular palp biarticulate. Maxillula with two incurved lobes. Maxilla with two slender lobes; large scaphognathite. First maxilliped endopod slender; exopodal lobe membraneous, reniform, extending further back than scaphognathite, exopod anteriorly divided into two lobes enclosing efferent passage. Second and third maxillipeds slender, pediform; epipod on basal segment of third maxilliped rudimentary or long.

Pereiopods 1-4 chelate. P5 either simple or chelate in both sexes, or chelate in female, simple or subchelate in male. First pereiopod larger, more robust than P2-5; pereiopods successively shorter posteriorly. Fingers of first chelipeds crossing, their inner margin furnished with row of overlapping cornute platelets, forming serrate edge. First male pleopod spatuliform, distal margin folded internally. Pleopods 2-6 biramose, with rod-like appendix interna, second pair in male with appendix masculina.

**REMARKS.** — The Polychelidae is the sole extant family of the superfamily Eryonoidea, a group represented in fossil records from the mid-Triassic period (GLAESSNER, 1969).

H. MILNE EDWARDS (1837) described "Tribu des Eryons", and DE HAAN (1841) erected the family Eryonidae for the fossil genus *Eryon*. HELLER (1863) placed *Polycheles typhlops* in the family Astacidae though he noted its affinity with the fossil *Eryon*. Only after additional material was collected, did WOOD-MASON (1875: 132) write that those specimens "cannot be placed in no existing family of crustaceans, recent or fossil, except perhaps the Eryonidae, the structural characters of which are too incompletely known at present to admit of their being included in it", and established the family Polychelidae. However, most authors continued placing the extant genera within the Eryonidae. The Eryonidae are now considered to be exclusively fossil (BALSS, 1957; GLAESSNER, 1969).

## Key to the genera and species of the family POLYCHELIDAE

1. Frontal margin of carapace without orbital sinus..... *WILLEMOESIA* 4
- Frontal margin of carapace with orbital sinus ..... 2
2. Carapace ovate; postorbital and postcervical carinae swollen; fifth pereopodal dactyl simple in both sexes ..... *CARDUS* gen. nov. (including one species: *C. crucifer*)
- Carapace ovate or subrectangular; postorbital and postcervical carinae well-defined or obsolescent, never swollen; dactyl of P5 simple or subchelate in male, chelate in female...  
..... 3
3. Epipod of third maxilliped longer than ischium; basal antennular segment proximally quadrate, lamellar ..... *PENTACHELES* 7
- Epipod of third maxilliped half as long as ischium, basal antennular segment squat .....  
..... *HOMERYON* gen. nov. 29
- Epipod of third maxilliped rudimentary; basal antennular segment proximally rounded .....  
..... *POLYCHELES* 11
4. Sixth abdominal tergite sculptured ..... 5
- Sixth abdominal tergite nearly smooth ..... 6
5. Lateral margins of carapace posterior to postcervical incision with less than 10 spines; upper margin of chela with 2 files of spines ..... *W. inornata*
- Lateral margins of carapace posterior to postcervical incision with more than 20 spines; upper margin of chela with several files of spines ..... *W. leptodactyla*
6. Lateral margins of carapace anterior to postcervical incision with 15-19 spines; abdominal tergites 2-5 with deep submedian grooves; tip of telson rounded ..... *W. forceps*
- Lateral margins of carapace anterior to postcervical incision with 6-10 spines; abdominal tergites smooth, lacking deep submedian grooves; tip of telson acuminate .. *W. pacifica*
7. Internal angle of orbital notch unarmed ..... 8
- Internal angle of orbital notch spinose ..... 9
8. Carapace depressed; abdominal terga, pleura nearly smooth ..... *P. obscurus*
- Carapace convex; abdominal terga, pleura set with conic tubercles ..... *P. gibbus*
9. Lateral margins of carapace posterior to postcervical incision with 14-15 spines .....  
..... *P. laevis*
- Lateral margins of carapace posterior to postcervical incision with more than 25 spines ...  
..... 10
10. Carapace subrectangular, densely spinulose; external orbital margin pectinate .....  
..... *P. snyderi*
- Carapace ovate, sparsely spinose; external orbital margin with 0-3 spines .... *P. validus*
11. One rostral spine ..... 12
- Two rostral spines ..... 13
12. Anterior pleuron ovate; inferior surface of uropodal exopod bicarinate ..... *P. typhlops*
- Anterior pleuron rounded; inferior surface of uropodal exopod tricarinate .. *P. perarmatus*
13. Antero-external margin of basal antennular segment unispinose ..... 14
- Antero-external margin of basal antennular segment bispinose ..... 15

14. Carina of fifth abdominal segment with antrorse spine; carapace between branchial and median postcervical carinae spinose ..... *P. phosphorus*  
 — Carina of fifth abdominal segment unarmed; carapace between branchial and median postcervical carinae unarmed ..... *P. politus* sp. nov.
15. Frontal submarginal tooth prominent, longer than separate rostral spines ..... 16  
 — Frontal submarginal tooth shorter than rostrum, or rostrum bifid ..... 17
16. Gastro-orbital region bispinose; median postrostral and postcervical carinae irregularly granulate; second pleuron ovate; upper margin of first chela prominently spinulose .....  
 ..... *P. baccatus*  
 — Gastro-orbital region quadrispinose; median postrostral and postcervical carinae set with antrorse tubercles; second pleuron anteriorly triangulate; upper margin of first chela granulose ..... *P. coccifer* sp. nov.
17. Internal angle of orbital sinus unarmed ..... 18  
 — Internal angle of orbital sinus spinose ..... 19
18. Antrorse spine on fifth abdominal tergite large, overhanging anterior margin of fourth tergite ..... *P. ceratus*  
 — Antrorse spine on fifth abdominal tergite not as above ..... *P. helleri*
19. Median carina on abdominal tergites 2-5 bicuspid, anteriorly spinose; gastro-orbital region quadrispinose anteriorly, cluster of 5-6 spines posteriorly ..... *P. suhmi*  
 — Median carina on abdominal tergites 2-5 not cuspidate; spinulation of gastro-orbital region otherwise ..... 20
20. Frontal margin with several spinules on either side of rostral spines ..... *P. enthrix*  
 — Frontal margin with single spine on internal angle of orbital sinus ..... 21
21. Cheliped carpus one third as long as merus ..... *P. tanneri*  
 — Cheliped carpus half as long as merus ..... 22
22. Branchial groove with a distal spine ..... 23  
 — Branchial groove unarmed ..... 25
23. Carapace between branchial and median postcervical carinae unarmed posteriorly; median carina on fifth abdominal tergite anteriorly bulbous ..... *P. pacificus*  
 — Carapace between branchial and median postcervical carinae posteriorly spinose; median carina on third abdominal tergite bearing long antrorse spine; fourth and fifth abdominal tergites unarmed ..... *P. trispinosus*  
 — Carapace between branchial and median postcervical carinae posteriorly spinose; median carina on fifth abdominal tergite bearing antrorse spine ..... 24
24. Antrorse spine on third abdominal tergite largest; lyre-shaped carina on sixth abdominal tergite prominently denticulate; basal tubercle on telson salient ..... *P. nanus*  
 — Antrorse spine on fifth abdominal tergite largest; lyre-shaped carina on sixth abdominal tergite rounded; basal tubercle on telson blunt ..... *P. evexus* sp. nov.
25. Median carina of fifth abdominal tergite with antrorse spine ..... 26  
 — Median carina of fifth abdominal tergite without antrorse spine ..... 27
26. Sixth abdominal tergite bearing lyre-shaped, denticulate carina mesially; lateral margins of carapace posterior to postcervical incision with 8-10 spines ..... *P. talismani*  
 — Sixth abdominal tergite bearing parallel rounded carinae, confluent anteriorly and posteriorly; lateral margins of carapace posterior to postcervical incision with 6-7 spines ..  
 ..... *P. sculptus*

27. Posterior margin of cervical groove with single antrorse spine midway between median postcervical and branchial carinae; frontal submarginal tooth prominent, visible in dorsal view; second pleuron anteriorly triangulate ..... *P. aculeatus* sp. nov.  
 — Posterior margin of cervical groove with 3 or 4 antrorse spines midway between median postcervical and branchial carinae; frontal submarginal tooth small; second pleuron ovate..  
 ..... 28
28. Lateral margins of carapace posterior to postcervical incision with 7 spines; submedian grooves on abdominal tergites marked; lyre-shaped carina on sixth tergite prominent .....  
 ..... *P. auriculatus*  
 — Lateral margins of carapace posterior to postcervical incision with 10-14 spines; submedian grooves on abdominal terga obsolescent; lyre-shaped carina on sixth tergite obsolescent ..... *P. surdus* sp. nov.
29. Lateral margins of carapace posterior to postcervical incision cristate, serrulate; abdominal carina blunt; second pleuron cordiform; uropods smooth ..... *H. asper*  
 — Lateral margins of carapace posterior to postcervical incision rounded, bearing rows of antrorse spinules; abdominal carina bicuspid; second pleuron reniform; uropods granulate .  
 ..... *H. armarium* sp. nov.

Genus *CARDUS* nov.

TYPE SPECIES. — *Deidamia crucifer* Thomson, 1873. Gender masculine.

DIAGNOSIS. — Carapace dorsoventrally flattened, ovate. Anterolateral angle of carapace produced, spiniform. Lateral margins well defined, spinose; cervical and postcervical incisions markedly dividing margin into three parts. Single rostral spine. Orbital sinus reduced, vermicular process of eyestalk filling orbit.

Cervical groove marked, arcuate, laterally bifurcate. Median postrostral and postcervical carinae well defined, swollen, granulate. Postorbital and branchial carinae swollen, well defined, granulate.

Abdomen narrow, laterally depressed. First abdominal tergite narrow, pleuron abbreviated. Abdominal tergites 2-5 sculptured, medially binodal; sixth tergite medially bituberculate. Abdominal pleura bearing granulate basal protuberance; second and third pleura lingulate, fourth pleuron triangulate, fifth acuminate. Abdominal sternites with median knob. Telson lanceolate, with a basal median tubercle and two submedian carinae. Uropodal exopod lamellar, oar-shaped; endopod lanceolate with a basal denticle on interior margin.

Mesial margin of basal antennular segment spinose, upcurved, anteriorly produced, not reaching base of peduncle; anterolateral angle spinose. Antero-internal angle of second, third antennular segments prominently spiniform. Outer antennular flagellum short, inner flagellum as long as antennal flagellum. Renal process well developed, tubular, fitting into hollow on underside of basal antennular segment. Antennal scaphocerite short, lanceolate, extending beyond second peduncular segment.

Buccal opening subquadrate. Mandible concave, cutting edge with triangular teeth of uneven size; mandibular palp biarticulate. Maxillula with two incurved lobes, spiniform setae distally on anterior lobe. Maxilla with two slender lobes, internal lobe half as long as lateral; large scaphognathite. First maxilliped endopod slender, exopodal lobe membraneous, reniform, extending further back than scaphognathite; exopod anteriorly divided into two lobes enclosing efferent passage. Second and third maxillipeds, slender, pediform; basal segment of third maxilliped bearing long epipod; dactyl as long as both preceding segments.

Pereiopods 1-4 chelate, P5 simple in both sexes. P1 larger, more robust than P2-5; pereiopods successively shorter posteriorly. Fingers of first, second chelipeds crossing, their inner margin furnished with row of overlapping cornute platlets, forming serrate edge. Fingers of third, fourth pereiopodal chelae slightly upcurved, their inner margins simple. First male pleopod spatuliform, spinulose swelling distally on inner margin, spinules

distally on mesial margin, distal margin folded internally. Pleopods 2-6 biramous, with rod-like appendix interna, second pair in male with appendix masculina.

ETYMOLOGY. — From the Latin, *carduus* (= thistle), referring to the spinose, thistle-like carapace.

REMARKS. — *Cardus* is distinguished from the other polychelid genera in having the fifth pereopodal dactyl simple in both sexes. It is further distinguished from *Polycheles* by the antero-internal process of the basal antennular segment not reaching the base of the peduncle; the basal segment of the third maxilliped bearing a long epipod; the fingers of the second and third pereopods slightly upcurved, and their internal margin simple.

WILLEMOES-SUHM (1875c: xxxiii) correctly distinguished *crucifer*: "hat nur Scheeren an vieren und wird vielleicht mit der Zeit ein eigenes Genus bilden müssen".

*Cardus crucifer* (Thomson, 1873)

Fig. 4

*Deidamia crucifer* Thomson 1873: 247, fig. 1. — WOOD-MASON, 1874: 180.

*Willemoesia crucifer* - GROTE, 1873: 485. — HUMBERT, 1874: 130. — WILLEMOES-SUHM, 1875b: 577; 1875c: xxxiii. — THOMSON, 1877: 256, fig. 59. — GIGLIOLI, 1912: 160.

*Willemoesia crucifera* - WILLEMOES-SUHM, 1875a: 52, pl. 12 fig. 10, pl. 33 figs 10-11. — NORMAN, 1879: 174. — PAGENSTECHER, 1879: 37.

*Polycheles crucifer* - WOOD-MASON, 1875: 132. — BATE, 1878a: 277, pl. 13 figs 6-8; 1878b: 484; 1878c: 563. — BOAS, 1882: 352, fig. 12. — MARSHALL, 1888: 267. — FAXON, 1896: 155. — BOUVIER, 1905a: 480; 1905b: 644; 1905c: 3; 1905d: 2; 1917: 36; 1925: 428, figs 5-8, pl. 4 fig. 4, pl. 11 figs 7-14. — DE MAN, 1916: 5 (list). — SCHMITT, 1935: 171, fig. 35. — BERNARD, 1953: 86. — CHACE, 1960: 30, fig. 9b. — FIRTH & PEQUEGNAT, 1971: 42. — PEQUEGNAT *et al.*, 1971: 4. — BEAUBRUN, 1979: 33, fig. 19. — GONZALEZ, 1995: 124. — DAWSON, 1997: 8.

*Pentacheles crucifer* - FILHOL, 1884: 231.

*Polycheles crucifera* - BATE, 1888: 127, fig. 31, pl. 13. — YOUNG, 1900: 440. — RICHARD, 1905: 3. — TÜRKAY, 1976: 27, fig. 5.

*Polychelles crucifer* - RODRIGUEZ, 1980: 194 [erroneous spelling].

MATERIAL EXAMINED. — **Ibero-Moroccan Gulf.** BALGIM: stn CP 10, 36°45'N, 9°32'W, 1582-1602 m, 29.05.1984: 1 ♂ 15.4 mm (MNHN-Pa 1675). — Stn CP 69, 35°11'N, 7°50'W, 1978-2077 m, 5.06.1984: 2 juvs (MNHN-Pa 1676). — Stn CP 99, 34°28'N, 7°43'W, 1848-1892 m, 9.06.1984: 3 juvs (MNHN-Pa 1677).

**Canary Is.** CANCAP 2: stn 2.131, 27°40'N, 18°10'W, 1200-1800 m, 8.09.1977: 3 juvs (RMNH).

CANCAP 4: stn 4.056, 28°47'N, 13°22'W, 1306-1345 m, 18.05.1980: 1 ♂ 17.0 mm (RMNH). — Stn 4.057, 28°27'N, 13°24'W, 1300-1335 m, 19.05.1980: 1 ov. ♀ 22.9 mm (RMNH).

**United States (East coast).** "Gerda" (id. L.B. HOLTHUIS): stn 223, Florida Str., 24°18'N, 80°29'W, 897-915 m, 23.01.1964: 1 juv. (USNM 136603). — Stn 296, Florida Str., 25°36'N, 79°23'W, 715 m, 5.04.1964: 1 ♀ 21.3 mm (USNM 136604). — Stn 266, Florida Str., 24°12'N, 81°17'W, 679-709 m, 15.09.1964: 1 ♀ 22.6 mm (RMNH 22396). — Stn 374, Florida Str., 23°50'N, 81°37'W, 1208-1241 m, 17.09.1964: 2 ♀ 20.5, 21.4 mm; 1 juv. (USNM 136605).

**Bahama Is.** "Albatross": stn 2629, 23°48'07"N, 75°10'07"W, 2104 m, 8.03.1886, id. M.J. RATHBUN: 2 juvs (USNM 11422). — Stn 2654, 27°57'05"N, 77°27'05"W, 1188 m, 2.05.1888, id. M.J. RATHBUN: 2 juvs (USNM 11460).

"Iselin": stn 40, 23°46'N, 76°58'W, 1317 m, 22.02.1972, id. F.M. BAYER: 1 ♂ 17.6 mm; 1 juv. (USNM 154313). — Stn 51, 23°37'N, 76°49'W, 1290 m, 25.02.1972: 1 ♀ 18.8 mm; 2 juvs (RMNH). — Stn 156, 23°43'N, 76°50'N, 1334 m, 5.02.1974: 1 ♂ 14.8 mm; 2 ♀ 18.3, 25.6 mm (RMNH). — Stn 163, 23°32.5'N, 77°09.9'W, 1342 m, 6.02.1974: 1 ♀ 16.1 mm (RMNH). — Stn 301, 23°51.95'N, 76°52'W, 1304 m, 3.04.1975: 1 ♂ 16.9 mm; 2 ♀ 21.5, 25.7 mm; 1 juv. (RMNH). — Stn 302, 24°11'N, 77°23.2'W, 1452 m, 3.04.1975: 1 juv. (RMNH). — Stn 316, 24°24'N, 76°26.75'W, 1567 m, 7.04.1975: 2 ♀ 15.8, 19.5 mm (RMNH). — Stn 321, 23°39.25'N, 76°46.24'W, 1328 m, 8.04.1975, id. F.M. BAYER: 2 ♀ 19.3, 26.6 mm; 1 juv. (USNM 154320). — Stn 322, 23°40.5'N, 77°03.5'W, 1362 m, 8.04.1975: 1 ♀ 19.3 mm (RMNH).

"Pillsbury": stn 634, 23°33'N, 82°47'W, 1638-1757 m, 25.03.1968: 5 ♀ 13.3-24.8 mm (RMNH).

**West Indies.** "Challenger": stn 23, Leeward Is, Sombrero I., 18°24'N, 63°28'W, 810 m, 15.03.1873: 1 ♂ 19.0 mm (NHM 1888.22).

**Caribbean Sea.** "Albatross": stn 2117, Aves Ridge, 15°24'40"N, 63°31'30"W, 1229 m, 27.01.1884: 1 ♂ 15.0 mm; 1 ♀ 20.3 mm, 2 juvs (USNM).

"Oregon": stn 1907, 12°25'N, 82°23'W, 720-765 m, 11.09.1957: 1 ♀ 27.5 mm (USNM 251942). — Stn 3561, 16°35'N, 80°04'W, 720 m, 18.05.1962: 1 ♂ 16.6 mm; 2 ♀ 21.8, 24.5 mm (USNM 244083). — Stn 4566, 23°05'N,

86°09'W, 1260 m, 6.12.1963: 1 ♀ 22.1 mm; 2 juvs (USNM 273140). — Stn 5753, 29°29'N, 79°53'W, 675 m, 19.11.1965: 1 ♀ 26.9 mm (USNM 273140). — Stn 5930, 15°38'N, 61°07'W, 796 m, 5.03.1966: 1 ♀ 22.7 mm (USNM 273140). — Stn 6697, 17°47'N, 63°09'W, 792-828 m, 18.05.1967: 2 ♀ 27.0 28.0 mm (USNM 273140). — Stn 6703, 16°53'N, 61°53'W, 738-828 m, 21.05.1967: 1 ♀ 29.6 mm (USNM 273140). — Stn 6705, 17°14'N, 63°01'W, 693-765 m, 22.05.1967: 2 ov. ♀ 28.5, 29.7 mm (USNM 273140).

"Oregon II": stn 10825, Martinique, 15°42'N, 61°08'W, 630 m, 1.12.1969: 1 ♀ 25.7 mm (USNM 283646). — Stn 10831, Saba I., 17°38'N, 63°48'W, 641 m, 3.12.1969: 1 ♀ 24.6 mm (USNM 283650). — Stn 10835, St. Martin I., 18°28'N, 63°23'W, 671 m, 6.12.1969: 1 ♀ 27.4 mm (USNM 283649).

"Gilliss": stn 31, 16°58'N, 79°28.1'N, 1116-1088 m, 28.07.1972: 1 ♂ 17.5 mm; 3 ♀ 19.8-21.2 mm; 6 juvs (RMNH).

Gulf of Mexico. "Oregon": stn 3516, 29°33'N, 88°38'W, 720 m, 18.03.1962: 3 ♂ 18.1-18.4 mm; 5 ♀ 16.1-26.9 mm; 4 juvs (USNM). — Stn 4570, 23°11'N, 86°28'W, 900 m, 7.12.1963: 1 ♀ 20.8 mm (USNM 260368). — Stn 4815, 25°05'N, 96°27'W, 720 m, 12.04.1964: 1 ♀ 21.7 mm (USNM 260368).

TYPES. — The male (19.0 mm cl) (NHM 1882.22) collected by the "Challenger" stn 23 off Sombrero I. (18°24'N, 63°28'W, 810 m), is the holotype.

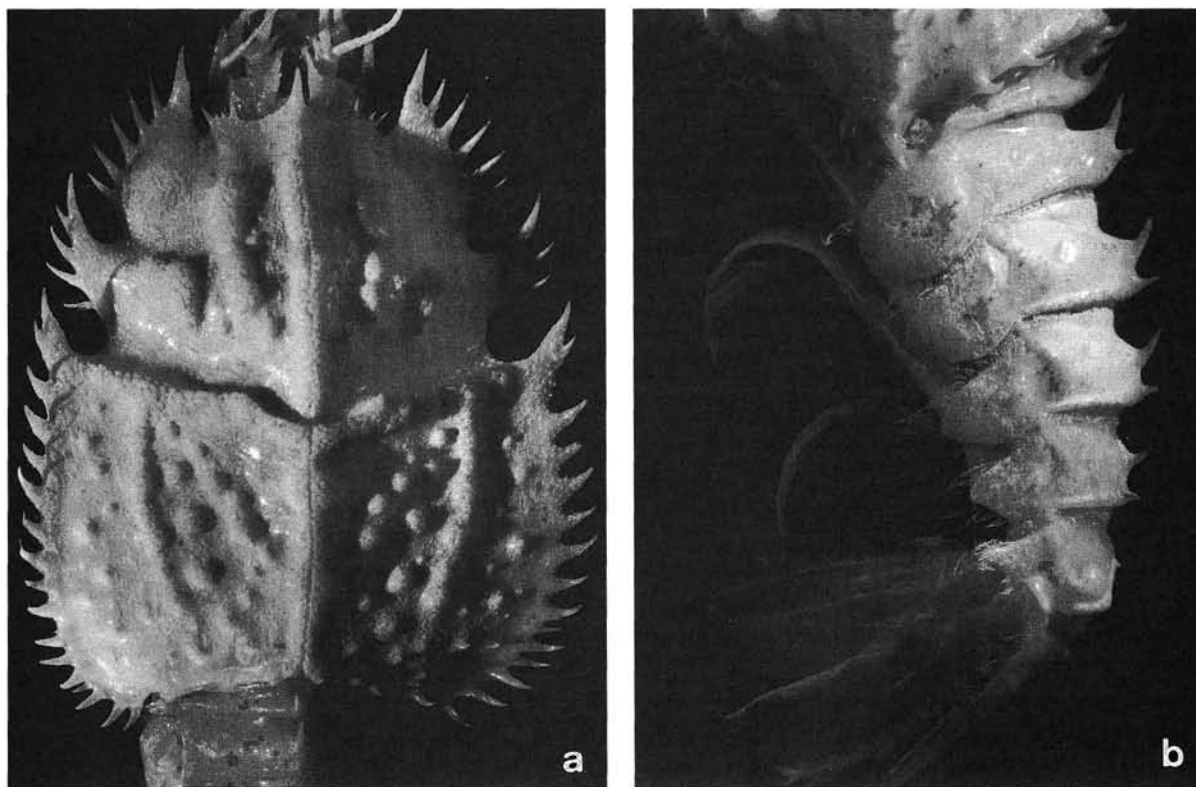


FIG. 4. — *Cardus crucifer* (Thomson, 1873), ♀ 27.0 mm, Caribbean Sea, "Oregon" stn 6697, 17°47'N, 6°39'W, 792-828 m (USNM 273140): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

DESCRIPTION. — Carapace ovate, granular, setose. Dorsal surface of carapace bearing swollen carinae. Two pairs of granulate submedian carinae anterior to cervical groove, lateral pair short; granulated tubercles posterior to cervical groove, some along branchial carina, some scattered. Posterior margin of cervical groove raised. Anterior margin of carapace nearly straight; single rostral spine prominent, upcurved. Internal angle of orbital sinus prominently bispinose, external angle unarmed. Eyestalk curved distad under anterolateral angle of carapace; vermicular appendage projects dorsally into orbital sinus, with basal spine directed forward. Basal antennular segment squat, produced anteriorly to a sharp point; mesial margin spinose, two distalmost spines largest; single spine on antero-external angle. Lateral margins of carapace armed with long, slender, upcurved spines; spine

formula 6,7:5:17; anterior spine in each section most prominent. Posterior margin of carapace with three pairs of antrorse spines, lateral pair largest.

Abdominal tergites granulate, medially carinate. Anterior tergite bearing antrorse spine. Tergites 2-5 with bispinose median carina, anterior spine antrorse, submedian shallow oblique grooves. Carina on sixth tergum blunt. Pleura bearing granulate tubercle mesially, scattered granules posteriorly. Telson distally with two obtuse submedian carinae.

Merus of P1 with margins smooth, lacking subterminal spine. Carpus triangular, very short, small subterminal spines on upper and lower margins. Chela swollen, upper margin irregularly spinose, distalmost spine largest.

*Color.* — Described by WILLEMOES-SUHM (1875a: 53) as "very beautiful", "a fine red, while the hairs bordering it were yellowish".

BOUVIER's (1925: 432) description relies on a watercolor sketch taken aboard the "*Talisman*": "un ton jaunâtre clair un peu lavé de rose; cette dernière devient plus forte en dehors de la ligne médiane sur la région gastrique; elle est également assez nette sur la ligne médiane de l'abdomen. Les pattes antérieures sont d'un gris noirâtre clair également un peu lavé de rose".

DISTRIBUTION. — Eastern Atlantic: Portugal, Morocco, Canary Is, Azores; Western Atlantic: Florida Str., Bahama Is, Gulf of Mexico, West Indies, Caribbean Sea; 549-2195 m.

#### Genus *HOMERYON* nov.

TYPE SPECIES. — *Homeryon armarium* sp. nov. Gender masculine.

DIAGNOSIS. — Carapace dorsoventrally flattened, ovate. Anterolateral angle of carapace produced, spiniform. Lateral margin divided into three parts by cervical and postcervical incisions. Two rostral spines. Orbital sinus slit-like. Eyestalk filling orbit, vermicular tip distad, beneath anterolateral angle of carapace.

Cervical groove marked, arcuate, laterally bifurcate. Postrostral and postcervical median carinae well defined, granulate, spinulate. Branchial carina well defined.

Abdomen broad, depressed. First abdominal tergite narrow, pleuron abbreviated. Abdominal tergites 2-5 sculptured, medially carinate; sixth tergite medially tuberculate. Abdominal pleura 2-5 rounded, successively diminishing in size posteriorly; sixth pleuron subquadrate. Abdominal sternites with median knob. Telson lanceolate, with short median basal ridge, two submedian carinae. Uropodal exopod lamellar, rounded; endopod oar-shaped, with basal lappet on interior margin.

Mesial margin of basal antennular segment anteriorly produced, upcurved, spinose, shorter than peduncle; segment proximally squat, anterolateral angle spinose. Outer antennular flagellum short, inner flagellum as long as antennal flagellum. Renal process well developed, tubular, fitting into hollow on underside of basal antennular segment. Antennal scaphocerite lingulate, reaching to base of flagellum.

Buccal opening subquadrate, lateral margins prominent, keel-like. Mandible concave, cutting edge with triangular teeth of uneven size; mandibular palp biarticulate. Maxillula with two incurved lobes, distally setose. Maxilla with two slender lobes, internal lobe half as long as lateral; large scaphognathite. First maxilliped endopod slender, exopodal lobe membranous, reniform, extending further back than scaphognathite, exopod anteriorly divided into two lobes enclosing efferent passage. Second and third maxillipeds slender, pediform; epipod on basal segment of third maxilliped half as long as ischium; dactyl slightly longer than preceding segment.

Pereiopods 1-4 chelate; P5 chelate in female, subchelate in male. P1 robust; pereiopods successively shorter posteriorly. Fingers of P1-2 crossing, their inner margin furnished with row of overlapping cornute platelets, forming serrate edge. Fingers of chelae of P3-5 markedly upcurved.

ETYMOLOGY. — Named for Homer, the blind poet, and *eryon* - the first name ever used for the fossil kin of the polychelids.



REMARKS. — *Homeryon* gen. nov. differs from the other polychelid genera in having epipod on basal segment of third maxilliped half as long as ischium; basal antennular segment squat; lateral margins of buccal opening prominent, keel-like; fingers of pereopodal chelae 3-5 upcurved.

*Homeryon armarium* sp. nov.

Fig. 5

*Polycheles* sp. - BABA, 1986: 157, 283, pl. 108.

MATERIAL EXAMINED. — **Kyushu-Palau Ridge**, 700 m, 18.12.1979, coll. M. TORIYAMA: 1 ♀ 58.1 mm (NFU 530-2-0740); 1 ♀ 56.0 mm (NFU 530-2-1489). — 28°04'N, 134°20'E, 520 m, 20.02.1978, coll. O. TABATA: 2 ♀ 61.4, 61.1 mm (NFU 530-2-0975).

**Japan** (?). Coll. T. SAKAI: 1 ♂ 37.7 mm (SMF 24649).

TYPES. — The female (58.1 mm cl) (NFU 530-2-0740) collected on the Kyushu-Palau Ridge, is the holotype; the other specimens (NFU 530-2-0975, NFU 530-2-1-489) are paratypes.

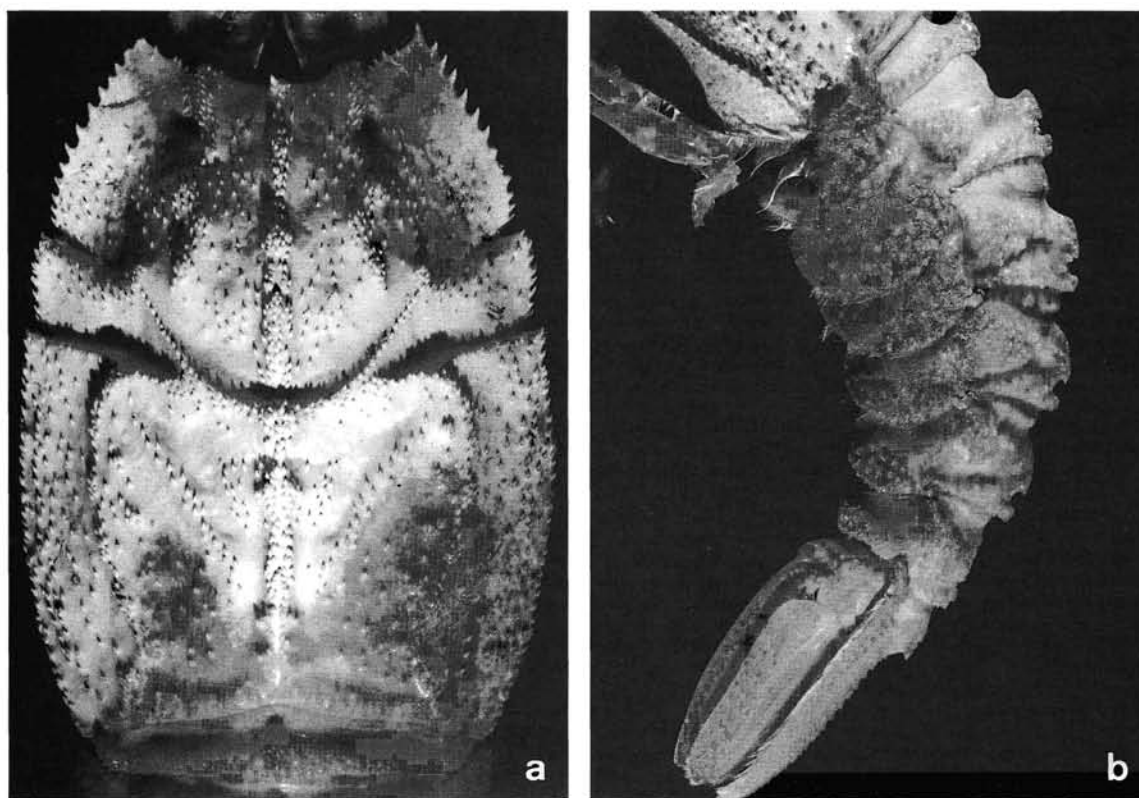


FIG. 5. — *Homeryon armarium* sp. nov., ♀ 58.1 mm, holotype, Kyushu-Palau Ridge, 700 m (NFU 530-2-0740): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

DESCRIPTION. — Dorsal surface of carapace setose, covered with robust, antrorse spinules. Frontal margin concave. Internal angle of orbital sinus triangulate, dense with antrorse spinules. Outer orbital margin pectinate. Eyestalk bearing vermicular process, pointing distad. Antennular segment bearing spinose tubercle on antero-external angle. Lateral margins of carapace anterior to postcervical incision cristate, bearing 11-14 spines. Posterolateral angle of cervical incision set with robust, antrorse spinules. Lateral margins of carapace posterior to postcervical incision rounded, with several irregular rows of robust, antrorse spinules. Median postrostral and postcervical cari-

nae swollen, thickly set with antrorse spinules; spinules blunter, more numerous behind cervical groove. Postorbital carina swollen, thickly set with antrorse spinules. Cervical carina set with row of spinules, terminating in spinose tubercle. Posterior margin of cervical groove minutely spinulose. Branchial carina sinuous, set with clumps of antrorse spinules. Posterior margin of branchial groove spinose. Posterior margin of carapace smooth.

Abdominal tergites 1-5 sculptured, prominently tuberculate, mesially carinate. Tergites 2-5 with deep transversely oblique grooves laterally. Carinae 2-5 bicuspid, anterior cusp larger, prominently granulose. Sixth tergite bearing obsolescent granules mesially and laterally. Second pleuron reniform, granulate, with short groove mesially; pleura 3-4 posteriorly granulate, with short rib mesially. Basal tubercle on telson granulate, submedian carinae prominently tuberculate, lateral margins thickly set with acuminate tubercles. Uropodal exopod and endopod thickly set with spinules laterally.

Merus of P1 serrulate on lower margin and with a subterminal spine on upper margin; carpus of P1  $3/4$  as long as merus, spinose on upper margin; chela of P1 spinose on upper and lower margins. Merus of P2 with several rows of spines on lower margin and subterminal spines on upper margin; carpus and chela of P2 spinose on upper margin.

*Color.* — Uniformly orange-red. Color plate in BABA (1986, fig. 108).

*ETYMOLOGY.* — From Latin, *armarium* (= chest, box) refers to the stocky, robust carapace of the species.

*REMARKS.* — "These specimens are not referred to any of the species in the literature now available to me. The granulate body, short basal segment of antennule and dactyli of 3rd and 4th pereopods curving outward seems to be unique to this species" (BABA, 1986: 283). Indeed, the slit-like orbital sinus, squat basal antennular segment and the curved dactyli of 3-4 pereopods are among the features that distinguish *Homeryon* gen. nov. from the other polychelid genera.

*DISTRIBUTION.* — Kyushu-Palau Ridge, Japan; 520-700 m.

*Homeryon asper* (Rathbun, 1906)

Fig. 6

*Polycheles asper* Rathbun, 1906: 899; pl. 24 fig. 11. — DE MAN, 1916: 5 (list). — BOUVIER, 1917: 35. — FIRTH & PEQUEGNAT, 1971: 41. — DAWSON, 1997: 7.

*MATERIAL EXAMINED.* — **Hawaiian Is.** "Albatross", stn 4174, Niihau I., 1323-1557 m, 1902: 1 ♀ 32.0 mm (USNM 30323).

*TYPE.* — The female (32.0 mm cl) (USNM 30323) collected by the "Albatross", stn 4174, off Niihau I., 1323-1557 m, is the holotype of *Polycheles asper* Rathbun, 1906.

*DESCRIPTION.* — Dorsal surface of carapace densely covered with slender antrorse spinules. Frontal margin slightly concave. Internal angle of orbital sinus bearing slender spine. Outer orbital margin pectinate. Eyestalk bearing vermicular process, pointing distad. Antennular segment bearing three closely set spines on antero-external angle. Spine formula of lateral margins of carapace 14-15:8-10:28-29. Median postrostral and postcervical carinae bearing irregular double row of antrorse spinules, blunter behind cervical groove. Gastro-orbital region without carina. Branchial carina sinuous, minutely spinulose. Diagonal groove anteriorly between median postcervical and branchial carinae. Posterior margin of cervical groove minutely spinulose. Posterior margin of carapace smooth.

Abdominal tergites sculptured, granulate. Tergites 2-5 with deep, transversely oblique grooves on each side of blunt median carina. Sixth tergite bearing obsolescent, beaded, lyre-shaped carina mesially, low granules laterally. Second pleuron cordiform, with short groove mesially; pleura 3-4 with short rib mesially. Telson margins serrulate, uropods smooth.

*REMARKS.* — RATHBUN (1906: 899) had not recognized that the single, juvenile *asper* differs much from other polychelid species: "This species has the form of *P. granulatus* Faxon, but the dorsal surface is much rougher, the

carapace more convex, its side margins more finely and obscurely cut, abdominal carinae, except the seventh, nonprojecting, antennal scale rounded at tip instead of pointed".

*H. asper* differs from its congener in having blunt abdominal carinae rather than bicuspid, the second pleuron cordiform rather than reniform, smooth uropods rather than granulate, and the lateral margins of carapace posterior to postcervical incision cristate and serrulate rather than rounded, bearing several irregular rows of robust, antrorse spinules.

DISTRIBUTION. — Known only from the type specimen, collected in Hawaii, between 1323-1557 m.

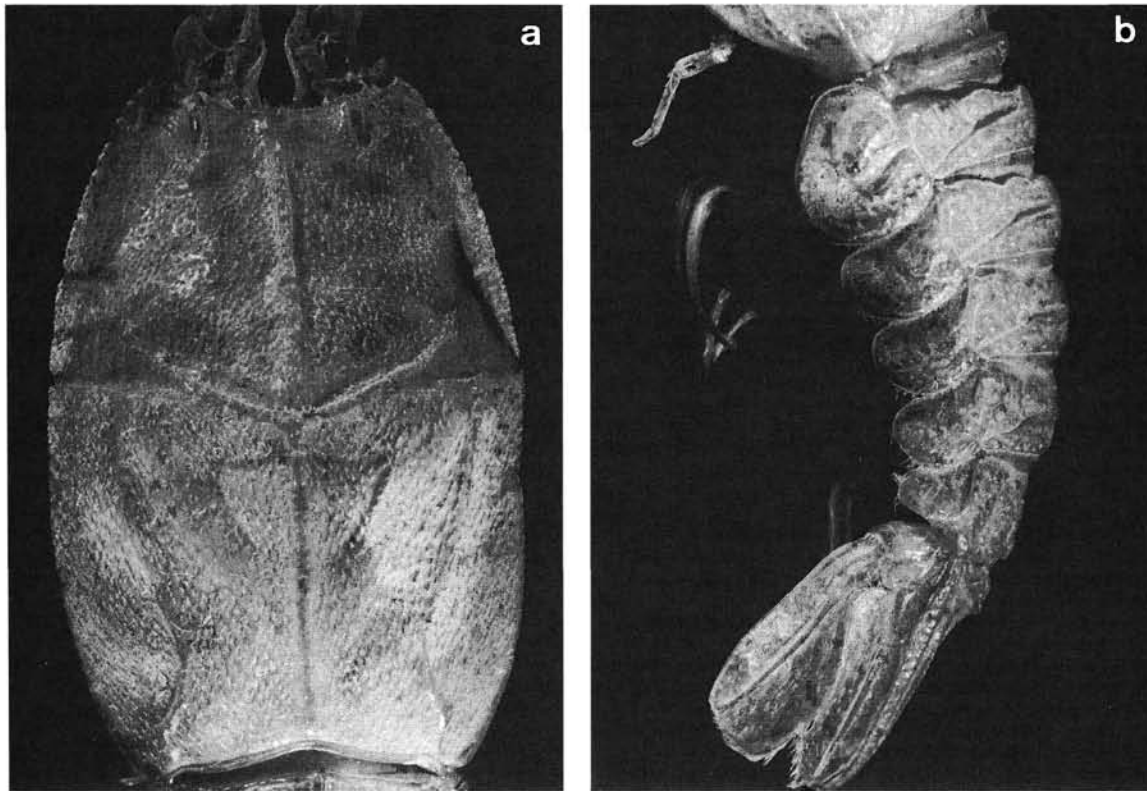


FIG. 6. — *Homeryon asper* (Rathbun, 1906), ♀ 32.0 mm, holotype, Hawaii, "Albatross" stn 4174, 1323-1557 m (USNM 30323): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

#### Genus *PENTACHELES* Bate, 1878

*Pentacheles* Bate, 1878a: 276.

TYPE SPECIES — *Pentacheles laevis* Bate, 1878, designated by FOWLER, 1912 (*Annual Report of the New Jersey State Museum* for year 1911: 569). Gender masculine.

DIAGNOSIS. — Carapace dorsoventrally flattened, subrectangular or ovate. Anterolateral angle of carapace produced, spiniform. Lateral margins well defined, spinose; cervical and postcervical incisions markedly dividing margin into three parts. Front concave, bearing two rostral spines. Orbital sinus well defined; eyestalk filling orbit, pointing distad.

Cervical groove marked, arcuate, laterally bifurcate. Postrostral and postcervical carinae well defined, granulate or spinose. Postorbital carina obsolescent, branchial carina obsolescent or spinulose.

Abdomen narrow, laterally depressed. First abdominal tergite narrow, pleura fused, abbreviated. Abdominal tergites 2-5 obliquely grooved, medially carinate; carinae blunt or anteriorly spinose; sixth tergite smooth. Second abdominal pleuron larger, clypeiform, smooth; pleura 3-4 cordiform, successively diminishing in size posteriorly; fifth pleuron triangulate. Abdominal sternites with median knob. Telson lanceolate, with median basal tubercle, two submedian carinae. Uropodal exopod lamellar, rounded, grooved; endopod rounded, grooved, basal lappet on interior margin.

Basal antennular segment proximally quadrate, lamellar; mesial margin granulate or spinose, upcurved, anteriorly produced, reaching base of peduncle. Outer antennular flagellum short, inner flagellum as long as antennal flagellum. Renal process well developed, tubular, fitting into hollow on underside of basal antennular segment. Antennal scaphocerite lanceolate, not extending beyond peduncle.

Buccal opening subquadrate. Mandible concave, cutting edge with triangular teeth of uneven size; mandibular palp biarticulate. Maxillula with two incurved lobes, spiniform setae distally on anterior lobe. Maxilla with two slender lobes, internal lobe half as long as lateral; large scaphognathite. First maxilliped endopod slender, exopodal lobe membranous, reniform, extending further back than scaphognathite, exopod anteriorly divided into two lobes enclosing efferent passage. Second and third maxillipeds, slender, pediform; third maxilliped epipod longer than ischium; dactyl as long as propodus.

Pereiopods 1-4 chelate, P5 chelate in female, subchelate in male. P1 larger, more robust than P2-5; pereiopods successively shorter posteriorly. Fingers of first and second chelipeds crossing, their inner margin furnished with row of overlapping cornute platelets, forming serrate edge. Fingers of chelae of P3-4 slightly upcurved. First male pleopod spatuliform, spinulose, swelling distally on inner margin, spinules distally on mesial margin, distal margin folded internally. P2-6 biramose, with rod-like appendix interna; second pair in male with appendix masculina.

ETYMOLOGY. — From Greek, *pente* (= five) and *chele* (= claw) referring to the chelae of all five pereiopods.

REMARKS. — BATE established *Pentacheles* for species where "All the pereiopoda are more or less perfectly chelate in both sexes" (BATE, 1888: 143). However, all species (*agassizii*, *euthrix*, *gracilis*, *laevis*, *obscura*, *sculptus*, *validus*) put into *Pentacheles* by BATE (1888) have males with fifth pereiopod simple or subchelate. ALCOCK (1901b: 165) characterized *Pentacheles* as having "epipodite of the external maxillipeds .....of fair size". This does not correspond with *Pentacheles* as described by BATE (1878a), and further, ALCOCK, mistakenly included *hextii*, a junior synonym of *Polycheles typhlops*, in his *Pentacheles*. KEMP & SEWELL (1912), SELBIE (1914), DE MAN (1916) rejected *Pentacheles* and it fell into disuse early in this century.

*Pentacheles* is distinguished from the closely related *Polycheles* in having third maxilliped epipod longer than ischium, proximally quadrate basal antennular segment, whereas *Polycheles* has rudimentary epipod and rounded basal antennular segment.

#### *Pentacheles gibbus* Alcock, 1894

*Pentacheles* sp. - WOOD-MASON, 1891: 19.

*Pentacheles gibba* Alcock, 1894: 234. — WOOD-MASON & ALCOCK, 1894, pl. 8 fig. 4. — ANDERSON, 1896: 98.

*Polycheles gibba* - ALCOCK, 1899: 33.

*Pentacheles gibbus* - ALCOCK, 1901b: 173.

*Polycheles gibbus* - DE MAN, 1916: 5. — BERNARD, 1953: 86. — HOLTHUIS, 1984: 4. — FIRTH & PEQUEGNAT, 1971: 46.

— DAWSON, 1997: 10.

MATERIAL EXAMINED. — **Andaman Sea.** "Investigator": stn 114, 13°21'N, 93°27'E, 1687 m, 13.11.1890: 1 juv. (IM 6799/10); 1 juv. (IM 6800/10).

**Arabian Sea.** "Investigator": stn 192, 15°11'N, 72°28'45"E, 1668-1703 m, 14.01.1895: 1 ♂ 62.0 mm (IM 46/10); 1 juv. 26.0 mm (IM 792/10).

TYPE. — The juvenile (IM 6799/10) collected by the "Investigator", stn 114, in the Andaman Sea is the holotype, the other juvenile in the sample is a paratype.

DESCRIPTION. — Carapace convex, gibbous; lateral margins convergent anteriorly and posteriorly. Dorsal surface of carapace thickly tomentose, minutely granulose. Anterior margin of carapace sinuous, bearing small, bifid rostral spine. Internal and external angles of orbital sinus unarmed. Eystalk with small spine directed upward. Basal antennular segment foliaceous; mesial margin raised above rostrum, irregularly granulate; single spine on antero-external angle. Spine formula of lateral margins of carapace 5-6:3:16-19; spines diminish considerably in size posteriorly, posteriormost no more than granules. Median postrostral carina irregularly granulate, median postcervical carina with two rows of antrorse spinules. Gastro-orbital region unarmed. Branchial carina sinuous, obsolescent. Posterior margin of carapace smooth.

Abdominal tergites set with prominent conic granules, medially carinate. Carinae on tergites 2-5 bicuspid. Sixth tergite set with prominent conic granules on each side of short crest. Tergites 2-5 bearing well-defined, transversely oblique submedian grooves. Pleura set with prominent conic granules. Second pleuron anteriorly produced, ovate. Telson with granulate tubercle medially, two smooth submedian carinae posteriorly, margins minutely spinulate.

First pereopod remarkably short, smooth except for subterminal spines on upper margin of merus, chela and lower margin of carpus. Merus proximally dilated. Carpus 3/4 as long as merus. P5 subchelate in male. Female unknown.

Color. — "bright pink" (ALCOCK, 1894: 235).

REMARKS. — *P. gibbus* is distinguished from the closely related *P. obscurus* in its humped carapace and prominent conic granulation on abdominal terga and pleura.

No photograph is available as the author was prohibited from photographing in the Indian Museum.

DISTRIBUTION. — Andaman Sea, Arabian Sea; 1668-1703 m.

### *Pentacheles laevis* Bate, 1878

Fig. 7

*Pentacheles laevis* Bate, 1878a: 278; 1878b: 484; 1878c: 563; 1888: 144, pl. 15 figs 4c, 5. — FAXON, 1895: 118. — MURRAY, 1897: 388. — DE MAN, 1916: 5 (list). — SUND, 1920: 224. — ESTAMPADOR, 1937: 497; 1959: 43.

*Pentacheles gracilis* Bate, 1878a: 279; 1878b: 484; 1878c: 563; 1888: 146, pl. 16 figs 1-2. — FAXON, 1895: 118. — SUND, 1920: 224. — BERNARD, 1953: 86.

*Polycheles granulatus* Faxon, 1893: 197; 1895: 123, pl. 32 fig. 1, pl. 33 figs 2, 2a. — RATHBUN, 1906: 899, fig. 54. — STEBBING, 1910: 378. — SELBIE, 1914: 23, pl. 3 figs 1-2. — DE MAN, 1916: 5 (list). — BOUVIER, 1917: 45, pl. 2 figs 7-14. — STEPHENSEN, 1923: 67. — BALSS, 1925: 200. — CALMAN, 1925: 18. — MIRANDA & RIVERA, 1933: 17. — LE DANOIS, 1948: 150 (list). — BARNARD, 1950: 569. — BERNARD, 1953: 86. — SQUIRES, 1965: 89, fig. 38; 1966: 2. — ALLEN, 1967: 55. — ZARIQUIEY, 1968: 210. — ZARENKOV, 1969: 81. — FIRTH & PEQUEGNAT, 1971: 47. — THIRIOT, 1974: 344. — TÜRKAY, 1976: 27. — WENNER, 1979: 443. — WENNER & BOESCH, 1979: 111. — BEAUBRUN, 1979: 39, figs 17-18. — KENSLEY, 1981b: 29. — POHLE, 1985: 22. — SQUIRES, 1991: 355, figs 187-188. — LEMAITRE & ALVAREZ-LEON, 1992: 33. — FALCIAI & MINERVINI, 1992: 134. — GONZALEZ, 1995: 126. — GRIFFIN & STODDART, 1995: 240, figs 4-5. — HENDRICKX, 1995: 156. — DAWSON, 1997: 10.

*Pentacheles beaumontii* Alcock, 1894: 236; 1901b: 175. — WOOD-MASON & ALCOCK, 1894, pl. 8 fig. 3.

*Polycheles beaumontii* - FAXON, 1895: 125. — ALCOCK, 1899: 33. — BOUVIER, 1905b: 644; 1905d: 2. — HOLTHUIS, 1984: 4.

*Polycheles dubius* Bouvier, 1905a: 480; 1905c: 4. — RICHARD, 1905: 3; 1907: 322.

*Polycheles eryoniformis* Bouvier, 1905b: 644; 1905d: 2; 1907: 62.

*Polycheles gracilis* - DE MAN, 1916: 5 (list). — BOUVIER, 1917: 35. — FIRTH & PEQUEGNAT, 1971: 46.

*Polycheles laevis* - FIRTH & PEQUEGNAT, 1971: 49. — DAWSON, 1997: 12.

*Polycheles* aff. *gracilis* - MACPHERSON, 1984: 74.

not *Polycheles beaumontii* - STEBBING, 1908: 25; 1910: 377 [= *Polycheles validus* (A. Milne Edwards, 1880)].

MATERIAL EXAMINED. — **Ibero-Moroccan Gulf.** BALGIM: stn CP 98, 34°29'N, 7°42'W, 1721-1773 m, 9.06.1984: 2 juvs (MNHN-Pa 1358).

**Azores.** "Travailleur": 44°04'N, 9°81'W, 1600 m, 12.07.1882: 1 juv. damaged (MNHN-Pa 1138).

"Hirondelle": 39°27'N, 33°29'W, 1557 m, 30.07.1888: 1 ♀ 36.4 mm; 2 juvs (MNHN-Pa 34).

- CANCAP 5: stn 5.005, 37°55'N, 24°46'W, 1650-2050 m, 24.05.1981: 1 juv. (RMNH). — Stn 5.090, 38°09'N, 28°31'W, 1320-1350 m, 2.06.1981: 1 ♂ 35.3 mm; 1 ♀ 37.8 mm; 1 juv. (RMNH).
- Canary Is.** CANCAP 4: stn 4.057, 28°47'N, 13°24'W, 1300-1335 m, 19.05.1980: 1 ♂ 48.0 mm (RMNH). — Stn 4.102, 29°08'N, 13°19'W, 1290 m, 23.05.1980: 1 ♀ 34.6 mm (RMNH).
- Cape Verde Is.** CANCAP 6: stn 6.049, 14°52'N, 24°32'W, 1100-1300 m, 10.06.1982: 2 juvs. (RMNH). — Stn 6.050, 14°53'N, 24°32'W, 1100-1200 m, 10.06.1982: 1 ♂ 54.1 mm (RMNH). — Stn 6.055, 15°46'N, 22°33'W, 950-1040 m, 12-13.06.1982: 2 ♂ 45.8, 37.7 mm (RMNH). — Stn 6.065, 15°58'N, 22°33'W, 950-1040 m, 12-13.06.1982: 2 ♂ 45.8, 37.7 mm (RMNH).
- SE Atlantic. Rio Grande Ridge.** "Prof. Mesyatsev": 12.07.1974, coll. B.N. KOTENEV: 2 ♂ 36.5, 39.8 mm; 1 ov. ♀ 56.0 mm; 1 juv. (ZMMU).
- SE Atlantic. Discovery Seamount.** "Prof. Mesyatsev": stn 154, 760 m, 10.12.1979, coll. M.V. BONDARENKO: 1 ♂ 33.7 mm; 1 juv. (ZMMU).
- United States.** "Gillis": stn 83, 36°41'N, 74°29'W, 1500-1350 m, 9.11.1974: 1 juv. (USNM 314136).
- Bahama Is.** "Gerda": stn 182, 27°55'N, 78°40'W, 860-897 m, 2.07.1963: 1 ♀ 55.4 mm (RMNH 25834).
- Panama.** "Albatross": stn 3380, 4°03'N, 81°31'W, 1645 m, 5.03.1891: 1 ♀ 44.2 mm (MCZ 4578).
- Galapagos Is.** "Albatross": stn 4641, Hood I., 01°35'S, 89°30'W, 1139 m, 7.11.1904: 1 juv. (USNM).
- Nazca Ridge.** "Prof. Mesyatsev": 25°51'S, 84°34'W, 1050 m, 5.09.1983: 1 ♂ 55.2 mm (ZMMU). — Stn 44, 20°44.9'S, 80°52.3'W, 18.09.1983: 1 ♀ 39.3 mm (ZMMU)
- Hawaiian Is.** "Albatross" (id. M.J. RATHBUN as *P. granulatus*): stn 3887, Molokai I., 21°16'30"N, 156°29'55"W, 997-1456 m, 17.04.1902: 1 ♀ 23.7 mm (USNM 30321). — Stn 3989, Kauai I., 22°05'55"N, 159°16'50"W, 900-693 m, 11.06.1902: 1 juv. (USNM 30315). — Stn 4007, btw. Honolulu and Kauai I., 21°50'20"N, 159°31'40"W, 914-1003 m, 17.06.1902: 1 ♀ 23.0 mm (USNM 30319). — Stn 4019, Kauai I., 22°05'15"N, 159°17'W, 990-736 m, 21.06.1902: 1 juv. (USNM 30315). — Stn 4111, Kaiwi Channel, 21°24'40"N, 157°23'55"W, 841-860 m, 24.07.1902: 1 ♂ 50.1 mm; 1 juv. (USNM 30320). — Stn 4138, Oahu, 22°00'N, 159°19'20"W, 857-788 m, 1.8.1902: 2 juvs (USNM 30318).
- Marquesas Is.** Eiao I., MUSORSTOM 9: stn CP 1278, 75°2'S, 140°39'W, 1000 m, 5.09.1997: 2 ♀ 24.6, 37.5 mm (MNHN).
- Wallis & Futuna Is.** MUSORSTOM 7: stn CP 592, 12°32'S, 174°22'W, 730-775 m, 24.05.1992: 1 juv. (MNHN-Pa 1655). — Stn CP 623, 12°34'S, 178°15'W, 1280-1300 m, 28.05.1992: 1 juv. (MNHN-Pa 1656).
- Fiji Is.** "Challenger": stn 174c, Kadavu I., 19°07'50"S, 178°19'35"E, 1098 m, 1 ♀ 24.7 mm (NHM 1888.22).
- South Fiji Basin.** NZOI: stn Z8880, 30°00.1'S, 177°20.1'E, 29.07.1997, coll. J. WILLS: 1 ♂ 30.3 mm (NIWA).
- Vanuatu.** MUSORSTOM 8: stn CP 956, 20°33.41'S, 169°35.95'W, 1175-1210 m, 20.09.1994: 1 ♀ 44.2 mm; 1 juv. (MNHN-Pa 1647). — Stn CP 990, 18°51.63'S, 168°50.98'W, 980-990 m, 24.09.1994: 1 ♀ 29.3 mm (MNHN-Pa 1648). — Stn CP 996, 18°52.41'S, 168°55.73'W, 764-786 m, 24.09.1994: 1 ♀ 49.8 mm (MNHN-Pa 1649). — Stn CP 1037, 18°03.70'S, 168°54.40'W, 1058-1086 m, 29.09.1994: 1 ♂ 32.8 mm (MNHN-Pa 1650). — Stn CP 1112, 14°52.57'S, 167°11.89'W, 961-950 m, 8.10.1994: 1 juv. (MNHN-Pa 1651).
- New Caledonia.** BIOCAL: stn CP 30, 23°09'S, 166°41'E, 1140 m, 29.08.1985: 1 ♀ 37.6 mm; 3 juvs (MNHN-Pa 1657). — Stn CP 31, 23°08'S, 166°51'E, 850 m, 29.08.1985: 1 ♀ 56.2 mm; 2 juvs (MNHN-Pa 1658). — Stn CP 32, 23°07'S, 166°51'E, 825 m, 29.08.1985: 1 ♂ 47.2 mm, 1 juv. (MNHN-Pa 1659). — Stn CP 54, 23°10'S, 167°43'E, 950-1000 m, 1.09.1985: 1 ♂ 37.8 mm (MNHN-Pa 1660).
- BIOGEOCAL: stn CP 290, 20°36.91'S, 167°03.34'E, 920-760 m, 04.1987: 1 ♂ 46.1 mm (MNHN-Pa 1750).
- VOLSMAR: stn CP 26, 22°22.8'S, 171°21.4'E, 980 m, 4.06.1989: 1 ♂ 48.4 mm (MNHN-Pa 1662).
- BATHUS 1: stn CP 651, 21°41.8'S, 166°40.1'E, 1080-1180 m, 11.03.1993: 1 ♂ 22.7 mm (MNHN-Pa 1663). — Stn CP 661, 21°05'S, 165°50.05'E, 960-1100 m, 13.03.1993: 1 ♀ 44.9 mm (MNHN-Pa 1664).
- BATHUS 2: stn CP 767, 22°10.47'S, 165°59.10'E, 1060-1450 m, 17.05.1993: 4 ♂ 22.1-33.7 mm; 1 ♀ 22.7 mm (MNHN-Pa 1665).
- BATHUS 3: stn CP 844, 23°60.38'S, 16°45.60'E, 908 m, 1.12.1993: 1 ♀ 58.3 mm (MNHN-Pa 1666).
- BATHUS 4: stn CP 951, 20°31.44'S, 164°54.57'E, 960 m, 10.08.1994: 1 juv. 16.6 mm (MNHN-Pa 1667).
- HALIPRO 1: stn 867, 21°26.15'S, 166°18.17'E, 720-950 m, 22.03.1994: 1 ♂ juv. 24.9 mm (MNHN-Pa 1668). — Stn 874, 23°05'S, 166°48'E, 708-830 m, 30.03.1994: 1 ♀ 57.0 mm (MNHN-Pa 1669). — Stn 876, 23°10.41'S, 166°49.16'E, 870-1000 m, 31.03.1994: 2 ♀ 52.9, 63.4 mm (MNHN-Pa 1670); 2 ♂ juvs 22.7, 26.4 mm.
- HALIPRO 2: stn BT 41, 25°51'S, 167°12'E, 1317-1383 m, 14.11.1996: 2 ♀ 36.5, 60.4 mm (MNHN-Pa 1689). — Stn BT 69, 24°40'S, 168°09'E, 943-1080 m, 19.11.1996: 1 ♀ 38.3 mm (MNHN-Pa 1691). — Stn BT 73, 24°51'S, 167°40'E, 1043-1102 m, 20.11.1996: 1 ♀ 59.6 mm (MNHN-Pa 1692). — Stn BT 85, 23°40'S, 168°05'E, 935-1100 m, 23.11.1996: 1 ov. ♀ 49.3 mm (MNHN-Pa 1693). — Stn BT 97, 24°00'S, 161°49'E, 964-1031 m, 25.11.1996: 4 ♀ 30.7-50.1 mm (MNHN-Pa 1694). — Stn BT 101, 24°19'S, 161°43'E, 970-1063 m, 26.11.1996: 1 ov. ♀ 59.1 mm (MNHN-Pa 1695). — Stn 102, 24°31'S, 161°52'E, 1060-1130 m, 26.11.1996: 1 ♀ 43.2 mm; 1 juv. (MNHN-Pa 1696). — Stn BT 103, 24°54'S, 162°09'E, 1235-1256 m, 26.11.1996: 1 ♀ 24.8 mm, 2 juvs (MNHN-Pa 1697). — Stn BT 104, 25°26'S, 162°27'E, 1118-1124 m, 27.11.1996: 1 ov. ♀ 44.3 mm; 2 juvs (MNHN-Pa 1698).
- Chesterfield Is.** MUSORSTOM 5: stn 323, 21°18.52'S, 157°57.62'E, 970 m, 14.10.1986: 1 ♂ 44.7 mm; 2 ♀ 48.4, 56.2 mm; 11 juvs (MNHN-Pa 1652). — Stn 324, 21°15.01'S, 157°51.33'E, 970 m, 14.10.1986: 2 ♂ 22.8, 42.3 mm;

1 ♀ 53.7 mm; 6 juvs (MNHN-Pa 1653). — Stn 326, 21°07.40'S, 157°47'E, 980 m, 14.10.1986: 1 ♂ 33.5 mm (MNHN-Pa 1654).

**Indonesia.** "*Challenger*": stn 214, Molucca Sea, 4°33'N, 127°06'E, 914 m, 10.02.1875: 1 ♀ 17.9 mm (NHM 1888.22).

"*Albatross*": stn 5601, Sulawesi, 1°13.10'N, 125°17.05'E, 1377 m, 13.11.1909: 1 ♀ 23.1 mm; 2 juvs (USNM).

**Philippines.** "*Albatross*": stn 5127, Panay, 10°22'45"N, 121°48'15"E, 1724 m, 4.02.1908: 1 ♂ 23.4 mm (USNM). — Stn 5428, Palawan, 9°13'N, 118°51'15"E, 1989 m, 3.04.1909: 1 ♂ 24.6 mm; 2 ♀ 25.1, 39.6 mm; 7 juvs (USNM). — Stn 5468, Lagonoy Gulf, San Bernardino Str., 13°35'39"N, 123°40'28"E, 1024 m, 18.06.1909: 1 ♀ 35.9 mm (USNM).

MUSORSTOM 2: stn CP 56, 13°54'S, 119°57'E, 970 m, 28.11.1980: 1 ♀ 44.1 mm (MNHN-Pa 1741).

**Australia.** *New South Wales.* "*Kapala*": stn K79-20-06, 33°36'S, 152°06'E, 914 m, 4.12.1979, id. H.E. STODDART as *Polycheles granulatus*: 1 ♀ 52.7 mm (AM P44898). — 33°30'S, 152°10'E, 880 m, Nov. 1992, id. H.E. STODDART as *Polycheles granulatus*: 1 ♂ 43.7 mm; 1 ♀ 52.4 mm (AM P44908).

*Tasmania.* Off St. Patrick's Head, 920 m, 24.07.1983, coll. R.M. GREEN: 1 ♂ 40.2 mm (TM G3278). — 41°14'S, 148°45'E, 950 m, 17.06.1991, coll. R. BREWSTER: 1 ov. ♀ 42.3 mm (TM G3489).

**Tasman Sea.** *Lord Howe Rise.* NZOI: stn U 197, 34°09.8'S, 163°36.7'E, 1186 m, 25.9.1982: 1 juv. (NIWA).

**New Zealand.** NZOI: stn V 370, 42°41.70'S, 179°03.42'W, 1024 m, 12.09.1989: 1 ♀ 24.1 mm (NIWA). — Stn X 508, 42°51.86'S, 174°56.10'W, 1163-1173 m, 9.07.1994: 1 ♂ 30.7 mm (NIWA). — Stn Z8445, 44°01'S, 160°37'W, 1000 m, 23.08.1995: 1 ♀ 54.7 mm (NIWA).

**Madagascar.** "*Vauban*": stn CH 131, 13°46'S, 47°33'E, 1490-1600 m, 20.01.1975: 3 juvs (MNHN-Pa 1742).

**TYPES.** — The juvenile female (17.9 mm cl) (NHM 1888.22) collected by the "*Challenger*" stn 214, off the Moluccas (4°33'N, 127°6'E, 914 m), is the lectotype of *Pentacheles laevis* Bate, 1878, designated by SUND (1920: 225).

The female (24.7 mm cl) (NHM 1888.22) collected by the "*Challenger*" stn 174c, off Fiji (19°07.50'S, 178°19.35'E, 1098 m), is the holotype of *Pentacheles gracilis* Bate, 1878.

The female (44.2 mm cl) (MCZ 4578) collected by the "*Albatross*" stn 3380, off Panama (43'N, 81°31'W, 1645 m), is the holotype of *Polycheles granulatus* Faxon, 1893.

The male (44.0 mm cl) (IM 520/7) collected by the "*Investigator*" off Colombo, Sri Lanka, at a depth of 1234 m, is the holotype of *Pentacheles beaumonti* Alcock, 1894.

The female (36.4 mm cl) (MNHN-Pa 34) collected by the "*Hirondelle*", off the Azores, is designated here as the lectotype of *Polycheles dubius* Bouvier, 1905; the two juvenile specimens of this sample and a juvenile collected by the "*Travailleur*" (MNHM-Pa1138) are paratypes.

**DESCRIPTION.** — Carapace ovate. Dorsal surface of carapace granulose, sparsely setose. Anterior margin of carapace slightly concave, two long rostral spines adjoining at base. Internal and external angles of orbital sinus prominently produced, spinose. Eystalk bearing spine, curved distad. Basal antennular segment lamellar, produced anteriorly to an acute point; mesial margin prominently spinose; single spine on antero-external angle. Lateral margins of carapace lined with upcurved spines, anteriormost spine largest, diminishing gradually in size posteriorly; spine formula 7-9:3-4:14-15. Median postrostral carina bearing irregular number of spines followed by close-set granules; median postcervical carina with two rows of antrorse, mammilate tubercles. Gastro-orbital region unarmed. Posterior margin of cervical groove unarmed. Branchial carina sinuous, spinulate; spinules increasing in size posteriorly. Posterior margin of carapace smooth.

Abdominal tergites medially carinate; carinae on tergites 1-3 bearing antrorse beak; tergites 4-5 with blunt carina; sixth tergite noncarinate; tergites 2-5 with well defined, oblique submedian grooves. Surface of pleura smooth, minutely punctate; anterior pleuron with mesial groove proximally; following pleura bearing short, obsolescent mesial rib; margins smooth. Telson with rounded tubercle anteriorly, two smooth, confluent carinae posteriorly.

Merus of cheliped finely granulate on upper margin with a subterminal claw; lower margin spinulate, spines increasing in size proximally. Carpus nearly as long as merus, claw-like spine on interior and exterior margins. Upper margin of chela with two (or more) serrulate rows, interior row with largest spines, claw-like subterminal spine; lower margin with single serrulate row. P5 subchelate in male, chelate in female.

**Color.** — "Entire carapace, abdominal segments and telson light rose pink, spines tipped with white. Antennular and antennal flagella and peduncles, pereopods, pleopods, endopods and exopods of uropods a darker



pink to red." (GRIFFIN & STODDART, 1995: 242). BOUVIER'S (1917: 150, fig. 7) colored drawing was done "d'après des aquarelles exécutées au moment de la capture".

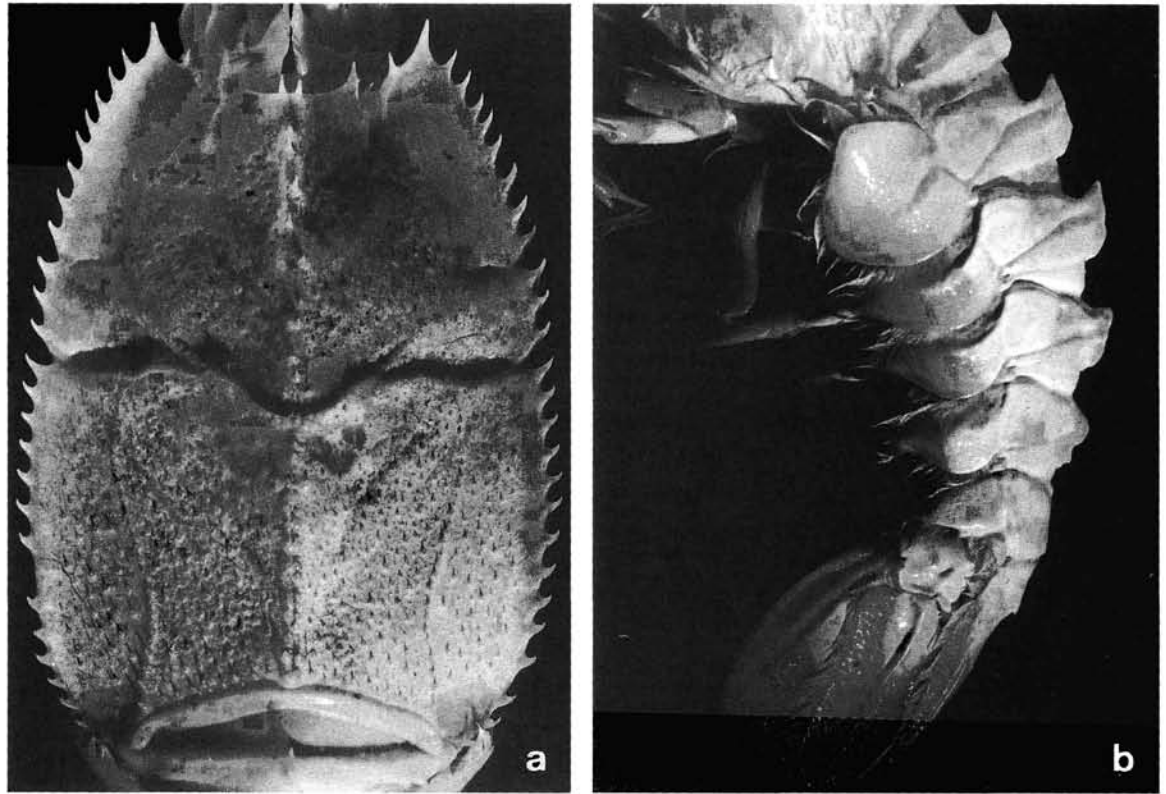


FIG. 7. — *Pentacheles laevis* Bate, 1878, ♂ 42.3 mm, New Caledonia, MUSORSTOM 5, stn 324, 21°15.01'S, 157°51.33' 970 m (MNHN-Pa 1653): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

REMARKS. — *P. laevis* is easily distinguished from *P. validus* in having fewer postcervical lateral spinule bearing prominent spines anteriorly on the median carina, lacking the gastro-orbital spines, and lacking spines on the posterior margin of the cervical groove.

The single female specimen of *Pentacheles laevis* was "not a very perfect one" (BATE, 1888: 146) and was inaccurately described and inadequately drawn. Though a juvenile, as evinced from its subchelate fifth pereopod, the ovate carapace, the prominently produced internal and external angles of the orbital sinus, the spinose mesial margin of the basal antennular segment, the single spine on its antero-external angle, and the form of the median abdominal carinae leave no doubt as to its identity. BATE's (1888) description of *P. gracilis* was based on a slightly larger specimen, but the accompanying drawing (pl. 16) has erroneously depicted the frontal margin much produced and was criticized by SUND (1920). However, it was FAXON's (1893) description of *P. granulatus* that was favoured by most subsequent authors. FAXON himself (1895: 124) observed: "This species [*P. granulatus*] somewhat resembles *P. laevis* (Bate), *P. validus* (A.M. Edw.), and *P. debilis* (Smith)... an East Indian species, *Polycheles beaumontii*, bears the closest likeness to *P. granulatus*. Indeed the resemblance between these two forms is so great that I am inclined to regard *P. beaumontii* as, at most, but a geographical race of *P. granulatus* scoring three out of four synonymies. SELBIE (1914: 25), following RATHBUN (1906), wrote "no doubt that *P. beaumontii*, Alcock, is merely a synonym of *P. granulatus*, Faxon". BOUVIER (1905a: 481) described *dubius* "elle se distingue par l'atrophie complète des carènes exogastriques, par ses carènes exocardiaques faiblement indiquées, par le bord postérieur inerme de la carapace, par la forte saillie aiguë qui limite en dedans et en dehors chaque sinus orbitaire, par les carènes obtuses et peu saillantes de ses tergites abdominaux 4 et 5, par l'absence



tout dessin sur le tergite 6" - a perfect description of *laevis*. SELBIE (1914: 25) recognized that "*P. dubius* (Bouvier) is also clearly a synonym of *P. granulatus*." BOUVIER (1917: 51) conceded that : "une étude plus sérieuse me donne la certitude que toutes ces formes [*P. dubius*, *P. eryoniformis*] doivent être identifiées avec le *P. granulatus*." - indeed with *laevis*.

DISTRIBUTION. — Worldwide; SW Ireland, Ibero-Moroccan Gulf, Madeira, Canary Is, Azores, Cape Verde Is, Mid-Atlantic bight, southwestern Atlantic, Rio Grande Ridge, Newfoundland, Nova Scotia, United States, Bahama Is, Gulf of Panama, Colombia, Galapagos Is, Nazca Ridge, Marquesas Is, Hawaii, Fiji, Wallis & Futuna Is, Vanuatu, New Caledonia, New Zealand, Tasmania, Australia, Indonesia, Molluca Sea, Philippines, Sri Lanka, Madagascar; 347 m (DAWSON, 1997) - 2505 m (ALCOCK, 1899).

*Pentacheles obscurus* Bate, 1878

Fig. 8

*Pentacheles obscura* Bate, 1878a: 279; 1878b: 484; 1878c: 563; 1888: 143, pl. 15 fig. 2. — PAGENSTECHER, 1879: 63. — FAXON, 1895: 12.

*Pentacheles carpenteri* Alcock, 1894: 235; 1901b: 174. — ALCOCK & ANDERSON, 1895, pl. 10 fig. 1.

*Polycheles carpenteri* - ALCOCK, 1899: 33. — DE MAN, 1916: 23, pl. 1 fig. 3. — BOUVIER, 1917: 35. — BERNARD, 1953: 86. — ZARENKOV, 1969: 81. — FIRTH & PEQUEGNAT, 1971: 42. — DAWSON, 1997: 7.

*Polycheles obscurus* - DE MAN, 1916: 5 (list). — BERNARD, 1953: 86. — FIRTH & PEQUEGNAT, 1971: 49. — DAWSON, 1997: 12.

MATERIAL EXAMINED. — **Wallis and Futuna Is area.** MUSORSTOM 7. *SW Combe Bank*: stn CP 622, 12°34'S, 178°11'W, 1280-1300 m, 28.05.1992: 1 ♀ 55.6 mm (MNHN-Pa 1671).

**New Caledonia.** BIOGEOCAL: stn CP 260, 21°00'S, 166°58.34'E, 1820-1980 m, 17.04.1987: 1 ♀ 43.2 mm (MNHN-Pa 1743).

BATHUS 1: stn CP 704, 20°55.8'S, 165°38.6'E, 1100-1200 m, 18.03.1993: 1 ♂ 39.0 mm (MNHN-Pa 1672).

**New Guinea.** "*Challenger*". stn 218, 2°33'S, 144°4'E, 1857 m, 1.03.1875: 1 juv. (damaged) (NHM 1888.22).

**Indonesia.** "*Siboga*": stn 126, Molucca Sea, 3°27.1'N, 125°18.7'E, 2053 m, 20.07.1899, id. DE MAN as *Polycheles carpenteri*: 1 ♂ 39.8 mm (ZMA).

"*Galathea*": stn 471, off the south coast of Java, 10°26'S, 114°15'E, 3080 m, 10.09.1951: 1 ♀ 20.8 mm (ZMC).

**Gulf of Aden.** "*Meteor 5*": stn Me5-257, 13°06.6'N, 47°0'E, 2227-2250 m, 11.03.1987: 1 ♀ 29.4 mm (SMF 24659). — Stn Me5-271, 12°56.7'N, 47°47.0'E, 2276-2282 m, 14.03.1987: 2 ♀ 43.9, 32.3 mm; 1 juv. (SMF 24660).

**Madagascar.** "*Vauban*": CH 138, 13°48.8'S, 47°29'E, 1800-2000 m, 27.02.1975, coll. A. CROSNIER: 1 ♂ 50.2 mm (MNHN-Pa 1673).

TYPES. — The damaged juvenile (NHM 1888.22) collected by the "*Challenger*" stn 218, off New Guinea (2°33'S, 144°4'E, 1857 m), is the holotype of *Pentacheles obscurus* Bate, 1878.

The female (38.5 mm cl) (IM 76/7) collected by the "*Investigator*" off Carpenter's Ridge, Bay of Bengal, at depths of 2505-2616 m, is the holotype of *Pentacheles carpenteri* Alcock, 1894.

DESCRIPTION. — Carapace ovate, lateral margins convergent anteriorly and posteriorly. Dorsal surface of carapace thickly tomentose, minutely granulose laterally. Anterior margin of carapace sinuous, bearing small, bifid rostral spine. Internal and external angles of orbital sinus unarmed. Eyestalk with small spine directed upward. Basal antennular segment foliaceous, mesial margin raised above rostrum, irregularly granulate; single spine on antero-external angle. Spine formula of lateral edges of carapace 5:3:27-28; spines diminish considerably in size posteriorly, posteriormost no more than granules. Median postrostral carina irregularly granulate anteriorly, median postcervical carina bearing two rows of antrorse granules. Gastro-orbital region unarmed. Branchial carina sinuous, obsolescent. Posterior margin of carapace smooth.

Abdominal tergites medially carinate; carinae on tergites 2-5 bicuspid; sixth tergite with short crest posteriorly. Tergites 2-5 bearing well-defined, transversely oblique, submedian grooves. Pleura nearly smooth; second pleuron anteriorly produced, ovate. Telson with granulate tubercle medially, two smooth submedian carinae posteriorly.

First pereopod remarkably short, smooth except for subterminal spines on upper margin of merus, palm and lower margin of carpus; merus proximally thickened; carpus 3/4 as long as merus. P5 subchelate in male, chelate in female.

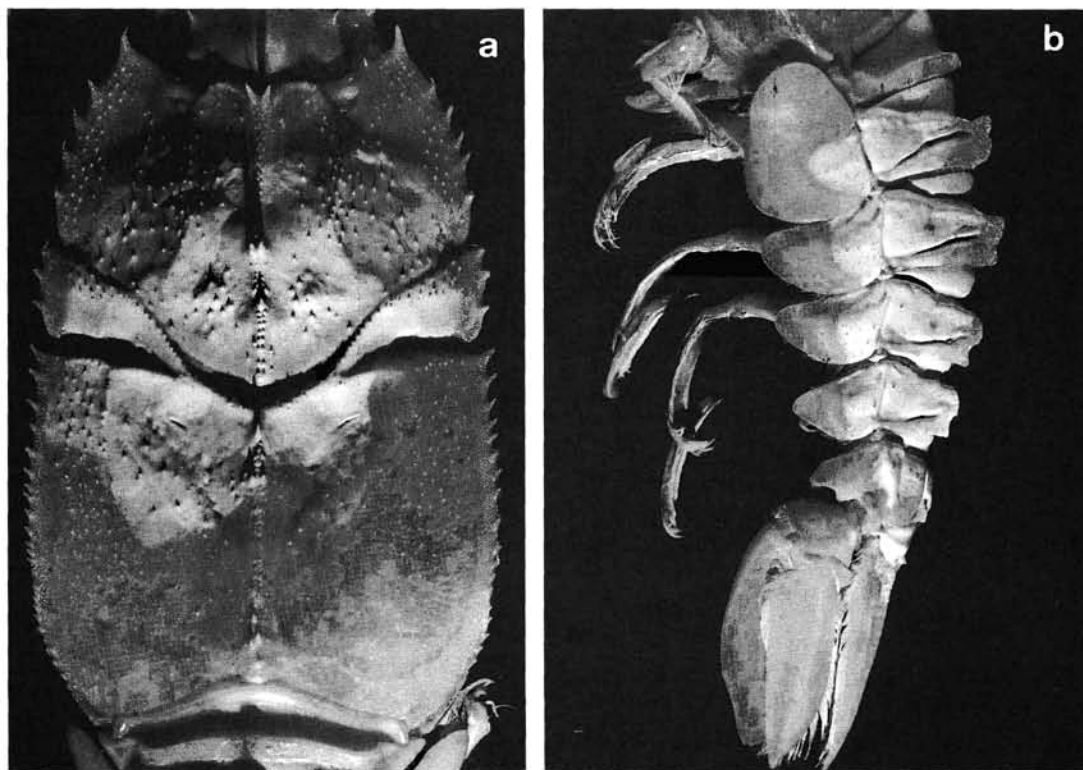


FIG. 8. — *Pentacheles obscurus* Bate, 1878, ♂ 50.2 mm, Madagascar, 13°48.8'S, 47°29'E, 1800-2000 m (MNHN-1673): **a**, dorsal view of the cephalothorax; **b**, lateral view of the abdomen.

REMARKS. — The female holotype of *Pentacheles obscurus* was described by BATE (1878a: 279) as being "in very imperfect condition". Though a juvenile, as evident from its subchelate fifth pereiopod, the densely tomentose carapace, the single spine on the antero-external angle of the basal antennular segment, the shallow orbital sinus, the bicuspid carinae on the abdominal tergites, and the remarkably short first pereiopod with proximally thickened merus and elongate carpus, leave no doubt that *P. carpenteri* Alcock (1899) is synonymous with *P. obscurus*.

DISTRIBUTION. — Melanesia, New Caledonia, New Guinea, Molluca Sea, Madagascar, Gulf of Aden; 110-3080 m.

*Pentacheles snyderi* (Rathbun, 1906)

Fig. 9

*Polycheles snyderi* Rathbun, 1906: 898, pl. 24 fig. 9. — DE MAN, 1916: 6 (list). — BERNARD, 1953: 86. — FIRTH & PEQUEGNAT, 1971: 50. — DAWSON, 1997: 12.

MATERIAL EXAMINED. — **Bay of Biscay**: "*Thalassa*": stn 448, 48°45.0'N, 11°19.8'W, 1830-1870 m, 1973: 1 ♂ 26.0 mm; 1 juv. (MNHN-Pa 358). — Stn 453, 48°34.0'N, 10°51.6'W, 1975-2070 m, 1973: 1 ♂ 21.1 mm (MNHN-Pa 359).

**BIOGAS III**, CV 23: stn 1, 47°32.70'N, 8°34.20'W, 2034 m, coll. IFREMER: 1 ♂ 21.8 mm; 1 ♀ 26.8 mm (MNHN-Pa 540). — CV 32: stn 6, 44°07.60'N, 4°15.80'W, 2245 m, coll. IFREMER: 1 juv. (MNHN-Pa 548).

**BIOGAS XI**, CP 37: stn 1, 47°33.80'N, 47°34.27'W, 11.10.1981, 2175 m, coll. IFREMER: 1 damaged (MNHN-Pa 1138).

**Hawaiian Is.** "*Albatross*": stn 4151, vicinity of Modu Manu, 573-1463 m, 7.08.1902: 1 ♂ 34.5 mm (USNM 30333).

Ohau. 21°15.30'N, 158°15.20'W, 0-1100 m, 9.09.1977, coll. F. CLARKE: 1 ♂ 36.0 mm (RMNH 32623).

Indian Ocean Ridge. "Prof. Mesyatsev": 11°31.0'S, 88°55.4'E, 1600-1700 m, 18.02.1979, coll. M.G. KARPINSKI: 2 ♂ 36.6, 42.7 mm; 1 ♀ 50.7 mm (ZMMU).

TYPE. — The male (34.5 mm cl) (USNM 30333) collected by the "Albatross" stn 4151, off Hawaii, is the holotype of *Polycheles snyderi* Rathbun, 1906.

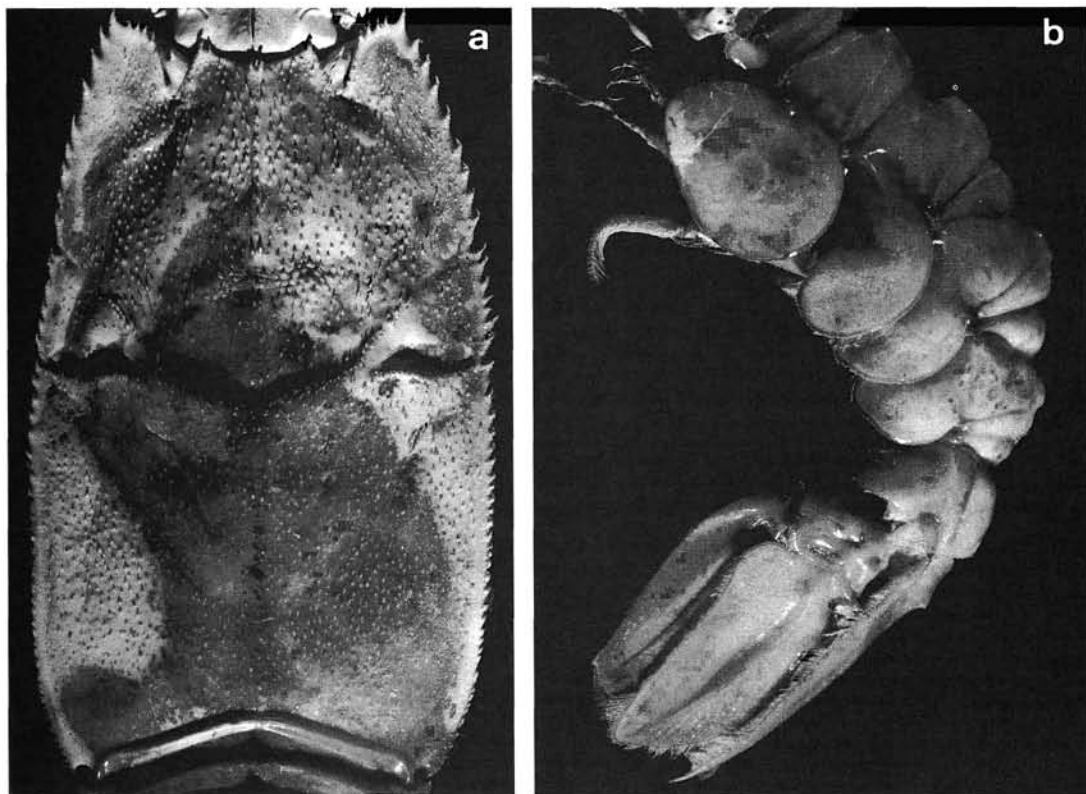


FIG. 9. — *Pentacheles snyderi* (Rathbun, 1906), ♂ 42.7 mm, Indian Ocean Ridge, "Prof. Mesyatsev" 11°31.0'S, 88°55.4'E, 1600-1700 m (ZMMU): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

DESCRIPTION. — Carapace narrow, subrectangular, slightly convergent anteriorly. Dorsal surface of carapace setose, wholly covered with slender spinules. Frontal margin concave, rostral spines adjoining at base. Internal angle of orbital sinus produced, triangular, unispinose, external orbital angle with 3-4 upcurved spines. Eyestalk bearing upcurved spine distad. Basal antennular segment lamellar, produced anteriorly to a sharp point, mesial margin distally spinose, anterolateral angle unispinose. Spines on lateral margins of carapace upcurved, anteriormost largest. Lateral spine formula 9-10:5-8:30-35, spines successively smaller posteriorly. Median postrostral carina defined, irregularly spinulose, bearing half way to cervical groove pair of stouter spines. Posterior margin of cervical groove spinulose. Postorbital carina obsolescent. Branchial carina obsolescent, sinuous, minutely spinulose. Posterior margin of carapace smooth.

Abdominal tergites 1-5 medially carinate, carinae blunt, lacking antrorse spine, sixth tergite noncarinate, smooth. Tergites 2-5 bearing transversely oblique submedian grooves. Pleura smooth. Second pleuron ovate. Telson with blunt median crest anteriorly, two smooth carinae posteriorly.

Merus of P1 basally dilated, with granulate margins and subterminal claw-like spine on upper margin; carpus nearly 2/3 as long as merus with subterminal spines on upper and lower margins; upper margin of propodus minutely serrulate, with subterminal spine. P5 subchelate in male, chelate in female.

REMARKS. — *P. snyderi* was summarily described by RATHBUN (1906) from a single specimen from Hawaii. *P. snyderi* is distinguished from *P. validus* by its subrectangular, spinose carapace and pectinate external orbital margin.

DISTRIBUTION. — Bay of Biscay, Indian Ocean Ridge, Hawaii. Known reliably between 1100-2245 m, collected too in a trawl between 573-1463 m.

*Pentacheles validus* A. Milne Edwards, 1880

Fig. 10

*Pentacheles validus* A. Milne Edwards, 1880: 65. — YOUNG, 1900: 443.

*Polycheles validus* - MOCQUARD, 1883: 153. — FAXON, 1895: 124. — BOUVIER, 1905a: 480; 1917: 45; 1925: 434, fig. 10, pl. 5, figs 1-2. — DE MAN, 1916: 6 (list). — BERNARD, 1953: 86. — SIVERTSEN & HOLTHUIS, 1956: 41. — DOLLFUS, 1956: 135. — FIRTH & PEQUEGNAT, 1971: 61. — PEQUEGNAT *et al.*, 1971: 4. — BEAUBRUN, 1979: 38. — WENNER, 1979: 443. — WENNER & BOESCH, 1979: 111. — RODRIGUEZ, 1980: 194 (list). — POHLE, 1985: 21. — DE SAINT LAURENT, 1985: 475. — DAWSON, 1997: 16.

*Pentacheles debilis* Smith, 1884: 360; 1886a: 188 (list); 1886b: 607, pl. 7, fig. 2. — VERRILL, 1885: 554 (list).

*Pentacheles laevis* BATE, 1888: 144, pl. 15, fig. 5 (p.p.). — MURRAY, 1986: 388.

*Polycheles debilis* - BOUVIER, 1905a: 480; 1905c: 3. — DE MAN, 1916: 5 (list). — FAXON, 1895: 124.

*Polycheles debilis* var. *armatus* Bouvier, 1905c: 4. — DE MAN, 1916: 5 (list).

*Polycheles beaumontii* (?) - STEBBING, 1908: 25; 1910: 377.

*Pentacheles debilis* - FOWLER, 1912: 570 [erroneous spelling].

*Polycheles* - MURRAY & HJORT, 1912: 420 [*vide* SIVERTSEN & HOLTHUIS, 1956].

*Polycheles laevis* - DE MAN, 1916 (list) (p.p.).

*Polycheles demani* Stebbing, 1917: 28, pl. xcii. — CALMAN, 1925: 17. — BARNARD, 1950: 570, figs 105a-c. — KENSLEY, 1968: 292; 1974: 69; 1981b: 29. — FIRTH & PEQUEGNAT, 1971: 45.

*Polycheles chilensis* Sund, 1920: 226. — HOLTHUIS, 1952a: 78. — BERNARD, 1953: 86. — BAHAMONDE, 1963: 4. — ZARENKOV, 1969: 81. — FIRTH & PEQUEGNAT, 1971: 42. — RETAMAL, 1981: 15. — WICKSTEN, 1989: 304. — DAWSON, 1997: 8.

MATERIAL EXAMINED. — Bay of Biscay. BIOGAS IV, CP 01: 47°34.6'N, 8°36.8'W, 25.02.1974, 2245 m, coll. IFREMER: 1 ♀ 44.4 mm; 1 ♂ damaged (MNHN-Pa 563).

Canary Is. "Talisman": stn 39, 30°08'N, 14°02'W, 2300 m, 23.06.1883: 1 juv. (MNHN-Pa 15). — Stn 41, 30°01'N, 14°06'W, 2115 m, 24.06.1883: 2 juvs (MNHN-Pa 16). — Stn 43, 29°52'N, 14°04'W, 2075 m, 25.06.1883: 2 juvs (MNHN-Pa 14).

CANCAP 2: stn 26, 27°50'N, 14°29'W, 1980-2200 m, 25.08.1977: 8 ♀ 20.0-49.7 mm (RMNH).

Azores. CANCAP 5: stn 5.004, 38°06'N, 25°49'W, 2400-3100 m, 24.05.1981: 6 juvs (RMNH). — Stn 5.052, 36°42'N, 25°09'W, 2500-3000 m, 30.05.1981: 1 ♂ 42.6 mm (RMNH). — Stn 5.171, 39°20'N, 30°52'W, 1874-1887 m, 11.06.1981: 1 juv. (RMNH).

West Africa. Ivory Coast. "Pillsbury": stn 314, 4°58'N, 3°48'E, 2268-2332 m, 27.05.1965: 1 ♂ 69.3 mm; 1 ♀ 69.3 mm (RMNH).

South Africa. Cape Point Lighthouse: NE 40 mi., 1024-1280 m, coll. Dr. GILCHRIST: 1 ♀ 66.9 mm (NHM 1928.12.1.337). — NE 43 mi., 1620 m, 1 ♂ 61.1 mm (SAM A4343).

South Atlantic. South Georgia I., 53°26.7'S, 36°32.6'W, 1967-2186 m, 17.05.1975: 1 juv. (USNM).

Bahama Is. (F.M. BAYER). N of Andros I., 1737 m, 5.03.1973: 1 juv. (USNM 154324). — N of Andros I., 24°24.48'N, 76°11.24'W, 1757 m, 13.02.1974: 3 juvs (USNM 154326). — Exuma Sound, 24°39'N, 76°26.54'W, 1624 m, 12.04.1975: 2 ♂ 49.3, 50.6 mm; 1 ♀ 22.9 mm (USNM 154399). — 24°31.54'N, 76°17.12'W, 1673 m, 12.04.1975: 1 ♂ 53.7 mm; 1 ♀ 23.5 mm (USNM 154398). — 24°38.54'N, 76°26.15'W, 1628 m, 15.04.1975: 1 ♀ 28.5 mm (USNM 154328). — 23°55'N, 75°27.12'W, 2178 m, 16.04.1975: 1 ♀ 33.8 mm (USNM 154329).

"Iselin": stn 73, 24°46'N, 75°41'W, 1792 m, 4.03.1972: 1 ♀ (RMNH 31659). — Stn 346, 22°55'N, 75°17.06'W, 2426 m, 17.04.1975: 1 ♀ 37.1 mm (USNM 154331). — Stn 8007, 22°46'N, 75°34'W, 7.09.1980: 1 ♂ 57.6 mm (USNM 344508).

United States. East Coast. "Albatross": stn 2074, 41°43'N, 65°21'50"W, 2393 m, 3.09.1883: 1 ♂ 20.0 mm (USNM 7145).

Caribbean Sea. Jamaica. "Albatross": stn 2140, 17°36'10"N, 76°46'05"W, 1768 m, 11.03.1884, id. M.J. RATHBUN as *P. debilis*: 1 juv. (USNM 23751).

"Oregon": stn 2571, 26°34'N, 90°31'W, 2340 m, 27.07.1959: 1 ♂ 50.7 mm (USNM 232276). — Stn 2574, 26°34'N, 89°53'W, 2610 m, 28.07.1959: 1 ♂ 32.2 mm; 1 ♀ 77.0 mm (USNM 232276). — Stn 2575, 27°06'N, 89°13'W, 1980-

2160 m, 29.07.1959: 1 ♂ 31.4 mm (USNM 232276). — Stn 2814, 28°53'N, 87°47'W, 1710-1890 m, 13.07.1960: 1 ♂ 51.7 mm (USNM 232276).

"Pillsbury": stn 634, 23°33'N, 82°47'W, 1638-1757 m, 25.03.1968: 1 ♂ 35.8 (RMNH). — Stn 1178, 19°14'N, 73°14'W, 1750 m, 30.06.1970: 1 ♂ 62.2 mm (RMNH).

**Gulf of Mexico.** "Albatross": stn 2379, 28°00'15"N, 87°42'W, 2684 m, 2.03.1885: 1 ♀ 27.3 mm (USNM 23645). — Stn 2383, 28°32'N, 88°05'W, 2161 m, 3.03.1885, id. M.J. RATHBUN as *P. debilis*: 1 juv. (USNM 23752).

"Oregon": stn 2577, 27°48'N, 88°45'W, 1530-1980 m, 30.07.1959: 1 ♂ 48.1 mm (USNM 232276). — Stn 2819, 28°35'N, 88°16.5'W, 1620-1800 m, 15.07.1960: 1 ov. ♀ 56.8 mm (USNM 232276). — Stn 2820, 28°23'N, 88°21.5'W, 1800 m, 15.07.1960: 1 ♂ 46.0 mm (USNM 232276).

"Oregon II": stn 10878, 28°54'N, 87°29'W, 1830 m, 16.01.1970, id. B. ANDRYZAK as *P. demani*: 1 ♂ 55.2 mm (USNM 283665). — Stn 10881, 24°51'N, 96°00'W, 1669 m, 24.01.1970, id. B. ANDRYZAK as *P. demani*: 4 ♂ 39.9-49.6 mm; 1 ♀ 63.2 mm (USNM 283667). — Stn 10897, 28°45'N, 88°23'W, 1647 m, 28.01.1970: 1 ♂ 42.2 mm (USNM 283669).

**Chile.** "Challenger": stn 300, Juan Fernandez Is, 33°42'S, 78°18'W, 2516 m, 17.12.1875: 1 ♀ 20.0 mm (NHM 1888.22).

"Albatross": stn 2788, 45°35'S, 75°55'W, 1921 m, 11.02.1888: 3 ♂ 19.3-41.1 mm; 2 ov. ♀ 59.6, 66.9 mm (USNM).

**Wallis & Futuna Is area.** MUSORSTOM 7. SW of Combe Bank: stn 621, 12°35.0'S, 178°11.5'W, 1300-1280 m, 28.05.1992: 1 ♀ 26.8 mm (MNHM-Pa 1734). — Stn 623, 12°34'S, 178°15'W, 1280-1300 m, 28.05.1992: 1 juv. (MNHM-Pa 1735).

**Vanuatu.** MUSORSTOM: 8: stn CP 1111, 14°51.09'S, 167°14'E, 1210-1250 m, 8.10.1994: 1 ♂ 31.6 mm (MNHN-Pa 1674).

**New Caledonia.** BIOCAL: stn CP 60, 24°01'S, 167°08'E, 1480-1530 m, 2.09.1985: 1 juv. (MNHN-Pa 1736).

HALIPRO 2: stn BT 22, 24°09'S, 167°47'E, 1349-1350 m, 21.11.1996: 1 ov. ♀ 58.4 mm (MNHN). — Stn BT 95, 24°00'S, 162°08'E, 1224-1233 m, 25.11.1996: 1 damaged (MNHN-Pa 1705). — Stn BT 103, 24°54'S, 162°09'E, 1235-1256 m, 26.11.1996: 1 ♂ 53.2 mm (MNHN-Pa 1706). — Stn BT 105, 24°45'S, 162°50'E, 1200-1218 m, 27.11.1996: 1 ♂ 56.7 mm; 1 ♀ 61.9 mm (MNHN-Pa 1707).

**New Zealand.** NZOI: stn P971, 41°11.9'S, 177°19.6'E, 2200-2328 m, 18.06.1980: 1 ♂ 39.5 mm (NIWA). — Stn P941, 41°15.2'S, 167°07.2'E, 1463-1457 m, 23.04.1980: 1 ♀ 37.4 mm; 1 juv. (NIWA). — Stn X188, 36°46.30'S, 177°15.06'E, 1500 m, 4.12.1989: 1 ♀ damaged (NIWA). — Stn U198, 35°59.3'S, 162°11.21'E, 1573 m, 26.09.1982: 1 juv. (NIWA). — Stn Z8391, 44°21.72'S, 177°52.90'E, 1143-1145 m, 10.10.1995: 1 ♀ 48.9 mm (NIWA).

**Australia.** *Tasmania.* 34°28'S, 132°03'E, 1175 m, 11.01.1984: 1 ov. ♀ 75.1 mm (TM G3279). — 41°53.6'S, 144°24.6'E, 1384-1416 m, 18.05.1986: 1 ♀ 45.8 mm (TM G3482). — 42°22.4'S, 144°37.9'E, 1376-1404 m, 8.01.1988: 1 ♂ 39.9 mm; 1 ♀ 39.2 mm (TM G3978).

**Australian Bight.** "Galathea": stn 554, 37°28'S, 138°55'E, 1350 m, 12.05.1951: 1 ♂ 38.5 mm (ZMC).

**Indian Ocean.** East Indian Ridge, "Prof. Mesyatsev": 31°55'S, 87°54'E, 1645-1600 m, 30.03.1979, coll. M. KARPINSKI: 1 ♀ 49.1 mm (ZMMU).

**TYPES.** — The large female (82 mm cl) (MCZ 4041) collected by the "Blake" stn 236, off Bequia (Antilles, Windward Islands), 2909 m (BOUVIER, 1925: 437), is the holotype of *Pentacheles validus* A. Milne Edwards, 1880.

The male (20.0 mm cl) (USNM 7145) collected by the "Albatross" stn 2074, off New England (41°43'N, 65°21'50"W, 2393 m), is designated here as the lectotype of *Pentacheles debilis* Smith, 1884; the male (19.5 mm cl) (USNM 7146) collected at stn 2084 (40°16.50'N, 67°05.15'W, 2359m) is the paralectotype.

The female (20 mm cl) (NHM 1888.22) collected by the "Challenger" stn 300, off Juan Fernandez I. (33°42'S, 78°18'W, 2516 m), is the holotype of *Polycheles chilensis* Sund, 1920.

The female (66.9 mm cl) (NHM 1928.12.1.337) collected off Cape Point Lighthouse, 1024-1280 m, South Africa, is the holotype of *Polycheles demani* Stebbing, 1917.

The juvenile collected by the "Talisman" stn 39, (MNHN-Pa 15) off the Canaries (30°08'N, 14°02'W, 2300 m), is designated here as the lectotype of *Polycheles armatus* Bouvier, 1905; the specimens from stns 41 (MNHN-Pa 16) (30°01'N, 14°06'W, 2115 m) and 43 (MNHN-Pa 14) (29°52'N, 14°04'W, 2075 m) are paralectotypes.

**DESCRIPTION.** — Carapace ovate. Dorsal surface of carapace setose, minutely granulose. Anterior margin concave, rostrum bifid, antrorse. Internal and external angles of orbital sinus irregularly spinose (0-2), sometime differing between left and right sides. Eyestalk bearing upcurved spine. Basal antennular segment lamellar, produced anteriorly to a sharp point, prominently spinose along its mesial edge, single spine on antero-external angle. Spine formula of lateral margins of carapace 7-9:4:20-32, spines posterior to postcervical incision successively decreasing

in size. Median postrostral carina with antrorse spinules, pair of larger spines  $2/3$  way to cervical groove; median postcervical carina with two files of antrorse tubercles, pair of larger spines one third distance to posterior margin. Gastro-orbital region bearing two (sometimes three) prominent spines anteriorly, some six spinules posteriorly. Posterior margin of cervical groove spinose. Branchial carina obsolescent. Carapace between median postcervical and branchial carinae with conical tubercles, between branchial carina and lateral margin minutely granulate. Posterior margin of carapace smooth.

Abdominal tergites 1-5 bearing blunt median carina, 1-3 armed anteriorly with obtuse tooth, sixth tergite noncarinate. Tergites 2-5 with deep, transversely oblique, submedian grooves. Pleura smooth. Telson with triangulate basal tubercle, smooth submedian carinae convergent posteriorly.

Subterminal claw-like spine on upper margin of merus and propodus of P1. Carpus,  $3/4$  as long as merus, with small subterminal spine on lower margin. P5 subchelate in male, chelate in female.

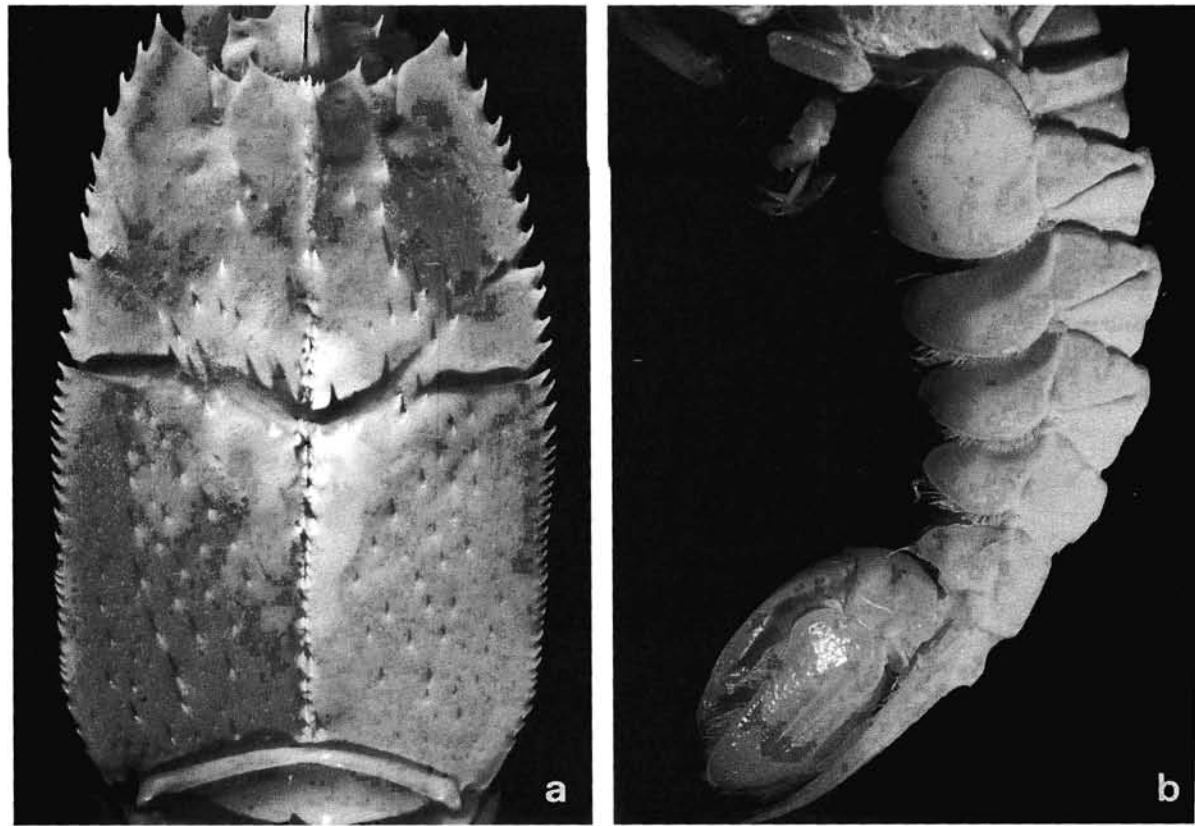


FIG. 10. — *Pentacheles validus* A. Milne Edwards, 1880, ♂ 49.3 mm, Bahama Is,  $24^{\circ}39'N$ ,  $76^{\circ}26.54'W$ , 1624 m (USI 154399): **a**, dorsal view of the cephalothorax; **b**, lateral view of the abdomen.

REMARKS. — A. MILNE EDWARDS (1880: 65) described *P. validus* as having "Les cinq premiers articles l'abdomen portent en dessus une carène obtuse terminée en avant par une pointe mousse; de cette pointe part chaque côté un sillon profond dirigé en arrière et en dehors". Similarly, SMITH (1884: 361) described his immature males of *P. debilis*: "The first five somites of the pleon are perceptibly, though very inconspicuous, carinated, and on the second, third, and fourth somites there is a narrow sulcus each side, extending from near carina outward and backward", and readily admitted "it is probably most nearly allied to *P. validus* A. M. Edwards". BOUVIER (1905c: 4), whose type series consisted of juvenile specimens only, distinguished the east Atlantic var. *armatus* from *P. debilis* by its "armature spiniforme sur le bord externe du sinus orbitaire", an unstable character. By 1917, BOUVIER himself synonymized both *debilis* and var. *armatus* with *P. validus*, and in 1925 (



wrote: "Les spécimens recueillis par le Talisman et la Princesse Alice m'ont permis d'établir, avec une entière certitude, que les exemplaires capturés par l'Albatross et décrits sous le nom de *P. debilis* Smith ne sont rien autre chose que des *P. validus* de médiocre ou de petite taille". Examination of the single juvenile specimen from "Challenger" stn 300, assigned to *laevis* by BATE (1888: 145) and then to *P. chilensis* by SUND (1920: 226), revealed it to be *P. validus*.

DISTRIBUTION. — Worldwide: Bay of Biscay, Canary Is, Azores, West Africa, South Africa., S. Georgia I., Mid Atlantic Bight, United States, Bahama Is, Caribbean Sea, Gulf of Mexico, Chile, Vanuatu, Wallis & Futuna Is, New Caledonia, New Zealand, Tasmania, Australian Bight, East Indian Ridge; 914 m (present work) - 3365 m (FIRTH & PEQUEGNAT, 1971).

### *POLYCHELES* Heller, 1862

*Polycheles* Heller, 1862: 389; 1863: 209. Gender masculine.

Type species, by monotypy, *Polycheles typhlops* Heller, 1862: 392.

Name placed on the official list of Generic Names in Zoology (p. 153) in Opinion 519 of the International Commission on Zoological Nomenclature.

*Eryoneicus* Bate, 1882: 456. Gender masculine.

Type species, by monotypy, *Eryoneicus caecus* Bate, 1882: 457.

Name suppressed by the International Commission on Zoological Nomenclature in Opinion 702 (1964, Bulletin of Zoological Nomenclature, 21(2):111, 112).

*Stereomastis* Bate, 1888: 154. Gender feminine.

Type species, designated by HOLTHUIS, 1962 (Bull. Zool. Nomencl., (19): 183): *Pentacheles suhmi* Bate, 1878: 278.

Name validated under the plenary powers in Opinion 702 of the ICZN and placed on the Official List of Generic Names in Zoology (p. 112).

DIAGNOSIS. — Carapace dorsoventrally flattened, subrectangular. Anterolateral angle of carapace produced, spiniform. Lateral margins well defined, spinose; cervical and postcervical incisions dividing margin into three parts. One or two rostral spines. Orbital sinus simple or compound, eyestalk filling orbit, continuing distad, beneath anterolateral angle of carapace.

Cervical groove marked, arcuate, laterally bifurcate. Postrostral and postcervical carinae well defined, granulate, spinulate. Gastro-orbital, posterior branchial carinae well defined. Sublateral carina starting near posterolateral margin of carapace, running to base of antenna and first cheliped.

Abdomen laterally depressed. First abdominal tergite narrow; pleura fused, abbreviated. Abdominal tergites 2-5 sculptured, medially carinate; sixth tergite medially bicarinate. Second abdominal pleuron clypeiform; pleura 3-5 lingulate, successively diminishing in size posteriorly. Abdominal sternites with median knob. Telson lanceolate, with median basal tubercle, two submedian carinae. Uropodal exopod lamellar, rounded; endopod oar-shaped, basal lappet on interior margin.

Mesial margin of basal antennular segment anteriorly produced, upcurved, reaching beyond peduncle; basal antennular segment proximally rounded, its anterolateral angle uni- or bispinose. Outer antennular flagellum short, inner flagellum as long as antennal flagellum. Renal process well developed, tubular, fitting into hollow on underside of basal antennular segment. Antennal scaphocerite lanceolate, extending to base of flagellum.

Buccal opening subquadrate. Mandible concave, cutting edge with triangular teeth of uneven size; mandibular palp biarticulate. Maxillula with two incurved lobes, distally setose. Maxilla with two slender lobes, internal lobe half as long as lateral; large scaphognathite. First maxilliped endopod slender; exopodal lobe membranous, reniform, extending further back than scaphognathite; exopod anteriorly divided into two lobes enclosing efferent passage. Second and third maxillipeds, slender, pediform; epipod on basal segment of third maxilliped rudimentary; dactyl as long as preceding segment.

Pereiopods 1-4 chelate, P5 simple or subchelate in male, chelate in female. P1 longer, more robust than P2-5; pereiopods successively shorter posteriorly. Fingers of first and second chelipeds crossing, their inner margin furnished with row of overlapping cornute platelets, forming serrate edge. Fingers of chelae of P3-4 slightly

upcurved, their inner margins simple. First male pleopod spatuliform, spinulose, swelling distally on inner margin; spinules distally on mesial margin; distal margin folded internally. Pleopods 2-6 biramose, with rod-like appendix interna; second pair in male with appendix masculina.

REMARKS. — "There seems to be some little doubt as to the right nomenclature of the various species of this group" - an understated comment by ALCOCK (1901b: 165) that fails to convey the nomenclatural confusion in the genus.

HELLER (1862), described the fifth pereopodal dactyl of the single male specimen of *Polycheles typhlops* as simple. With the rush of excitement engendered by the findings of the "Challenger", an error was introduced when BATE (1878a: 276) described *Pentacheles* as differing from *Polycheles* "in having the last pair of pereopods always more or less perfectly chelate". NORMAN (1878: 382) intuited "Has not my friend mistaken sexual for generic characters?" but was brusquely rebuffed, though BATE (1878b: 484) admitted "I was hesitating where several species of *Pentacheles* should be placed, as there is a regular gradation from the imperfect to the perfect chelate character of the fifth pereopod; but as I found *Polycheles*, both male and female, with simple non-chelate foot, at present it appears to me that there is no arrangement so constant as that which I propose." This last statement was patently false - BATE examined both male and female specimens of *Polycheles baccatus*, which fifth pereopod is simple in male, chelate in female and *P. helleri*, which fifth pereopod is subchelate in male, chelate in female. FAXON (1895: 118) recognized that chelation of the fifth pereopod in this genus was both sex and age-dependent and was gravely critical of BATE: "That author was most arbitrary in the disposal of his own species".

A decade later, BATE (1888: 154) erected *Stereomastis*: "This genus differs in nothing externally from *Pentacheles*, but is established to receive those species in which the mastigobranchial lash does not exist".

ALCOCK (1901b: 165) acknowledged the value of the third maxilliped epipod, recognizing *Polycheles* (rather than *Stereomastis*) as having "epipodite of the external maxillipeds .. a mere papilla". Adding to the confusion, ALCOCK kept shifting species from one genus to the other: *phosphorus* was placed first in *Pentacheles* (ALCOCK & ANDERSON, 1894: 165), then in *Polycheles* (1901b: 168); *hextii*, placed in *Pentacheles* (1901b: 171), was found to be synonymous with *Polycheles typhlops*.

No wonder then that BALSS (1925: 16) wrote in consternation: "Alle Unterschiede generischer Art, die man zwischen einzelnen Formen hat finden wollen, sind, wie sich herausgestellt hat, so geringfügiger Natur und zudem noch durch Übergänge verbunden, das man am besten alle zu den obigen drei Gattungen gerechneten Arten unter dem ältesten Namen *Polycheles* zusammenfast".

*Eryoneicus* Bate 1882, early presumed "a young and immature form of some species allied to *Polycheles*" (BATE, 1888: 125). Yet, although "In all essential characteristics" resembling *Polycheles* (ALCOCK, 1901b: 176), it was considered a separate genus. FAXON (1895: 108), on examining the eight specimens collected by the "Albatross" wrote "The existence of well developed external sexual organs... at once disposes of the theory that *Eryoneicus* is an immature stage in the development of some other genus". SUND (1915: 372) believed the close correspondence in carapace spine formula "evidence of the *Eryoneicus* species being in fact larval *Polycheles*". GORDON (1960) recognized 37 "species" of *Eryoneicus*, many unrelated to adult polychelids. Following the ruling of the ICZN to suppress *Eryoneicus* (ICZN 702), it is used to denote polychelid larval stages, though DE SAINT LAURENT (1979) maintains that they are adults secondarily adapted to life in the bathypelagial.

*Polycheles* differs from the other polychelid genera in having only a rudimentary epipod on the basal segment of the third maxilliped. It is distinguished from *Willemoesia* and *Cardus* in having the fifth pereopodal dactyl simple or subchelate in the male, chelate in the female, and from *Pentacheles* and *Homeryon* in having the basal antennular segment proximally rounded.

*Polycheles aculeatus* sp. nov.

Fig. 11

*Stereomastis phosphorus* - GRIFFIN & STODDART, 1995: 246, figs 9-11 (p.p.).

MATERIAL EXAMINED. — Vanuatu. MUSORSTOM 8: stn CC 992, 18°52.34'S, 168°55.16'W, 775-748 m, 24.09.1994: 1 juv. (MNHN-Pa 1425). — Stn CC 994, 18°47.72'S, 168°17'W, 649-641 m, 24.09.1994: 4 ♂ 20.6-44.6 mm



(MNHN-Pa 1426). — Stn CC 996, 18°52.41'S, 168°55.73'W, 764-786 m, 24.09.1994: 2 ♂ 33.2, 34.4 mm; 1 ♀ 34.7 mm (MNHN-Pa 1427). — Stn CC 1033, 17°54.75'S, 168°40.66'W, 650-691 m, 29.09.1994: 3 ♀ 23.0-47.7 mm (MNHN-Pa 1428). — Stn CC 1056, 16°33.11'S, 167°55.64'W, 602-620 m, 1.10.1994: 2 ♂ 46.6, 53.9 mm; 2 ♀ 52.5, 57.7 mm (MNHN-Pa 1429). — Stn CC 1073, 15°45.70'S, 167°22.24'W, 630-650 m, 4.10.1994: 2 ♂ 33.1, 42.5 mm; 1 ♀ 48.9 mm; 1 juv. (MNHN-Pa 1430). — Stn CC 1124, 15°01.72'S, 166°56.51'W, 532-599 m, 9.10.1994: 1 ♀ 49.2 mm; 2 juvs (MNHN-Pa 1431).

**Loyalty Islands.** MUSORSTOM 6: stn DW 426, 20°24.60'S, 166°22.90'E, 610 m, 17.02.1989: 1 ♂ 22.5 mm (MNHN-Pa 1434).

**New Caledonia.** BATHUS 1: stn CP 663, 20°58.66'S, 165°38.27'E, 730-780 m, 13.03.1993: 2 ♀ 28.3, 51.5 mm (MNHN-Pa 1435). — Stn CP 702, 20°55.97'S, 165°34.67'E, 591-660 m, 18.03.1993: 1 ♀ 69.8 mm (MNHN-Pa 1436).

BATHUS 2: stn CP 741, 22°35.53'S, 166°26.56'E, 700-950 m, 14.05.1993: 2 ♂ 48.3, 49.1 mm; 2 ♀ 45.5, 57.0 mm, 2 juvs (MNHN-Pa 1437). — Stn CP 743, 22°35.6'S, 166°26.2'E, 713-950 m, 14.05.1993: 3 ♂ 23.7-28.6 mm; 1 ♀ 40.6 mm, 1 juv. (MNHN-Pa 1438). — Stn CP 751, 22°24'S, 166°12'E, 1300-1500 m, 15.05.1993: 1 ♂ 42.4 mm; 1 ♀ 46.3 mm, (MNHN-Pa 1604). — Stn DW 753, 22°35.6'S, 166°26.2'E, 144-155 m, 15.05.1993: 1 ♂ 45.6 mm (MNHN-Pa 1423). — Stn CP 765, 22°09.6'S, 166°02.8'E, 600-630 m, 17.05.1993: 1 ♂ 43.0 mm; 2 ♀ 28.4, 61.8 mm (MNHN-Pa 1439). — Stn CP 766, 22°10'S, 166°01.7'E, 650-724 m, 17.05.1993: 3 ♂ 25.9-32.6 mm; 3 ♀ 24.7-33.8 mm, 1 juv. (MNHN-Pa 1440). — Stn CP 771, 22°09.52'S, 166°01.75'E, 610-800 m, 18.05.1993: 2 ♂ 24.7, 48.3 mm; 1 ♀ 60.9 mm; 1 juv. (MNHN-Pa 1441).

BATHUS 4: stn CP 899, 20°16.68'S, 163°50.26'E, 500-600 m, 3.08.1994: 1 ♀ 19.4 mm (MNHN-Pa 1442). — Stn CP 910, 18°59.32'S, 163°08.47'E, 560-608 m, 5.08.1994: 1 ♀ 20.3 mm (MNHN-Pa 1443). — Stn CP 912, 18°55.61'S, 163°07.68'E, 702-690 m, 5.08.1994: 1 ♀ 19.9 mm (MNHN-Pa 1444). — Stn CP 948, 20°33.13'S, 164°57.03'E, 533-610 m, 10.08.1994: 1 ♀ 52.2 mm (MNHN-Pa 1445). — Stn CP 949, 20°32.01'S, 164°56.85'E, 616-690 m, 10.08.1994: 1 ♂ 42.9 mm (MNHN-Pa 1446). — Stn CP 950, 20°31.93'S, 164°56.11'E, 705-750 m, 10.08.1994: 3 ♂ 29.7-46.7 mm; 1 ♀ 54.9 mm (MNHN-Pa 1468).

HALIPRO 1: stn CP 854, 21°45.77'S, 166°38.34'E, 650-780 m, 19.03.1994: 1 juv. (MNHN).

**Chesterfield Islands.** MUSORSTOM 5: stn 324, 21°15.01'S, 157°51.33'E, 970 m, 14.10.1986: 3 juvs (MNHN-Pa 1432). — Stn CC 384, 19°42.40'S, 158°50.80'E, 21.10.1986: 1 juv. (MNHN-Pa 1433).

**Indonesia.** "Siboga": stn 297, Timor Sea, 10°39'S, 123°40'E, 520 m, 27.01.1900: 1 ♀ 27.7 m (ZMA).

*Off south coast of Bali*, 08°34'S, 115°36'E, 27.06.1981: 1 ♀ 62.0 mm (USNM 356448).

KARUBAR. *Tanimbar I.*: stn CC 39, 7°47'S, 132°26'E, 477-466 m, 28.10.1991: 2 ♂ 39.7, 45.8 mm; 5 ♀ 43.3-58.7 mm (MNHN-Pa 1447). — Stn CC 40, 7°46'S, 132°31'E, 443-468 m, 28.10.1991: 2 ♂ 38.7, 50.5 mm; 4 ♀ 34.9-63.0 mm (MNHN-Pa 1448). — Stn CC 41, 7°45'S, 132°42'E, 401-393 m, 28.10.1991: 2 ♂ 39.7, 45.8 mm; 5 ♀ 43.3-58.7 mm (MNHN-Pa 1449). — Stn CC 42, 7°53'S, 132°42'E, 354-350 m, 28.10.1991: 1 ♀ 56.5 mm (MNHN-Pa 1450). — Stn CC 56, 8°16'S, 131°59'E, 552-549 m, 31.10.1991: 2 ♀ 43.5, 44.0 mm (MNHN-Pa 1451). — Stn CP 69, 8°42'S, 131°53'E, 358-368 m, 2.11.1991: 3 ♂ 25.1-35.1 mm; 2 ♀ 44.8-64.0 mm (MNHN-Pa 1452). — Stn CP 72, 8°36'S, 131°33'E, 699-676 m, 2.11.1991: 1 ♀ 58.3 mm (MNHN-Pa 1453). — Stn CP 76, 8°50'S, 131°33'E, 401-400 m, 3.11.1991: 2 ♂ 31.3, 36.4 mm; 4 juvs (MNHN-Pa 1455). — Stn CP 78, 9°06'S, 132°4'E, 295-284 m, 3.11.1991: 5 ♂ 18.0-28.0 mm; 4 ♀ 19.4-26.6 mm (MNHN-Pa 1456).

*Kai I.*: stn CP 9, 5°23'S, 132°29'E, 368-389 m, 23.10.1991: 4 ♂ 26.6-46.8 mm (MNHN-Pa 1457). — Stn CC 10, 5°21'S, 132°30'E, 329-389 m, 23.10.1991: 5 ♂ 36.6-48.6 mm; 4 ♀ 27.6-62.2 mm (MNHN-Pa 1458). — Stn CP 12, 5°23'S, 132°37'E, 436-413 m, 23.10.1991: 1 ♂ 42.2 mm; 1 ♀ 47.5 mm (MNHN-Pa 1459). — Stn CP 35, 6°08'S, 132°45'E, 390-502 m, 27.10.1991: 4 ♂ 27.9-43.4 mm; 1 ♀ 37.0 mm (MNHN-Pa 1460).

**East China Sea.** "Ryoan Maru": 29°44'N, 127°48'E, 495-510 m, 19.03.1978, id. Y. MIYA as *Stereomastis andamanensis*: 1 ♀ 57.3 mm (NUM Cr10239).

**Australia.** *North West Coast.* N.N.W. of Cape Leveque, "Solea": 13°07.2'S, 123°15.7'E, 400 m, 15.02.1984: 1 ov. ♀ 60.3 mm (WAM C23588). — N.W. Collier Bay, "Solea": 13°44'S, 122°13.3'E, 496-494 m, 13.02.1984: 1 ov. ♀ 51.2 mm (WAM C23515). — N.W. York Sound, "Solea": 12°48.1'S, 122°56.7'E, 496-504 m, 15.02.1984: 1 ♂ 48.1 mm (WAM C23514). — N.W. of Beagle Bay, "Solea": 15°12.8'S, 121°05.9'E, 410-404 m, 11.02.1984: 2 ♂ 38.9, 38.7 mm; 1 ov. ♀ 54.9 mm (WAM C23587). — W. of Lacedpede Arch., "Solea": 16°55.2'S, 119°52.8'E, 432-430 m, 20.02.1984: 2 ♂ 52.4, 52.2 mm; 1 ♀ 56.2 mm (WAM C23526). — 16°56.8'S, 119°51.0'E, 480-432 m, 20.02.1984: 2 ♂ 48.8, 45.7 mm (WAM C23525). — 14°50.2'S, 121°31.4'E, 356 m, 12.02.1984: 1 ov. ♀ 64.4 mm (WAM C23517). — 16°56'S, 119°53.0'E, 436 m, 22.02.1984: 1 ♀ 50.7 mm (WAM C23528). — Off Port Hedland, "Solea": 16°46.1'S, 119°44'E, 495-502 m, 19.08.1983: 1 ♂ 58.5 mm; 1 ♂ juv. 31.7 mm (WAM C23596). — 17°55'S, 118°22.0'E, 437-442 m, 21.08.1983: 1 ♀ 51.9 mm (WAM C23521). — "Solea": 18°29.1'S, 117°42.5'E, 352-356 m, 18.08.1983: 1 ♂ 51.6 mm (TM G3777). — 18°34.1'S, 117°27.5'E, 400-402 m, 16.08.1983: 1 ♂ 48.8 mm (TM G3776). — Off Port Hedland, "Solea": 17°42'S, 118°38'E, 402-404 m, 18.08.1983: 1 ♀ 53.7 mm (WAM C23519). — 17°42'S, 118°38'E, 402-404 m, 18.08.1983: 1 ♂ 44.1 mm (WAM C23520).

**TYPES.** — The holotype is the male (45.6 mm cl) (MNHN-Pa 1423) collected in New Caledonia, BATHUS 2 stn DW 753 (22°35.6'S, 166°26.2'E, 144-155 m). Two males and one female (MNHN-Pa 1427) collected in

Vanuatu, MUSORSTOM 8 stn CC 996 (18°52.41'S, 168°55.73'W, 764-786 m), an ovigerous female (WAL C23588) collected in Australia (NW coast), and a female (USNM 356448) collected in Indonesia off Bali, a paratypes.

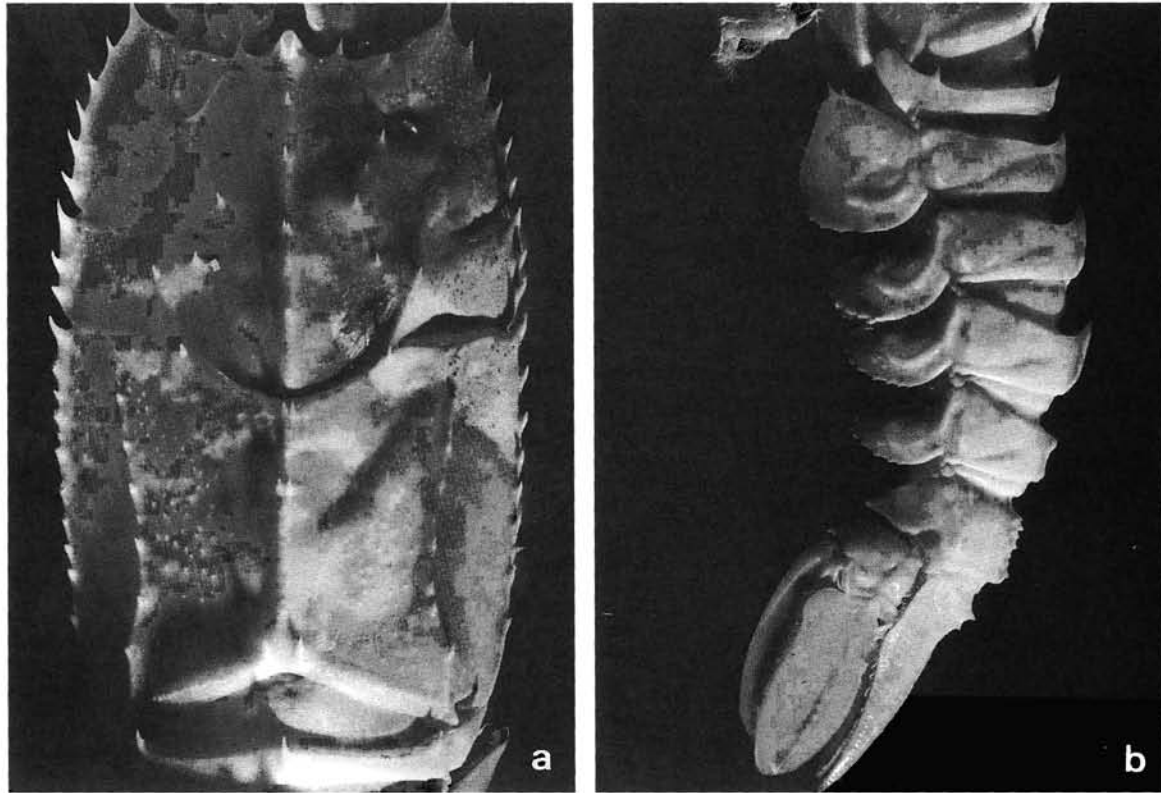


FIG. 11. — *Polycheles aculeatus* sp. nov., ♂ 42.8 mm, Vanuatu, MUSORSTOM 8, stn 994, 18°47.72'S, 168°17'W, 6641 m (MNHN-Pa 1426): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

**DESCRIPTION.** — Lateral margins of carapace subparallel, slightly convergent anteriorly. Dorsal surface carapace tomentose. Anterior margin of carapace straight. Median submarginal tooth prominent, upcurved, front small, bifid rostrum. Internal angle of orbital sinus bearing small spine, external angle unarmed. Eyestalk v mammilate tubercle, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth; antero-external margin angled, bispinose, anterior spine longer than posterior. Spines on lateral margin of carapace decreasing successively in size posteriorly; spine formula 6-7:3:8-10. Spine formula of medio-postrostral carina 1:1:2:1; postcervical carina with two pairs of spines. Posterior margin of cervical groove v antrorse spine midway between median and branchial carinae. Gastro-orbital region bearing five spines in curved row, anterior and posterior spines largest. Branchial carina sinuous, bearing 6 or 7 spinules, posteriormost large. Posterior margin of carapace bearing two prominent, antrorse submedian spines. Anterior margin of first tergite with two pairs of lateral spines.

Abdominal tergites medially carinate; carinae 1-4 with antrorse spines; third and fourth prominent, salient; 1 carina bicuspid; sixth bearing denticulate double carina, confluent posteriorly in somewhat larger tooth. Tergite 5 with oblique submedian grooves obsolescent. Pleura 2-5 with curved rib mesially, margins denticulate. Second pleuron anteriorly produced, triangulate, prominently spinose. Telson with short, denticulate crest anteriorly; margin minutely serrulate, submedian carinae posteriorly.

Merus of P1 with mostly two (1-3) spines proximally, subterminal claw-like spine on upper margin, occasional spinule on lower margin. Carpus more than half as long as merus, with prominent subterminal spine.

on upper and lower margins. Upper margin of propodus granulate, spinose, subterminal spine long; lower margin with two minutely granulate rows. P5 subchelate in male, chelate in female.

ETYMOLOGY. — The Latin *aculeatus* (= sharp, pointed) refers to the prominently spinose anterior margin of the second abdominal pleuron.

REMARKS. — *P. aculeatus* is distinguished from the closely allied *auriculatus* and *surdus* in having the second pleuron anteriorly triangulate, and a single antrorse spine midway between the median postcervical and the branchial carinae on the posterior margin of the cervical groove.

According to GRIFFIN & STODDART (1995: 247) "The east Australian specimens differ from Alcock's original descriptions of *S. phosphorus* in having two spines on the antero-external angle of the basal antennular segment instead of one, and nine to thirteen spines on the lateral edges of the carapace (behind the cervical groove) instead of six or seven.... also differ in having a conical tooth, quite large in some specimens, projecting from the frontal wall of the carapace but concealed by dense setae". The accompanying photograph (fig. 11) clearly shows the anteriorly triangulate second pleuron typical of *P. aculeatus*.

DISTRIBUTION. — Vanuatu, New Caledonia, Loyalty Is, Chesterfield Is, Indonesia, Australia (NW Coast), East China Sea; 144 m (present work) - 1053 m (GRIFFIN & STODDART, 1995).

### *Polycheles auriculatus* (Bate, 1878)

Fig. 12

*Pentacheles auriculatus* Bate, 1878a: 280; 1878b: 484; 1878c: 563.

*Stereomastis auriculata* - BATE, 1888: 159. — DE MAN, 1916: 4 (list). — SUND, 1920: 224. — BERNARD, 1953: 87. —

FIRTH & PEQUEGNAT, 1971: 64. — DAWSON, 1997: 17.

*Pentacheles auriculata* - BATE, 1888, pl. 16 figs 3-4 [erroneous spelling].

*Polycheles auriculatus* - BOUVIER, 1917: 35 (list).

*Stereomastis phosphorus* - GRIFFIN & STODDART, 1995: 246, figs 9-11 (p.p.).

MATERIAL EXAMINED. — **Marquesas Islands.** *Eiao*. MUSORSTOM 9: stn CP 1278, 7°52'S, 140°39'W, 1000 m, 5.09.1997: 3 juvs (MNHN).

**Fiji Islands.** "*Challenger*": stn 174c, Kandavu I., 19°07.50'S, 178°19.35'E, 1116 m, 3.08.1874: 1 ♂ 21.7 mm (NHM 1888.22).

MUSORSTOM 10: stn CP 1309, 17°32.05'S, 178°53.24'E, 830 m, 5.08.1998: 2 ♂ 25.0, 39.8 mm; 3 juvs (MNHN).

**Vanuatu.** MUSORSTOM 8: stn CC 991, 18°51.26'S, 168°52.19'W, 936-910 m, 24.09.1994: 1 ♀ 53.7 mm (MNHN-Pa 1424). — Stn CC 1124, 15°01.72'S, 166°56.51'W, 532-599 m, 9.10.1994: 1 juv. (MNHM-Pa 1680). — Stn 1125, 15°57.63'S, 166°38.43'W, 1160-1220 m, 10.10.1994: 1 juv. (MNHN-Pa 1461). — Stn CP 1126, 1 juv. (MNHN-Pa 1462).

**New Caledonia.** BATHUS 1: stn CP 651, 21°41.8'S, 166°40.1'E, 1080-1180 m, 11. 03.1993: 1 ♀ 20.6 mm (MNHN-Pa 1464). — Stn CP 661, 21°05'S, 165°50.05'E, 960-1100 m, 13.03.1993: 2 ♂ 20.5, 20.9 mm; 1 ♀ 17.3 mm (MNHN-Pa 1465).

BATHUS 2: stn CP 751, 22°24.35'S, 166°12.83'E, 1300-1500 m, 15.05.1993: 1 ♀ 24.8 mm (MNHN-Pa 1466). — Stn CP 767, 22°10'S, 165°59'E, 1060-1450 m, 17.05.1993: 2 ♂ 24.3, 31.2 mm; 3 ♀ 19.7-22.7 mm (MNHN-Pa 1467).

**Philippines.** "*Albatross*": stn 5467, Lagonoy Gulf, San Bernardino Str., 13°35'27"N, 123°37'18"E, 864 m, 18.06.1909: 1 ♀ 23.4 mm (USNM). — Stn 5468, 13°35'30"N, 123°40'28"E, 1024 m, 18.06.1909: 2 ♂ 31.5, 40.2 mm; 1 ♀ 29.8 mm (USNM).

**Australia.** *Torres Str.* "*Franklin*", 10°37.17'S, 144°21.99'E, 990-1053 m, 21.08.1988, id. H.E. STODDART as *Stereomastis phosphorus*: 1 ♂ 31.6 mm (AM P44920).

**North West coast.** "*Solea*": N.W. of Port Hedland, 18°42'S, 116°21'E, 694-704 m, 5.04.1982: 1 ♂ 45.3 mm (WAM C23583). — 18°40'S, 116°27'E, 720-724 m, 5.04.1982: 1 ♂ 44.2 mm; 1 ♀ 31.7 mm (WAM C13435). — 18°45'S, 116°26.5'E, 590-592 m, 4.04.1982: 2 ♀ 52.6, 54.1 mm (WAM C13434). — 18°41'S, 116°29.5'E, 696-704 m, 6.05.1982: 1 ♂ 47.7 mm (WAM C13433).

"*Southern Surveyor*": Exmouth Plateau, 20°55.4'S, 112°51.5'E, 1139-1128 m, 23.1.1991: 1 ♀ 28.4 mm (TM G3779). — 20°16.5'S, 113°13.5'E, 913 m, 23.1.1991: 2 ov. ♀ 47.9, 51.2 mm (TM G3778).

**West coast.** "*Southern Surveyor*": W. of Cape Farquhar, 23°44.6'S, 112°35.5'E, 612-620 m, 26.1.1991: 1 ♀ 55.0 mm (TM G3780). — W. of Freycinet Estuary, 26°40.4'S, 112°32.7'E, 478-456 m, 30.1.1991: 1 ♀ 45.1 mm (TM G3843).

**Western Australian Basin. "Lira":** 22°08'S, 113°02'E, 880 m, 7.05.1973, coll. O. PETROV: 2 ♀ 51.4, 53.2 mm (ZMMU). — 20°10.3'S, 112°58.1'E, 880-862 m, 7.05.1973, coll. O. PETROV: 2 ♀ 56.4, 38.3 mm (ZMMU).

**TYPE.** — The male (21.7 mm cl) (NHM 1888.22) collected by the "Challenger" stn 174c, off Kandavu I., Fiji, (19°07.50'S, 178°19.35'E, 1116 m) is the holotype.



FIG. 12. — *Polycheles auriculatus* (Bate, 1878), ♀ 51.4 mm, West Australian Basin, "Lira", 22°08'S, 113°02'E, 880 m (ZMMU): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

**DESCRIPTION.** — Carapace oblong, lateral margins subparallel, slightly convergent anteriorly. Dorsal surface of carapace tomentose. Anterior margin of carapace straight. Median submarginal tooth upcurved, in front of small, bifid rostrum. Internal angle of orbital sinus bearing small spine, external angle unarmed. Eyestalk with mammillate spine, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth; antero-external margin bispinose, anterior spine twice as long as posterior. Lateral spines decreasing successively in size posteriorly; spine formula 6-7:3:7. Spine formula of median postrostral carina 1:1:2:1; postcervical carina with two pairs of spines. Posterior margin of cervical groove with 3 or 4 antrorse spines midway between median postcervical and branchial carinae. Gastro-orbital region bearing five spines in curved row, posteriormost spine largest. Branchial carina sinuous, bearing 10 spinules, posteriormost largest. Carapace between branchial and median postcervical carinae minutely granulate. Posterior margin of carapace bearing two prominent, antrorse, submedian spines.

Anterior margin of first abdominal tergite bearing two pairs of lateral spines. Abdominal tergites medially carinate; carinae of tergites 1-4 bearing antrorse spine; spine of third tergite elongate, salient, longer than the one of fourth; carina of fifth tergite simple; sixth tergite bearing prominent, denticulate, lyre-shaped carina. Tergites 2-5 with marked oblique submedian grooves. Pleura 2-5 with curved rib mesially. Anterior pleuron anteriorly produced, ovate. Telson with short, denticulate, crest anteriorly, two minutely serrulate submedian carinae posteriorly.

Merus of P1 bispinose proximally, with subterminal claw-like spine on upper margin. Carpus, more than half as long as merus, with prominent subterminal spines on upper and lower margins. Upper margin of propodus smooth, except for a subterminal spine; lower margin with two minutely granulate rows. P5 subchelate in male, chelate in female.

REMARKS. — *P. auriculatus* differs from the closely allied *P. surdus* in having the lateral margins of carapace posterior to postcervical incision bearing 7 spines rather than 10-14; the branchial carinae with 10 spines rather than 5 or 6; the submedian grooves on the abdominal tergites well marked rather than obsolescent; and the sixth abdominal tergite bearing prominent rather than obsolescent carinae.

The single specimen collected by the "Challenger" was a juvenile male. SUND (1920: 224) was mistaken in describing the holotype as female. Comparing the type specimen with BATE's drawing, a discrepancy is apparent in the form of the second pleuron and the pleural mid rib. BATE (1878a: 161) described the "Coxal plates ridged with markings like small ears," or (1888: 161) as "an elevated line or ridge that somewhat resembles in form the outline of the human ear" however, the rib appears in the illustration bow-like (pl. 16, fig. 4).

DISTRIBUTION. — Marquesas Is, Fiji Is, Vanuatu, New Caledonia, Philippines, Australia, Western Australian Basin. 532-1500 m.

### *Polycheles baccatus* Bate, 1878

Fig. 13

*Polycheles baccatus* Bate, 1878a: 278; 1878b: 484; 1878c: 563. — DE MAN, 1916: 26, pl. 1 figs 4, 4a. — BOUVIER, 1917: 35 (list). — GUNTHER & DECKERT, 1950: 6. — BERNARD, 1953: 86. — FIRTH & PEQUEGNAT, 1971: 41. — GRIFFIN & STODDART, 1995: 238.

*Polycheles baccata* - BATE, 1888: 131, fig. 32, pl. 14 fig. 1. — STEBBING, 1893: 200. — HICKSON, 1894: 136, fig. 18. — SUND, 1920: 226.

*Polycheles buccatus* - ZARENKOV, 1983: 110, fig. 46 [erroneous spelling].

not *Polycheles baccatus* - CHAN & YU, 1989: 168, pl. 1 figs c-d; 1993: 109 [= *P. coccifer* sp. nov.].

MATERIAL EXAMINED. — **Wallis and Futuna Islands area.** MUSORSTOM 7. *Wallis Is*: stn DW 606, 13°21'S, 176°08'W, 420-430 m, 22.05.1992: 1 ♀ 31.8 mm (MNHN-Pa 1469).

*Banc Tuscarosa*: stn DW 555, 11°47'S, 178°19'W, 540-542 m, 19.05.1992: 1 ♂ 26.6 mm (MNHN-Pa 1470). — Stn CP 559, 11°48'S, 178°19'W, 547-552 m, 19.05.1992: 5 ♂ 16.6-30.0 mm; 1 ♀ 36.2 mm (MNHN-Pa 1471).

*Banc Bayonnaise*: stn DW 625, 11°52'S, 179°34'W, 425-430 m, 29.05.1992: 1 ♂ 31.5 mm (MNHN-Pa 1472). — Stn DW 627, 11°54'S, 179°31'W, 597-600 m, 29.05.1992: 5 m 17.3-21.4 mm, 6 ♀ 19.0-25.0 mm; 9 juvs (MNHN-Pa 1473). — Stn CP 629, 11°54'S, 179°32'W, 400-420 m, 29.05.1992: 2 ♂ 17.6, 21.5 mm; 2 juvs (MNHN-Pa 1474). — Stn CP 630, 11°54'S, 179°32'W, 500 m, 29.05.1992: 1 ♂ 23.7 mm (MNHN-Pa 1475). — Stn CP 631, 11°54'S, 179°32'W, 600 m, 29.05.1992: 2 ♂ 16.8, 19.0 mm; 1 ♀ 21.3 mm (MNHN-Pa 1476). — Stn CP 632, 11°54'S, 179°31'W, 595-600 m, 29.05.1992: 1 ♂ 19.4 mm; 4 ♀ 21.1-31.9 mm (MNHN-Pa 1477).

**Fiji Islands.** Matuku I. "Challenger": stn 173, 19°09.35'S, 179°41.50'E, 567-576 m, 24.07.1874: 3 ♂ 17.5-27.8 mm; 3 ♀ 16.9-29.3 mm (NHM 1888.22).

**Vanuatu.** MUSORSTOM 8: stn DW 1014, 17°54.53'S, 168°19.08'E, 495-498 m, 27.09.1994: 1 ♂ 28.8 mm (MNHN-Pa 1478). — Stn CP 1089, 15°08.82'S, 167°17.23'E, 494-516 m, 6.10.1994: 1 juv. (MNHN-Pa 1479). — Stn CP 1111, 14°51.09'S, 167°14.00'E, 1210-1250 m, 8.10.1994: 1 ♂ 28.6 mm (MNHN-Pa 1480).

**New Caledonia.** MUSORSTOM 4: stn CP 169, 18°54.03'S, 163°11.20'E, 575-600 m, 17.09.1985: 3 ♂ 15.9-24.6 mm; 1 ♀ 24.2 mm, 3 juvs (MNHN-Pa 1481). — Stn 200, 18°53.8'S, 163°14.1'E, 535 m, 20.09.1985: 1 ♀ 25.5 mm (MNHN-Pa 1482). — Stn 202, 18°58'S, 163°59.3'E, 560 m, 20.09.1985: 4 ♂ 24.6-32.7 mm; 3 ♀ 32.9-38.8 mm (MNHN-Pa 1483). — Stn 236, 22°11.35'S, 167°15'E, 495-550 m, 2.10.1985: 1 ♀ 36.4 mm (MNHN-Pa 1484).

HALIPRO 1: stn CP 872, 23°02'S, 166°52'E, 620-702 m, 30.03.1994: 1 ♀ 29.0 mm (MNHN-Pa 1488).

BATHUS 4: stn 909, 18°57.64'S, 163°10.30'E, 516-558 m, 4.08.1994: 2 ♀ 33.2, 37.0 mm (MNHN-Pa 1489). — Stn 911, 18°57.80'S, 163°08.47'E, 566-558 m, 5.08.1994: 1 ♂ 33.3 mm (MNHN-Pa 1490). — Stn 921, 18°46.72'S, 163°17.81'E, 613-610 m, 6.08.1994: 1 ♀ 29.4 mm (MNHN-Pa 1491).

**Chesterfield Islands.** MUSORSTOM 5: stn 383, 19°40.85'S, 158°46.10'E, 615-600 m, 21.10.1986: 3 ♂ juvs 17.5-20.7 mm (MNHN-Pa 1486).

**Australia.** *New South Wales.* "Kapala": off Newcastle, 360-540 m, 27-29.04.1971: 1 ov. ♀ 35.9 mm (WAM C13430). — Stn K77-13-12, 29°52'S, 153°43'E, 495 m, 23.08.1977, id. D.E. BROWN: 1 ♂ 34.8 mm (AM P26549). — Stn K78-17-21, 28°37'S, 153°50'E, 502 m, 19.08.1978, id. H.E. STODDART: 1 ♀ 33.5 mm (AM P44749).

**Philippines.** MUSORSTOM 1: stn CP 50, 13°49.2'N, 120°01.8'E, 415-510 m, 25.03.1976: 1 ♂ 26.4 mm (MNHN-Pa 1492).

MUSORSTOM 2: stn CP 75, 13°50.5'N, 120°30.3'E, 300-330 m, 1.12.1980: 1 ♀ 19.4 mm (MNHN-Pa 1493).

MUSORSTOM 3: stn CP 118, 11°58'N, 121°06'E, 448-466 m, 3.06.1985: 1 juv. (MNHN-Pa 1494).

**Indonesia.** "Siboga": stn 38, Bali Sea, 7°35.4'S, 117°28.6'E, 730-915 m, 1.04.1899: 1 ♂ 26.3 mm; 1 ♀ 26.9 mm (ZMA).

**KARUBAR.** *Kai Is:* stn CP 17, 5°15'S, 133°01'E, 459-439 m, 24.10.1991: 5 ♂ 19.8-23.8 mm; 7 ♀ 20.7-27.1 mm; 12 juvs (MNHN-Pa 1496). — Stn CP 25, 5°30'S, 132°52'E, 336-346 m, 26.10.1991: 1 ♀ 35.5 mm (MNHN-Pa 1497). — Stn CP 27, 5°03'S, 132°51'E, 304-314 m, 26.10.1991: 1 ♀ 29.8 mm (MNHN-Pa 1498).

*Tanimbar Is:* stn CC 42, 7°52'S, 132°42'E, 354-350 m, 28.10.1991: 2 ♂ 30.1, 33.0 mm; 3 ♀ 29.8-32.4 mm (MNHN-Pa 1564).

**TYPES.** — The male (27.8 mm cl) (NHM 1888.22) collected by the "Challenger" stn 173, off Matuku I., Fiji (19°09.35'S, 179°41.50'E, 567-576 m), is the lectotype; all other specimens from that sample are paralectotypes.

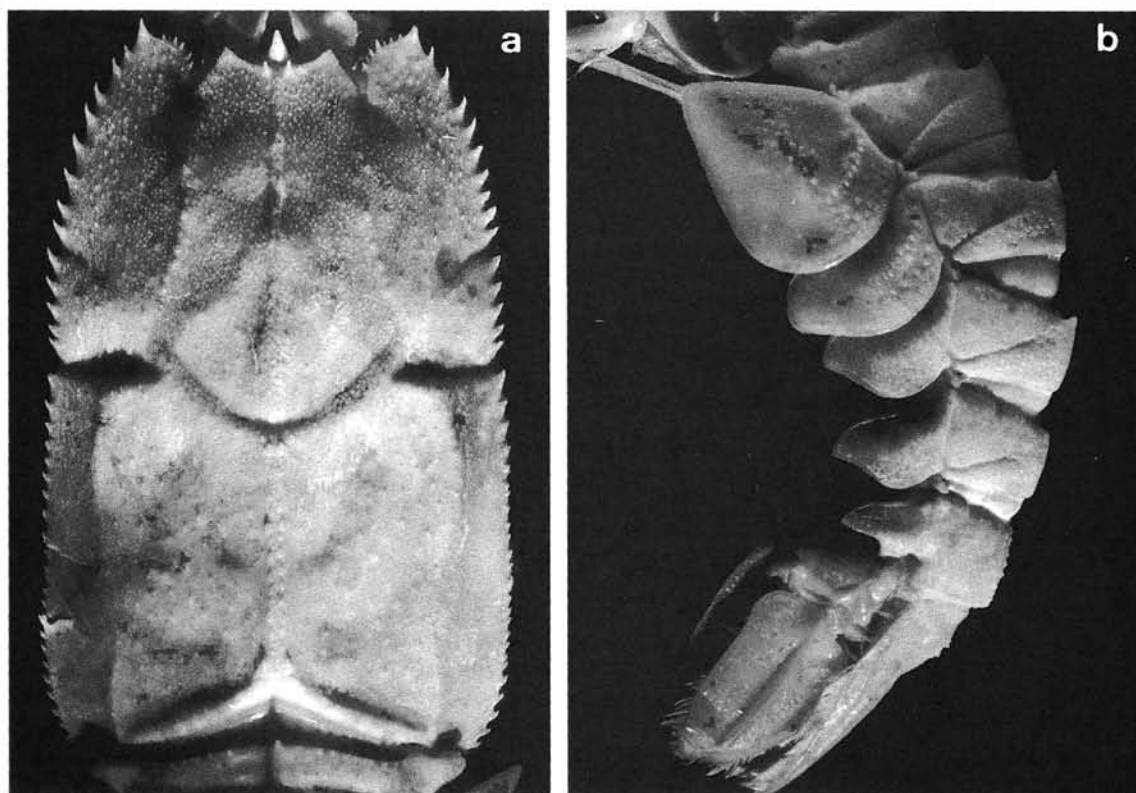


FIG. 13. — *Polycheles baccatus* Bate, 1878, ♂ 32.7 mm, New Caledonia, MUSORSTOM 4, stn 202, 18°58'S, 163°59.560 m (MNHN-Pa 1483): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

**DESCRIPTION.** — Lateral margins of carapace parallel, slightly convergent anteriorly. Dorsal surface of carapace densely granulate, setose. Frontal margin concave. Median submarginal tooth upcurved, prominent, flanked two slender rostral spines. Internal angle of orbital sinus produced, triangulate; external angle pectinate, 6-spin. Eyestalk bearing vermicular tubercle. Basal antennular segment produced anteriorly to a sharp point, mesial margin spinose, antero-external margin with one or more minute spinules. Spines on lateral margins of carapace decreasing successively in size posteriorly; spine formula 10-12:4-6:25-26. Median postrostral carina irregular granulate; granules on postcervical carina larger, paired. Postorbital carina obsolescent, granulate, bispin. Posterior margin of cervical groove between branchial carinae granulate. Branchial carina finely granulate. Posterior margin of carapace bearing conic granules, submedian pair largest.



Abdominal tergites granulate. Tergites 2-5 bearing oblique submedian grooves. Anterior margin of first tergite beaded. Tergites 1-4 bearing antrorse beaks; fifth carinate; sixth with submedially two beaded rows, confluent posteriorly. Proximal half of pleura 2-5 granulate, margins smooth. Second pleuron medially scooped; margin anteriorly produced, ovate. Pleura 3-5 with short, curved, granulate rib medially. Telson with granulate tubercle anteriorly; two minutely serrulate, confluent carinae posteriorly.

Merus of P1 minutely serrulate on upper and lower margins, with subterminal claw-like spine on upper margin. Carpus half as long as merus, with two serrulate rows on upper margin; spines on external row more prominent, distal spines largest; spinule subterminally on lower margin. Upper margin of propodus with several rows of antrorse conic granules; lower margin with two distal serrulate rows. P5 simple in male, chelate in female.

*Color.* — "Dorsal surface of the carapace and abdomen a rich burnt orange, area below lateral edges of carapace and lower half of the abdominal pleura white. Interspaces between abdominal segments as well as grooves in abdominal terga also white. Second to fifth pereopods white, chelae of second and third pereopods pinkish red. Ischium of cheliped pinkish, colour continuing to proximal portion of merus; distal portion of merus, carpus and propodus burnt orange; joints between merus and carpus, carpus and propodus and tips of fingers whitish". (GRIFFIN & STODDART, 1995).

REMARKS. — BATE's (1878a: 278) preliminary description, though brief and inaccurate, presents the essential characters of *P. baccatus*: "armed with teeth on the inner side of the antero-lateral angle, central ridge projected into a rostriform tooth supported by two small teeth;...Pleon carinated on each of the four anterior somites and projected into an anteriorly pointed tooth". DE MAN's (1916) description is detailed and meticulous, pointing out many of BATE's inaccuracies.

CHAN & YU (1989: 110) clearly describe another species (*P. coccifer*) which has the "anterolateral angles armed with 2-3 strong spines... Abdominal pleuron II with anterior margin sharply pointed".

DISTRIBUTION. — Wallis Is, Melanesia, Fiji Is, Vanuatu, New Caledonia, Australia (east coast), Philippines, Indonesia, 300-1250 m.

### *Polycheles ceratus* (Alcock, 1894)

Fig. 14

*Pentacheles* sp. WOOD-MASON, 1891: 19.

*Pentacheles cerata* Alcock, 1894: 241. — WOOD-MASON & ALCOCK, 1894, pl. 8 fig. 1.

*Polycheles cerata* - ALCOCK, 1899: 33.

*Polycheles ceratus* - ALCOCK 1901b: 170. — BOUVIER, 1917: 35.

*Stereomastis cerata* - DE MAN, 1916: 4 (list). — BERNARD, 1953: 87. — FIRTH & PEQUEGNAT, 1971: 64. — DAWSON, 1997: 18.

*Pentacheles certa* - DAWSON, 1997: 74 [erroneous spelling].

MATERIAL EXAMINED. — **Indonesia.** *Sumatra.* "Te Vega": stn 96, 3°25'N, 95°40'E, 1150 m, 21.11.1963: 1 ♀ 33.5 mm (RMNH).

**Andaman Sea.** "Investigator": stn 114, 13°21'N, 93°27'E, 1686 m: 1 ♀ 32 mm (IM 6880/9). — Stn 310, 13°29'30"N, 95°29'E, 1757 m, 5.11.1902: 1 ♀ 33 mm (IM).

TYPE. — The female (32 mm cl) (IM 6880/9) collected by the "Investigator" stn 114 in the Andaman Sea (13°21'N, 93°27'E, 1686 m) is the holotype.

DESCRIPTION. — Lateral margins subparallel, slightly convergent anteriorly. Dorsal surface of carapace smooth, nearly glabrous. Frontal margin straight. Rostrum short, bifid. Internal and external angles of orbital sinus unarmed. Eyestalk without vermicular tubercle. Basal antennular segment with mesial margin smooth, antero-external margin bispinose. Spine formula of lateral margin of carapace 5-6:2:3; lateral margins of carapace posterior to postcervical incision smooth. Median postrostral carina set with antrorse spines; spine formula 1:1:2:1. Pair of antrorse spines medially on posterior margin of cervical groove. No postorbital carina and spines.

Small spine on posterior margin of cervical groove at junction of anterior and posterior branches. Branchial carinae distinct, unarmed. Posterior margin of carapace with pair of antrorse submedian spines.

Abdominal tergites smooth. Oblique submedian grooves on tergites 2-5 obsolescent. Anterior margin of first tergite smooth. Tergites 2-5 medially crested; tergites 2-4 with small antrorse spine; fifth tergite with large, ramiform, antrorse spine reaching forward beyond fourth tergite. Sixth tergite bearing mesially parallel pair of rounded carinae, confluent posteriorly. Pleura nearly smooth; second pleuron anteriorly produced, ovate. Telson with obsolete tubercle anteriorly, two smooth confluent carinae posteriorly.

Merus of P1 smooth. Carpus half as long as merus with subterminal spine on upper and lower margins. Upper margin of propodus with two subterminal spines. P5 chelate in female.



FIG. 14. — *Polycheles ceratus* (Alcock, 1894), ♀ 33.5 mm, Sumatra, "Te Vega", stn 96, 3°25'N, 95°40'E, 1150 m (RMNH): **a**, dorsal view of the cephalothorax; **b**, lateral view of the abdomen.

REMARKS. — *P. ceratus* is easily distinguished from its congeners by the large antrorse spine on fifth abdominal tergite, overhanging the anterior margin of the fourth tergite.

DISTRIBUTION. — Known from Sumatra (Indonesia) and the Andaman Sea, 1150-1757 m.

*Polycheles coccifer* sp. nov.

Fig. 15

*Polycheles baccatus* — TUNG *et al.*, 1988: 47, pl. 46. — CHAN & YU, 1989: 168, pl. 1 figs c-d; 1993: 109 [non Bate, 1878].

MATERIAL EXAMINED. — Vanuatu. MUSORSTOM 8: stn CP 1123, 15°07.19'S, 166°55.20'E, 262-352 m, 9.10.1994: 1 juv. (MNHN-Pa 1500).



**New Caledonia.** MUSORSTOM 4: stn 247, 22°09'S, 167°13.3'E, 435-460 m, 4.10.1985: 1 ♂ 40.6 mm (MNHN-Pa 1499).

HALIPRO 1: stn CP 868, 21°14.53'S, 165°55.84'E, 430-450 m, 21.03.1994: 1 ♂ 26.1 mm (MNHN-Pa 1501).

BATHUS 1: stn CP 698, 20°34.2'S, 164°57.3'E, 491-533 m, 17.03.1993: 2 ♂ 34.5, 38.3 mm; 3 ♀ 27.6-40.5 mm (MNHN-Pa 1502).

BATHUS 4: stn 947, 20°33.72'S, 164°57.72'E, 470-490 m, 10.08.1994: 3 ♀ 30.2-33.5 mm; 4 juvs (MNHN-Pa 1503). — Stn 948, 20°33.13'S, 164°57.03'E, 533-610 m, 10.08.1994: 1 ♂ 39.7 mm; 1 ♀ 40.1 mm; 1 juv. (MNHN-Pa 1504).

**Indonesia.** KARUBAR. *Kai Is*: stn CP 16, 5°17'S, 132°50'E, 315-349 m, 24.10.1991: 1 ♀ 44.6 mm (MNHN-Pa 1733).

*Tanimbar I.*: stn CC 42, 7°53'S, 132°42'E, 354-350 m, 28.10.1991: 1 ♀ 46.7 mm (MNHN-Pa 1511). — Stn CP 62, 9°01'S, 132°42'E, 246-253 m, 1.11.1991: 3 ♂ 39.8-44.6 mm; 2 ♀ 37.1, 47.9 mm (MNHN-Pa 1512). — Stn CP 78, 9°06'S, 131°24'E, 295-284 m, 3.11.1991: 2 ♀ 43.7, 45.8 mm (MNHN-Pa 1513). — Stn CP 79, 9°16'S, 131°22'E, 250-239 m, 3.11.1991: 1 ♂ 33.4 mm; 1 ♀ 53.8 mm (MNHN-Pa 1514).

**Philippines.** "*Albatross*": stn 5112, Luzon, 13°48'22"N, 120°47'25"E, 319 m, 17.01.1908: 2 ♂ 25.5, 33.5 mm; 2 ♀ 34.6, 37.2 mm (USNM). — Stn 5118, Balayan Bay, 13°48'45"N, 120°41'51"E, 284 m, 21.01.1908: 1 ♀ 38.3 mm (USNM). — Stn 5221, btw Marinduque and Luzon, 13°38'15"N, 121°48'15"E, 351 m, 24.04.1908: 3 ♂ 28.2-40.1 mm; 2 ♀ 30.1, 57.2 mm (USNM). — Stn 5222, btw Marinduque and Luzon, 13°38'30"N, 121°42'45"E, 351 m, 24.04.1908: 1 ♀ 21.5 mm (USNM). — Stn 5256, Illana Bay, Bongo I., 7°21'45"N, 124°07'15"E, 284 m, 22.05.1908: 1 ♂ 22.7 mm; 2 ♀ 25.2, 46.7 mm (USNM). — Stn 5289, Luzon, 13°41'50"N, 120°58'30"E, 310 m, 21.07.1908: 1 ♀ 30.1 mm (USNM). — Stn 5297, Luzon, 13°41'20"N, 120°58'E, 356 m, 24.07.1908: 1 dry (USNM). — Stn 5364, Luzon, Balayan Bay, 13°48'30"N, 120°43'45"E, 288 m, 20.02.1909: 10 ♂ 19.8-34.5 mm; 1 ♀ 18.1-28.0 mm (USNM). — Stn 5365, Luzon, Balayan Bay, 13°44'24"N, 120°45'30"E, 385 m, 22.02.1909: 1 ♀ 56.1 mm (USNM). — Stn 5374, Marinduque I., 13°45'45"N, 121°35'08"E, 342 m, 2.03.1909: 3 ♂ 17.5-37.0 mm; 4 ♀ 17.7-39.3 mm (USNM). — Stn 5421, btw Panay and Guimaras, 10°33'30"N, 122°26'E, 247 m, 30.03.1909: 1 ♂ 25.1 mm; 1 ♀ 45.9 mm (USNM). — Luzon, Balayan Bay, Calaca Town, 13°44'N, 120°45'E, 99-177 m, 24.06.1966: 1 ♂ 41.9 mm; 1 ♀ 30.9 mm (USNM 322873). — Nouongcasto, 13°44'N, 120°45'E, 144-155 m, 25.06.1966: 2 ♂ 26.8, 33.5 mm (USNM 322873). — S. of Sapating, 13°44'N, 120°45'E, 266-301 m, 29.07.1966: 2 ♂ 27.3, 37.7 mm; 1 juv. (USNM 322873).

MUSORSTOM 1: stn 42, 13°55.1'N, 120°28.6'E, 379-407 m, 24.03.1976: 1 ♀ damaged (MNHN-Pa 1505).

MUSORSTOM 2: stn CP 26, 13°49.6'N, 120°51.0'E, 299-320 m, 23.11.1980: 8 ♂ 23.6-33.4 mm; 7 ♀ 25.1-48.2 mm (MNHN-Pa 1506). — Stn CP 74, 13°54'N, 120°27'E, 300-370 m: 1 ♀ 47.9 mm (MNHN-Pa 1507).

MUSORSTOM 3: stn CP 105, 13°52'N, 120°30'E, 398-417 m, 1.06.1985: 2 ♂ 20.0, 25.0 mm; 1 ♀ 50.4 mm; 1 juv. (MNHN-Pa 1508). — Stn CP 119, 11°59'N, 121°13'E, 320-337 m, 3.06.1985: 1 ♂ 36.3 mm (MNHN-Pa 1509). — Stn CP 125, 11°57'N, 121°28'E, 388-404 m, 4.06.1985: 19 ♂ 22.7-38.1 mm; 16 ♀ 24.7-51.6 mm; 14 juvs (MNHN-Pa 1510).

**Taiwan.** Tai chi, I-lan County, 300 m, 10.06.1993, coll. & id. T.Y. CHAN as *P. baccatus*: 1 ♂ 34.3 mm (NTOU).

**TYPE.** — The male (36.3 mm cl) (MNHN-Pa 1509) collected by MUSORSTOM 3 at stn 119 (11°59'N, 121°13'E, 320-337m) in the Philippines is the holotype.

**DESCRIPTION.** — Lateral margins of carapace parallel, slightly convergent anteriorly. Dorsal surface of carapace densely granulose, tomentose. Frontal margin concave. Median submarginal tooth upcurved, prominent, reaching considerably beyond pair of non contiguous rostral spines. Internal angle of orbital sinus produced, triangulate; external angle bispinose, occasionally with auxillary spinules. Eyestalk bearing vermicular tubercle. Basal antennular segment produced anteriorly to a sharp point, mesial margin minutely serrulate, antero-external margin tuberculate. Spine formula of lateral margins of carapace 6-7:4-6:20-23, spines decreasing in size posteriorly. Median postrostral carina set with antrorse mammilate tubercles; postcervical carina set with larger granules, paired, anteriormost largest. Postorbital carina obsolescent, quadrispinose, anteriormost spine largest. Posterior margin of cervical groove between branchial carinae granulate. Branchial carina serrulate. Posterior margin of carapace granulate, with pair of antrorse submedian spines.

Abdominal tergites granulate; tergites 2-5 with transversely oblique submedian grooves. Anterior margin of first tergite irregularly beaded. Tergites 1-4 bearing antrorse spines; fifth crested; sixth bearing submedially two beaded rows, confluent posteriorly. Proximal 3/4 of pleura 2-5 granulate, margins granulate. Second pleuron medially scooped, margin anteriorly triangulate. Pleura 3-5 with short, curved, granulate rib medially. Telson with granulate tubercle anteriorly; two minutely serrulate, confluent carinae posteriorly.

Merus of P1 spinulate on upper margin with longer proximal spines and subterminal claw-like spine, minutely serrulate on lower margin. Carpus half as long as merus, with two minutely serrulate rows on upper margin and

subterminal spinule on lower margin. Upper margin of propodus minutely granulate, tiny spinules on lower margin. P5 simple in male, chelate in female.

*Color.* — "Body generally ivory and covered with large patches of orange-red on dorsal surface. Non-articular surface of dorsal abdomen, posterior parts of abdominal pleura, telson margins and bases of uropods also orange-red. Setae light brown." (CHAN & YU, 1989: 109, color photo).

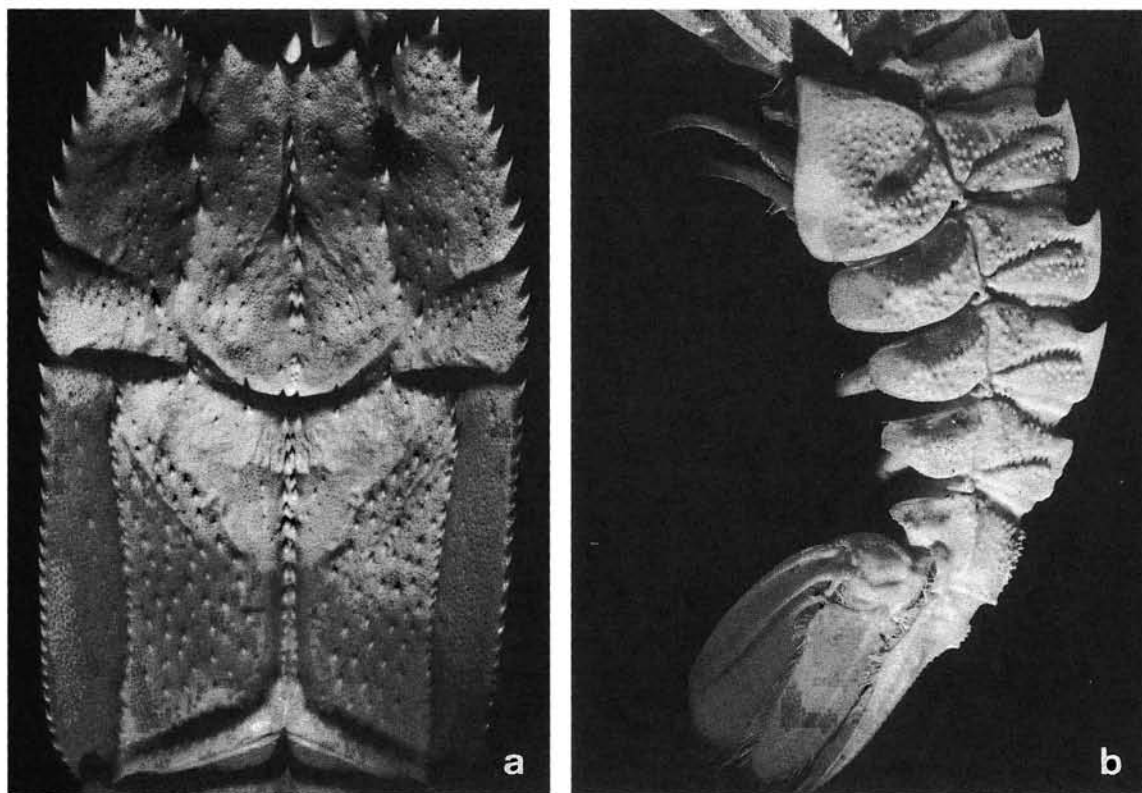


FIG. 15. — *Polycheles coccifer* sp. nov., ♀ 53.8 mm, Indonesia, Tanimbar I., KARUBAR stn 79, 9°16'S, 131°22'E, 239 m (MNHN-Pa 1514): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

ETYMOLOGY. — The Latin *coccifer* (= berried) refers to the densely granulate carapace of this species.

REMARKS. — *P. coccifer* is distinguished from its closely related congener, *P. baccatus*, in having the external angle of orbital sinus bispinose, the lateral margins of carapace anterior to cervical incision bearing 6-7 spines, carpus and propodus of the first cheliped indistinctly granulate, the gastro-orbital carina quadrispinose, and anterior margin of the second pleuron triangulate.

DISTRIBUTION. — Vanuatu, New Caledonia, Taiwan, Indonesia, Philippines; known reliably between 533 m, collected too in trawlings between 99-610 and 533-610 m.

*Polycheles enthrix* (Bate, 1878)

Fig. 16

*Willemoesia enthrix* Willemoes-Suhm, 1875c: xxxiii. (see remarks).

*Pentacheles enthrix* Bate, 1878a: 280, pl. 13 figs 1-3; 1878b: 484; 1878c: 563. — SMITH, 1880b: 272.

*Pentacheles anthrax* - SMITH, 1880a: 353 [erroneous spelling].

- Pentacheles euthrix* - BATE, 1888: 149, figs 14-27, 33-36. — STEBBING, 1893: 200. — FAXON, 1895: 119. — HUTTON, 1904: 253. — SUND, 1920: 226.
- Polycheles helleri* Bate, 1878a: 277 (p.p.); 1878b: 484 (p.p.); 1878c: 563 (p.p.); 1888: 138 (p.p.).
- Pentacheles enthrix* - BATE, 1888, pl. 17 [erroneous spelling].
- Pentacheles helleri* - BATE, 1888, pl. 15 fig. 1 [non Bate, 1878].
- Polycheles euthrix* - DE MAN, 1916: 5 (list). — BOUVIER, 1917: 35 (list). — BERNARD, 1953: 86. — FIRTH & PEQUEGNAT, 1971: 45. — GRIFFIN & STODDART, 1995: 239, figs 2-3. — DAWSON, 1997: 9.
- Polycheles enthrix* - CHAN & YU, 1993: 107.
- Stereomastis kermadecensis* Sund, 1920: 224. — BERNARD, 1953: 87.
- Polycheles amemiyai* Yokoya, 1933: 44, fig. 23. — MIYAKE, 1972: 65; 1982: 190. — TAKEDA, 1982: 38. — DAWSON, 1997: 7.
- Polycheles anaemayai* - FIRTH & PEQUEGNAT, 1971: 41. — DAWSON, 1997: 78 [erroneous spelling].
- Polycheles kermadecensis* - FIRTH & PEQUEGNAT, 1971: 49. — DAWSON, 1997: 11.
- Stereomastis nana* - BABA *et al.*, 1986 pl. 109 [non Smith, 1880].

MATERIAL EXAMINED. — **Wallis and Futuna Is area.** MUSORSTOM 7. *Banc Combe*: stn DW 539, 12°27'S, 177°27'W, 700 m, 17.05.1992: 1 ♀ 59.1 mm (MNHN-Pa 1515). — Stn CC 551, 12°15'S, 177°28'W, 791-795 m, 18.05.1992: 1 ♂ 20.1 mm (MNHN-Pa 1516). — Stn CC 552, 12°16'S, 177°28'W, 786-800 m, 18.05.1992: 1 ♂ 21.7 mm (MNHN-Pa 1517). — Stn CC 553, 12°17'S, 177°28'W, 780-794 m, 18.05.1992: 1 ♀ 31.3 mm (MNHN-Pa 1518). — Stn CC 554, 12°14'S, 177°28'W, 795-820 m, 18.05.1992: 1 ♀ 25.7 mm (MNHN-Pa 1519).

*Banc Bayonnaise*: stn CP 631, 11°54'S, 179°32'W, 600 m, 29.05.1992: 1 ♀ 54.1 mm (MNHN-Pa 1520). — Stn CP 632, 11°54'S, 179°31'W, 595-600 m, 29.05.1992: 1 ♂ 39.0 mm (MNHN-Pa 1521).

**Fiji Islands.** "*Challenger*": stn 173, off Matuku I., 19°09.35'S, 179°41.50'E, 576 m, 24.07.1874: 1 ♀ 27.4 mm (NHM 1888.22).

**New Caledonia.** BIOCAL: stn CP 32, 23°07'S, 166°51'E, 825 m, 28.08.1985: 4 ♀ 24.9-56.3 mm (MNHN-Pa 1536).

BERYX 2: stn CP 58, 23°19.20'S, 167°59.35'E, 850-920 m, 22.10.1992: 1 ♀ 23.7 mm (MNHN-Pa 1537). — Stn CP 59, 23°19'S, 168°00'E, 750-800 m, 22.10.1992: 1 ♂ 26.2 mm; 1 ♀ 47.6 mm (MNHN-Pa 1538).

BATHUS 1: stn CP 663, 20°58.66'S, 165°38.27'E, 730-780 m, 13.03.1993: 1 ♀ 54.5 mm (MNHN-Pa 1539). — Stn CP 709, 21°41.78'S, 166°37.88'E, 650-800 m, 19.03.1993: 2 ♀ 56.7, 59.5 mm (MNHN-Pa 1540).

BATHUS 2: stn CP 741, 22°35.53'S, 166°26.56'E, 700-950 m, 14.05.1993: 1 ♀ 42.8 mm (MNHN-Pa 1541). — Stn CP 743, 22°35.6'S, 166°26.2'E, 713-950 m, 14.05.1993: 1 ♂ 20.0 mm; 2 ♀ 57.2, 48.0 mm (MNHN-Pa 1542). — Stn CP 765, 22°09.6'S, 166°02.8'E, 600-630 m, 17.05.1993: 1 ♀ 46.6 mm (MNHN-Pa 1543). — Stn CP 766, 22°10'S, 166°01.7'E, 650-724 m, 17.05.1993: 1 ♀ 52.7 mm (MNHN-Pa 1679). — Stn CP 771, 22°09.52'S, 166°01.75'E, 610-800 m, 18.05.1993: 1 ♀ 47.3 mm (MNHN-Pa 1544).

BATHUS 3: stn DW 790, 23°48.94'S, 169°47.60'E, 685-715 m, 25.11.1993: 1 ♀ 29.7 mm (MNHN-Pa 1545). — Stn DW 793, 23°47.50'S, 169°48.75'E, 731-751 m, 26.11.1993: 2 ♂ 26.0-34.5 mm (MNHN-Pa 1546). — Stn DW 794, 23°48.35'S, 169°49.10'E, 751-755 m, 26.11.1993: 1 ♂ 34.1 mm (MNHN-Pa 1547). — Stn CP 831, 23°04'S, 166°56'E, 650-658 m, 30.11.1993: 6 ♂ 23.2-43.1 mm; 2 ♀ 31.2, 45.0 mm (MNHN-Pa 1548). — Stn CP 832, 23°03'S, 166°54'E, 650-659 m, 30.11.1993: 2 ♀ 50.7, 51.7 mm (MNHN-Pa 1549). — Stn CC 841, 23°03'S, 166°53'E, 640-680 m, 30.11.1993: 3 ♂ 26.4-47.7 mm; 7 ♀ 22.0-52.5 mm (MNHN-Pa 1550). — Stn CP 845, 23°03.30'S, 166°59.29'E, 592-622 m, 1.12.1993: 1 ♂ 29.1 mm; 1 ♀ 41.2 mm (MNHN-Pa 1551). — Stn CC 848, 23°02.50'S, 166°52.80'E, 680-700 m, 1.12.1993: 5 ♂ 28.6-46.9 mm; 10 ♀ 40.0-58.5 mm (MNHN-Pa 1552).

HALIPRO 1: stn CP 854, 21°40'S, 166°38'E, 650-780 m, 19.03.1994: 2 ♀ 59.1, 57.8 mm (MNHN-Pa 1554). — Stn CH 872, 23°02'S, 166°52'E, 620-702 m, 30.03.1994: 9 ♂ 28.9-42.7 mm; 10 ♀ 36.3-57.8 mm (MNHN-Pa 1555). — Stn CH 873, 23°01'S, 166°53'E, 640-680 m, 30.03.1994: 1 ♂ 29.7 mm; 2 ♀ 50.8, 57.2 mm (MNHN-Pa 1556). — Stn CH 874, 23°05'S, 166°48'E, 708-830 m, 30.03.1994: 1 ♂ 45.7 mm; 1 ♀ 52.1 mm (MNHN-Pa 1557). — Stn CH 876, 23°10'S, 166°49'E, 870-1000 m, 31.03.1994: 1 ♂ 37.5 mm (MNHN-Pa 1558).

BATHUS 4: stn CP 913, 18°56.23'S, 163°04.86'E, 777-820 m, 5.08.1994: 1 ♂ 32.6 mm; 1 ♀ 43.2 mm (MNHN-Pa 1553).

**Loyalty Islands.** MUSORSTOM 6: stn DW 483, 21°19.80'S, 167°47.80'E, 600 m, 23.02.1989: 2 ♂ 39.3, 44.5 mm (MNHN-Pa 1535).

**Chesterfield Islands.** MUSORSTOM 5: stn DC 321, 21°20.40'S, 158°02.20'E, 1000 m, 14.10.1986: 1 juv. 12.2 mm (MNHN-Pa 1522). — Stn CP 323, 21°18.52'S, 157°57.62'E, 970 m, 14.10.1986: 2 ♂ 31.4, 32.2 mm; 2 ♀ 41.6, 48.4 mm; 35 juvs (MNHN-Pa 1523). — Stn CP 359, 19°39.00'S, 158°49.00'E, 700-720 m, 18.10.1986: 1 ♂ 31.8 mm (MNHN-Pa 1524). — Stn CP 360, 19°36.40'S, 158°49.60'E, 770-810 m, 18.10.1986: 1 ♀ damaged; 2 juvs (MNHN-Pa 1525). — Stn CP 363, 19°47.90'S, 158°44.30'E, 700-685 m, 19.10.1986: 1 ♀ 47.3 mm (MNHN-Pa 1526). — Stn CC 365, 19°42.82'S, 158°48.00'E, 710 m, 19.10.1986: 1 ♂ 37.2 mm; 3 ♀ 53.2-65.1 mm (MNHN-Pa 1527). — Stn CC 366, 19°45.40'S, 158°45.62'E, 650 m, 19.10.1986: 2 ♂ 35.2, 22.9 mm; 1 ♀ 37.0 mm (MNHN-Pa 1528). — Stn CC 367, 19°36.80'S, 158°53.20'E, 855-830 m, 19.10.1986: 1 ♂ 42.9 mm; 1 ♀ 31.8 mm (MNHN-Pa 1529). —

Stn CC 383, 19°40.85'S, 158°46.10'E, 615-600 m, 21.10.1986: 2 ♀ 46.7, 52.5 mm (MNHN-Pa 1530). — Stn CC 384, 19°42.40'S, 158°50.80'E, 772-756 m, 21.10.1986: 3 ♂ 13.3-45.2 mm; 6 ♀ 15.8-59.3 mm (MNHN-Pa 1531). — Stn DC 385, 20°53.60'S, 160°49.40'E, 740-750 m, 22.10.1986: 1 ♂ 23.2 mm (MNHN-Pa 1532). — Stn CP 386, 20°56.21'S, 160°51.12'E, 770-755 m, 22.10.1986: 2 juvs 14.6, 15.4 mm (MNHN-Pa 1533). — Stn CP 387, 20°53.41'S, 160°52.41'E, 650-660 m, 22.10.1986: 1 juv. 14.4 mm (MNHN-Pa 1534).

**Kermadec Is.** "Challenger": stn 170, 29°55'S, 178°14'E, 951 m, 14.07.1874: 1 ♀ 15.3 mm (NHM 1888.22). — Stn 170a, 29°45'S, 178°11'W, 1152 m, 14.07.1874: 1 ♀ 22.0 mm, badly broken specimen (NHM 1888.22).

**New Zealand.** NZOI: stn K5804, 29°14.8'S, 177°49.6'W, 590-490 m, 22.07.1974: 2 juvs (NIWA). — Stn Z8989, 37°32.55'S, 176°48.61'E, 550-577 m, 18.01.1998: 1 ov. ♀ 42.6 mm (NIWA). — Stn Z9263, 34°09.2'S, 162°51.9'E, 791 m, 18.09.1998: 1 ♂ 36.2 mm (NIWA).

**Australia.** New South Wales. "Kapala": stn K78-09-05, 28°02'S, 153°59'E, 549 m, 2.06.1978, id. D.E. BROWN as *P. euthrix*: 1 ♀ 73.2 mm (AM P44750). — Stn K78-23-08, 28°03'S, 154°04'E, 732 m, 6.11.1978, id. H.E. STODDART as *P. euthrix*: 2 ♂ 61.4, 69.5 mm; 1 ♀ 51.2 mm (AM P44754).

**East China Sea.** "Yuryo-maru" (det. Y. MIYA as *Stereomastis nana*): 28°27.20'N, 126°56.36'E, 320-340 m, 7.02.1978: 1 ♀ 62.4 mm (NUM cr.10243). — 25°48'N, 124°25.5'E, 420-400 m, 14.09.1979: 1 ♀ 57.5 mm (NUM cr.10406). — 28°31'N, 126°57'E, 310 m, 12.10.1979: 1 ov. ♀ 60.9 mm (NUM cr.10407).

**Taiwan.** Su-Aon, I-Lan County, 500 m, 10.04.1991, coll. T.Y. CHAN: 1 ♀ 25.4 mm (NTOU).

**Japan.** Tosa Bay, 16.01-14.02.1961, coll. K. SAKAI: 1 ♂ 45.7 mm; 1 ♀ 49.3 mm (SMF 24647).

**TYPES.** —The female (15.3 mm cl) (NHM 1888.22) collected by the "Challenger" stn 170 off Kermadec Is (29°55'S, 178°14'E, 951 m) is designated here as the lectotype of *Pentacheles euthrix* Bate, 1878. The female (22.0 mm cl) (NHM 1888.22) collected by the "Challenger" off Kermadec Is (stn 170a) is a paralectotype.

About the types of *S. kermadecensis*, see remarks.

**DESCRIPTION.** — Margins of carapace subparallel, slightly convergent anteriorly. Dorsal surface of carapace setose, minutely granulose, granules more prominent anteriorly. Frontal margin of carapace slightly convex; median submarginal tooth half as long as rostral spines; several spines and spinules on either side of rostral spines. Internal angle of orbital sinus spinose, external angle unarmed. Eyestalk bearing small mammilate spine, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin serrulate, two spines on antero-external angle, lateral spine smaller. Anterolateral angle of carapace prominently produced. Spine formula of lateral margins of carapace 8-9:4-5:12-14. Median postrostral carina ill-defined anteriorly, spine formula 1:1:2:1; postcervical carina with one pair of spines followed by two rows of mammilate tubercles. Gastro-orbital region bearing single spine. Branchial carina sinuous, obsolescent, granulose. Posterior margin of carapace bearing three pairs of antrorse spines, submedian pair largest.

Abdominal tergites without submedian grooves, medially carinate. Carina on tergites 1-4 with antrorse spine; carina on fifth tergite with small tooth; sixth tergite crested distally. Anterior tergite with pair of lateral spines. Pleura with crescentic mid-rib nearly obsolete, margins setose. Second pleuron anteriorly produced, triangulate. Telson with mammilate tubercle anteriorly followed by deep furrow; two smooth, confluent carinae posteriorly.

Merus of cheliped bispinose proximally on upper margin, clawed subterminal spine; lower margin serrulate, proximal spinules longer. Carpus 3/4 as long as merus, upper margin distally granulate, small subterminal spine on lower margin. Upper margin of chela with two serrulate rows, distalmost spine on inner row prominent, lower margin with single serrulate row. P5 subchelate in male, pollex very short; chelate in female.

**Color.** — Carapace and abdomen red, first chela pale distally (S. O'SHEA, pers. comm.). "Body generally orange-red. Lateral surface and grooves on carapace, antennal and antennular flagella, pereopods, ventral surface, articulated surface and lateral margins of abdominal tergites slightly orange-red to somewhat whitish" (CHAN & YU, 1993: 107, color photo). Color photo also in BABA, 1986, pl. 109.

**REMARKS.** — During the "Challenger" expedition WILLEMOES-SUHM collected two juvenile female specimens off the Kermadec Is on July 14th, 1874. He described them in his notes (cited in BATE, 1888: 153) and referred to them by name, *Willemoesia euthrix*, in his letter to VON SIEBOLD, sent September 1874 and published in 1875. However, as he failed to include even the briefest description, the name could not be accepted. BATE (1878a), working from WILLEMOES-SUHM's notes, described the species under the name *Pentacheles euthrix*. Including, in addition to the two Kermadec specimens, a male (in fact a female) specimen collected off Matuku I., Fiji. A farther complication arose as it seems that BATE (1878a), in his preliminary account of the Challenger Polychelids, put

down the same female specimen from the Kermadec Islands as syntype of both *Polycheles helleri* and *Pentacheles enthrix* - actually depicting it (BATE, 1888, pl. 15 fig. 1). SUND (1920: 224) recognized that "the other specimens (from stn 170, near Kermadec Islands, N. of New Zealand) is certainly of a species distinct from the type" [from the type of *Polycheles helleri*]. However the species SUND erected, *Stereomastis kermadecensis*, is a junior synonym of *P. enthrix*. BATE's misplacement serves to explain SUND's (1920) confusion as to the number of *enthrix* specimens available to BATE, of which, he reported, only two survived. However, all three syntypes of *P. enthrix* are extant. The three are very young specimens, as attested by their small size and the fact that "The posterior pair of pereopoda is chelate, the dactylos and pollex being subequal in both sexes" (BATE, 1888: 150) - a condition existing in juveniles.

YOKOYA's (1933) description and illustration leave no doubt that *P. amemiyai* is but a synonym of *enthrix*. Unfortunately, a search in the Kitakyushu Museum for the type was unsuccessful (K. BABA, pers. com).

DISTRIBUTION. — Melanesia, Fiji Is, Kermadec Is, New Caledonia, New Zealand, Australia, East China Sea, Taiwan, Japan; 229 m (GRIFFIN & STODDART, 1995) - 1152 m.

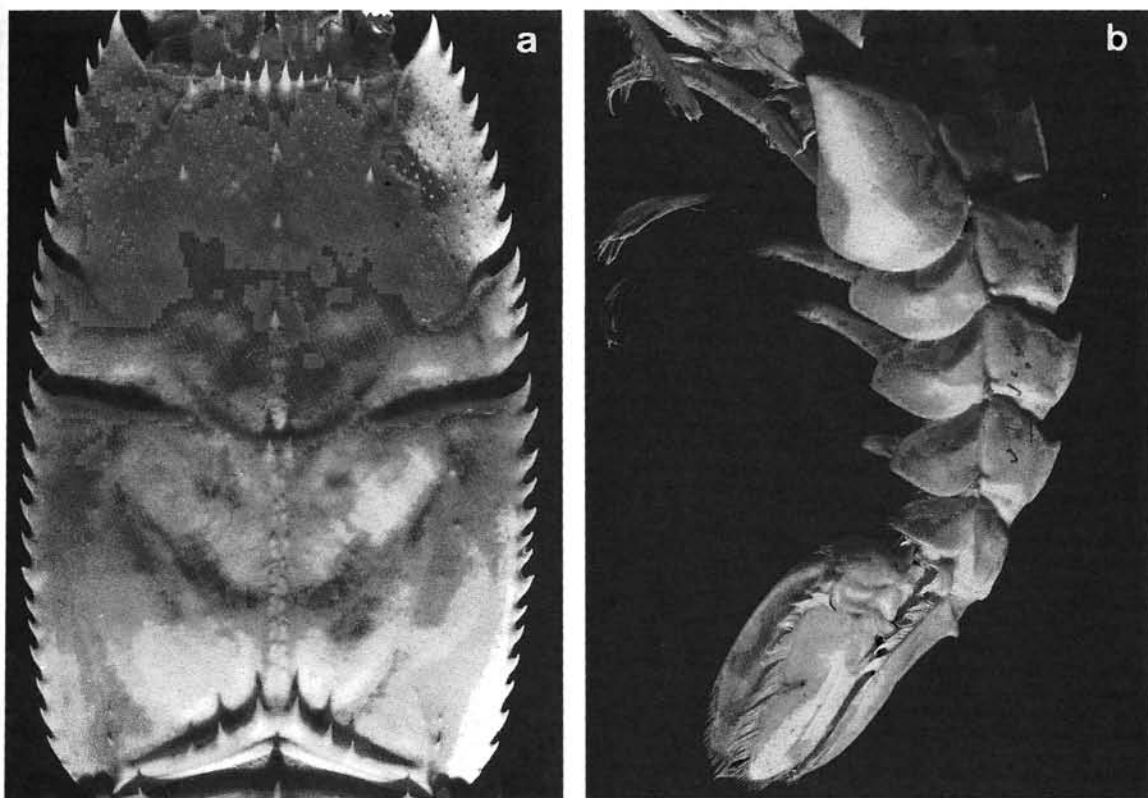


FIG. 16. — *Polycheles enthrix* (Bate, 1878), ♀ 46.7 mm, New Caledonia, MUSORSTOM 5: stn 383, 19°40.85'S, 158°46.10'E, 615-600 m (MNHN-Pa 1530): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

*Polycheles evexus* sp. nov.

Fig. 17

*Polycheles nanus* - FAXON, 1895: 121, pl. 33, figs 1, 1a-b [non Smith, 1884].

*Stereomastis nana* - WICKSTEN, 1989: 304. — HENDRICKX, 1995: 156 [non Smith, 1884].

MATERIAL EXAMINED. — Peru. "Anton Bruun": stn 766, 04°10'S, 81°27'W, 1860-1815 m, 9.09.1966: 3 ♀ 22.8-23.9 mm (USNM).

**Chile.** "Albatross": stn 2788, Chonos Arch., 45°35'S, 75°55'W, 1890 m, 11.02.1883, id. M.J. RATHBUN: 3 ♂ 19.7-21.9 mm (USNM 28350). — Stn 2789, Chiloe I., 45°36'S, 75°28'W, 2416 m, 12.02.1883, id. W.L. SCHMITT: 1 spec. damaged (USNM 58644).

**TYPES.** — The male (21.9 mm cl) (USNM 28350) collected by the "Albatross", stn 2788 off Chile (45°35'S, 75°55'W, 1890 m), is the holotype; the other males from that sample are paratypes.

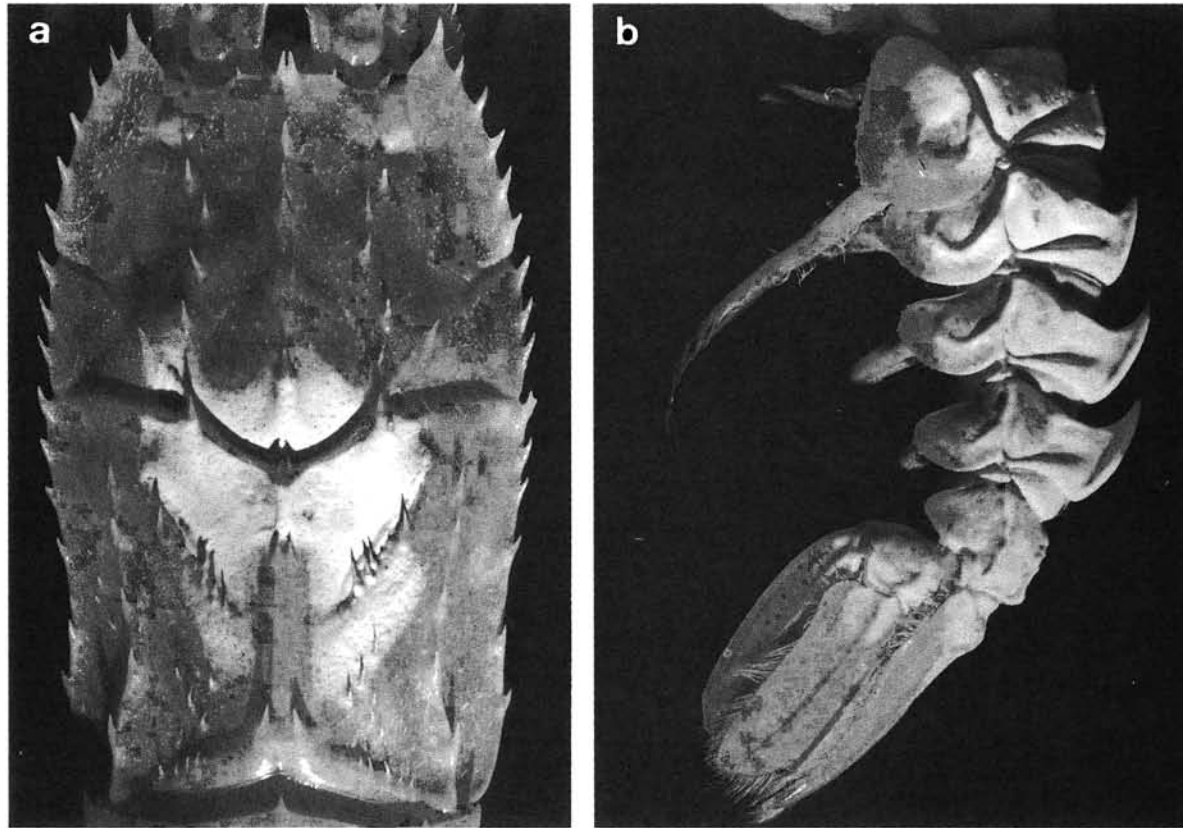


FIG. 17. — *Polycheles evexus* sp. nov. ♀ 22.8 m, Peru, "Anton Bruun", stn 766, 4°10'S, 81°27'W, 1860-1815 (USNM): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

**DESCRIPTION.** — Dorsal surface of carapace setose. Anterior margin straight, rostrum bifid. Internal angle orbital sinus with slender spine, external angle unarmed. Eyestalk bearing small spine, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth, anterolateral margin bispinose; posterior spine half as long as anterior. Spines on lateral margins of carapace upcurved, anteriormost large. Lateral spine formula 5-6:3:6-7, spines further apart posteriorly. Spine formula of median postrostral carina 1:1:2:1; postcervical carina with two pairs of spines. Gastro-orbital region with crescentic row of five prominent antrorse spines. Posterior margin of cervical groove with antrorse spine between median and branchial carina. Branchial carina prominent, subparallel to lateral margin, with five spines. Posterior margin of branchial groove spinose; several antrorse spines posterior to groove. Posterior margin of carapace spinose, submedian spine largest.

Abdominal tergites medially carinate. Carinae on tergites 1-5 bearing antrorse spine; spine of tergites prominent; sixth tergite bearing mesially pair of obsolete granulate carinae, joined posteriorly in a low tubercle. First tergite bearing two pairs of spinules distally on anterior margin. Tergites 2-5 with transversely oblique submedian grooves. Pleura 2-4 with curved rib mesially, margins minutely granulate. Second pleuron on Telson with obsolescent median crest anteriorly, two convergent carinae posteriorly.



Merus of P1 proximally unispinose, subterminal claw-like spine on upper margin, finely granulose on lower margin; carpus half as long as merus with subterminal spines on upper and lower margins; upper margin of propodus with subterminal spine. P5 subchelate in male, chelate in female.

ETYMOLOGY. — The Latin *evexus* (= rounded at the top) refers to the blunter, less prominent tubercles on the sixth abdominal tergite and telson.

REMARKS. — FAXON (1895: 121) correctly observed that his Pacific specimens "differ slightly, but constantly, from the type specimens from the Atlantic. The edges of the sulcated carina on the sixth abdominal somite are less prominently denticulated and the tubercle at the posterior end of this carina is lower. Further, the spine near the base of the dorsal surface of the telson of the type specimens is reduced to a blunt tubercle in the Pacific examples." However, he failed to recognize them as a distinct species.

DISTRIBUTION. — Eastern Pacific, Mexico, Peru, Chile; 1544 m (WICKSTEN, 1989) - 2418 m (FAXON, 1895).

*Polycheles helleri* Bate, 1878

Fig. 18

*Polycheles helleri* Bate, 1878a: 277 (p.p.); 1878b: 484 (p.p.); 1878c: 563 (p.p.); 1888: 138, pl. 14 fig. 2 (p.p.). — PAGENSTECHEER, 1879: 63. — SUND, 1920: 224. — HUTTON, 1904: 253.  
*Stereomastis helleri* - DE MAN, 1916: 4 (list). — BERNARD, 1953: 87. — FIRTH & PEQUEGNAT, 1971: 65. — GRIFFIN & STODDART, 1995: 245. — DAWSON, 1997: 18.  
*Stereomastis nana* - BABA, 1986: 157 [not Smith, 1884].

MATERIAL EXAMINED. — **Japan.** "Albatross": stn 4957, Kagoshima Gulf, 32°36'N, 132°23'E, 787 m, 23.08.1905: 1 ♂ 23.2 mm (USNM). — Stn 4958, Kagoshima Gulf, 32°32'N, 132°25'E, 1296 m, 23.08.1905: 1 ♂ 20.2 mm (USNM). — Stn 4969, Wakayama, 33°23'40"N, 135°33'E, 1057 m, 29.08.1905: 3 ♂ 19.1-24.3 mm; 1 ♀ 24.9 mm (USNM). — Stn 4971, Wakayama, 33°23'30"N, 135°34'E, 1168 m, 30.08.1905: 1 ♂ 23.5 mm; 1 ♀ 28.2 mm; 4 juvs (USNM). — Stn 4972, Wakayama, 33°25'45"N, 135°33'E, 792 m, 30.08.1905: 1 ♂ 21.5 mm; 1 ♀ 35.9 mm (USNM). — Stn 4973, Wakayama, 33°24'15"N, 135°30'30"E, 1080 m, 30.08.1905: 2 ♂ 28.2, 31.2 mm; 2 ♀ 29.5, 42.5 mm (USNM). — Stn 4975, Wakayama, 33°21'30"N, 135°38'50"E, 1282-981 m, 31.08.1905: 1 ♂ 22.5 mm (USNM). — Stn 4976, Wakayama, 33°22'50"N, 135°38'30"E, 981 m, 31.08.1905: 1 ♂ 22.6 mm (USNM). — Stn 4977, Wakayama, 33°23'N, 135°37'40"E, 979 m, 31.08.1905: 1 ♀ 18.5 mm (USNM). — Stn 5082, 34°05'N, 137°59'E, 1192 m, 20.10.1905: 1 ♂ 28.3 mm; 1 ♀ 34.8 mm; 1 ov. ♀ 45.6 mm (USNM).

NE Honshu I., Iwate Pref., 39°10.3'N, 142°25'E, 980-1000 m, 19.09.1979, det. K. BABA as *Stereomastis nana*: 1 ♀ 41.3 mm (NFU 530-2-1498).

Locality uncertain, 1000 m, 26.01.1975, coll. TORIYAMA, det. K. BABA as *Stereomastis nana*: 1 ♀ 40.5 mm (NFU 530-2-1497).

**Indonesia.** "Albatross": stn 5601, Sulawesi, 1°13'10"N, 125°17'05"E, 1399 m, 13.11.1909: 1 ov. ♀ 35.4 mm (USNM).

**New Guinea.** "Challenger": stn 218, 2°33'S, 144°04'E, 1957 m, 1.03.1875: 1 ♂ 20.8 mm damaged (NHM 1888.22).

**New Caledonia.** BIOGEOCAL: stn CP 260, 21°00.00'S, 166°58.34'E, 1820-1980 m, 17.04.1987: 2 ♀ 24.0 mm; 1 damaged (MNHN-Pa 1749).

**Australia.** Coral Sea. "Franklin": 11°33.02'S, 145°19.34'E, 1611-1584 m, 22.08.1988, id. H.E. STODDART as *Stereomastis helleri*: 1 ♂ 18.7 mm (AM P40360).

**Madagascar.** "Vauban": stn CH 126, 17°50'S, 43°07'E, 1475-1530 m, 16.01.1975: 1 ♂ 27.9 mm (MNHN-Pa 1559). — Stn CH 127, 17°50'S, 43°07'E, 1715-1750 m, 16.01.1975: 1 ♀ 36.7 mm (MNHN-Pa 1560). — Stn CH 131, 13°46'S, 47°33'E, 1490-1600 m, 20.01.1975: 1 ♂, 22.8 mm; 1 juv. (MNHN-Pa 1561). — Stn CH 132, 13°43.8'S, 47°29'E, 1950-2150 m, 20.01.1975: 1 ♂ 25.7 mm (MNHN-Pa 1562).

TYPE. — The male (20.8 mm cl) (NHM 1888.22) collected by the "Challenger" north of New Guinea is the holotype.

DESCRIPTION. — Lateral margins of carapace subparallel, convergent anteriorly. Dorsal surface of carapace sparsely setose, minutely granulate. Anterior margin of carapace straight, bearing bifid rostrum. Internal, external



angles of orbital sinus unarmed. Eystalk with mammilate spine curved distad. Basal antennular segment with smooth mesial margin, bispinose antero-external angle. Spine formula of lateral margins of carapace 6:3:8-9, spines diminish in size posteriorly to form indistinct serrulation. Spine formula of median postrostral carina 1:1:2:1; postcervical carina with two paired spines. Posterior margin of cervical groove with spine midway between median and branchial carinae. Gastro-orbital region bearing five spines; anterior and posterior spines largest. Branchial carina sinuous, well defined, prominently spinose; posteriormost spine largest. Posterior margin of carapace bearing submedian spines.

Abdominal tergites without oblique submedian grooves, medially carinate; carinae on tergites 2-5 bearing antrorse spine, increasing in size posteriorly; fifth carina noticeably larger; margins of double carina on sixth tergite smooth, confluent posteriorly. Anterior margin of first tergite with pair of lateral spinules. Pleura 3-5 with obsolescent rib mesially; second pleuron anteriorly ovate, medially faintly depressed, sparsely denticulate. Telson with two smooth, confluent carinae posteriorly.

Merus of P1 bispinose proximally on upper margin, lower margin smooth; carpus, half as long as merus, distally with claw-like spine on upper and lower margins; upper margin of propodus smooth except for subterminal spine, lower margin with single row of minute granules distally. P5 subchelate in male, chelate in female.

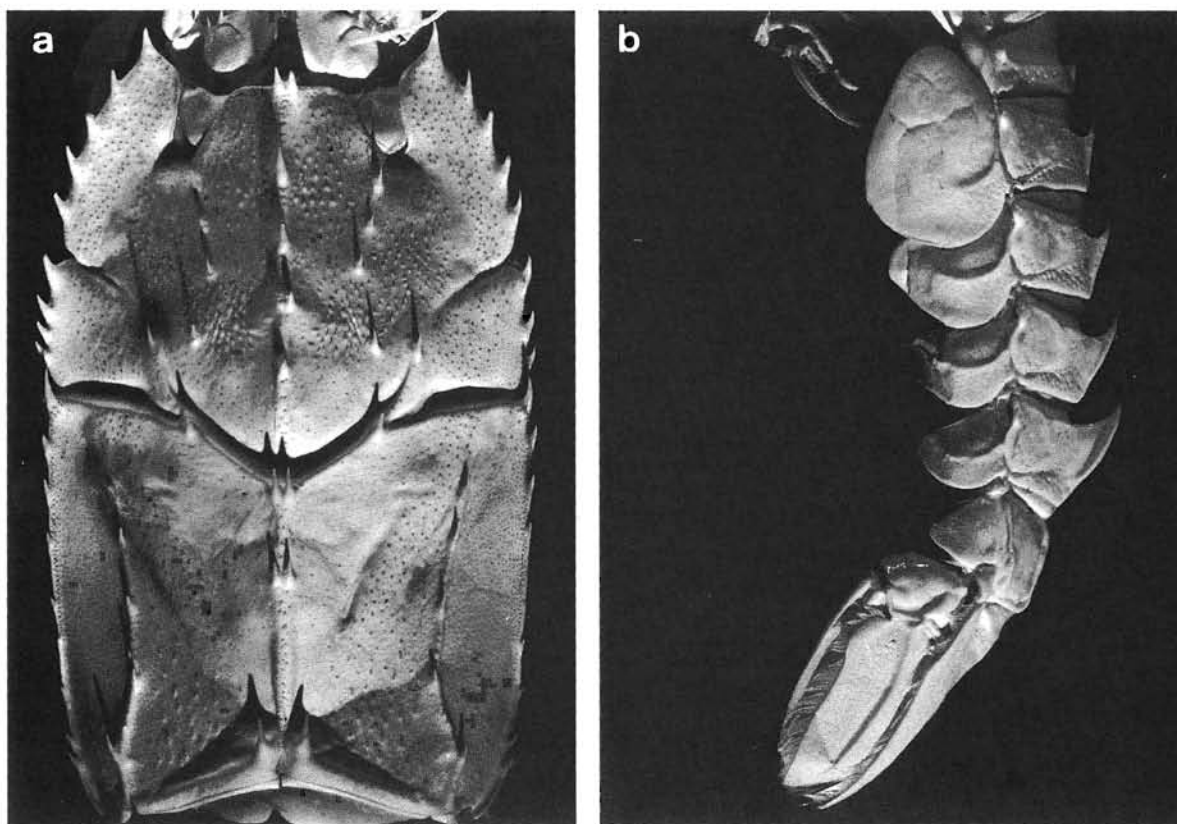


FIG. 18. — *Polycheles helleri* Bate, 1878, ♀ 36.7 mm, Madagascar, stn 127, 17°50'S, 43°07'E, 1715-1750 m (MNHN-P 1560): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

REMARKS. — BATE (1888: 141) wrote "I can detect no distinction of sufficient importance to separate *Pentacheles sculptus* from *Polycheles helleri*, nor would it have taken much consideration to decide their identity had it not been for the generic character of the fifth pair of pereiopoda, and that the specimens were procured from localities so widely apart". He was mistaken in all three points: *P. helleri* is easily distinguished from *sculptus* in lacking a spine on the internal orbital margin; both *helleri* and *sculptus* have the fifth the pereiopod subchelate in

the male, chelate in the female - BATE was mistaken because he examined immature specimens; and lastly, both *sculptus* and *helleri* are present in the Indo-Pacific Ocean.

GRIFFIN & STODDART (1995: 246) thought *helleri* "very similar to *S. nana* (Smith, 1884)... especially in the absence of a spine on the inner orbital angle". However, *P. nanus* bears a spine on the inner orbital angle, though it was omitted by SMITH (1884), and is further distinguished by possessing a prominent spine anteriorly on branchial groove, and having the carapace spinulose between the median postcervical and branchial carinae.

DISTRIBUTION. — Japan, New Caledonia, Australia, New Guinea, Indonesia, Madagascar; 787-2150 m.

*Polycheles nanus* (Smith, 1884)

Fig. 19

*Pentacheles nanus* Smith, 1884: 359; 1886a: 188; 1886b: 607, 612, 619, 651, pl. 7 figs 1, 1a. — VERRILL, 1885: 554. — FOWLER, 1912: 569.

*Pentacheles andamanensis* Alcock, 1894: 239. — ALCOCK & ANDERSON, 1895 pl. 10 fig. 3.

*Polycheles nanus* - CAULLERY, 1896: 386, pl. 16 fig. 12. — KOEHLER, 1896: 723. — BOUVIER, 1905a: 480; 1905c: 5; 1915: 2; 1917: 35. — HANSEN, 1908: 42. — STEBBING, 1908: 27; 1910: 377. — MURRAY & HIJORT, 1912: 539. — STEPHENSEN, 1912: 578; 1913: 11. — SELBIE, 1914: 21. — SUND, 1915: 372. — WILLIAMSON, 1915: 457. — JENSEN, 1928: 24. — MIRANDA & RIVERA, 1933: 17. — HEEGAARD, 1941: 20, fig. 6. — LE DANOIS, 1948: 255. — KRAMP, 1963: 57. — ALLEN, 1967: 55. — THIRIOT, 1974: 344 (list).

*Polycheles andamanensis* - ALCOCK, 1899: 33; 1901b: 169. — BOUVIER, 1905a: 481; 1905c: 5; 1917: 35. — RAMADAN, 1938: 124. — SEWELL, 1955: 205. — DONG *et al.*, 1986: 203.

*Polycheles grimaldii* Bouvier, 1905a: 481; 1905c: 4; 1917: 52, pl. 3 figs 2-4. — BOAS, 1939: 4, pls 2,4,5,6,9. — DANOIS, 1948: 255.

*Polycheles nanus* var. *grimaldii* - SELBIE, 1914: 21, pl. 1 figs 14-15. — RICHARD, 1907: 322.

*Stereomastis nana* - DE MAN, 1916: 4 (list). — CALMAN, 1925: 19. — BARNARD, 1950: 573, fig. 105e. — BERNARD, 1953: 87. — DAHL, 1953: 46. — KENSLEY, 1968: 293; 1981b: 29. — FIRTH & PEQUEGNAT, 1971: 65. — BAEZ & ANDRADE, 1979: 226. — WENNER, 1979: 436. — WENNER & BOESCH, 1979: 131. — GEORGE, 1983: 16. — DE SAINT LAURENT, 1985: 474. — SQUIRES, 1991: 354 (key). — TAKEDA & HANAMURA, 1994: 32. — DAWSON, 1997: 19.

*Stereomastis grimaldii* - DE MAN, 1916: 4 (list). — STEPHENSEN, 1923: 67. — ZARIQUIEY, 1968: 211. — BEAUBRUN, 1979: 42, figs 22-23. — MACPHERSON, 1991: 405, fig. 7.

*Stereomastis nanus* - STEBBING, 1917: 30. — ABELE & FELGENHAUER, 1982: 311 [non Smith, 1884].

*Stereomastis grimaldii* - THIRIOT, 1974: 344 (list).

*Stereomastis andamanensis* - OHTA, 1983: 230 (list) [erroneous spelling] [non Alcock, 1895].

*Stereomastis andamanensis* - DE MAN, 1916: 16, pl. 1 figs 2, 2b (p.p.). — DAHL, 1953: 46. — HOLTHUIS, 1984: 4. — GRIFFIN & STODDART, 1995: 244 (p.p.). — DAWSON, 1997: 17 (p.p.) [non Alcock, 1895].

not *Polycheles nanus* - FAXON, 1895: 121, pl. 33 figs 1, 1a-b [= *P. evexus* sp. nov.].

not *Polycheles grimaldii* - WOLFF, 1967: 236 (photo) [= *P. talismani* (Bouvier, 1917)].

not *Stereomastis nana* - MIYAKE, 1982: 78, pl. 26 fig. 6 [= *P. typhlops* Heller, 1862].

not *Stereomastis nana* - BABA *et al.*, 1986: 284 [= *P. helleri* Bate, 1878].

not *Stereomastis nana* - BABA *et al.*, 1986, pl. 109 [= *P. enthrinx* (Bate, 1878)].

not *Stereomastis nana* - WICKSTEN, 1989: 304 [= *P. evexus* sp. nov.].

not *Stereomastis nana* - HENDRICKX, 1995: 156 [= *P. evexus* sp. nov.].

MATERIAL EXAMINED. — Bay of Biscay. "*Thalassa*": stn 333, 44°10.5'N, 4°32.'W, 1900-1950 m, 14.10.1971: 1 juv. (MNHN-Pa 346). — Stn 453, 48°34'N, 10°51.6'W, 1975-2070 m: 1 ♂ 20.8 mm; 2 ♀ 21.9, 19.4 mm (MNHN-Pa 352).

BIOGAS IV: stn CV 33, 44°04.6'N, 4°18.1'W, 1913 m, Feb. 1974: 3 ♀ 25.7-26.3 mm (MNHN-Pa 644).

BIOGAS XI, CP 37: stn 1, 47°33.80'N, 8°40.5'W, 2175 m, 11.10.1981, coll. IFREMER: 1 ♀ damaged (MNHN-Pa 1138).

Western Sahara. "*Meteor*": stn M36-100 AT 152, 21°27.1'N, 18°16.1'W, 2049-2110 m, 26.02.1975: 2 spec. (SMF 24646).

West Africa. Senegal. "*Talisman*": stn 98, 17°16'N, 20°17'W, 2324 m, 17.07.1883: 1 ♂ damaged (MNHN-Pa 22).

— Stn 100, 17°16'N, 19°19'W, 1550 m, 17.07.1883: 1 ♀ 35.1 mm (MNHN-Pa 21).

Ivory Coast. "*Pillsbury*": stn 233, 5°19'N, 4°14'E, 2013-1464 m, 12.05.1965: 1 ♀ 49.4 mm (RMNH).

Azores. "*Talisman*": stn 698, 39°11'N, 33°04'W, 1846 m, 18.07.1883: 1 ♂ 18.6 mm (MNHN-Pa 23). — Stn 863, 39°19'N, 29°15'W, 1940 m, 1.08.1897: 1 ♀ 21.7 mm (MNHN-Pa 24).

CANCAP 5: stn 5.016, 37°21'N, 25°29'W, 2000-2100 m, 26.05.1981: 5 ♂ 19.5-20.7 mm; 4 ♀ 19.8-20.0 mm (RMNH). — Stn 5.123, 38°56'N, 27°44'W, 2300-2400 m, 4.06.1981: 1 ♂ 29.8 mm (RMNH). — Stn 5.162, 39°21'N, 30°51'W, 900 m, 11.06.1981: 1 juv. (RMNH).

"*Atlantis*": cr. 152, stn 20, 37°50.5'N, 26°00'W, 2560 m, 18.08.1948, coll. L.W. HUTCHINS, id. F.A. CHACE as *P. grimaldii*: 1 ♂ 22.0 mm (USNM 88693).

**SE Atlantic. Off Cape Province.** "*Africana*": 32°26'S, 16°11'E, 1302 m, 27.01.1993: 2 ov. ♀ 26.1, 27.1 mm (SAM). — 32°22'S, 16°09'E, 1150 m, 14.01.1995: 3 ♀ 23.2-27.7 mm (SAM).

**Canada.** "*Albatross*": stn 2706, Nova Scotia, 41°28'05"N, 65°35'05"W, 2138 m, 27.08.1886: 2 ♂ 17.7, 23.1 mm; 3 ♀ 19.1-22.7 mm (USNM 11887).

**United States.** "*Albatross*": stn 2102, 38°44'N, 72°38'W, 2212 m, 5.11.1883: 1 ♂ 22.8 mm (USNM 5714). — Stn 2035, 39°26'12"N, 70°02'37"W, 2490 m, 17.07.1883: 1 ♀ damaged (USNM 7142). — Stn 2077, 41°09'40"N, 66°02'W, 2296 m, 4.09.1883: 3 ♂ 19.0-22.3 mm (USNM 7143). — Stn 2102, 38°44'N, 72°38'W, 2212 m, 5.11.1883: 1 ♂ 22.6 mm; 1 ♀ 22.5 mm (USNM 5714). — Stn 2103, 38°47'20"N, 72°37'00"W, 1964 m, 5.11.1883: 2 juvs (AMNH 15329). — Stn 2105, 37°50'N, 73°03'50"W, 2551 m, 6.11.1883: 1 ♀ 18.7 mm (USNM 5711). — Stn 2106, 37°41'20"N, 73°03'20"W, 2838 m, 6.11.1883: 1 ♀ 19.0 mm (USNM 5710). — Stn 2115, 35°49'30"N, 74°34'45"W, 1541 m, 11.11.1883: 1 ♂ 20.4 mm; 1 ♀ 19.5 mm (USNM 5709). — Stn 2116, 35°45'23"N, 74°31'25"W, 1624 m, 11.11.1883: 3 ♀ 19.0-35.6 mm (USNM 5708). — Stn 2205, 39°35'00"N, 71°18'45"W, 1931 m, 20.08.1884: 2 ov. ♀ 27.8, 27.6 mm (AMNH 15239); 2 ♀ 23.5, 26.7 mm (USNM 8237). — Stn 2206, off New Jersey, 39°35'00"N, 71°24'30"W, 1877 m, 20.08.1884: 1 ov. ♀ 29.5 mm; 1 juv. (USNM 8238). — Stn 2230, 38°27'00"N, 73°02'00"W, 2102 m, 12.09.1884: 1 ♀ 23.2 mm (AMNH 15589). — Stn 2533, 40°16'30"N, 67°26'15"W, 1490 m, 15.07.1885: 1 ov. ♀ 31.3 mm (AMNH 15176). — Stn 2728, 36°30'N, 74°33'W, 1546 m, 25.10.1886: 1 ov. ♀ 31.8 mm (AMNH 15104). — Stn 2729, 36°36'N, 74°32'W, 1222 m, 25.10.1886: 1 ♀ 22.1 mm (AMNH 15104). — Stn 2731, 36°45'N, 74°28'W, 1406 m, 25.10.1886: 1 ov. ♀ 32.3 mm (USNM 12270). — Stn 2732, 37°27'N, 73°33'W, 2074 m, 26.10.1886: 1 ov. ♀ 27.3 mm (USNM 12274). — Stn 2734, 37°23'N, 74°33'W, 1514 m, 26.10.1886: 1 ov. ♀ 29.7 mm (AMNH 15106).

"*Gilliss*": stn 71, 36°37.36'N, 74°28'W, 1695-1734 m, 17.11.1974: 1 ♂ 29.6; 1 ♀ damaged (USNM 314136). — Stn 72, 36°36.18'N, 74°24.48'W, 1730-1790 m, 17.11.1974: 1 ♂ 27.9 mm (USNM 314136). — Stn 84, 36°36'N, 74°24.24'W, 1740-1775 m, 19.11.1974: 1 ♂ 18.1 mm (USNM 314136). — Stn 95, 37°05'N, 74°12.30'W, 2250 m, 22.11.1974: 1 ♂ 20.7 mm (USNM 314136). — Stn 97, 37°00.18'N, 74°15'W, 1400-1460 m, 23.11.1974: 2 ♂ 19.0, 20.4 mm; 3 ♀ 19.1-26.9 mm; 2 ov. ♀ 26.1, 30.6 mm (USNM 314136).

**Wallis & Futuna Is area.** — MUSORSTOM 7. *SW of Combe Bank*: stn CP 621, 12°34.4'S, 178°11.5'W, 1280 m, 28.05.1992: 1 ♀ 27.0 mm (MNHN-Pa 1712).

**Vanuatu.** MUSORSTOM 8: stn CP 1124, 15°01.72'S, 166°56.51'E, 532-599 m, 9.10.1994: 1 ♀ 43.7 mm (MNHN-Pa 1565). — Stn CP 1125, 15°57.63'S, 166°38.43'E, 1160-1220 m, 10.10.1994: 1 ♂ 22.8 mm; 1 juv. (MNHN-Pa 1566). — Stn CP 1126, 15°58.35'S, 166°39.98'E, 1210-1260 m, 10.10.1994: 1 ♀ 30.2 mm (MNHN-Pa 1567). — Stn CP 1127, 15°58.86'S, 166°37.82'E, 1052-1058 m, 10.10.1994: 1 ♀ 32.3 mm (MNHN-Pa 1568).

**New Caledonia.** BIOCAL: stn CP 30, 23°09'S, 166°41'E, 1140 m, 29.08.1985: 1 ♀ 36.2 mm (MNHN-Pa 1569).

BIOGEOCAL: stn CP 205, 22°40.61'S, 166°28.01'E, 1350-1380 m, 8.04.1987: 1 juv. (MNHN-Pa 1713).

HALIPRO 1: stn CP 858, 21°42'S, 166°41'E, 1000-1120 m, 20.03.1994: 1 ♀ (MNHN-Pa 1570).

BATHUS 1: stn CP 651, 21°41.8'S, 166°40.1'E, 1080-1180 m, 11.03.1993: 1 ♂ 25.1 mm (MNHN-Pa 1678).

HALIPRO 2: stn BT 95, 24°00'S, 162°08'E, 1224-1233 m, 25.11.1996: 1 ♂ 22.4 mm; 1 ♀ 29.7 mm (MNHN-Pa 1699). — Stn BT 103, 24°54'S, 162°09'E, 1235-1256 m, 26.11.1996: 1 ♀ 41.3 mm (MNHN-Pa 1700). — Stn BT 105, 25°45'S, 162°50'E, 1200-1218 m, 27.11.1996: 1 ♀ 32.4 mm (MNHN-Pa 1701). — Stn BT 106, 25°27'S, 163°16'E, 1315-1357 m, 27.11.1996: 2 ♀ 25.2, 23.8 mm (MNHN-Pa 1702).

**Chesterfield Islands.** MUSORSTOM 5: stn 323, 21°18.52'S, 157°57.62'E, 970 m, 14.10.1986: 1 ♀ 21.9 mm (MNHN-Pa 1571). — Stn 324, 21°15.01'S, 157°51.33'E, 970 m, 14.10.1986: 1 ♀ 22.7 mm (MNHN-Pa 1572).

**New Zealand.** NZOI. stn U 198, 34°59.3'S, 162°11.21'E, 1573 m, 26.09.1982: 1 juv. (NIWA).

**Australia.** Lord Howe Rise. "*Franklin*": 27°59.3'S, 162°48.6'E, 1250 m, 6.05.1989, id. H.E. STODDART as *Stereomastis andamanensis*: 1 ♀ 42.6 mm (AM P40370).

**Japan.** "*Albatross*": stn 4909, Kagoshima Gulf, Koshiki Is, 31°38'30"N, 129°27'30"E, 540 m, 11.08.1906: 1 ♀ 24.0 mm (USNM).

**East China Sea.** "*Ryoan Maru*": 29°11'N, 127°11'E, 300-310 m, 17.03.1978, det. Y. MIYA as *Stereomastis andamanensis*: 2 ♀ 20.6, 34.9 mm (NUM cr10238).

**Philippines.** "*Albatross*": stn 5468, Lagonoy Gulf, San Bernardino Str., 13°35'30"N, 123°40'28"E, 1024 m, 18.06.1909: 1 ♀ 32.7 mm (USNM).

**Indonesia.** "*Siboga*": stn 48, 8°47'S, 188°44.3'E, 2000 m, 13.04.1899: 1 juv. (ZMA).

CORINDON: stn CH 241, 0°58'S, 119°15'E, 1525-1550 m: 1 juv. (MNHN). — Stn CH 286, 2°03'S, 118°45'E, 1710-1730 m: 3 juvs (MNHN-Pa 1573).

**Arabian Sea.** "*Investigator*": stn 108, off Cape Comorin, 7°04'N, 76°34'15"E, 1877 m; 24.10.1890: 1 ♀ 20.5 mm (IM 532/7). — Stn 250, SW Ceylon, 6°54'30"N, 79°34'30"E, 878 m, 20.10.1898, det. ALCOCK as *P. andamanensis*: 1 ♀ 31.0 mm; 3 juvs (IM 3421/10).

**Gulf of Aden.** "Meteor 5": stn Me5-257, 13°06.6'N, 47°54.0'E, 2227-2250 m, 11.03.1987: 2 ♂ 19.6, 21.8 mm (SMF 24653). — Stn 262, 13°19.7'N, 47°29.2'E, 1830-1837 m, 12.03.1987: 1 ♂ 22.0 mm (SMF 24652).

**TYPES.** — The male (22.8 m cl) (USNM 5714) collected by the "Albatross" at stn 2102 (38°44'N, 72°38'W, 2212 m) is designated here as the lectotype of *P. nanus* Smith, 1884.

The female (20.5 mm cl) (IM 532/7) collected by the "Investigator" stn 108, off Cape Comorin (7°04'N, 76°34'15"E, 1908 m) is the holotype of *Pentacheles andamanensis* Alcock, 1894.

The female (35.1 mm cl) (MNHN PA21) collected by the "Talisman" off Senegal is the holotype of *P. grimaldii* Bouvier, 1905.

**DESCRIPTION.** — Dorsal surface of carapace setose. Anterior margin straight, rostrum bifid. Internal angle of orbital sinus with slender spine, external angle unarmed. Eyestalk bearing small spine, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth, anterolateral margin bispinose, posterior spine half as long as anterior. Spines on lateral margins of carapace upcurved, anteriormost largest. Lateral spine formula 5-6:3:6-7, spines further apart posteriorly. Spine formula of median postrostral carina 1:1:2:1 anterior to cervical groove, postcervical carina with two pairs of spines. Gastro-orbital region with crescentic row of five prominent antrorse spines. Posterior margin of cervical groove with antrorse spine between median and branchial carinae. Branchial carina prominent, subparallel to lateral margin, with five spines. Carapace between branchial and median carinae unarmed anteriorly, obliquely grooved medially, spinulose posteriorly. Large spine distally on posterior margin of oblique groove. Posterior margin of carapace spinose, submedian spines largest. First abdominal tergite bearing two pairs of spines distally on anterior margin.

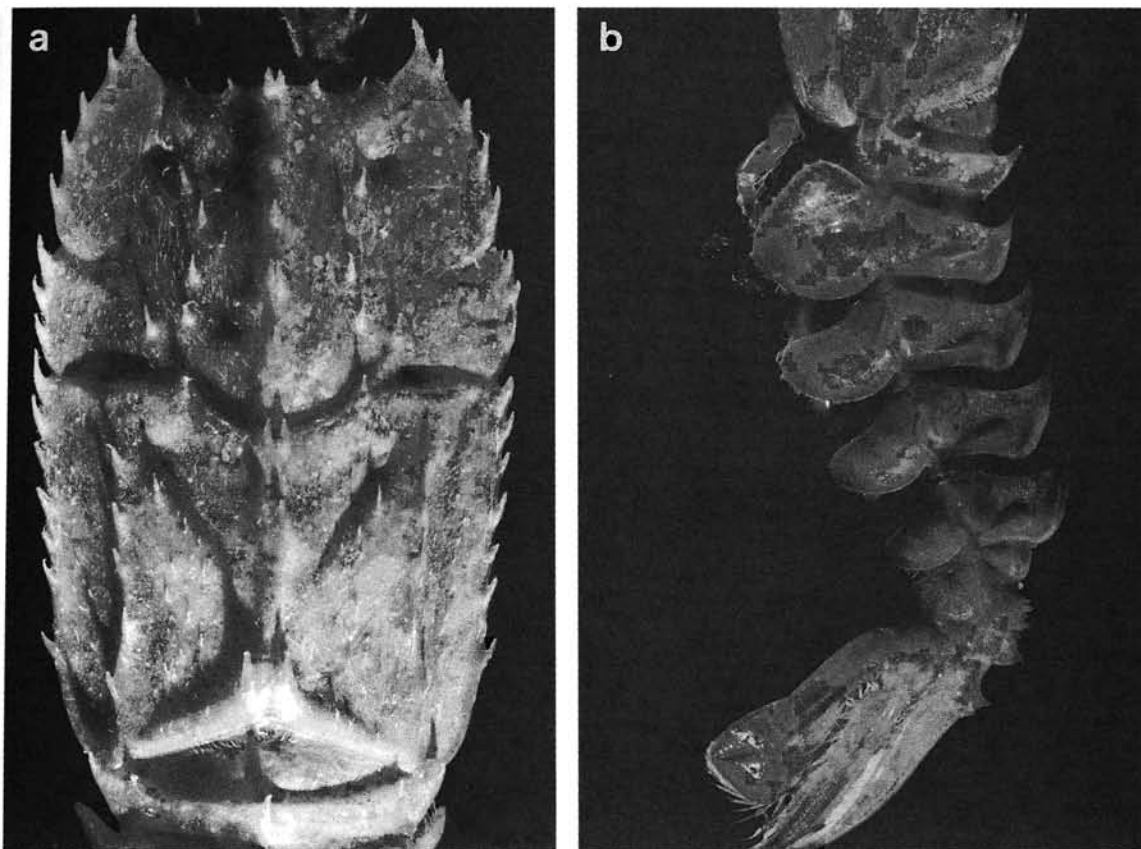


FIG. 19. — *Polycheles nanus* (Smith, 1884), ♀ 26.1 mm, Off Cape Province, "Africana", 32°26'S, 16°11'E, 1302 m (SAM): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

Abdominal tergites medially carinate. Carinae on tergites 1-5 bearing antrorse spine; spine of tergites 3-5 longer, salient; sixth tergite bearing mesially pair of denticulate carinae, joined posteriorly in a prominent tooth. Tergites 2-5 with transversely oblique submedian grooves. Pleura 2-4 with curved rib mesially, margins minutely granulate. Second pleuron ovate. Telson with denticulate median crest anteriorly, two minutely serrulate, convergent carinae posteriorly.

Merus of P1 proximally bispinose with subterminal claw-like spine on upper margin, finely granulose on lower margin; carpus half as long as merus, subterminal spines on upper and lower margins; upper margin of propodus with subterminal spine, lower margin with two minutely granulate rows distally. P5 subchelate in male, chelate in female.

*Color.* — BOUVIER (1917: 54) wrote "D'après deux aquarelles ..... l'animal est rouge avec une teinte d'un blanc jaunâtre sur le céphalothorax". But he adds "il est probable que cette teinte (blanc jaunâtre) est due à la vase".

REMARKS. — *P. nanus* is distinguished from *P. sculptus* in having the region between the branchial and median carinae spinulose posteriorly, and having a prominent spine anteriorly on the branchial groove.

SMITH (1884: 359) described *P. nanus*: "the surface of the branchial region on both sides of the sublateral carina is armed with many small spines or spinules, and on the anterior part of the oblique ridge between the dorsal and sublateral carinae there is one spine as large as the spines of the sublateral carina itself", and added "the distinctive characters are well marked and very constant in all the large number of specimens seen". Yet he hesitated: "This species is very closely allied to *P. sculptus* and will possibly prove to be only a dwarf deep-water variety of it". FAXON (1895: 121) reiterated: "*P. nanus* may be only a dwarf deep-water variety of *P. sculptus*". HANSEN (1908: 42), who examined the large series of specimens collected by the "Ingolf" expedition, disagreed: "*P. nanus* must remain an independent species well-marked off from *P. sculptus*". Yet, KENSLEY (1968: 294) persisted: "The possibility exists that *nana* is a juvenile form of *sculpta* and that some of the spines are lost with development". However, the distinguishing characters separating *P. sculptus* and *P. nanus* were found to be constant in the many specimens studied; this, together with the comparable vertical distributions of both species, and the ovigerous *nanus* specimens found, convince us that *sculptus* and *nanus* are indeed distinct species.

SMITH's (1884) omission of the spine on the interior margin of the orbital sinus (though the type specimens possess them) moved BOUVIER (1905a) to describe *P. grimaldii*. BOUVIER (1905c: 4) gallantly complimented the type specimen on being "une très jolie femelle" and pronounced "j'ai pu constater que le *Polycheles grimaldii* est une forme représentative... d'une espèce américaine décrite et figurée par Smith, le *P. nanus*". Indeed, SELBIE (1914: 2) regarded *grimaldii* as "merely... a variety" of *P. nanus*, and CALMAN (1925: 19) surmised it "may even be identical with the typical form of that species".

DE MAN (1916: 20) recognized the similarity between *andamanensis* and *nanus*: "This species [*andamanensis*] now bears such a close resemblance to *Stereom. nana* (S.I. Smith), that I wonder why Col. Alcock has made no mention of it". Yet the specimens DE MAN described as *andamanensis* are in fact *P. phosphorus*.

DISTRIBUTION. — Worldwide: Iceland, Irish Sea, Bay of Biscay, Portugal, West Africa, Azores, South Africa, Mid Atlantic Bight, Greenland, Canada, United States, Wallis & Futuna Is area, Vanuatu, New Caledonia, New Zealand, Australia, Japan, East China Sea, Philippines, Indonesia, India, Arabian Sea, Gulf of Aden; 300 m (present work) - 4000 m (STEPHENSEN, 1923).

### *Polycheles pacificus* (Faxon, 1893)

Fig. 20

*Polycheles sculptus pacificus* Faxon, 1893: 196; 1895: 122, pl. 50 figs 1, 1a. — CAULLERY, 1896: 386. — HANSEN, 1908: 42. — MURRAY & HJORT, 1912: 587, fig. 427. — BOUVIER, 1915: 2. — SUND, 1915: 372. — LUKE, 1977: 20. — PRETZMANN, 1983: 316.

*Stereomastis sculpta pacifica* - DE MAN, 1916: 5 (list). — FIRTH & PEQUEGNAT, 1971: 71. — WICKSTEN, 1980: 914; 1989: 293. — WICKSTEN & MENDEZ, 1982: 110. — HENDRICKS, 1995: 156. — DAWSON, 1997: 23.

*Polycheles sculptus* - DEL SOLAR, 1972: 11 [non Smith, 1880].

*Stereomastis pacifica* - RETAMAL, 1981: 16. — QUINTANA & RETAMAL, 1984: 133.

**MATERIAL EXAMINED.** — **United States. California.** SW Pt Conception, 900-1080 m, 10.05.1979, id. M. WICKSTEN as *Stereomastis sculptus pacificus*: 1 ♂ 33.8 mm (LACM ex AHF 1679-1). — Tanner Bank, 32°52.56'N, 120°09.06'W, 1080 m, 26.10.1979, id. M. WICKSTEN as *Stereomastis sculptus pacificus*: 1 ♀ 39.7 mm (LACM ex AHF). — SW Santa Rosa I., 1080-1260 m, 18.10.1979, id. M. WICKSTEN as *Stereomastis sculptus pacificus*: 1 ♂ 32.2 mm (LACM ex AHF).

**Mexico. Baja California.** "Albatross": stn 5685, 25°42'45"N, 113°38'30"W, 1161 m, 22.04.1911, 1 ♂; 1 ♀ (damaged) (AMNH A6281).

"Velero III": stn 13770, Off San Juanito I., 1125-1530 m, 21.01.1970, id. M. WICKSTEN as *Stereomastis sculptus pacificus*: 1 ♀ 39.7 mm (LACM ex AHF).

31°59.6'N, 118°47.4'W, 1110 m, 11.1978, id. M. WICKSTEN as *Stereomastis sculptus pacificus*: 1 ov. ♀ 46.9 mm (LACM ex AHF 1396-1).

**Gulf of Panama. "Galathea":** stn 724, 5°44'N, 79°20'W, 2712-3330 m, 12.05.1952: 2 ♀ 18.9, 21.8 mm (ZMC). — Stn 739, 7°22'N, 79°32'W, 938 m, 15.05.1952: 25 ♂ 31.0-34.7 mm; 12 ov. ♀ 41.9-53.3 mm; 25 ♀ 39.0-49.6 mm (ZMC). — Stn 745, 7°15'N, 79°25'W, 938 m, 16.05.1952: 1 ♂ 33.0 mm; 1 ov. ♀ 46.3 mm; 2 ♀ 36.2, 40.6 mm (ZMC).

"Gilliss": stn 22, 7°28.5'N, 79°12'W, 741-823 m, 18.01.1972: 1 ♂ 33.9 mm; 3 ♀ 42.5-43.7 mm (RMNH).

"Albatross": stn 3394, 7°21'N, 79°35'W, 920 m, 10.03.1891: 13 ♂ 31.5-34.4 mm; 19 ♀ 37.1-48.1 mm (USNM 21076).

**Ecuador. "Anton Bruun":** stn 770, Gulf of Guayaquil, 3°15'S, 80°55'W, 945-960 m, 10.09.1966: 3 ♂ 33.9-34.2 mm; 1 ♀ 37.1 mm (USNM).

450-500 m, 2.05.1967, coll. G. RICAUTER: 1 ov. ♀ 42.4 mm (RMNH 23445).

**Peru. "Anton Bruun":** 7°49'S, 80°38'W, 605-735 m, 5.09.1966: 3 ♂ 31.3-34.1 mm; 3 ♀ 39.2-40.3 mm (USNM). — 7°44.05'S, 80°30.05'W, 750-760 m, 23.01.1974, id. M. WICKSTEN as *Stereomastis sculptus pacificus*: 2 ♂ 33.3, 35.4 mm; 1 ♀ 40.4 mm (LACM ex AHF 104-01). — 7°46'S, 80°31'W, 800 m, 23.01.1974, id. M. WICKSTEN as *Stereomastis sculptus pacificus*: 2 ♂ 35.6, 35.4 mm (LACM ex AHF 103-05).

**Chile. "Anton Bruun":** stn 714, 25°00'S, 70°40'W, 950 m, 16.08.1966: 3 ♂ 32.7-35.5 mm (USNM).

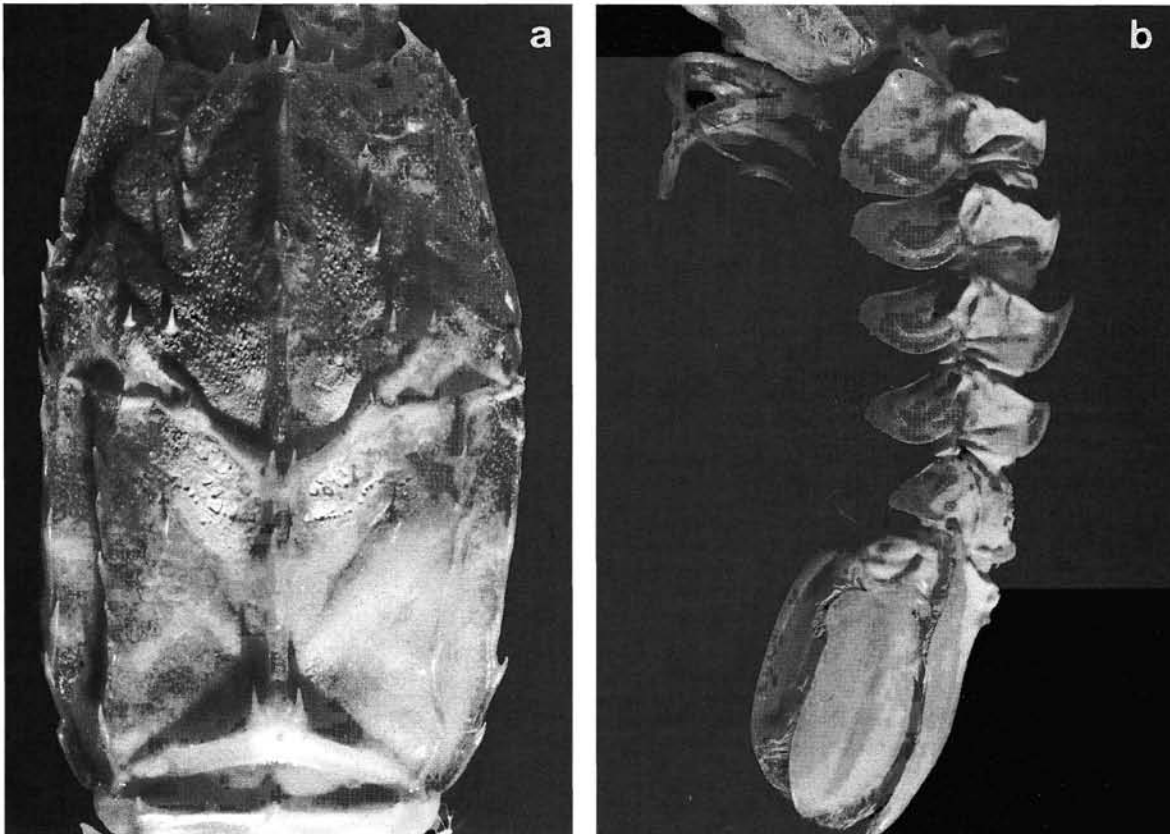


FIG. 20. — *Polycheles pacificus* (Faxon, 1893), ♂ 32.0 mm, Panama, "Albatross" stn 3394, 7°21'N, 79°35'W, 920 m (USNM 21076): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.



TYPES. — The male (34.4 mm cl) (USNM 21076) collected by the "Albatross" stn 3394, off Panama (7°21'N, 79°35'W, 920 m) is the holotype. The other specimens of the sample are paratypes

DESCRIPTION. — Dorsal surface of carapace densely setose. Anterior margin of carapace nearly straight, bearing two rostral spines. Internal angle of orbital sinus spinose, external angle convex, unarmed. Eyestalk bearing distad mammilate tubercle. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth, anterolateral angle bispinose. Spine formula of lateral margin of carapace 6:3:7. Spine formula of median postrostral carina 1:2:1; postcervical carina bearing two paired spines. Gastro-orbital region with five spines. Branchial carina well-defined, bearing 5 prominent spines. Single spine midway between second spine of branchial carina and median postcervical carina. Posterior margin of carapace bearing pair of prominent submedian spines.

First abdominal tergites bearing two pairs of spines distally on anterior margin, lateral pair minute, mammilate. Median carina on tergites 1-4 bearing antrorse spine, increasing in size posteriorly. Fifth carina without antrorse spine, bulbous. Sixth tergite bearing lyre-shaped carina, posteriorly with raised knob. Shallow, transversely oblique grooves on either side of median carina 2-5. Pleura 2-5 with crescentic carina mesially; margins setose, occasionally denticulate. Second pleuron not produced anteriorly. Telson with median blunt crest anteriorly; rounded, convergent carinae posteriorly.

Merus of P1 with two spines proximally and a single subterminal claw-like spine on upper margin; minutely serrulate lower margin; carpus with subterminal claw-like spine on upper and lower margins; lower margin of propodus with two rows of spines distally, upper margin with subterminal antrorse spine. P5 subchelate in male, chelate in female.

Color. — "Pale rose purple on the dorsal side of the carapace and abdomen, deepening to a brighter orange red on the thoracic appendages, the branches of the posterior abdominal appendages, and the flagella of both pairs of antennae, and fading to a delicate bluish white on the hepatic and anterior branchial regions. The raised ridges of the carapace and abdomen are whitish, the setae on the margins of the basal parts of antennae, swimmerets, etc., are yellow". (FAXON, 1895: 123, pl. C).

REMARKS. — FAXON (1893: 196) separated *P. sculptus pacificus* from the typical form citing the "small spine on each branchial region inside of and on a level with the second spine of the submarginal carina ... the pleurae of the second abdominal somite have a different shape... These differences, although slight, are constant". Other distinguishing characters are the mammilate lateral spine on the first abdominal tergite, the bulbous median carina on the fifth abdominal tergite and the prominent knob posteriorly on the median carina of the sixth abdominal tergite.

DISTRIBUTION. — Eastern Pacific, from California to Chile; 600 m (present work) - 3380 m (WICKSTEN, 1981).

### *Polycheles perarmatus* Holthuis, 1952

Fig. 21

*Polycheles typhlops perarmata* Holthuis, 1952b: 7, figs 1-2. — BURUKOVSKY, 1983: 134, fig. 178.

*Polycheles perarmatus* FOREST, 1963: 627. — FRANSEN *et al.*, 1997: 61.

*Polycheles typhlops* - SPRINGER & BULLIS, 1956: 14 (p.p.).

*Polycheles typhlops perarmatus* - FIRTH & PEQUEGNAT, 1971: 56, fig. 8. — GRIFFIN & STODDART, 1995: 243. — DAWSON, 1997: 15.

MATERIAL EXAMINED. — West Africa. Ivory Coast and Nigeria. "Pillsbury": stn 44, 5°05'N, 4°00'W, 586-403 m, 30.05.1964: 3 juvs (RMNH). — Stn 255, 3°49'N, 7°38'E, 269-264 m, 14.05.1965: 1 ♂ 40.2 mm; 2 ♀ 41.4, 49.8 mm (RMNH). — Stn 256, 3°49'N, 7°38'E, 267-264 m, 14.05.1965: 8 ♂ 48.0-54.4 mm; 2 ♀ 54.4, 51.1 mm (RMNH).

Ghana. GUINEAN TRAWLING SURVEY I: stn 28\8, 4°16'N, 2°09.30'W, 380-400 m, 4.10.1963: 1 ♂ 24.9 mm (MNHN-Pa 559).

Equatorial Guinea. "Atlantide": stn 120, 2°09'N, 9°27'E, 260-650 m, 1.03.1946: 1 ♂ 19.0 mm (ZMC).

Gabon. 1°64'S, 8°44'E, 396 m, 3.09.1963, id. R.B. MANNING: 1 ♂ 37.6 mm (USNM 125986). — "Mbizi": stn AS 154, 0°15'S, 8°47'E, 239 m, 15.03.1949: 2 ♀ 50.7, 45.8 mm (RMNH 8622).



*Congo. "Ombango"*: 5°34'S, 11°35'W, 345-350 m, 7.07.1967, coll. A. CROSNIER: 1 ♀ 52.2 mm (MNHN-Pa 1122). — 4°49'S, 11°17'W, 300-600 m, 30.10.1969, coll. A. CROSNIER: 1 ♂ 50.8 mm; 1 ♀ 46.2 mm (MNHN-Pa 1575).

**Gulf of Mexico. "Albatross"**: stn 2376, 29°03'03"N, 88°16'W, 583 m, 11.02.1885, id. M.J. RATHBUN as *P. agassizii*: 1 ♂ 21.2 mm; 1 ♀ 31.1 mm; 1 juv. (USNM 23470). — Stn 2377, 29°07'05"N, 88°08'W, 378 m, 11.02.1885, id. M.J. RATHBUN as *P. agassizii*: 1 ♂ 33.7 mm; 2 ♀ 44.3, 47.6 mm (USNM 9654). — Stn 2398, 28°45'N, 86°26'W, 409 m, 14.03.1885, id. M.J. RATHBUN as *P. agassizii*: 1 ♀ 60.1 mm (USNM 9743).

**"Oregon"**: stn 126, 29°02'N, 88°34.5'W, 351 m, 23.09.1950: 3 ♂ 33.2-41.2 mm; 2 ♀ 32.6, 41.4 mm (USNM 91443). — Stn 542, 27°41'N, 94°59'W, 450-540 m, 16.04.1952, id. F.A. CHACE as *P. typhlops*: 1 ♀ 38.5 mm (USNM 93661). — Stn 1407, 28°07'N, 89°59'W, 464 m, 20.09.1955, id. F.A. CHACE as *P. typhlops*: 1 ♂ 35.2 mm; 1 ov. ♀ 40.8 mm (USNM 99454). — Stn 3076, 28°30'N, 89°23'W, 41 m, 25.10.1960: 2 ♂ 34.7, 41.3 mm; 5 ♀ 37.7-54.4 mm; 1 ov. ♀ 45.6 mm (USNM 273140). — Stn 3651, 29°12'N, 88°03'W, 450-540 m, 25.07.1962: 2 ♀ 45.6, 56.6 mm (USNM 244083). — Stn 4005, 29°07.5'N, 88°09'W, 540 m, 23.10.1962: 1 ♂ 34.8 mm (USNM 273140). — Stn 4703, 27°55'N, 90°28'W, 540 m, 22.02.1964: 1 ♂ 28.3 mm; 5 ♀ 22.0-33.7 mm (USNM 273140). — Stn 4729, 27°46'N, 92°13'W, 540 m, 26.02.1964: 1 ♂ 20.9 mm; 1 ♀ 30.6 mm (USNM 260368). — Stn 5107, 29°15'N, 80°05'W, 378 m, 16.11.1964: 2 ♂ 40.0, 42.3 mm (USNM 273140). — Stn 5240, 29°39'N, 80°11.5'W, 342 m, 10.02.1965: 1 ♂ 40.3 mm; 2 ♀ 53.9, 54.3 mm (USNM 273140).

**"Silver Bay"**: stn 2070, 29°13'N, 79°59'W, 369 m, 2.05.1960: 1 ♀ 52.5 mm; 1 ov. ♀ 43.1 mm (USNM 232276). — Stn 5464, 29°25'N, 80°07'W, 310 m, 11.02.1964: 4 ♂ 38.8-42.2 mm; 6 ♀ 40.1-45.6 mm (USNM 260368).

**"Success"**: stn 1, 29°21.30'N, 88°21.48'W, 379-430 m, 24.02.1989, id. as *Stereomastis nana* by M.K. WICKSTEN: 1 ♂ 40.0 mm (LACM). — Stn 58, 29°04.03'N, 88°25.12'W, 411-418 m, 26.10.1989, id. as *Stereomastis nana* by M.K. WICKSTEN: 1 ♂ 42.2 mm (LACM).

**Panama. Golfo de Escudo de Veraguas. "Oregon"**: stn 3583, 9°16'N, 81°37'W, 512 m, 25.05.1962: 3 ♂ 38.6-43.7 mm (RMNH). — Stn 3598, 9°03'N, 81°22'W, 360-396 m, 31.05.1962, id. F.M. BAYER as *P. agassizii*: 1 ♂ 41.0 mm (USNM 154396).

**Caribbean Sea. "Oregon"**: stn 2774, 11°32'N, 62°40'W, 351-382 m, 19.04.1960, 1 ♂ 41.4 mm; 1 ov. ♀ 48.2 mm (USNM 232276). — Stn 2779, 11°35'N, 62°59'W, 468-432 m, 20.04.1960: 1 ♂ 45.4 mm; 1 ♀ 40.1 mm (USNM 232276).

**"Pillsbury"**: stn 776, 12°13.3'N, 72°50'W, 408-576 m, 29.07.1968: 1 ♂ 35.5 mm; 1 ♀ 35.4 mm (RMNH).

**Surinam. "Snellius"**: stn B22, 7°21.6'N, 55°22.2'W, 400-420 m, 27.04.1966: 2 juvs. (RMNH). — Stn F36, 7°26'N, 56°21.8'W, 365-410 m, 5.05.1966: 2 juvs. (RMNH).

**TYPES.** — The male (131 mm total length) (IRScNB 16808) collected by the "*Mbizi*" stn AS 35, off West Africa (7°16'S 12°01'E, 440 m) is the holotype. The females (50.7, 45.8 mm cl) (RMNH 8622) collected at stn AS154 (0°15'S, 8°47'E, 239 m) are paratypes.

**DESCRIPTION.** — Dorsal surface of carapace setose, prominently spinulate. Frontal margin concave. Median submarginal tooth prominent. Single rostral spine antrorse. Internal angle of orbital sinus triangular, spinose; external margin pectinate. Internal margin of orbit mesially pectinate, dividing orbit into two. Eyestalk bearing upcurved spine. Basal antennular segment produced anteriorly to a sharp point, mesial margin spinose, anterolateral margin rounded, bispinose. Spines on lateral margins of carapace upcurved. Spine formula of lateral margin of carapace 7-9:4-5:17-20; spines successively decrease in size posteriorly. Median postrostral carina granulate, irregularly spinulate, postcervical carina with paired spinules. Postorbital carina obsolescent, comprising five antrorse spines, anteriormost largest. Posterior margin of cervical groove spinose between branchial carinae. Branchial carina prominent, parallel with lateral margin, bearing 12-15 spines; region between branchial and median postcervical carinae prominently spinulose. Posterior margin of carapace bearing seven or more pairs of antrorse spines, submedian spines largest.

Abdominal tergites densely granulate, medially carinate. Carinae on tergites 2-5 bearing antrorse spines, fourth and fifth more prominent, salient. Sixth tergite prominently granulate, bearing mesially twin parallel rows of granules, confluent posteriorly. Anterior margin of first tergite bearing nearly 30 denticles. Anterior and posterior margins of tergites 2-5 prominently denticulate. Pleura prominently granulate, margins denticulate. Second pleuron rounded; pleura 3-5 with curved, granulate rib mesially. Telson with granulate median crest anteriorly, two minutely serrulate, convergent carinae posteriorly. Inferior surface of uropodal expopod tricarinate.

Upper margin of merus of P1 spinulate with subterminal claw-like spine, lower margin finely granulose; carpus half as long as merus, two serrulate rows distally on upper margin, subterminal spines on upper and lower margins; upper margin of propodus with several rows of antrorse spinules, lower margin with two minutely spinulate rows. P5 simple in male, chelate in female.

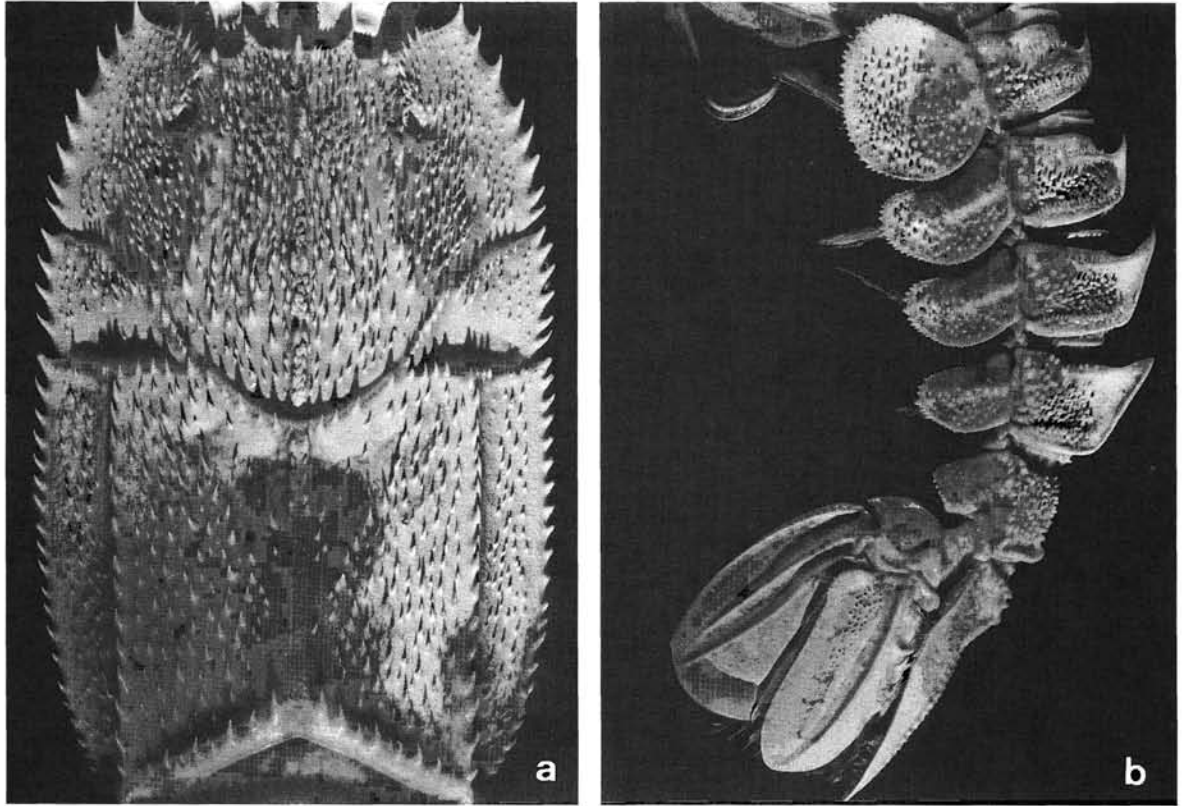


FIG. 21. — *Polycheles perarmatus* Holthuis, 1952, ♂ 50.8 mm, Congo, 4°49'S, 11°17'W, 300-600 m (MNHN-Pa 1575): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

REMARKS. — *P. perarmatus* is distinguished from *P. typhlops* by the rounded second pleuron, the three carinae ventrally on the uropodal expopod, the prominently granulate sixth tergite, the seven pairs of spines on the posterior margin of the carapace and the evenly denticulate anterior margin of the first abdominal tergite.

DISTRIBUTION. — Eastern Atlantic: Gulf of Guinea to Angola, Azores; Western Atlantic: Gulf of Mexico, Caribbean, Panama; 41-650 m.

### *Polycheles phosphorus* (Alcock, 1894)

Fig. 22

*Pentacheles phosphorus* Alcock, 1894: 240. — WOOD-MASON & ALCOCK, 1894, pl. 8 fig. 2. — ALCOCK & ANDERSON, 1894: 165. — ANDERSON, 1896: 98. — THOMSON, 1901: 18. — ALCOCK, 1901a: 74; 1902: 134. — LLOYD, 1907: 6. — HANSEN, 1925: 142. — BOAS, 1939, fig. 1.

*Polycheles phosphorus* - ALCOCK, 1899: 33; 1901b: 168. — CALMAN, 1910: 59, fig. 38; 1911, fig. 46. — KEMP & SEWELL, 1912: 24. — BALSS, 1924: 177, fig. 2. — DUNCAN, 1948: 69.

*Stereomastis andamanensis* - DE MAN, 1916: 16, pl. 1 figs 2-2b (p.p.). — TAKEDA & HANAMURA, 1994: 31. — GRIFFIN & STODDART, 1995: 244 (p.p.) [non Alcock, 1894].

*Stereomastis phosphorus* - CALMAN, 1927: 55, fig. 37. — DAHL, 1953: 46. — FIRTH & PEQUEGNAT, 1971: 68. — MONOD, 1973: 126, figs 40-44 (p.p.). — HOLTHUIS, 1984: 4.

not *Polycheles phosphorus* - RATHBUN, 1906: 898 [= *P. surdus* sp. nov.].

not *Stereomastis phosphorus* - DE MAN, 1916: 15 [= *P. aculeatus* sp. nov.].

not *Stereomastis phosphorus* - GRIFFIN & STODDART, 1995: 246 [= *P. aculeatus* sp. nov., *P. auriculatus* Bate, 1878, *P. surdus* sp. nov.].

**MATERIAL EXAMINED.** — **Central Eastern Pacific.** "Te Vega": stn 58, 1°31'N, 128°13'W, 525-570 m, 27.09.1963: 1 ♀ 47.0 mm (USNM).

**Vanuatu.** MUSORSTOM 8: stn CP 1074, 15°48.42'S, 167°24.27'E, 775-798 m, 4.10.1994: 1 juv. (MNHN-Pa 1738). — Stn CP 1076, 15°53'S, 167°30'E, 1100-1191 m, 4.10.1994: 1 juv. (MNHN-Pa 1739). — Stn CP 1089, 15°57.30'S, 167°27.73'E, 799-850 m, 5.10.1994: 2 juvs (MNHN-Pa 1740).

**New Caledonia.** 22°02'S, 165°57'E, 800 m, 1971, det. Th. MONOD *Stereomastis phosphorus*: 1 ♂ 27.3 mm (MNHN-Pa 1576).

**BATHUS 2:** stn CP 743, 22°35.6'S, 166°26.2'E, 713-950 m, 14.05.1993: 2 ♂ 32.4, 37.1 mm (MNHN-Pa 1578). — Stn CP 751, 22°24.35'S, 166°12.83'E, 1300-1500 m, 15.05.1993: 1 ♀ 22.5 mm (MNHN-Pa 1579).

**Chesterfield Islands.** MUSORSTOM 5: stn 324, 21°15.01'S, 157°51.33'E, 970 m, 14.10.1986: 1 ♀ 20.5 mm (MNHN-Pa 1577).

**Australia.** *Coral Sea.* "Franklin": 10°34.28'S, 144°21.99'E, 990-1053 m, 21.08.1988, id. H.E. STODDART as *Stereomastis andamanensis*: 1 ♂ 33.3 mm (AM P40367).

*N.W. Coast.* "Solea" N.W. Port Headland, 18°48'S, 116°21'E, 694-704 m, 5.04.1982: 1 ♂ 44.8 mm (WAM C13436).

**Japan.** "Albatross": stn 4906, Koshiki Is, 31°39'N, 129°20'E, 664-731 m, 11.08.1906: 2 ♀ 26.3, 44.5 mm (USNM). — Stn 4911, Koshiki Is, 31°38'30"N, 129°19'E, 794 m, 12.08.1906: 1 ♂ 37.9 mm; 1 ♀ 45.3 mm, 2 juvs (USNM). — Stn 4912, Koshiki Is, 31°39'40"N, 129°20'E, 704 m, 12.08.1906: 2 ♂ 32.0, 38.5 mm; 1 ♀ 46.3 mm; 3 juvs (USNM). — Stn 4915, Koshiki Is, 31°31'N, 129°25'30"E, 769 m, 12.08.1906: 2 ♂ 33.6, 41.2 mm (USNM).

Suruga Bay, off Fuji River, 200 m, 9.12.1975: 1 ♂ broken (NFU 530-2-1495). — S.W. Kyushu, 30°32'N, 128°25'E, 700-750 m, 15.06.1978, colls O. TABETA & K. HAYASHI: 3 ♂ 39.9-40.0 mm (NFU 530-2-1490); 1 ♀ 47.8 mm; 2 ov. ♀ 49.7, 51.3 mm (NFU 530-2-1527).

**East China Sea.** "Yuryo Maru": 29°38.92'N, 127°55.95'E, 750 m, 4.02.1978, det. Y. MIYA as *Stereomastis andamanensis*: 6 ♂; 1 ov. ♀; 3 ♀ (NUM cr10229). — 29°23.01'N, 127°30.92'E, 650-642 m, 5.02.1978, det. Y. MIYA as *Stereomastis andamanensis*: 1 ♂ 37.8 mm; 1 ♀ 36.8 mm (NUM cr10231).

"Ryoan Maru" (det. Y. MIYA as *Stereomastis andamanensis*): 28°53'N, 127°18'E, 820-830 m, 16.03.1978: 6 ♂; 1 ♀; 2 ov. ♀ (NUM cr10230). — 28°43'N, 127°14'E, 750-755 m, 11.03.1978: 6 ♂ 31.3-36.5 mm; 3 ov. ♀ 47.6-53.0 mm; 1 ♀ 47.4 mm (NUM cr10232). — 28°44'N, 127°01'E, 610-640 m, 11.03.1978: 1 ♂ 41.6 mm; 3 ov. ♀ 47.4-51.3 mm; 3 ♀ 50.5-51.6 mm (NUM cr10233). — 28°42'N, 127°09'E, 500-535 m, 11.03.1978: 2 ♂ 26.0, 26.5 mm (NUM cr10234). — 28°35'N, 127°10'E, 600 m, 16.03.1978: 3 ♂; 2 ov. ♀; 4 ♀ (NUM cr10235). — 28°45'N, 127°07'E, 542-530 m, 16.03.1978: 2 ♂ 34.1, 39.5 mm; 3 ov. ♀ 47.1-59.2 mm; 2 ♀ 41.0, 51.0 mm (NUM cr10236). — 28°50'N, 127°14'E, 700-740 m, 16.03.1978: 9 ♂ 26.7-40.1 mm; 3 ov. ♀ 41.4-50.8 mm; 6 ♀ 27.7-58.7 mm (NUM cr10237). — 29°46'N, 127°59'E, 710-713 m, 20.03.1978: 3 ov. ♀ 26.7-54.8 mm (NUM cr10240). — 29°44'N, 128°03'E, 815 m, 20.03.1978: 1 ♀ 35.5 mm (NUM cr10241). — 29°49'N, 128°06'E, 915-932 m, 20.03.1978: 2 ♀ damaged (NUM cr10242).

**South China Sea.** W. Borneo. 6°05'N, 110°07'E, 6.11.1964, coll. A.J. BRUCE: 1 ♂ 35.8 mm; 1 ♀ 50.9 mm (RMNH 23484).

**Indonesia.** "Siboga": (det. DE MAN as *Stereomastis andamanensis*): stn 18, 7°28.2'S, 115°24.6'E, 1018 m, 18.03.1899: 1 juv. (ZMA). — Stn 85, 0°36.5'S, 119°29.5'E, 724 m, 17.06.1899: 2 ♂ 43.9, 44.4 mm (ZMA). — Stn 137, 0°23'S, 127°29'E, 472 m, 3.08.1899: 1 ♂ 20.3 mm (ZMA). — Stn 314, 7°36'S, 117°30.8'E, 694 m, 17.02.1900: 1 ♂ 41.6 mm; 1 ♀ 38.3 mm (ZMA).

"Albatross": stn 5613, Sulawesi, Gulf of Tomini, 0°42'S, 121°44'E, 1376 m, 2.11.1909: 1 juv. (USNM). — Stn 5646, 5°31'30"S, 122°22'40"E, 834 m, 16.12.1909: 1 juv. (USNM). — Stn 5658, Gulf of Boni, 3°32'40"S, 120°31'30"E, 918 m, 19.12.1909: 1 ♂ 44.7 mm (USNM).

**CORINDON:** stn CH 209, 0°07.3'S, 117°53.8'E, 490 m, 31.10.1980: 10 ♂ 20.8-36.2 mm; 10 ♀ 20.1-51.7 mm (MNHN-Pa 1588). — Stn CH 214, 0°31.4'N, 117°50.1'E, 595 m, 1.11.1980: 1 ♂ 42.9 mm (MNHN-Pa 1589). — Stn CH 217, 0°38.2'N, 117°59.6'E, 470-447 m, 1.11.1980: 1 ♂ 39.2 mm; 1 ♀ 19.8 mm (MNHN-Pa 1590). — Stn CH 240, 0°37'N, 119°33'E, 675 m, 5.11.1980: 1 ♂ 43.2 mm; 2 juvs (MNHN-Pa 1591). — Stn CH 276, 1°54.6'S, 119°13.8'E, 456-395 m, 8.11.1980: 1 ♂ 29.7 mm; 3 ♀ 24.7-48.4 mm (MNHN-Pa 1592). — Stn CH 280, 1°59.0'S, 119°09.9'E, 715-800 m, 8.11.1980: 1 juv. (MNHN-Pa 1593). — Stn CH 281, 1°57.5'S, 119°02.0'E, 1120-1150 m, 8.11.1980: 1 juv. (MNHN-Pa 1594).

**SNELLIUS 2:** stn 4.267, 8°17.6'S, 118°21.3'E, 650 m, 29.10.1984: 4 ♂ 24.7-35.4 mm; 4 ♀ 19.2-37.3 mm (RMNH). — Stn 4.276, 8°12'S, 118°12'E, 750 m, 31.10.1984: 1 ♂ 40.2 mm; 2 ov. ♀ 47.8, 43.3 mm (RMNH).

**KARUBAR:** *Tanimbar I.:* stn CP 38, 7°40'S, 132°27'E, 620-666 m, 28.10.1991: 2 juvs (MNHN-Pa 1580). — Stn CP 54, 8°21'S, 131°43'E, 836-869 m, 30.10.1991: 2 ♂ 20.3, 34.7 mm; 3 ♀ 21.7-64.5 mm (MNHN-Pa 1582). — Stn CP 73, 8°29'S, 131°33'E, 855-840 m, 2.11.1991: 1 ♂ 33.0 mm; 1 ♀ 49.2 mm (MNHN-Pa 1583). — Stn CP 81, 9°35'S, 131°02'E, 200-207 m, 4.11.1991: 2 ♂ 31.2, 50.7 mm; 2 juvs (MNHN-Pa 1584).

**Philippines.** "Albatross": stn 5114, Balayan Bay, 13°36'11"N, 120°45'26"E, 622 m, 20.01.1908: 2 ♀ 27.1, 32.7 mm (USNM). — Stn 5286, Luzon, 13°38'15"N, 120°34'20"E, 823 m, 20.07.1908: 1 ♂ 44.8 mm (USNM). — Stn 5349, Palawan Passage, 10°54'N, 118°26'20"E, 1335 m, 27.12.1908: 2 ♂ 28.8, 42.8 mm; 2 juvs (USNM).

MUSORSTOM 1: stn 47, 13°40.7'N, 120°30'E, 757-685 m, 25.03.1976: 1 ♂ 44.2 mm; 3 ♀ 34.9-44.8 mm (MNHN-Pa 1587).

MUSORSTOM 2: stn CP 50, 13°37'N, 120°33'E, 810-820 m, 27.11.1980: 1 ♂ 28.9 mm (MNHN-Pa 1585). — Stn CP 55, 13°54'N, 119°58'E, 865 m, 27.11.1980: 1 ♂ 22.8 mm (MNHN-Pa 1586).

**Bay of Bengal.** "Investigator": stn 112, 13°47'30"N, 92°36'E, 1026 m, 7.11.1890: 1 ♀ 54.0 mm (IM 6873/9).

**Ceylon.** "Investigator": stn 377, 5°51'N, 80°26'E, 1107 m, 25.04.1907: 2 ♀ 26.0, 28.0 mm (IM 5814/10).

**Laccadive Sea.** "Investigator": stn 177, 13°47'49"N, 73°07'E, 1166 m, 5.05.1894: 1 ♀ 38.7 mm (USNM 19012; ex. IM).

**TYPE.** — The female (54.0 mm cl) (IM 6873/9) collected by the "Investigator" at stn 112, Bay of Bengal (13°47'30"N, 92°36'E, 1026 m), is the holotype of *Pentacheles phosphorus* (Alcock, 1894).

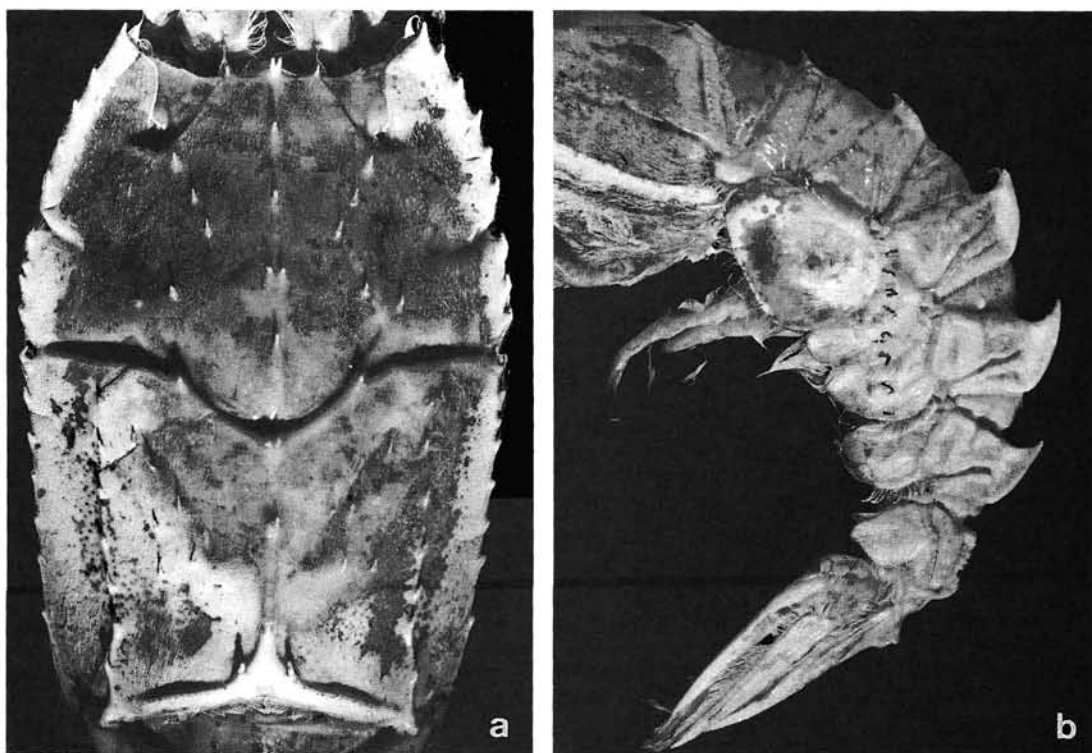


FIG. 22. — *Polycheles phosphorus* (Alcock, 1894), ♀ 43.6 mm, East China Sea, "Ryoan Maru", 28°50'N, 127°14'E, 700-740 m (NUM 10237): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

**DESCRIPTION.** — Lateral margins of carapace anteriorly convergent. Dorsal surface of carapace setose. Rostrum bifid. Small spine on internal angle of orbital sinus, external angle unarmed. Eye stalk bearing mammilate tubercle, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth, anterolateral margin unispinose. Spines on lateral margins of carapace upcurved. Spine formula of lateral margin of carapace 6:3:6-7, posteriormost spine further apart. Spine formula of median postcervical carina (excluding rostral spines) 1:1:2:1; median postcervical carina bearing two pairs of spines. Gastro-orbital region with five prominent antrorse spines in arcuate row. Posterior margin of cervical groove with antrorse spine midway between median postcervical and lateral carinae. Branchial carina prominent, bearing 6 or 7 spines. Anteriorly between branchial and median carinae shallow diagonal groove, 5 or 6 spines posterior to groove. Posterior margin of carapace bearing antrorse submedian spines.

Abdominal tergites medially carinate. Carinae on tergites 1-5 bearing antrorse spines, 3 and 4 largest. Sixth tergite boldly sculptured, raised lateral margins, mesially bearing prominently denticulate double carinae, confluent at posterior margin. Anterior margin of first tergite with two pairs of lateral spines. Tergites 2-5 bearing deep,

transversely oblique, submedian grooves with raised margins. Pleura 2-5 with curved rib mesially, bolder posteriorly, margins minutely denticulate. Second pleuron ovate. Telson with short crest anteriorly, two minutely serrulate, confluent carinae posteriorly.

Merus of P1 proximally bispinose, claw-like spine subterminally on upper margin, finely granulose on lower margin; carpus 2/3 as long as merus, subterminal spines on upper, lower margins; upper margin of propodus with subterminal spine, lower margin with two minutely spinulate rows. P5 subchelate in male, chelate in female.

*Color.* — "bright pink" (ALCOCK, 1894: 241).

**REMARKS.** — ALCOCK (1894: 240) clearly distinguished *phosphorus* as having on its "basal joint of the antennules..... a single spine at the antero-external angle", and further (1901b): "some spines flanking the cardio-branchial grooves". Misunderstanding the significance of these characters, authors mistook various polychelid species for *phosphorus*. DE MAN (1916) and GRIFFIN & STODDART (1995) mingled both *nanus* and *phosphorus* and misidentified them as *andamanensis*, whereas their *phosphorus* are different species - in fact, GRIFFIN & STODDART (1995: 246) had three different species identified as *Stereomastis phosphorus*.

**DISTRIBUTION.** — Vanuatu, New Caledonia, Australia, Japan, China Sea, Indonesia, Philippines, Bay of Bengal, Ceylon, Laccadive Sea; 200 m (present work) - 1354 m (TAKEDA & HANAMURA, 1994).

*Polycheles politus* sp. nov.

Fig. 23

**MATERIAL EXAMINED.** — **Philippines.** "*Albatross*": stn 5219, btw Marinduque & Luzon, 13°21'N, 122°18'45"E, 969 m, 23.04.1908: 7 ♀ 25.6-49.6 mm (USNM). — Stn 5423, Cagayan Is, 9°38'30"N, 121°11'E, 914 m, 31.03.1909: 1 ♂ 19.1 mm; 2 juvs (USNM). — Stn 5424, Cagayan Is, 9°37'05"N, 121°12'37"E, 622 m, 31.03.1909: 1 ♂ 19.1 mm; 1 ♀ 24.9 mm (USNM). — Stn 5488, Panaon I., Leyte, 10°00'N, 125°06'45"E, 1412 m, 31.07.1909: 1 ♂ 18.4 mm; 3 juvs (USNM). — Stn 5492, Mindanao, 9°12'45"N, 125°20'E, 1344 m, 1.08.1909: 1 ♀ 34.3 mm (USNM). — Stn 5494, Mindanao, 9°06'30"N, 125°18'40"E, 1220 m, 2.08.1909: 2 ♂ 17.9, 22.4 mm (USNM). — Stn 5495, Mindanao, 9°06'30"N, 125°00'20"E, 1785 m, 2.08.1909: 1 ♀ 23.1 mm (USNM). — Stn 5511, Mindanao, 8°15'20"N, 123°57'E, 750 m, 7.08.1909: 1 ♀ 23.1 mm (USNM). — Stn 5514, Mindanao, 8°32'42"N, 123°58'36"E, 1275 m, 8.08.1909: 1 ♀ damaged (USNM).

**MUSORSTOM 2:** stn CP 38, 12°53.5'N, 122°26.6'E, 1650-1660 m, 25.11.1980: 2 ♂ 21.5, 25.1 mm; 5 ♀ 20.7-37.0 mm (MNHN-Pa 1595). — Stn CP 39, 10°02.8'N, 122°37.1'E, 930-1190 m, 25.11.1980: 19 juvs (MNHN-Pa 1596). — Stn CP 40, 13°07.7'N, 122°39.1'E, 280-440 m, 25.11.1980: 1 ♀ 21.8 mm (MNHN-Pa 1597). — Stn CP 42, 13°04.2'N, 122°25.0'E, 1580-1610 m, 25.11.1980: 1 ♂ 21.7 mm; 2 ♀ 22.3, 31.7 mm (MNHN-Pa 1598). — Stn CP 44, 13°23.2'N, 122°20.7'E, 760-820 m, 26.11.1980: 1 ♂ 27.5 mm; 5 juvs (MNHN-Pa 1599).

**Gulf of Thailand.** "*Galathea*": stn 324, Str. of Malacca, 6°06'N, 96°00'E, 1130 m, 9.05.1951: 1 ♀ 25.3 mm (ZMC). — Stn 443, Mindanao Sea, 8°48'N, 124°09'E, 1570 m, 16.08.1951: 1 ♂ 22.6 mm; 3 ♀ 26.4-28.3 mm; 3 juvs (ZMC).

**Indonesia.** "*Albatross*": stn 5629, Moluccas, S. Doworra I., 0°50'S, 128°12'E, 375 m, 2.12.1909: 1 ♂ 17.3 mm (USNM).

**TYPES.** — The male (25.1 mm cl) (MNHN) collected by MUSORSTOM 2, stn CP 38 (12°53.5'N, 122°26.6'E, 1650-1660 m) off the Philippines, is the holotype. The other specimens in the sample are paratypes.

**DESCRIPTION.** — Margins of carapace anteriorly convergent. Dorsal surface of carapace setose. Rostrum bifid. Internal angle of orbital sinus with minute spine, external angle unarmed. Eyestalk bearing minute mammillate tubercle, curved distad. Basal antennular segment elongate, produced anteriorly to a sharp point, mesial margin smooth, anterolateral margin unispinose. Spines on lateral margins of carapace upcurved, anteriormost largest. Spine formula of lateral margin of carapace 6:3:6-7, posteriormost spine further apart. Spine formula of median postrostral carina (excluding rostral spines) 1:1:2:1, median postcervical carina bearing two pairs of spines. Gastro-orbital region quadrispinose, anterior spine larger by far. Posterior margin of cervical groove with antrorse spine between median postcervical carina and lateral margin of carapace. Branchial carina obsolescent, prominent spine (sometime preceded by spinules) near posterior margin of carapace. Posterior margin of carapace bearing antrorse submedian spines.

Abdominal tergites medially carinate. Anterior margin of first tergite with two pairs of prominent lateral spines. Carinae on tergites 1-4 bearing antrorse spine, spine of third tergite longest; carina of fifth tergite unarmed. Sixth tergite smooth, mesially bearing lyre-shaped denticulate carina. Tergites 2-5 bearing shallow, transversely oblique, submedian grooves. Pleura 2-5 with obsolescent curved rib mesially, margins minutely denticulate. Second pleuron ovate, bearing spine on anterior margin. Telson with short crest anteriorly, two minutely serrulate, confluent carinae posteriorly.

Merus of P1 proximally bispinose with subterminal claw-like spine on upper margin, finely granulose on lower margin; carpus 2/3 as long as merus, subterminal spines on upper and lower margins; upper margin of propodus with subterminal spine, lower margin granulate. P5 subchelate in male, chelate in female.

ETYMOLOGY. — The Latin *politus* (= polished) refers to the smooth, unarmed carapace of the species.

REMARKS. — Both *P. phosphorus* and *politus* have but a single spine on the anterolateral margin of the basal antennular segment, however, *politus* is clearly distinguished from *phosphorus* by its unarmed fifth abdominal carina, the obsolescent branchial carinae, and the postcervical part of the carapace, between the branchial and median carinae, lacking spines.

DISTRIBUTION. — Philippines, Gulf of Thailand, Indonesia; 280-1785 m.

### *Polycheles sculptus* Smith, 1880

Fig. 24

*Polycheles typhlops* - NORMAN, 1878: 382 (p.p.); 1879: 175 (p.p.).

*Polycheles sculptus* Smith, 1880a: 346, pl. 7 figs 1-6; 1880b: 269. — FAXON, 1893: 196; 1895: 121, pl. C fig. 2; 1896: 155. — CAULLERY, 1896: 385. — KOEHLER, 1896: 721 (list). — ALCOCK, 1901b: 170. — STEBBING, 1902: 36. — SENNA, 1902: 338. — JOUBIN, 1905: 75, fig. 58. — BOUVIER, 1905a: 480; 1905c: 3; 1905d: 4; 1915: 2; 1917: 51, pl. 3, fig. 1; 1925: 438, fig. 11, pl. 7 fig. 1. — HANSEN, 1908: 41. — STEBBING, 1910: 377. — ANDREWS, 1911: 428, figs 11-15. — MURRAY & HJORT, 1912: 538. — SELBIE, 1914: 18, pl. 2, figs 1-9. — SUND, 1915: 372. — WILLIAMSON, 1915: 457. — BALSS, 1925: 201. — BOONE, 1930: 86, pl. 23 fig. b. — MIRANDA & RIVERA, 1933: 17. — DELPHY & MAGNE, 1938: 83 (list). — BOAS, 1939: 4, figs 3, 7-8. — ZARIQUIEY, 1946: 99. — LE DANOIS, 1948: 150 (list). — SPRINGER & BULLIS, 1956: 14. — HOLTHUIS, 1962: 183. — CHINA, 1964: 111. — BARNARD, 1964: 12 (list). — PÉRÈS & PICARD, 1964: 105. — ALLEN, 1967: 56. — PÉRÈS, 1967: 519. — RODRIGUEZ, 1980: 194.

*Pentacheles spinosus* A. Milne Edwards, 1880: 66. — FILHOL, 1885: 139, fig. 44. — W. MARSHALL, 1888: 267, fig. 88. — YOUNG, 1900: 442. — SEELIGER, 1901: 43. — BOUVIER, 1925: 438, figs 11-12, pl. 7 fig. 1.

*Willemoesia leptodactyla* - GIGLIOLI, 1881: 358; 1882: 5; 1912: 186 [non Willemoes-Suhm, 1875].

*Pentacheles sculptus* - SMITH, 1882: 23, pls 3-4; 1884: 358 (list); 1886a: 188; 1886b: 607 (list). — VERRILL, 1882: 364; 1884: 653; 1885: 554; pl. 34 fig. 152. — AGASSIZ, 1888: 42, fig. 239. — ALCOCK & ANDERSON, 1899: 289.

*Stereomastis sculpta* - DE MAN, 1916: 8. — STEPHENSEN, 1923: 66. — CALMAN, 1925: 18; 1927: 55. — BOONE, 1927: 90. — BARNARD, 1950: 572, fig. 105d. — HOLTHUIS, 1952b: 11, fig. 3; 1962: 182; 1984: 4; 1987: 297, fig. 2; 1991, fig. 169. — BERNARD, 1953: 87. — SIVERSTEN & HOLTHUIS, 1956: 41. — DOLLFUS, 1956: 135 (list). — SQUIRES, 1965: 88, figs 37-38; 1966: 2. — KENSLEY, 1968: 29; 1981a: 60 (list); 1981b: 29 (list). — ZARIQUIEY, 1968: 210. — CARPINE, 1970a: 11 (list); 1970b: 135 (list). — FIRTH & PEQUEGNAT, 1971: 69. — RELINI-ORSI & RELINI, 1972: 59, fig. 5. — RELINI-ORSI, 1973: 29. — LAGARDÈRE, 1973: 93; 1977a: 399. — THIRIOT, 1974: 344 (list). — WILLIAMS & WIGLEY, 1977: 8. — BAEZ & ANDRADE, 1979: 225, pl. 1 fig. 6. — PEQUEGNAT & JEFFREY, 1979: 72. — WENNER, 1979: 441. — BEAUBRUN, 1979: 40, fig. 21. — ANDRADE & BAEZ, 1980: 262 (list). — BURUKOVSKY *et al.*, 1982: 523. — BURUKOVSKY, 1983: 134, fig. 179. — TAKEDA & OKUTANI, 1983: 75. — POHLE, 1985: 21. — ANDRADE, 1986: 45. — DURIS, 1987: 9. — MACPHERSON, 1988: 58, fig. 5b. — ABELLO & VALLADARES, 1988: 98. — PEQUEGNAT *et al.*, 1990: 63. — SQUIRES, 1991: 360, figs 190-191. — ABELLO & CARTES, 1992: 109. — CARTES & ABELLO, 1992: 139. — CARTES & SARDA, 1992: 1315. — FALCIAI & MINERVINI, 1992: 134. — CARTES, 1993: 32 (list). — CARTES *et al.*, 1993: 210. — EMMERSON, 1993: 181. — QUACKENBUSH, 1994: 85. — GONZALEZ, 1995: 126. — GRIFFIN & STODDART, 1995: 248. — TIEFENBACHER, 1995: 8, fig. 3.

*Stereomastis sculptus* - STEBBING, 1917: 30.

*Stereomastis sculpta* - FIRTH & PEQUEGNAT, 1971: 69. — WENNER & BOESCH, 1979: 131. — DAWSON, 1997: 21.

*Stereomastis andamanensis* - TUNG *et al.*, 1988: 45, fig. 45a-f.

not *Polycheles sculptus* - BRUUN, 1950: 24, fig. 16 [= *P. talismani* Bouvier, 1917].



not *Stereomastis sculpta* - HOLTHUIS, 1952b: 11. — LONGHURST, 1958: 32. — FOREST, 1963: 627. — MACPHERSON, 1983: 48. — RUCABADO & BAS, 1984: 19 [= *P. talismani* Bouvier, 1917].  
 not *Stereomastus sculpta* - GAULD, 1960: 63, [erroneous spelling] [= *P. talismani* Bouvier, 1917].  
 not *Polycheles sculptus* - DEL SOLAR, 1972: 11 [= *P. pacificus* Faxon, 1893].

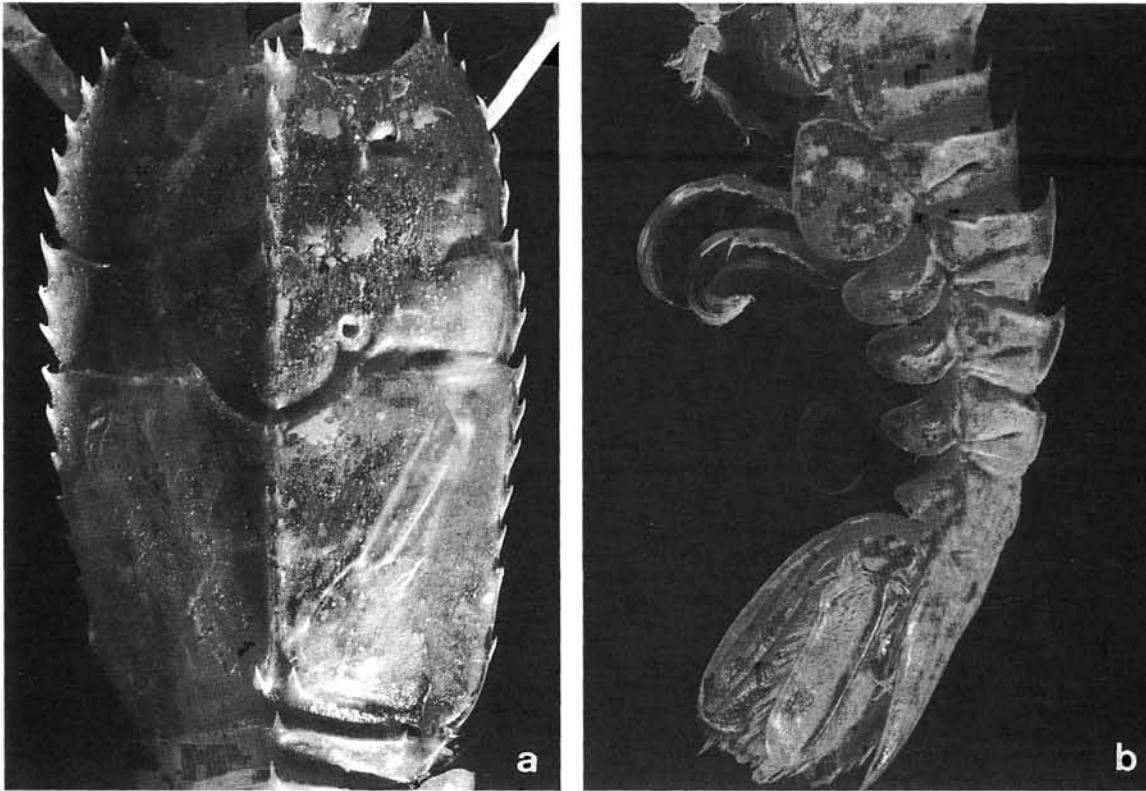


FIG. 23. — *Polycheles politus* sp. nov., ♂ 25.1 mm, holotype, Philippines, MUSORSTOM 2 stn CP 38, 12°53.5'N, 122°26.6'E, 1650-1660 m (MNHN-Pa 1595): **a**, dorsal view of the cephalothorax; **b**, lateral view of the abdomen.

**MATERIAL EXAMINED.** — **Mediterranean Sea.** "Washington": 41°15'09"N, 8°10'41"E, 2150 m, 4.08.1881, coll. & id. E.H. GIGLIOLI as *Willemoesia leptodactyla*: 1 juv. damaged (MF). — 41°14'38"N, 8°18'05"E, 2145 m, 8.08.1881, coll. & id. E.H. GIGLIOLI as *W. leptodactyla*: 1 ♂ 21.2 mm (MF). — 41°24'42"N, 7°43'28"E, 2836-2809 m, 9.08.1881, coll. & id. E.H. GIGLIOLI as *W. leptodactyla*: 1 ♀ 25.1 mm (MF).

**Ibero-Moroccan Gulf.** BALGIM: stn CP 69, 35°11'N, 7°50'W, 1978-2077 m, 5.06.1984: 2 juvs (MNHN-Pa 1600). — Stn CP 92, 34°24'N, 7°30'W, 1182 m, 8.06.1984: 1 juv. (MNHN-Pa 1601). — Stn CP 98, 34°29'N, 7°42'W, 1721-1773 m, 9.06.1984: 2 juvs (MNHN-Pa 1602). — Stn CP 108, 36°11'N, 8°06'W, 1521-1534 m, 10.06.1984: 1 ♀ 31.6 mm (MNHN-Pa 1603).

"Talisman": Cap Bogador, 11.07.1883, 1400 m: 1 damaged (MNHN).

**Canary Is.** CANCAP 2: stn 27, 27°56'N, 14°28'W, 1440-1540 m, 25.08.1977: 2 juvs (RMNH).

CANCAP 4: stn 4.056, 28°47'N, 13°22'W, 1306-1345 m, 18.05.1980: 2 ♂ 28.5, 41.5 mm; 3 ♀ 26.2-46.0 mm (RMNH). — Stn 4.057, 28°47'N, 13°24'W, 1300-1335 m, 19.05.1980: 3 ♂ 26.8-35.2 mm; 2 ♀ 22.8, 28.0 mm (RMNH).

**Western Sahara.** "Meteor": stn M36-98 AT149, 25°31.5'N, 16°02.2'W, 658-888 m, 24.02.1975: 1 juv. (SMF 24645).

**Mauritania.** TYRO: stn 104, 19°43'N, 17°30'W, 1500 m, 17.06.1988: 1 ♂ 42.9 mm; 1 ♀ 53.2 mm (RMNH).

**West Africa.** "Pillsbury": stn 4, 5°37'N, 3°19'E, 1876-1263 m, 24.05.1964: 1 ♀ 29.1 mm (RMNH). — Stn 44, 5°05'N, 4°00'W, 586-403 m, 30.05.1964: 1 juv. (RMNH). — Stn 52, 4°54'N, 4°58'W, 952-915 m, 31.05.1964: 1 ♀ 63.1 mm (RMNH). — Stn 53, 4°50'N, 4°55'W, 1579-1519 m, 31.05.1964: 1 ♂ 24.8 mm; 1 ♀ 36.1 mm (RMNH). — Stn 233, 5°19'N, 4°14'E, 2013-1464 m, 12.05.1965: 1 ♂ 29.3 mm; 6 ♀ 28.9-33.1 mm (RMNH). — Stn 309, 4°15'N, 4°27'E, 678-720 m, 26.05.1965: 19 ♂ 22.2-54.0 mm; 26 ♀ 22.1-71.4 mm (RMNH).



**SE Atlantic.** Off Cape province. 34°54.45'S, 18°12.06'E, 1650 m, 14.03.1988: 2 ♂ 33.6, 43.1 mm (USNM 235172).

"*Africana*": 29°38.8'S, 14°25.4'E, 861 m, 23.01.1990: 5 ♂ 32.7-41.5 mm; 5 ♀ 25.2-50.5 mm (SAM). — 32°26'S, 16°11'E, 1302 m, 27.01.1993: 1 ♀ 30.7 mm (SAM). — 32°22'S, 16°09'E, 1150 m, 14.01.1995: 3 ♂ 31.7-37.6 mm; 5 ♀ 20.1-32.1 mm (SAM).

**Labrador Sea.** "*Dana*": stn 16439, off Hudson str., 62°49'N, 60°20'W, 980-1000m, 26.07.1974: 1 ♂ 35.7 mm (ZM CRU3275).

**Canada. Nova Scotia.** "*Epes Tarr*": SE Sable I., 43°10'N, 61°20'W, 450 m, coll. Capt. Th. OLSEN: 1 ♂ 38.2 mm (USNM 39957).

**United States.** "*Albatross*" (id. S.I. SMITH as *Pentacheles sculptus*): stn 1123, off Massachusetts, 1417 m, 26.08.1882: 1 ♂ 31.6 mm (AMNH 15234). — Stn 2115, 35°45'30"N, 74°34'45"W, 1517 m, 11.11.1883: 1 juv. 20.6 mm (AMNH 15535). — Stn 2233, 38°36'30"N, 73°06'00"W, 1134 m, 12.09.1884: 1 ♂ 22.3 mm (AMNH 15745). — Stn 2550, 39°44'30"N, 70°30'45"W, 1811 m, 9.08.1883: 1 ♀ 26.5 mm (AMNH 15445). — Stn 2628, 950 m, 1885: 1 ♀ 35.5 mm (AMNH 5074).

Off Florida, 448-450 m, 3.08.1932, coll. W.L. SCHMITT: 1 ♂ 32.6 mm (USNM 78272).

**Gulf of Mexico.** "*Albatross*": stn 2396, 28°34'N, 86°48'W, 603 m, 13.03.1885, id. M.J. RATHBUN: 1 ♂ 29.2 mm, (AMNH 3983).

"*Cape Hatteras*": 28°23.3'N, 86°43.8'W, 750-818 m, 23.04.1987, coll. H.G. KUCK & J.F. QUINN: 2 ♂ 41.7, 43.1 mm; 1 ♀ 38.0 mm (LACM 87-2691).

"*Oregon*": stn 2814, 28°53'N, 87°47'W, 1710-1890 m, 13.07.1960: 2 ♀ 38.0, 39.0 mm; 3 juvs (USNM 232276). — Stn 2816, 28°38'N, 88°18'W, 1710 m, 14.07.1960: 3 juvs (USNM 232276). — Stn 2820, 28°23'N, 88°21.5'W, 1800 m, 15.07.1960: 5 ♀ 26.5-39.0 mm (USNM 232276). — Stn 2824, 29°07'N, 88°04'W, 657-711 m, 17.07.1960: 2 ♂ 22.4, 29.2 mm; 2 ♀ 42.1, 43.5 mm (USNM 232276). — Stn 4005, 29°07.5'N, 88°09'W, 540 m, 23.10.1962: 1 ♀ 51.4 mm; 2 ov. ♀ 43.8, 44.2 mm (USNM 273140). — Stn 4147, 24°12'N, 83°32'W, 900 m, 15.12.1962: 1 ♂ 28.5 mm; 3 ♀ 27.1- 56.4 mm; 1 ov. ♀ 53.2 mm, 2 juvs (USNM). — Stn 4531, 24°32'N, 83°36'W, 360 m, 24.11.1963: 2 ♀ 46.9, 51.2 mm; 2 juvs (USNM 279502). — Stn 4561, 24°03'N, 83°15'W, 900 m, 3.12.1963: 4 ♂ 22.0-27.0; 2 ♀ 22.6, 31.9 mm; 1 juv. (USNM 260368). — Stn 4570, 23°11'N, 86°28'W, 900 m, 7.12.1963: 2 ♀ 34.8, 41.3 mm; 1 ov. ♀ 62.5 mm; 1 juv. (USNM 260368). — Stn 5790, 24°22'N, 83°34'W, 648 m, 26.11.1965: 3 ♂ 31.5-44.0 mm (USNM 273140).

**Caribbean Sea.** "*Oregon*": stn 1907, 12°25'N, 82°23'W, 720-765 m, 11.09.1957: 2 ♀ 33.7, 44.2 mm (USNM 251942). — Stn 2777, 11°36'N, 62°46'W, 522 m, 19.04.1960: 1 ♀ 47.9 mm (USNM 232276). — Stn 3561, 16°35'N, 80°04'W, 720 m, 18.05.1962: 1 ♀ 44.0 mm (USNM 244083). — Stn 3601, 9°07'N, 81°00'W, 720 m, 31.05.1962: 4 ♀ 32.7-56.5 mm (USNM 244083). — Stn 4293, 7°14'N, 52°55'W, 720 m, 21.03.1963: 1 ♂ 43.0 mm; 3 ♀ 49.2-60.8 mm; 1 ov. ♀ 48.5 mm (USNM 273140). — Stn 4300, 7°44'N, 54°19'W, 540 m, 23.03.1963: 1 ♀ 53.9 mm; 2 ov. ♀ 53.0, 55.6 mm (USNM 273140). — Stn 4412, 11°49'N, 69°24'W, 540 m, 3.10.1963: 11 ♂ 30.0- 39.6 mm; 12 ♀ 28.7-44.5 mm (USNM 273140). — Stn 4413, 11°53'N, 69°25'W, 630 m, 3.10.1963: 2 ♂ 28.0-32.1 mm; 2 ♀ 48.7, 62.8 mm; 2 juvs (USNM 260368); 4 ♂ 28.7-37.8 mm; 2 ♀ 43.5 mm, damaged; 3 ov. ♀ 43.4-50.1 mm; 4 juvs (USNM 273140). — Stn 4414, 11°54'N, 69°23'W, 720 m, 3.10.1963: 2 ♂ 30.0 34.6 mm; 1 ♀ damaged (USNM 260368). — Stn 4428, 11°41'N, 68°57'W, 720 m, 6.10.1963: 3 ♂ 22.1-30.4 mm; 3 ♀ 27.7-50.5 mm (USNM 260368). — Stn 4441, 11°03'N, 67°53'W, 900 m, 9.10.1963: 1 ♀ 70.3 mm; 1 ov. ♀ 65.6 mm (USNM 273140).

"*Pillsbury*": stn 455, off Guajira, Colombia, 13°01'N, 71°55'N, 27.07.1966: 1 ♂ 42.0 mm; 1 ♀ 42.4 mm; 1 juv. (RMNH). — Stn 478, W. Grenadine Is., 11°34.4'N, 62°10.7'W, 598-597 m, 2.08.1966: 6 ♂ 23.5-46.1 mm; 5 ♀ 23.3-47.4 mm; 1 juv. (RMNH). — Stn 846, 11°37.48'N, 60°37.24'W, Tobago I., 659-1126 m, 2.07.1969: 2 ♂ 25.4, 27.6 mm; 4 ♀ 29.2-50.5 mm; 2 juvs (LACM ex AHF 1969-31). — Stn 850, 11°45.30'N, 61°29.30'W, Tobago I., 896-923 m, 3.07.1969: 2 ♂ 24.4, 29.1 mm; 3 ♀ 30.7-40.5 mm (LACM ex AHF 1969-31).

**Guyana.** "*Luymes*": stn 48, 7°45'N, 57°01'W, 500 m, 30.08.1970: 1 ♀ 41.6 mm (RMNH).

**Chile.** "*Anton Bruun*": stn 687, 34°07'S, 72°19'W, 750-730 m, 5.08.1966: 3 ♂ 25.4-30.9 mm; 1 ♀ 26.2 mm; 3 juvs (USNM). — Stn 703, 32°09'S, 71°43'W, 960 m, 12.08.1966: 3 ♂ 25.4-26.4 mm; 4 ♀ 31.7-32.4 mm (USNM). — Stn 714, 25°00'S, 70°40'W, 950 m, 16.08.1966: 1 ♂ 26.1 mm; 1 damaged (USNM). — Off Valparaiso, 400 m, 12.02.1966: 1 ♀ 31.2 mm (USNM 266221).

**New Zealand.** NZOI: stn X 518, 42°52.06'S, 175°39.21'W, 979-922 m, 11.07.1994: 1 ov. ♀ 55.8 mm (NIWA). — Stn K 521, 42°58.16'S, 175°27.91'W, 862-865 m, 11.07.1994: 1 ♀ 22.2 mm (NIWA). — Stn U 197, 34°09.8'S, 163°36.7'E, 1186 m, 25.09.1982: 1 ♂ 26.2 mm (NIWA).

**Tasman Sea.** "*Kamenskoe*": 40°32'S, 167°23.5'E, 1140 m, 9.11.1977: 1 ♂ 30.3 mm; 1 juv. (ZMMU).

**Vanuatu.** MUSORSTOM 8: stn 1075, 15°53.26'S, 167°27.21'E, 956-944 m, 4.10.1994: 4 ♀ 23.3-36.5 mm (MNHN-Pa 1605). — Stn 1076, 15°53.81'S, 167°30.42'E, 1100-1191 m, 4.10.1991: 7 juvs (MNHN-Pa 1714).

**Australia.** New South Wales. "*Kapala*": stn K77-23-13, 33°27'S, 152°09'E, 882-914 m, 8.12.1977, id. D. BROWN as *Stereomastis sculpta*: 1 ♀ 48.8 mm; 2 juvs. (AM P40365). — Stn K88-08-04, 32°06'S, 153°08'E, 1025-1080 m, 4.05.1988, id. H.E. STODDART as *Stereomastis sculpta*: 1 ♀ 41.9 mm (AM 40363).

**Japan.** "*Albatross*": stn 3696, off Honshu I., 902-1346 m, 5.05.1900: 1 ♀ 35.2 mm (USNM).

**East China Sea.** "Yuryo Maru": 29°38.92'N, 127°55.95'E, 750 m, 4.02.1978: 2 ov. ♀ 51.6, 56.0 mm (NUM cr10229).

**Philippines.** "Albatross": stn 5468, Lagonoy Gulf, 13°35'39"N, 123°40'28"E, 1040 m, 18.06.1909: 1 ♀ 66.8 mm (USNM). — Stn 5470, Lagonoy Gulf, 13°37'30"N, 123°41'09"E, 1024 m, 18.06.1909: 1 ♀ 51.3 mm (USNM).

**Indonesia.** "Albatross": stn 5607, Sulawesi, 00°04'S, 121°36'00"E, 1392 m, 18.11.1909: 1 juv. (USNM). — Stn 5619, Molucca Passage, 00°35'00"N, 127°14'40"E, 795 m, 27.11.1909: 2 juvs (USNM). — Stn 5638, Moluccas, 3°47'15"S, 126°23'40"E, 946 m, 10.12.1909: 1 ♀ 24.3 mm (USNM). — Stn 5648, Buton str., 5°35'00"S, 122°20'00"E, 1022 m, 16.12.1909: 1 juv. (USNM). — Stn 5654, Gulf of Boni, 3°42'00"S, 120°45'50"E, 1472 m, 18.12.1909: 1 juv. (USNM). — Stn 5657, Gulf of Boni, 3°19'40"S, 120°36'30"E, 898 m, 19.12.1909: 1 juv. (USNM). — Stn 5658, Gulf of Boni, 3°32'40"S, 120°31'30"E, 933 m, 19.12.1909: 1 ov. ♀ 56.3 mm (USNM).

"Siboga": stn 18, 7°28'02"S, 115°24'06"E, 1018 m, 18.03.1899: 1 ♂ 40.6 mm (ZMA). — Stn 211, 5°40'07"S, 120°45'05"E, 1158 m, 25.09.1899: 1 juv. (ZMA).

**KARUBAR.** *Tanimbar Is.*: stn CP 52, 8°03'S, 131°48'E, 1244-1266 m, 30.10.1991: 2 juvs (MNHN-Pa 1715). — Stn CP 54, 8°21'S, 131°43'E, 836-869 m, 30.10.1991: 1 ♂ 37.4 mm (MNHN-Pa 1716). — Stn CP 73, 8°29'S, 131°33'E, 855-840 m, 2.11.1991: 1 ♂ 32.8 mm (MNHN-Pa 1606). — Stn CP 81, 9°35'S, 131°02'E, 200-207 m, 4.11.1991: 1 ♂ 40.4 mm (MNHN-Pa 1607).

**Bali Sea.** "Galathea": stn 489, 7°38'S, 116°08'E, 1195-1165 m, 13.09.1951: 1 ♂ 40.2 mm (ZMC).

**Ceylon.** "Investigator": stn 321, 5°04'08"N, 80°22'E, 1208 m, 15.11.1903: 1 ov. ♀ 59.5 mm (IM 4003/10).

**Gulf of Aden.** "Meteor 5": stn Me5-268, 13°11.2'N, 47°10.9'E, 1654-1686 m, 13.03.1987: 1 ♂ 27.2 mm; 1 ♀ 42.2 mm; 1 juv. (SMF 24651). — Stn Me5-277, 12°37.5'N, 46°09.4'E, 1552-1554 m, 14.03.1987: 1 ♂ 32.9 mm; 1 ♀ 46.7 mm; 2 juvs (SMF 24650).

**Comoro Is.** BENTHEDI: stn CA 31, 12°37.4'S, 45°25.2'E, 1800 m, 25.03.1977: 2 ♂ 20.4, 24.4 mm (MNHN-Pa 1709).

**Madagascar.** "Vauban" (A. CROSNIER coll.): stn CH 126, 17°50'S, 43°07'E, 1475-1530 m, 16.1.1975: 1 ♂ 29.1 mm; 1 ♀ 31.7 mm (MNHN-Pa 1717). — Stn CH 133, 13°02'S, 48°02'E, 1000-1525 m, 21.01.1975: 1 ♂ 42.4 mm (MNHN-Pa 1608). — Stn CH 142, 13°45.6'S, 47°34.2'E, 1250-1300 m, 29.02.1975: 1 juv. (MNHN).

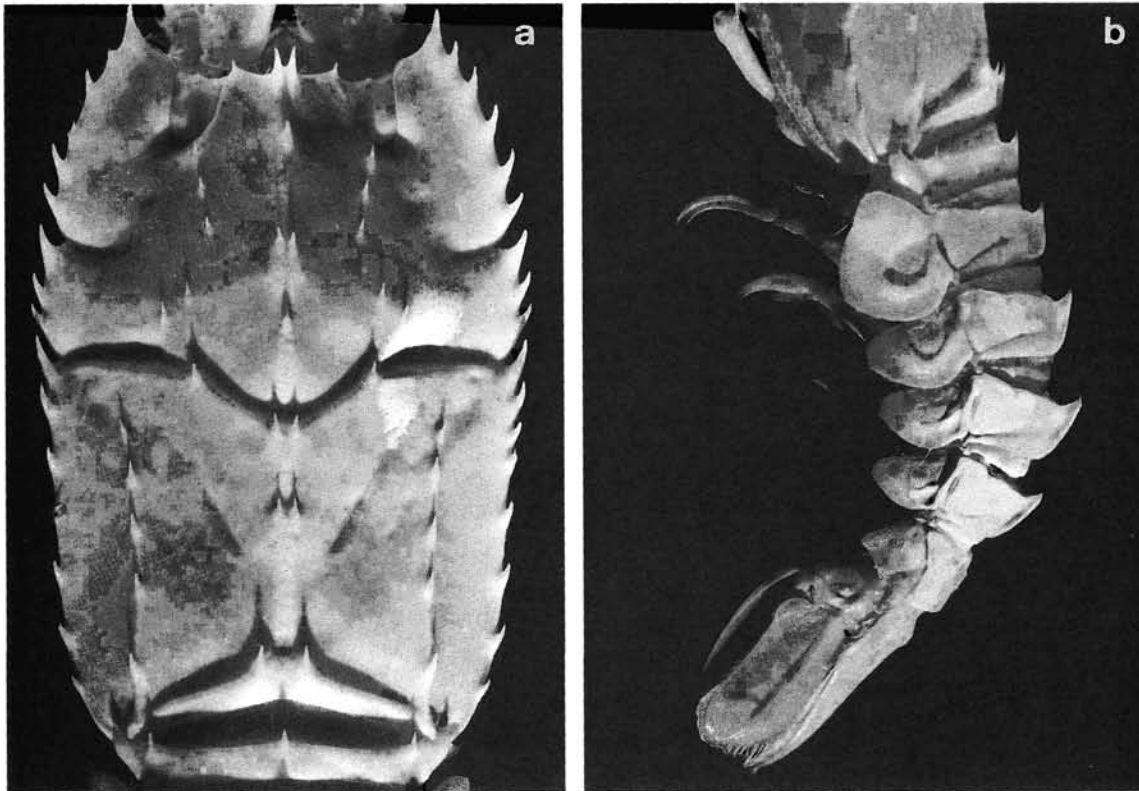


FIG. 24. — *Polycheles sculptus* Smith, 1880, ♂ 42.4 mm, Madagascar, 13°02'S, 48°02'E, 1000-1525 m (MNHN-Pa 1608): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

TYPE. — The male (38.2 mm cl) (USNM 39957) collected by the "Epes Tarr" off Nova Scotia, Canada (43°10'N, 61°20'W, 450 m) is the holotype of *Polycheles sculptus* Smith, 1880.

Four syntypes of *Pentacheles spinosus* A. Milne Edwards, 1880 are at the Museum of Comparative Zoology (Harvard) under the registration numbers MCZ 2794 ("Blake" stn 29, 2 specimens), MCZ 2795 ("Blake" stn 175, 1 specimen), MCZ 3076 ("Blake" stn 162, 1 specimen).

DESCRIPTION. — Dorsal surface of carapace setose, minutely granulate. Frontal margin straight, rostrum bifid. Internal angle of orbital sinus minutely spinose, external angle unarmed. Eyestalk bearing papilla, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth, anterolateral margin bispinose. Spines on lateral margins of carapace upcurved, anteriormost largest. Spine formula of lateral margins of carapace 5-7:3:6-7; spines successively further apart posteriorly. Spine formula of median postrostral carina (excluding rostral spines) 1:2:1; median postcervical carina bearing two pairs of spines. Gastro-orbital region with crescentic row of five antrorse spines, anteriormost largest. Anterior margin of cervical groove with antrorse spine between median postcervical and branchial carinae. Branchial carina prominent, parallel to lateral margin, with 5-7 spines, posteriormost largest; region between branchial and median postcervical carinae unarmed, obliquely grooved anteriorly. Posterior margin of carapace bearing pair of antrorse submedian spines.

First abdominal tergite bearing two pairs of prominent spines laterally on anterior margin. Abdominal tergites medially carinate. Carinae on tergites 1-5 bearing antrorse spines, spines 1-4 increasing in size posteriorly; antrorse spine on fifth tergite smaller than fourth. Sixth tergite bearing mesially parallel pair of rounded carinae, confluent posteriorly. Tergites 2-5 with transversely oblique submedian grooves. Pleura 2-5 with curved rib mesially, margins minutely granulate. Anterior margin of second pleuron produced, triangulate. Telson with median crest anteriorly, two minutely serrulate, convergent carinae posteriorly.

Merus of P1 proximally bispinose, claw-like spine subterminally on upper margin, finely spinulose on lower margin; carpus half as long as merus with subterminal spines on upper and lower margins; upper margin of propodus with subterminal spine, lower margin with two minutely spinulate rows. P5 subchelate in male, chelate in female.

Color. — "rosy pink" (ALCOCK, 1901b: 171). In BOUVIER's color plate of *P. sculptus* (1917, pl. 3 fig. 1) the carapace and abdomen of *P. sculptus* are ivory colored with spines, tail fan, antennae and legs light orange red. BOUVIER (1925: 439) described it as "rouge rose presque uniforme".

REMARKS. — SMITH's description of *P. sculptus* (1880a, 1882) is both detailed and meticulous. A. MILNE EDWARDS' (1880) description of *Pentacheles spinosus*, though brief, allowed ALCOCK (1901b) to synonymize it with *sculptus*.

The "magnificent specimen of that strange blind crustacean" collected in the Mediterranean and described by GIGLIOLI (1881: 358) as differing "only in one or two minor details, which may be sexual differences" from *Willemoesia leptodactyla*, is in fact *P. sculptus*.

DISTRIBUTION. — Worldwide: Mediterranean, Ibero-Moroccan Gulf, Canary Is, Mauritania, Cape Verde Is, West Africa, South Africa, Labrador Sea, Iceland, Canada (Nova Scotia), United States, Gulf of Mexico, Caribbean Sea, Guyana, Chile, New Zealand, Tasman Sea, Vanuatu, Australia, Japan, China Sea, Philippines, Indonesia, Malay Archipelago, Ceylon, Arabian Sea, Gulf of Aden, Comoro Is, Madagascar, East Africa; 200 m (present work) - 4000 m (STEPHENSON, 1923).

### *Polycheles suhmi* (Bate, 1878)

Fig. 25

- Pentacheles suhmi* Bate, 1878a: 278; 1878b: 484; 1878c: 563. — NORMAN, 1879: 180. — HOLTHUIS, 1962: 183. — CHINA, 1964: 111.  
*Stereomastis suhmi* - BATE, 1888: 154, figs 13, 37-38, pl. 15 figs 3-4. — STEBBING, 1893: 200. — DE MAN, 1916: 5 (list). — SUND, 1920: 223. — CALMAN, 1925: 19. — BARNARD, 1950: 574, fig. 105f. — HOLTHUIS, 1952a: 78. —

BERNARD, 1953: 87. — BAHAMONDE, 1963: 4. — ZARENKOV, 1964: 8; 1969: 81. — FIRTH & PEQUEGNAT, 1971: 72. — RETAMAL, 1974: 6; 1981: 16. — BAEZ & ANDRADE, 1979: 225, pl.1 fig. 5. — ANDRADE & BAEZ, 1980: 262. — KENSLEY, 1981b: 29. — MACPHERSON, 1983: 48 fig. 27; 1984: 74; 1991: 405. — ANDRADE, 1986: 45, 50. — TAKEDA, 1990: 358. — TIEFENBACHER, 1994: 17, fig. 1. — GRIFFIN & STODDART, 1995: 249, figs 12-15. — DAWSON, 1997: 23.

*Polycheles suhmi* - BOUVIER, 1917: 35.

*Steromastis suhmi* - WICKSTEN, 1989: 304 [erroneous spelling].

**MATERIAL EXAMINED.** — **SE Atlantic.** Off Cape province. "*Africana*": 32°50'S, 16°45'E, 495 m, 25.08.1988: 1 ov. ♀ 28.5 mm (SAM). — 29°50.0'S, 15°03.1'E, 345 m, 12.08.1989: 1 ♂ 18.7 mm; 1 ♀ 23.1 mm (SAM). — 30°05'S, 14°54.1'E, 465 m, 13.08.1989: 1 ♀ 27.0 mm (SAM). — 32°20.4'S, 16°31.7'E, 367 m, 14.01.1990: 1 ♂ 18.2 mm (SAM). — 34°14'S, 17°39'E, 419 m, 12.02.1992: 3 ov. ♀ 27.7-30.5 mm (SAM). — 34°34'S, 17°57'E, 438 m, 12.02.1992: 1 ov. ♀ 31.4 mm (SAM). — 31°20'S, 16°09'E, 462 m, 20.02.1992: 2 ♂ 20.5, 23.1 mm; 1 ♀ 31.2 mm; 1 ov. ♀ 26.5 mm (SAM). — 29°56'S, 14°51'E, 446 m, 22.02.1992: 1 ♂ 23.6 mm; 1 ov. ♀ 27.0 mm (SAM). — 34°12'S, 17°37'E, 416 m, 11.01.1995: 1 ♂ 25.1 mm; 2 ov. ♀ 28.6, 22.6 mm (SAM). — 31°45'S, 15°42'E, 468 m, 25.01.1995: 1 ♀ 27.3 mm; 2 ov. ♀ 26.7, 24.2 mm (SAM). — 35°14'S, 18°42'E, 424 m, 5.02.1996: 4 ♂ 21.2-26.0 mm; 4 ♀ 22.9-29.5 mm (SAM).

33°20'S, 17°32.48'E, 451 m, 10.03.1988, coll. & id. B. KENSLEY: 2 ♂ 18.7, 18.9 mm; 2 ♀ 20.3, 28.8 mm; 10 ov. ♀ 25.5-29.4 mm (USNM 235173).

Discovery Seamount. "*Prof. Mesyatsev*": stn 154, 760 m, 10.12.1979, coll. M.V. BONDARENKO: 1 ♂ 18.3 mm; 2 ♀ 20.9, 20.1 mm (ZMMU).

**Chile.** "*Challenger*": stn 305b, Gulf of Penas, 47°48'S, 74°46'W, 292 m, 1.01.1876: 1 ♂ 17.1 mm (NHM 1888.22). — Stn 311, 52°45'30"S, 73°46'W, 441 m, 11.01.1876: 5 ♂ 15.2-18.6 mm; 4 ♀ 17.3-22.3 mm (NHM 1888.22).

"*Albatross*": stn 2780, 53°01'S, 73°42'30"W, 664 m, 2.02.1888, id. W.L. SCHMITT: 4 ♂ 19.9-22.6 mm; 5 ♀ 17.2-32.4 mm (USNM 58641). — Stn 2781, 51°52'S, 73°41'W, 626 m, 4.02.1888, id. W.L. SCHMITT: 1 damaged (USNM 58642). — Stn 2782, 51°12'S, 74°13'05"W, 464 m, 6.02.1888, id. M.J. RATHBUN: 3 ♂ 21.1-23.6 mm; 4 ♀ 22.7-37.7 mm; 1 juv. (USNM 28348). — Stn 2784, 48°41'S, 74°24'W, 349 m, 8.02.1888, id. M.J. RATHBUN: 2 ♂ 19.5, 26.8 mm; 3 ♀ 28.8-29.3 mm; 1 ov. ♀ 26.6 mm (USNM 28349). — Stn 2785, 48°09'S, 74°36'W, 808 m, 8.02.1888, id. M.J. RATHBUN: 1 ♀ 19.3 mm (USNM 58643).

Valparaiso. 10.02.1956: 2 ov. ♀ 24.5, 20.6 mm (USNM 99776); 1 ♂ 21.3 mm (RMNH).

"*Eltanin*": stn 1605, 52°53'S, 74°05'W, 522-544 m, 1.04.1966: 1 ♂ 22.1 mm; 1 ♀ 27.1 mm; 1 ov. ♀ 27.7 mm (USNM).

"*Anton Bruun*": stn 687, 34°07'S, 72°19'W, 750-730 m, 5.08.1966: 1 ♀ 21.3 mm (USNM).

**New Zealand.** NZOI: stn E747, 40°43.2'S, 176°48.4'E, 548-563 m, 29.03.1967: 1 ♀ 34.6 mm (NIWA). — Stn P120, 35°45.7'S, 165°04.1'E, 950 m, 3.06.1977: 1 juv. (NIWA). — Stn 1699, 48°16.0'S, 179°E, 532 m, 19.03.1979: 1 ♀ 20.1 mm; 2 juvs (NIWA). — Stn P927, 40°50.1'S, 168°14.8'E, 1009-1005 m, 18.04.1980: 1 ♂ 25.9 mm (NIWA). — Stn T33, 48°30.2'S, 179°43.5'W, 721-725 m, 13.03.1981: 1 juv. (NIWA). — Stn V227, 39°33.9'S, 169°04.7'E, 604 m, 18.10.1982: 1 ♂ 15.4 mm (NIWA). — Stn V391, 42°49.97'S, 176°59.91'E, 476 m, 17.09.1989: 1 ♂ 19.3 mm (NIWA). — Stn X510, 42°56.29'S, 175°41.39'W, 856-860 m, 10.07.1994: 1 ♂ 19.2 mm (NIWA). — Stn Z8974, 37°01.29'S, 176°19.58'E, 566-578 m, 11.04.1996: 1 ♂ 22.9 mm (NIWA). — Stn Z8566, 43°04'S, 175°39'E, 460 m, 1.10.1996: 5 ♀ 35.2-39.0 mm (NIWA). — Stn Z8990, 37°31.70'S, 176°46.96'E, 523-527 m, 17.01.1998: 1 ♂ 25.1 mm (NIWA). — Stn Z9014, 36°54.78'S, 176°20.43'E, 588-599 m, 23.01.1998: 1 ♀ 19.8 mm (NIWA).

**Tasman Sea.** "*Galathea*": stn 626, 42°10'S, 170°10'E, 610 m, 20.01.1952: 2 ♂ 16.8, 26.5 mm; 6 ♀ 17.9-31.1 mm (ZMC).

**Australia.** SE Port Hunter. "*Kapala*": stn K77-23-10, 33°11'S, 152°24'E, 732 m, 7.12.1977, id. D.E. BROWN: 1 ♂ 26.8 mm; 1 ov. ♀ 30.8 mm (AM P26756). — Stn K87-23-03, 34°42'S, 151°16'E, 760-855 m, 3.12.1987, id. H.E. STODDART: 1 ♀ 37.4 mm (AM P38726).

**TYPE.** — The male (17.1 mm cl) (NHM 1888.22) collected by the "*Challenger*" at stn 305b in the Gulf of Penas (47°48'S, 74°46'W, 292 m), is the holotype.

**DESCRIPTION.** — Dorsal surface of carapace with short setae, minutely granulate. Anterior margin of carapace straight, two obliquely set rostral spines. Internal angle of orbital notch bearing spine, external angle unarmed. Eye stalk with short spine, curved distad. Mesial margin of basal antennular segment with 2-3 spines, antero-external angle bearing two long spines. Spines on lateral margins of carapace upcurved, diminishing in size posteriorly, spine formula 5-6:2-3:7-9. Spine formula of mid-dorsal carina (excluding rostral spines) 1:1:2:2:1 before cervical groove, 2,2,2 behind cervical groove. Posterior margin of cervical groove with three spines midway between

median, branchial carinae. Gastro-orbital region with quadrispinose row, anteriormost largest, followed by cluster of 5-6 spines. Superior branchial carina prominently spinose, 7 spines between median and branchial carinae. Posterior margin of carapace with pair of submedian spines.

Anterior margin of first abdominal tergite laterally with two pairs of prominent spines, antrorse median spine. Median carina on abdominal tergites 2-5 bicuspidate, anteriorly spinose; sixth tergite with prominently denticulate double carina joined posteriorly in larger denticle. Terga 2-5 bearing shallow oblique grooves on each side of median carina. Pleura with crescentic rib mesially, margins sparsely denticulate, ventrally acute. Anterior margin of second pleuron produced, bearing prominent spine. Telson with median denticulate crest anteriorly, serrulate carinae posteriorly.

Merus of P1 with single proximal spine and subterminal claw-like spine on upper margin, lower margin smooth. Carpus half as long as merus, subterminal spine on upper and lower margins. Margins of chela smooth. P5 subchelate in male, chelate in female.

*Color.* — "Carapace, abdominal segments and telson a uniform pale whitish pink; all spines of carapace and abdominal terga a darker rose pink. Endopods and inner three-quarters of exopods of uropods whitish (almost transparent), entire outer edge of exopods trimmed in dark rose pink. Ischium, anterior portion of merus and palm of propodus of cheliped pale, almost white; distal end of merus and carpus pale pink; fingers of cheliped also pale pink, fading to white at tips." (GRIFFIN & STODDART, 1995: 250).

**REMARKS.** — *P. suhmi* is easily distinguished from its congeners in having a cluster of 5 or 6 spinules posteriorly on the gastric region, bicuspid median carinae on the abdominal tergites 2-5, the posterior cusp more prominent on fourth and fifth tergites.

**DISTRIBUTION.** — Southern Ocean: South Africa, Chile, New Zealand, Australia; 292 (present work) - 2195 m (CALMAN, 1925).

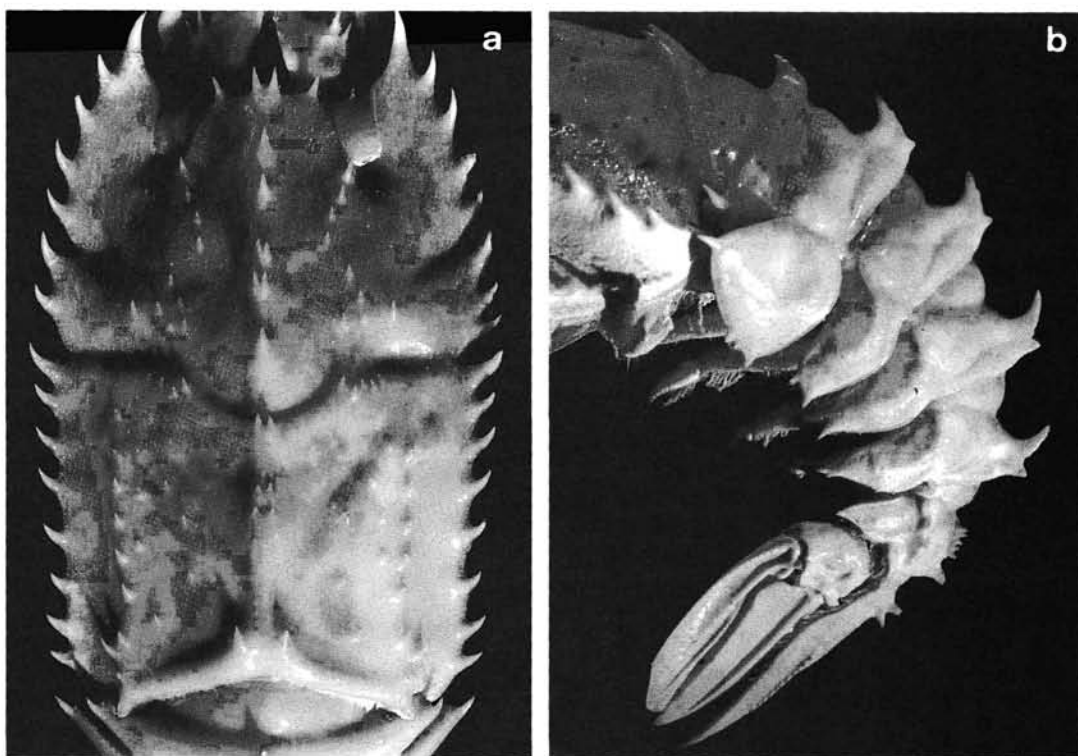


FIG. 25. — *Polycheles suhmi* (Bate, 1878): a, ♀ 31.2 mm, off Cape Province, "Africana", 31°20'S, 16°09'E, 462 m (SAM), dorsal view of the cephalothorax; b, ♂ 26.5 mm, Tasman Sea, "Galathea" stn 626, 42°10'S, 170°10'E, 610 m (ZMC), lateral view of the abdomen.

*Polycheles surdus* sp. nov.

Fig. 26

*Polycheles phosphorus* RATHBUN, 1906: 898 [non Alcock, 1894].*Stereomastis phosphorus* - GRIFFIN & STODDART, 1995: 246, figs 9-11 (p.p.).

**MATERIAL EXAMINED.** — **Southeast Pacific. Nazca Ridge.** "Prof. Mesyatsev": 24°58'S, 88°28'W, 565 m, 1.09.1983: 2 ♀ 45.8, 55.7 mm (ZMMU).

"Prof. Stockman": stn 1964, 580-564 m, 30.04.1987: 3 ♂ 38.2-45.7 mm; 1 ov. ♀ 47.8 mm (ZMMU). — Stn 1965, 565-570 m, 30.04.1987: 1 ♂ 43.1 mm; 2 ♀ 43.3, 27.6 mm (ZMMU). — Stn 1971, 570-580 m, 1.05.1987: 2 ♂ 28.5, 39.4 mm; 1 ♀ 49.4 mm; 7 juvs (ZMMU). — Stn 1976, 569-590 m, 1.05.1987: 1 ♂ 38.2 mm; 1 ♀ 33.3 mm; 1 ov. ♀ 45.9 mm, 5 juvs (ZMMU). — Stn 1977, 545-600 m, 1-2.05.1987: 1 ♂ 28.8 mm; 4 juvs (ZMMU). — Stn 1996, 750-800 m, 5.05.1987: 2 ♂ 31.9, 39.9 mm; 1 ov. ♀ 52.0 mm; 1 juvs (ZMMU).

**Sala-y-Gomez Ridge.** "Prof. Stockman": stn 2018, 760 m, 7.05.1978: 1 ♂ 44.8 mm; 1 ♀ 49.2 mm; 9 juvs (ZMMU). — Stn 2019, 25°05.6'S, 99°28.9'W, 750 m, 7.05.1978, colls MIRONOV & ZARENKOV: 1 ♀ 45.4 mm (ZMMU).

**Marquesas Is.** MUSORSTOM 9: stn CP 1191, 8°46.3'S, 140°07.2'W, 350 m 26.08.1997: 1 ov. ♀ 35.1 mm (MNHN-Pa 1688). — Stn CP 1271, 7°53.6'S, 140°42.2'W 600 m, 4.09.1997: 4 juvs (MNHN-Pa 1684). — Stn CP 1272, 7°55.5'S, 140°43.6'W 660-680 m, 4.09.1997: 1 ♂ 31.7 mm; 1 ov. ♀ 39.3 mm (MNHN-Pa 1683). — Stn CP 1276, 7°51.9'S, 140°38.2'W, 800-805 m, 5.09.1997: 3 juvs (MNHN-Pa 1685). — Stn CP 1278, 7°52.1'S, 140°38.6'W, 1000 m, 6.09.1997: 1 juv. (MNHN-Pa 1687). — Stn CP 1307, 8°57.9'S, 140°15.8'W, 708-738 m, 10.09.1997: 1 juv. (MNHN-Pa 1686).

**Hawaii.** "Albatross" (all the specimens identified as *P. phosphorus* by M.J. RATHBUN): stn 3467, Kauai Channel, 21°13'N, 157°43'37"W, 558 m, 3.12.1891: 1 ♀ 39.4 mm (USNM 30273). — Stn 3476, Kauai Channel, 21°09'N, 157°53'W, 536 m, 6.12.1891: 1 ♀ 43.6 mm (USNM 30274). — Stn 3816, Oahu I., surface, 29.03.1902: 1 ♂ 39.1 mm (USNM 30275). — Stn 3824, Molokai I., 400-880 m, 1.04.1902: 1 ov. ♀ 52.8 mm (USNM 30276). — Stn 3836, Molokai I., 428-459 m, 3.04.1902: 1 ♂ 38.5 mm (USNM 30277). — Stn 3839, Molokai I., 466-479 m, 4.04.1902: 1 ♂ 33.8 mm (USNM 30278). — Stn 3867, Pailolo Channel, 511-522 m, 10.04.1902: 1 ♂ 33.6 mm; 3 ♀ 31.1-58.0 mm (USNM 30282). — Stn 3883, Pailolo Channel, 499-511 m, 16.04.1902: 1 ♂ 38.0 mm (USNM 30283). — Stn 3884, Pailolo Channel, 511-522 m, 16.04.1902: 1 ♂ 47.6 mm (USNM 30284). — Stn 3907, Oahu I., Diamond Head, 547-567 m, 5.05.1902: 1 ♂ 39.4 mm (USNM 30286). — Stn 3910, Oahu I., Diamond Head, 560-607 m, 5.05.1902: 2 ♂ 37.0, 49.7 mm; 1 ♀ 39.9 mm (USNM 30287). — Stn 3911, Oahu I., Diamond Head, 601-607 m, 5.05.1902: 1 ♂ 43.1 mm (USNM 30288). — Stn 3917, Oahu I., Diamond Head, 529-594 m, 6.05.1902: 1 ♀ 26.8 mm (USNM 30289). — Stn 3920, Oahu I., Diamond Head, 477-504 m, 6.05.1902: 1 ♀ 39.4 mm (USNM 30290). — Stn 3988, Kauai I., 297-844 m, 11.06.1902: 1 ♂ 31.5 mm; 1 ♀ 48.6 mm (USNM 30296). — Stn 4028, Kauai I., 799-862 m, 24.06.1902: 1 ♂ 21.5 mm; 1 ♀ 46.0 mm (USNM 30300). — Stn 4097, Pailolo Channel, Mokuhooniki Islet, 515 m, 22.07.1902: 1 ♂ 43.7 mm (USNM 30285). — Stn 4187, Kauai I., 914-1265 m, 13.08.1902: 1 ♀ 41.2 mm (USNM 30314).

**Banc Tuscarrora.** MUSORSTOM 7: stn CP 562, 11°48'S, 178°22'W, 775-777 m, 19.05.1992: 2 ♂ 49.0, 49.5 mm; 1 ♀ 45.1 mm (MNHN-Pa 1610). — Stn CC 550, 12°15'S, 177°28'W, 800-810 m, 18.05.1992: 1 ♀ 27.8 mm (MNHN-Pa 1718). — Stn CC 554, 12°14'S, 177°28'W, 795-820 m, 18.05.1992: 1 juv. (MNHN-Pa 1719). — Stn CP 567, 11°47'S, 178°27'W, 1010-1020 m, 20.05.1992: 1 juv. (MNHN-Pa 1720).

**Banc Combe.** MUSORSTOM 7: stn CC 553, 12°17'S, 177°28'W, 780-794 m, 18.05.1992: 2 ♂ 46.6, 34.7 mm; 1 ♀ 45.0 mm (MNHN-Pa 1609).

**Banc Field.** MUSORSTOM 7: stn CP 592, 12°32'S, 174°22'W, 730-775 m, 24.05.1992: 3 juvs (MNHN-Pa 1721).

**Vanuatu.** MUSORSTOM 8: stn CP 991, 18°51.26'S, 168°52.19'E, 936-910 m, 24.09.1994: 1 ♂ 29.4 m; 1 juv. (MNHN-Pa 1724). — Stn CP 996, 18°52'S, 168°56'E, 764-786 m, 24.09.1994: 1 juv. (MNHN-Pa 1725). — Stn CP 1008, 18°53.29'S, 168°52.65'E, 919-1000 m, 25.09.1994: 4 juvs (MNHN-Pa 1726). — Stn CC 1035, 17°58.02'S, 168°44.06'E, 765-780 m, 29.09.1994: 1 ♀ 44.7 mm (MNHN-Pa 1727).

**New Caledonia.** BIOGEOCAL: stn CP 290, 20°36.91'S, 167°03.34'E, 920-760 m, 27.04.1987: 1 ♀ 28.4 mm (MNHN-Pa 1746).

**BATHUS 2:** stn CP 751, 22°24.35'S, 166°12.83'E, 1300-1500m, 15.05.1993: 1 ♀ 26.8 mm (MNHN-Pa 1747). — Stn CP 765, 22°09'S, 166°02'E, 600-630 m, 17.05.1993: 1 ♂ 29.7 mm (MNHN-Pa 1722).

**BATHUS 4:** stn CP 950, 20°31.93'S, 164°56.11'E, 705-750 m, 10.08.1994: 1 ♂ 37.7 mm; 1 ♀ 54.6 mm (MNHN-Pa 1728).

**New Zealand.** NZOI: stn P927, 40°50.1'S, 168°14.8'E, 1009-1005 m, 18.04.1980: 1 juv. (NIWA). — Stn Z8256, 36°09.1'S, 176°15.5'E, 470 m, January 1994: 1 ♂ 25.6 mm (NIWA). — Stn Z8267, 36°49.7'S, 176°18.3'E, 510 m, December 1994: 1 ♀ 50.6 mm (NIWA). — Stn Z8268, 36°52.9'S, 176°19.1'E, 520 m, December 1994: 2 ♀ 43.1, 43.8 mm (NIWA). — Stn Z28996, 37°23.23'S, 176°32.85'E, 525-552 m, 19.01.1998: 1 ♀ 52.6 mm (NIWA). — Stn Z9007, 37°08.61'S, 176°19.64'E, 472-475 m, 21.01.1998: 2 ♂ 31.1, 30.3 mm; 1 ♀ 49.0 mm (NIWA). — Stn Z9008, 37°09.87'S, 176°21.74'E, 518-536 m, 22.01.1998: 1 ♂ 34.3 mm; 1 ♀ 29.2 mm (NIWA). — Stn Z9009,

37°13.40'S, 176°14.37'E, 224-264 m, 22.01.1998: 1 ♂ damaged (NIWA) — Stn Z9014, 36°54.78'S, 176°20.43'E, 588-599 m, 23.01.1998: 1 ♂ 32.4 mm (NIWA). — Stn Z9017, 36°46.53'S, 176°16.56'E, 465-474 m, 23.01.1998: 1 ♀ 41.8 mm (NIWA)

**Australia.** *New South Wales. "Kapala"*: stn K78-23-08, 28°03'S, 154°04'E, 732 m, 6.11.1978, id. H.E. STODDART as *Stereomastis phosphorus*: 1 ♂ 42.4 mm; 1 ♀ 49.4 mm (AM P44915).

**Indonesia.** Makassar Strait. CORINDON 2: stn 209, 00°07'S, 117°53'E, 490 m, 31.10.1980: 1 ♀ 45.9 mm (MNHN).

**Indian Ocean.** *Mascarene Ridge. "Vitiáz"*: stn 2817, 9°26'S, 60°05'E, 350-430 m, 10.01.1989: 1 ov. ♀ 45.0 mm (USNM). — Stn 2819, 8°48'S, 59°47'E, 525-530 m, 10.01.1989: 2 ♀ 27.3, 32.0 mm (USNM).

**Reunion.** *"Marion Dufresne"*: stn CP 113, 20°47.8'S, 55°08.5'E, 712-790 m, 31.08.1982: 2 ♂ 28.5, 40.0 mm (MNHN). — Stn CP 120, 20°54'S, 55°14.4'E, 940-1180 m, 31.08.1982: 1 ♂ 28.1 mm; 2 ♀ damaged (MNHN).

**Madagascar.** *"Vauban"* (coll. A. CROSNIER): stn 48, 15°18'S, 46°12.1'E, 480-510 m, 8.11.1972: 2 ♂ 32.6, 42.4 mm; 5 ♀ 46.6-56.7 mm (MNHN-Pa 1613). — Stn 59, 23°36'S, 43°29.6'E, 600-610 m, 27.02.1973: 1 ♂ 37.0 mm, 1 ♀ 50.9 mm (MNHN-Pa 1614). — No stn number, 21°17'S, 43°23'E, 490-530 m, 6.06.1973: 2 ♂ 32.0, 45.8 mm; 1 ♀ 53.5 mm (MNHN-Pa 1615). — Stn CH 133, 13°02'S, 48°02'E, 1000-1525 m, 21.01.1975: 3 juvs (MNHN-Pa 1612). — Stn CH 139, 13°50'S, 47°37'E, 850-1125 m, 27.02.1975: 4 juvs (MNHN-Pa 1616). — Stn CH 142, 13°45.6'S, 47°34.2'E, 1250-1300 m, 28.02.1975: 10 juvs (MNHN-Pa 1617).

*"Mascareignes III"* (coll. R. CLEVA): stn 5, 22°25'S, 43°04.8'E, 500-520 m, 21.12.1985: 3 ♂ 49.1-58.0 mm (MNHN-Pa 1145). — Stn 7, 22°26.1'S, 43°06.3'E, 400-425 m, 21-22.12.1985: 1 ♀ 50.4 mm (MNHN-Pa 1147). — Stn 9, 22°25.3'S, 43°04.9'E, 525-550 m, 22.12.1985: 3 ♀ 42.4-56.3 mm (MNHN-Pa 1148). — Stn 12, 22°23.5'S, 43°04.9'E, 400-425 m, 23.12.1985: 1 juv. (MNHN-Pa 1142). — Stn 25, 22°23.5'S, 43°05'E, 500-520 m, 15.01.1986: 3 ♂ 48.4-57.7 mm; 2 ♀ 31.1, 57.8 mm (MNHN-Pa 1144). — Stn 26, 22°18.7'S, 43°04.1'E, 450-600 m, 15.01.1986: 2 ♂ 43.0, 49.3 mm (MNHN-Pa 1143). — Stn 32, 22°25.8'S, 43°04.3'E, 450-475 m, 19.01.1986: 1 ♂ 52.7 mm (MNHN-Pa 1149).

*"Mascareignes III"* (coll. R. VON COSEL): stn CH 55, 22°17.2'S, 43°03.4'E, 430 m, 16.10.1986: 1 ♂ 50.7 mm (MNHN Pa 1618). — Stn CH 60, 22°25.6'S, 43°06.2'E, 475 m, 18.10.1986: 1 ♂ 50.9 mm (MNHN-Pa 1619). — Stn CH 63, 22°26.8'S, 43°05.4'E, 530 m, 20.10.1986: 1 ♂ 44.8 mm; 1 damaged (MNHN-Pa 1620). — Stn CH 113, 22°11.35'S, 43°02.3'E, 650 m, 27.11.1986: 5 juvs (MNHN-Pa 1621).

**Mozambique Channel.** *"Anton Bruun"*: stn 398, 22°25'S, 35°54'E, 740 m, 1.10.1964: 1 ♀ 26.9 mm (USNM).

**Mozambique.** *"Algoa"*: 18°14'S, 37°31'E, 472 m, 17.06.1994: 2 ♂ 39.5, 38.1 mm (SAM A41702); 1 ♀ 44.7 mm (SAM A41700). — 19°27'S, 36°51'E, 486 m, 14.06.1994: 1 ♀ 39.6 mm (SAM A41703). — 16°20'S, 40°08'E, 500 m, 16.06.1994: 1 ov. ♀ 51.8 mm (SAM A41701).

**TYPES.** — The male (39.5 mm cl) (SAM A41 702) collected off Mozambique (18°14'S, 37°31'E, 472 m) is the holotype; the smaller male from that sample is a paratype.

**DESCRIPTION.** — Carapace oblong, lateral margins subparallel, slightly convergent anteriorly. Dorsal surface of carapace tomentose, minutely granulose. Anterior margin of carapace straight. Median submarginal tooth upcurved, in front of bifid rostrum. Internal angle of orbital sinus unispinose, external angle unarmed. Eyestalk bearing mammillate spine, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth; antero-external margin curved, bispinose, anterior spine longer than posterior. Spines formula of lateral margins of carapace 6-7:3-4:10-14; spines decreasing successively in size posteriorly. Spine formula of median postrostral carina (excluding rostral spines) 1:1:2:1; median postcervical carina bearing two pairs of spines. Posterior margin of cervical groove with 3 or 4 antrorse spines midway between median postcervical and branchial carinae. Gastro-orbital region bearing five spines in curved row. Branchial carina prominent, sinuous, bearing five spinules, posteriormost largest. Carapace between branchial and median carinae minutely granulate. Posterior margin of carapace bearing two prominent, antrorse submedian spines.

Anterior margin of first abdominal tergite bearing two pairs of lateral spines. Abdominal tergites medially carinate. Carinae of tergite 1-2 bearing small antrorse spine; carina of tergite 3 with a prominent, salient spine longer than the spine of the fourth; carina of tergite 5 simple. Sixth tergite bearing low, granulate, double carinae, confluent posteriorly in rounded knob. Tergites 2-5 with submedian grooves obsolescent. Pleura 2-4 with curved rib mesially. Margins of pleura denticulate; second pleuron anteriorly produced, ovate. Telson with short, denticulate crest anteriorly, two minutely serrulate submedian carinae posteriorly.

Merus of P1 bispinose proximally, claw-like spine subterminally on upper margin, occasionally spinulose on lower margin; carpus more than half as long as merus, with prominent spines subterminally on upper and lower margins. Upper margin of propodus nearly smooth. P5 subchelate in male, chelate in female.

**Color.** — "Dorsum pale opaque rose madder, darkest on abdomen; ridges of carapace opaque white; swimmerets, thoracic legs and mouth parts deeper madder yet still pink." (RATHBUN, 1906: 898).



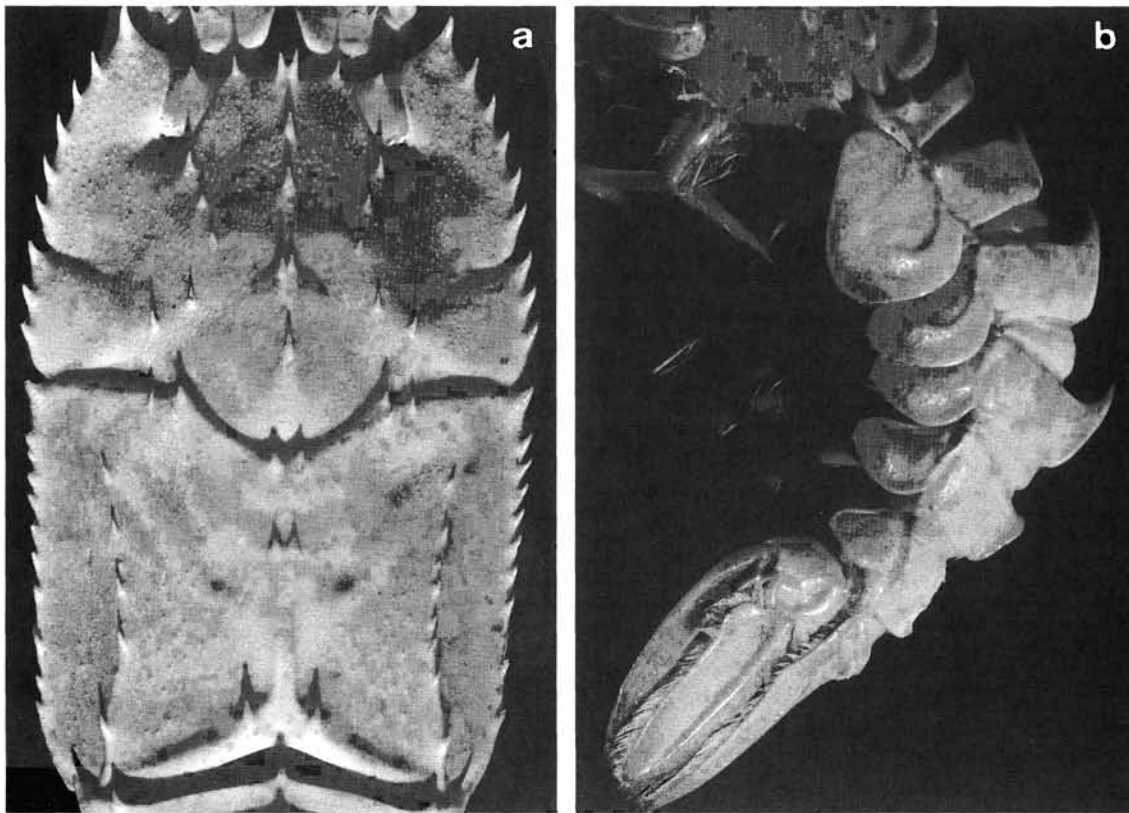


FIG. 26. — *Polycheles surdus* sp. nov., ♂ 38.4 mm, off Mozambique, "Algoa", 18°14.0'S, 37°31.0'E, 472 m (SAM A41702): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

ETYMOLOGY. — From the Latin *surdus* (= deaf), refers to its relation to *auriculatus* (Bate, 1878).

REMARKS. — RATHBUN (1906: 898) observed that in her Hawaiian specimens "The lateral marginal spines of the carapace... are frequently seven in front of the first sinus, sometimes five between the sinus and the cervical groove, and behind the groove there may be as many as ten". Indeed, the increased number of spines on the postcervical lateral margin distinguishes *surdus* from *auriculatus* (see above).

DISTRIBUTION. — Nazca Ridge in the southeast Pacific, Marquesas Is, Hawaii, New Caledonia, New Zealand, Australia, Indian Ocean, Reunion, Madagascar, Mozambique; 350-1525 m.

*Polycheles talismani* (Bouvier, 1917)

Fig. 27

*Polycheles sculptus* var. *talismani* Bouvier, 1917: 53.

*Polycheles sculptus* - BRUUN, 1950: 24, fig. 16 [non Smith, 1880].

*Stereomastis sculpta* - HOLTHUIS, 1952b: 11. — LONGHURST, 1958: 32. — FOREST, 1963: 627. — MACPHERSON, 1983: 48. — RUCABADO & BAS, 1984: 19 [not Smith, 1880].

*Stereomastus sculpta* - GAULD 1960: 63 [erroneous spelling] [non Smith, 1880].

*Polycheles grimaldi* - WOLFF, 1967: 236 (photo) [non Bouvier, 1905].

*Stereomastis talismani* - MACPHERSON, 1988: 57, fig. 5a; 1991: 405, fig. 7. — DAWSON, 1997: 24.

*Stereomastis sculpta talismani* - HOLTHUIS, 1991: 88.

MATERIAL EXAMINED. — West Africa. CANCAP 3: 24°17'N, 16°52'W, 1100-1150 m, 26.10.1978: 1 ♂ 26.3 mm (RMNH).

"*Talisman*": stn 78, 23°57'N, 19°35'W, 1400-1435 m, 11.07.1883: 1 ♂ 28.1 mm; 1 ♀ 28.8 mm (MNHN-Pa 29). — Stn 93, 20°24'N, 20°28'W, 1435 m, 14.07.1883: 1 ♂ damaged (MNHN-Pa 28).

TYRO: stn 104, 19°43'N, 17°30'W, 1500 m, 17.06.1988: 1 ♀ 32.9 mm; 7 juvs (RMNH).

"*Meteor*": stn 192, 17°11.8'N, 16°50.6'W, 620 m, 11.02.1977: 1 ♀ (SMF 24644). — Stn 265, 17°17.1'N, 16°27.7'W, 95 m, 13.02.1982: 1 ♂, 1F (SMF 24643).

"*Prof. Bogucki*": stn 31, 15°02'N, 17°33'W, 807 m, 30.05.1979, coll. P. CAYRE: 1 ♂ 28.7 mm; 1 ♀ 35.1 mm (MNHN-Pa 655).

"*Pillsbury*": stn 41, 4°47'N, 3°33'W, 641-842 m, 30.05.1964: 11 ♂ 23.5-29.5 mm; 12 ♀ 26.2-47.8 mm (RMNH). — Stn 44, 5°05'N, 4°00'W, 586-403 m, 30.05.1964: 10 ♂ 24.5-30.1 mm; 9 ♀ 29.8-49.9 mm (RMNH). — Stn 51, 4°56'N, 4°01'W, 494-329 m, 31.05.1964: 19 ♂ 23.5-30.1 mm; 21 ♀ 27.9-40.2 mm (RMNH). — Stn 52, 4°54'N, 4°58'W, 952-915 m, 31.05.1964: 1 ♂ 27.9 mm (RMNH). — Stn 74, 4°20'N, 9°26'W, 733-641 m, 4.06.1994: 33 ♂ 24.6-28.0 mm; 94 ♀ 23.5-48.5 mm (RMNH). — Stn 256, 14.05.1965: 20 ♂ 24.1-26.1 mm; 26 ♀ 26.2-36.8 mm (RMNH). — Stn 309, 4°15'N, 4°27'E, 678-720 m, 26.05.1965: 1 ♂ 26.1 mm; 2 ♀ 27.1, 29.5 mm (RMNH).

"*Atlantide*": stn 120, 2°09'N, 9°27'E, 260-650 m, 1.03.1946: 21 ♂ 24.6-29.4 mm; 16 ♀ 26.8-50.1 mm (ZMC). — Stn 135, 7°55'S, 12°38'E, 235-460 m, 17.03.1946: 16 ♂ 23.7-28.3 mm; 26 ♀ 26.5-51.5 mm; 1 ov. ♀ 42.3 mm (ZMC).

"*Galathea*": stn 32, 4°05'N, 2°13'W, 2100 m, 20.11.1950: 3 ♂ 22.1-23.8 mm (ZMC). — Stn 101, 8°50'S, 12°32'E, 1000 m, 12.12.1950: 1 ♀ 47.7 mm (ZMC). — Stn 110, 12°05'S, 13°08'E, 1000 m, 19.12.1950: 2 ♂ 26.9, 27.0 mm; 4 ♀ 28.0-54.3 mm (ZMC).

GUINEAN TRAWLING SURVEY I (GTS I): "*Thierry*": stn 18/6, 4°28'N, 8°28.5'W, 100 m, 31.10.1963: 1 ♂ 29.8 mm; 2 ♀ 28.9, 49.1 mm (USNM). — Stn 29/8, 4°13'N, 1°23'W, 380-535 m, 4.09.1963: 2 ♀ 43.5, 48.5 mm (USNM). — Stn 34/8, 5°57'N, 1°33'W, 400 m, 23.02.1964: 3 ♀ 33.5-51.2 mm (USNM).

Stn 31/8, 5°06'N, 0°17'W, 400 m, 8.09.1963: 1 ♂ 28.1 mm; 3 ♀ 29.4-47.1 mm (MNHN-Pa 1622). — Stn 34/8, 5°57'N, 1°34'E, 370 m, 2.10.1963: 1 ♀ 29.0 mm (MNHN-Pa 1623). — Stn 36/8, 6°08'N, 2°56'E, 350-600 m, 6.10.1963: 1 ♀ 39.2 mm (MNHN-Pa 1624). — Stn 46/8, 3°45'N, 8°22'E, 425 m, 2.11.1963: 1 ♂ 28.0 mm (MNHN-Pa 1625). — Stn 59/8, 3°52'S, 10°14'E, 400 m, 2.12.1963: 3 ♀ 39.8-47.8 mm (MNHN-Pa 1116). — Stn 60/8, 4°25'S, 1°04'E, 400 m, 3.12.1968: 1 ♀ 41.2 mm (MNHN 1627).

GUINEAN TRAWLING SURVEY II (GTS II): stn 28/8, 4°21'N, 2°08'W, 400 m, 18.03.1963: 3 ♀ 26.6-42.9 mm (MNHN-Pa 562). — Stn 31/8, 5°05'N, 0°18'W, 400 m, 5.03.1964: 2 ♀ 33.0, 44.0 mm (MNHN-Pa 1628).

"*André Nizery*": stn 28, 1°51'S, 8°38'E, 950 m, 16.04.80: 4 ♀ 48.5- 58.7 mm (MNHN-Pa 530). — Stn 29, 1°55'S, 8°33.5'E, 1200-1430 m, 16.04.80: 2 ♀ 53.3, 57.8 mm (MNHN-Pa 533). — Stn 32, 2°41'S, 8°51'E, 900-930 m, 17.04.80: 2 ♀ 43.1, 43.2 mm (MNHN-Pa 528).

"*Geronimo*": stn 2-240, 4°08'S, 10°08'E, 1134 m, 8.09.1963: 1 ♀ 42.2 mm (MNHN-Pa 1108). — Stn 2-247, 4°38.4'S, 11°01.2'E, 402 m, 9.09.1963: 1 ♀ 43.9 mm (MNHN-Pa 1108).

TYPES. — The male (28.1 mm cl) (MNHN-Pa 29) collected by the "*Talisman*" stn 78 off West Africa (23°57'N, 19°35'W, 1400-1435 m), is the lectotype of *Polycheles talismani* Bouvier, 1917; the female in the same sample is the paralectotype.

DESCRIPTION. — Dorsal surface of carapace setose, minutely granulate. Frontal margin straight, rostrum bifid. Internal angle of orbital sinus minutely spinose, external angle unarmed. Eyestalk bearing papilla, curved distad. Basal antennular segment produced anteriorly to a sharp point, mesial margin smooth, anterolateral margin bispinose. Spines on lateral margins of carapace upcurved, anteriormost largest. Spines formula of lateral margins of carapace 5-6:3:8-10; spines successively further apart posteriorly. Spine formula of median postrostral carina (excluding rostral spines) 1:2:1, median postcervical carina bearing two pairs of spines. Gastro-orbital region with crescentic row of five antrorse spines, anteriormost largest. Posterior margin of cervical groove with antrorse spine between median postcervical and branchial carinae. Branchial carina prominent, parallel to lateral margin, with 5-7 spines, posteriormost largest; region between branchial and median carinae unarmed, obliquely grooved anteriorly. Posterior margin of carapace bearing pair of antrorse submedian spines.

First abdominal tergite bearing two pairs of prominent spines distally on anterior margin. Abdominal tergites medially carinate. Carinae on tergites 1-5 bearing antrorse spines, spines 1-4 increasing in size posteriorly; antrorse spine on fifth tergite smaller than on the fourth. Sixth tergite bearing lyre-shaped denticulate carina mesially. Tergites 2-5 with transversely oblique submedian grooves. Pleura 2-5 with curved rib mesially, margins minutely granulate. Anterior margin of second pleuron produced, triangulate. Telson with procumbent crest anteriorly, two minutely serrulate, convergent carinae posteriorly.

Merus of P1 proximally bispinose, with subterminal claw-like spine on upper margin, finely spinulose on lower margin; carpus half as long as merus, subterminal spines on upper and lower margins. Upper margin of

propodus with subterminal spine, lower margin with two minutely spinulate rows. P5 subchelate in male, chelate in female.

*Color.* — Carapace pale pink anterior to cervical groove, spines red, abdomen pale pink carinae, uropods dark red, legs red, antennae and antennulae red (HOLTHUIS, pers. obs.).

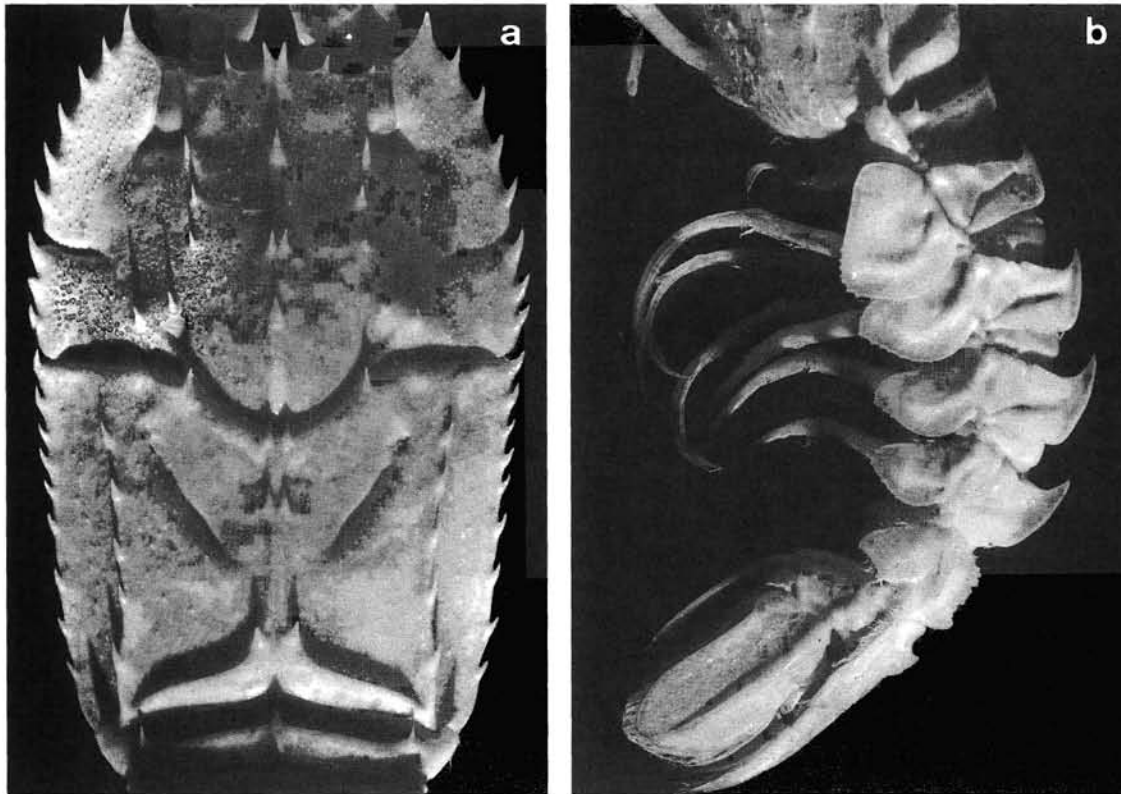


FIG. 27. — *Polycheles talismani* (Bouvier, 1917), ♀ 35.1 mm, Senegal, "Prof. Bogucki", stn 31, 15°02'N, 17°33'W, 807 m (MNHN-Pa 655): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

REMARKS. — *P. talismani* is distinguished from *P. sculptus* in having 8-10 spines on the lateral margins of carapace posterior to postcervical incision rather than 6 or 7; the sixth tergal carina denticulate and lyre-shaped rather than parallel and rounded; and the median crest on telson prominent, keel-like, rather than rounded.

BOUVIER (1917: 53) offered but a cryptic description of *Polycheles sculptus* var. *talismani* "qui habite...d'Atlantique oriental". HOLTHUIS (1952: 11) noticed that his West African specimens differed in the number of spines on the lateral margin of the carapace from the North Atlantic *sculptus*. MACPHERSON (1988), examined BOUVIER's specimens and finding that they differed from *sculptus* in the number of lateral spines of the carapace, and the median dorsal keels on the sixth abdominal segment, assigned them specific status.

DISTRIBUTION. — West Africa: Mauritania to Angola; 100-2100 m.

*Polycheles tanneri* Faxon, 1893

Fig. 28

*Polycheles tanneri* Faxon, 1893: 196; 1895: 119, pl. 31. — SEELIGER, 1901: 46. — BOUVIER, 1915: 2. — SUND, 1915: 372. — DE MAN, 1916: 6 (list). — BERNARD, 1953: 86. — FIRTH & PEQUEGNAT, 1971: 50. — DEL SOLAR, 1972: 11. — WICKSTEN, 1989: 303. — HENDRICKX, 1995: 156. — DAWSON, 1997: 12.

**MATERIAL EXAMINED.** — **Panama.** "Albatross": stn 3354, 7°09'07"N, 80°50'W, 580 m, 23.02.1891, id. W. FAXON: 1 juv. (USNM 21068).

**Galapagos Is.** "Albatross": stn 3402, San Cristobal I., 0°57'03"S, 89°03'30"W, 758 m, 28.03.1891, id. W. FAXON: 4 ♀ 19.6-25.9 mm (USNM 21069). — Stn 3409, 0°18'40"N, 90°34'W, 589 m, 3.04.1891: 1 ♀ 41.8 mm (USNM 21070). — Stn 4642, Hood I., 1°30'30"S, 89°35'W, 540 m, 7.11.1904: 1 juv. (USNM).

**Ecuador.** "Albatross": stn 2792, 0°37'N, 81°00'W, 722 m, 2.03.1888, id. W.L. SCHMITT: 1 ♂ damaged; 7 juvs (USNM 58646).

**Peru.** S. of Mancora Bank, 700-830 m, 11.01.1971, coll. E.M. DEL SOLAR: 1 ♂ 31.7 mm; 1 ♀ 24.5 mm (RMNH 27349).

**TYPE.** — The female (41.8 mm cl) (USNM 21070) collected by the "Albatross" stn 3409 off the Galapagos Is (0°18'40"N, 90°34'W, 589 m) is the holotype of *Polycheles tanneri* Faxon, 1893.

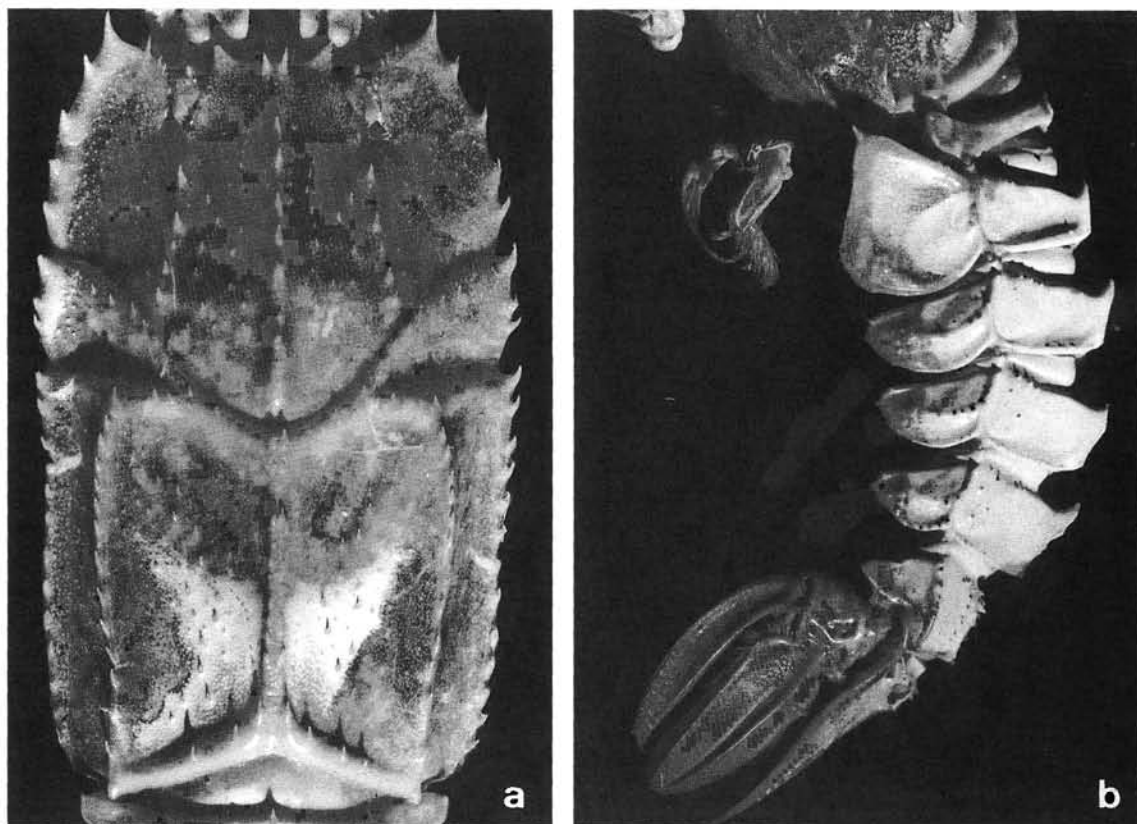


FIG. 28. — *Polycheles tanneri* Faxon, 1893, ♀ 41.8 mm, holotype, Galapagos Is, "Albatross" stn 3409, 0°18'40"N, 90°34'W, 589 m (USNM 21070): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

**DESCRIPTION.** — Dorsal surface of carapace tomentose, laterally granulose. Median submarginal tooth upcurved, reaching beyond twin rostral spines. Internal angle of orbital sinus pronounced, triangular; external angle convex, spinose, pectinate. Eyestalk distally granulose, bearing mammillate tubercle. Basal antennular segment produced anteriorly to a sharp point, mesial margin prominently spinulose; antero-external angle bispinose. Lateral spines diminishing in size posteriorly. Spine formula of lateral margins of carapace 5:3:13-14. Spine formula of median postrostral carina (excluding rostral spines) 1:1:1:(0-1):2:1; median postcervical carina bearing two pairs of spines. Gastro-orbital carina quadrispinose, anteriormost spine largest. Anterior branch of cervical carina spinulose. Posterior margin of cervical groove between median postcervical and branchial carinae spinose. Branchial carina prominent, bearing 13 or 14 antrorse spines. Carapace between gastro-orbital, branchial and median carinae with antrorse spinules. Posterior margin of carapace bearing antrorse spines, median pair largest.

First abdominal tergite with mammilate tubercle laterally. Abdominal tergites without oblique, submedian grooves, medially carinate. Tergites 1-5 bearing prominent, keel-like antrorse spine, spine of fourth tergite most prominent. Sixth tergite with conical tubercles, prominently granulate lateral margins, medially with two parallel rows of large conical granules meeting posterior margin in prominent denticle. Second pleuron furnished anteriorly with prominent spine. Pleura 3-5 with granulate rib mesially. Telson anteriorly with median denticulate crest, posteriorly with convergent, minutely serrulate carinae.

Merus of P1 spinulose on upper and lower margins, two distal claw-like spines on upper margin. Carpus one third as long as merus, distally spinose on upper margin, distal claw-like spine on upper and lower margins. Upper and lower margins of propodus prominently spinose. P5 simple in male, chelate in female.

REMARKS. — *P. tanneri* was described (1893), and not-quite-accurately illustrated (1895) by FAXON. *P. tanneri* is distinguished by its short cheliped carpus, the spinulose anterior branch of cervical carina and the prominent keel-like carinae on abdominal terga.

DISTRIBUTION. — Eastern Pacific: Panama, Ecuador, Peru and Galapagos Is; 540-830 m.

*Polycheles trispinosus* (De Man, 1905)

Fig. 29

*Pentacheles trispinosus* De Man, 1905: 587.

*Stereomastis trispinosa* - DE MAN, 1916: 10, pl. 1 figs 1, 1a-b. — BERNARD, 1953: 87. — FIRTH & PEQUEGNAT, 1971: 74. — MACPHERSON, 1991: 405. — TAKEDA & HANAMURA, 1994: 32.

MATERIAL EXAMINED. — **Indonesia**. "*Siboga*": stn 38, 7°35.4'S, 117°28.6'E, 732-915 m, 1.04.1899: 1 ♂ 34.8 mm (ZMA); 1 ♀ 23.6 mm and 4 juvs (ZMA). — Stn 314, 7°36'S, 117°30.8'E, 694 m, 17.02.1900: 1 ♀ 34.0 mm; 7 juvs (ZMA).

SNELLIUS 2: stn 4267, 8°17.6'S, 118°21.3'E, 650 m, 29.10.1984: 6 ♂ 21.2-34.6 mm; 6 ♀ 21.4-35.2 mm; 1 juv. (RMNH).

TYPES. — The male (34.8 mm cl) (ZMA) collected by the "*Siboga*" stn 38 off Indonesia (7°35.4'S, 117°28.6'E, 732-915 m) is designated here as the lectotype; the female (23.6 mm cl) in the same sample is a paratype.

DESCRIPTION. — Carapace oblong, lateral margins subparallel, slightly convergent anteriorly. Dorsal surface of carapace tomentose. Frontal margin straight. Median submarginal tooth upcurved, in front of bifid rostrum. Internal angle of orbital sinus spinose, external angle unarmed. Eyestalk bearing mammilate tubercle, pointing distad. Basal antennular segment produced anteriorly to sharp point, mesial margin smooth; antero-external angle bispinose, anterior spine nearly twice as long as lateral. Spines of lateral margins of carapace decreasing successively in size posteriorly. Spine formula of lateral margins of carapace 5:3:9. Spine formula of median postrostral carina (excluding rostral spines) 1:1:2:1; median postcervical carina bearing two pairs of spines. Gastro-orbital region with row of five antrorse spines curved distad. Posterior margin of cervical groove with single prominent antrorse spine midway between median postrostral carina and lateral margin. Branchial carina slightly sinuous, bearing 11 spines. Carapace bearing 5 spines parallel with branchial groove; additional spine posteriorly, near branchial carina. Posterior margin of carapace bearing antrorse submedian spines.

Anterior margin of first abdominal tergite bearing two pairs of lateral spines. Carinae on tergites 1-3 bearing antrorse spine; spine of tergite 3 considerably longer, overhanging second tergite. Carinae on tergites 4-5 unarmed. Tergite 6 granulate, medially with denticulate double carina, confluent posteriorly. Tergites 2-5 with deep, transversely oblique, submedian grooves. Pleura 2-5 granulate, with curved, granulate rib medially, margins denticulate. Second pleuron rounded, bearing spine anteriorly. Telson bituberculate anteriorly, two minutely serrulate, confluent carinae posteriorly.

Merus of P1 proximally bispinose, subterminal claw-like spine on upper margin, finely spinulose on lower margin. Carpus half as long as merus, subterminal spines on upper and lower margins. Upper margin of propodus with 6-7 spinules, lower margin finely spinulose distally. P5 subchelate in male, chelate in female.



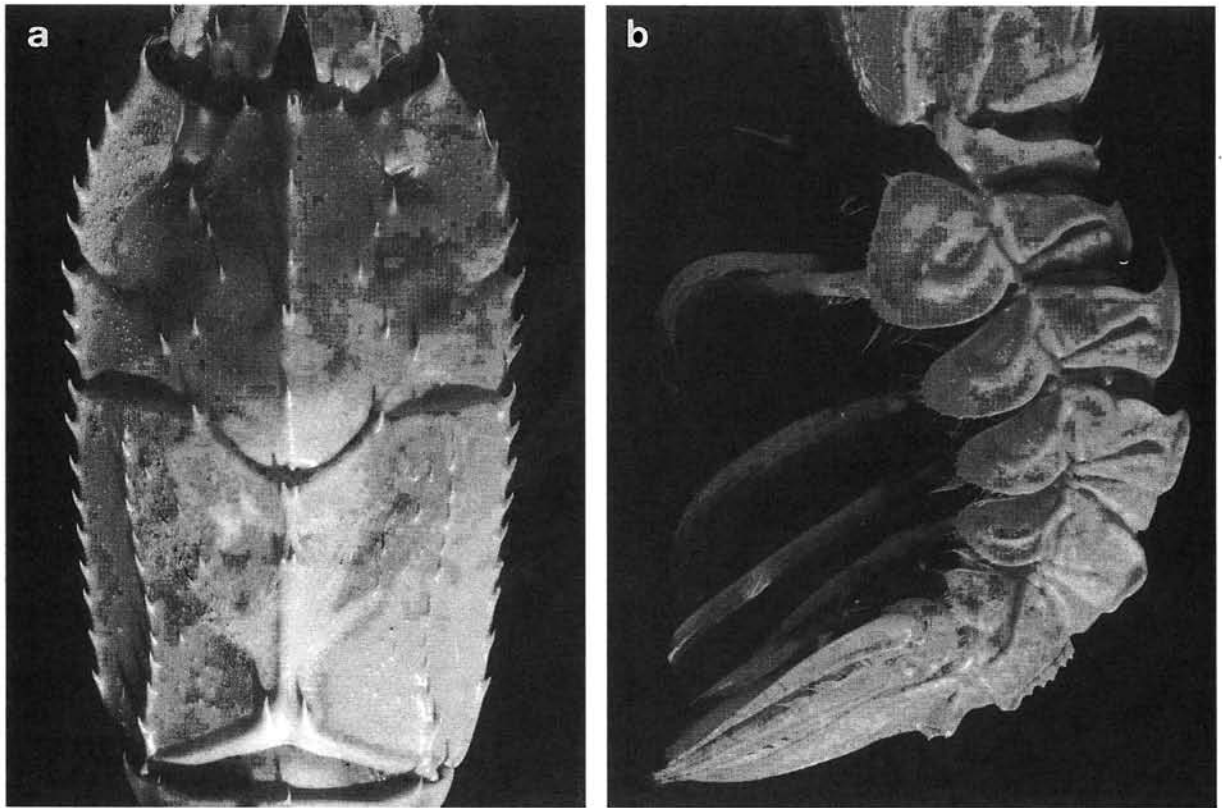


FIG. 29. — *Polycheles trispinosus* (de Man, 1905), ♀ 34.7 mm, Indonesia, SNELLIUS 2, stn 4267, 8°17.6'S, 118°21.3'E, 650 m (RMNH): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

REMARKS. — *Polycheles trispinosus* is distinguished from its congeners: "The carinae of only the three first abdominal terga are culminating in antrorse spine" (DE MAN, 1916: 10).

DISTRIBUTION. — Known only from Indonesia; 650-915 m (DE MAN, 1905).

*Polycheles typhlops* Heller, 1862

Fig. 30

*Polycheles typhlops* Heller, 1862: 392, pl. 1 figs 1-6; 1863: 211, pl. 7 figs 1-2. — CARPENTER & JEFFREYS, 1870: 154. — WOOD-MASON, 1874: 180; 1875: 134. — BATE, 1878a: 273; 1878c: 563; 1888: 100. — NORMAN, 1878: 382 (p.p.); 1879: 175 (p.p.); 1886: 7. — CARUS, 1885: 486. — STEINDACHNER, 1891: 438. — STEBBING, 1893: 200. — ADENSAMER, 1898: 621. — LO BIANCO, 1903: 250. — SENNA, 1903: 332, fig. 7, pl. 18 figs 1-11. — MAGRI, 1904: 7. — BOUVIER, 1905a: 480; 1905c: 3; 1915: 2; 1917: 35, pl. 2 figs 1-6; 1925: 433, fig. 9; 1940: 75, pl. 2, fig. 5. — KEMP, 1906: 7; 1910: 413. — RICHARD, 1907: 322. — PESTA, 1912: 103; 1918: 162, fig. 53. — KEMP & SEWELL, 1912: 24. — SELBIE, 1914: 12, pl. 1 figs 1-13. — SUND, 1915: 372. — H.C. WILLIAMSON, 1915: 437. — DE MAN, 1916: 6. — MIRANDA & RIVERA, 1921: 184; 1933: 18. — STEPHENSEN, 1923: 67. — BALSS, 1924: 179, figs 5, 8; 1925: 201, pl. 19. — CALMAN, 1925: 18. — DIEUZEIDE, 1929: 103; 1950: 46; 1960: 77. — BOLIVAR, 1930: 21, fig. 2. — SEURAT, 1930: 37; 1940: 145. — SANTUCCI, 1931: 1; 1932: 1; 1933: 1. — SCHMITT, 1935: 172. — ZARIQUIEY CENARRO, 1935: 6. — ZARIQUIEY ALVAREZ, 1946: 99, figs 123-124; 1955: 407; 1962: 30, 33; 1968: 209, fig. 86b. — VILELA, 1936: 224. — RAMADAN, 1938: 129. — PARENZAN, 1940: 139 (list). — LE DANOIS, 1948: 139, pl. 3. — BARNARD, 1950: 568. — TORTONESE, 1951: 220; 1958: 195; 1959: 448; 1962: 112; 1965: 85. — BERNARD, 1953: 86. — MARSHALL, 1954: 120. — PÉRÈS & PICARD, 1955: 51. — SEWELL, 1955: 203. — HOLTHUIS, 1956: 114; 1987: 297, fig. 2. — SPRINGER & BULLIS, 1956: 14 (p.p.). — DIEUZEIDE & ROLAND, 1957: 19; 1958: 23. — HEMMING, 1958: 137. — HOLTHUIS & GOTTLIEB, 1958: 114. — LONGHURST, 1958: 32. — ROSSI, 1958: 7. — FOREST & GANTES, 1960:

348. — RUSSELL, 1962: 6. — MAURIN, 1962: 180; 1968a: 45; 1968b: 479. — FOREST, 1963: 627; 1965: 346. — LEWINSOHN & HOLTHUIS, 1964: 54. — PÉRÈS, 1964: 22. — TORCHIO, 1964: 120; 1967: 122. — BULLIS & THOMPSON, 1965: 8. — DAWSON, 1965: 1. — GRINDLEY & PENRITH, 1965: 286. — KOTTHAUS, 1966: 348, figs 1-3. — ALLEN, 1967: 55. — MASSUTI, 1968: 306. — BERRY, 1969: 46. — STEVCIC, 1969: 128; 1990: 210. — CARPINE, 1970b: 135. — RUBIO LOIS, 1971: 10. — FIRTH & PEQUEGNAT, 1971: 50, figs 9-10. — PEQUEGNAT *et al.*, 1971: 4. — LAGARDÈRE, 1972: 672, fig. 5; 1977a: 399. — RELINI-ORSI & RELINI, 1972, fig. 5. — KOUKOURA, 1973: 753. — RELINI, 1973: 29. — NEVES, 1974: 7. — THIRIOT, 1974: 344. — PASTORE, 1976: 107. — TÜRKAY, 1976: 26; 1993: 284. — VOSS & JEUNIAUX, 1978: 127. — BEAUBRUN, 1979: 35, figs 15-16. — RODRIGUEZ, 1980: 194. — SOTO, 1980: 87. — BURKENROAD, 1981: 263. — MONCHARMONT, 1981: 66. — KENSLEY, 1981b: 29. — BURUKOVSKY, 1983: 134, fig. 178. — GEORGE, 1983: 16. — OHTA, 1983: 230. — RIEDL, 1983: 481, pl. 176. — TAKEDA, 1983: 74. — LEMAITRE, 1984: 427. — O'RIORDAN, 1984: 322. — OMORI, 1985: 63. — BABA, 1986: 157, pl. 107. — RELINI *et al.*, 1986: 156, tab. 4, fig. 4. — MANNING & FROGLIA, 1982: 321. — DURIS, 1987: 9. — GARCIA & MASSUDI, 1987: 75. — GONZALEZ-GURRIARAN & OLASO, 1987: 328 (list). — ABELLO & VALLADARES, 1988: 98. — ABELLO *et al.*, 1988: 41. — MORGAN & JONES, 1988: 15. — GONZALES *et al.*, 1988: 28. — CHAN & YU, 1989: 166, pl. 1; 1993: 105. — INTES & BACH, 1989: 21. — CARTES & ABELLO, 1990: 35; 1992: 139. — FALCIAI & MINERVINI, 1992: 134, pl. 9, fig. 3. — CARTES & SARDA, 1992: 1315. — CARTES, 1993: 32. — CARTES *et al.*, 1993: 210. — EMMERSON, 1993: 181. — KOCATAS & KATAGAN, 1993: 35. — RODRIGUEZ, 1993: 197 (list). — VASO & GIKNURI, 1993: 397. — PIPITONE & TAMBIOLO, 1993: 361 (list). — GALIL & GOREN, 1994: 45, fig. 2b. — QUACKENBUSH, 1994: 85. — GONZALEZ, 1995: 126, fig. 65.
- Pentacheles agassizii* A. Milne Edwards, 1880: 65. — FAXON, 1896: 155. — YOUNG, 1900: 441.
- Polycheles doerleini* Riggio, 1885: 103, pl. 3 figs 1-5.
- Polycheles hextii* Alcock, 1894: 237; 1899: 35; 1901b: 172; 1902: 264. — ALCOCK & ANDERSON, 1894: 165; 1895, pl. 10 fig. 2.
- Polycheles agassizii* - FAXON, 1895: 120.
- Polycheles agassizi* - BOUVIER, 1905a: 480; 1905c: 3.
- Polycheles hexti* - BOUVIER, 1905a: 481.
- Policheles typhlops* - MAGRI, 1911: 32. — BOMBACE, 1968: 113. — RELINI-ORSI & RELINI, 1972: 59 [erroneous spelling].
- Polycheles intermedius* Balss, 1914: 599.
- Polychelles typhlopis* - NOBRE, 1931: 246, fig. 137; 1936: 153, pl. 51 fig. 130. [erroneous spelling].
- Polycheles typhlops typhlops* - FIRTH & PEQUEGNAT, 1971: 51, fig. 7. — WADLEY & EVANS, 1991: 27, pl. n.n. — GRIFFIN & STODDART, 1995: 242, figs 6-8. — TIEFENBACHER, 1995: 5. — DAWSON, 1997: 13.
- Polycheles typhlos* - ARENA & GRECI, 1973: 164 [erroneous spelling].
- Polycheles thyphlos* - ARENA & GRECI, 1973: 173. [erroneous spelling].
- Polycheles tiphlops* - FROGLIA, 1976: 78 (list) [erroneous spelling].
- Polycheles* sp. - GAMO, 1980, pl. 7b. — UTINOMI, 1983: 105.
- Stereomastis nana* - MIYAKE, 1982: 78, pl. 26 fig. 6 [non Smith, 1884].
- Polycheles hextii* - HOLTHUIS, 1984: 4.
- Polycheles thyphlops* - GONZALEZ-GURRIARAN & OLASO, 1987: 329. — JACQUES, 1989: 4. [erroneous spelling].
- Polycheles typhlops* - MIYAKE, 1982, pl. 26 fig. 6. [erroneous spelling].
- not *Polycheles typhlops* - TAKEDA, 1982, pl. 38.

## MATERIAL EXAMINED. — MEDITERRANEAN SEA.

**Israel.** 32°31'N, 34°12'E, 1347-1500 m, 4-7.11.1998, coll. B. GALIL: 13 ♂ 18.3-37.6 mm; 16 ♀ 17.0-43.2 mm (TAU).

**Spain.** *Costa Brava*, 09.1960, id. L.B. HOLTHUIS: 1 ov. ♀ 33.2 mm (USNM 106118).

**France.** *Banyuls sur mer*, 1978: 1 ♀ (SMF 24637).

## ATLANTIC OCEAN.

**North Atlantic.** 49°24.52'N, 11°29.14'W, 581 m, 20.07.1996: 1 ♂ 27.7 mm; 1 ♀ 25.9 mm; 10 juvs (RMNH).

BALGIM: stn CP 124, 35°46'N, 3°52'W, 1405 m, 14.06.1984: 2 ♀ 22.6, 37.1 mm (MNHN-Pa 1630).

**West Africa.** "*Meteor*": stn M36-98 AT-149, 25°31.5'N, 16°02.2'W, 658-888 m, 24.02.1975: 8 spec. (SMF 24640). — Stn 180, 33°37.5'N, 9°02.2'W, 953-1038 m, 12.03.1975: 1 juv. (SMF 24641). — Stn M36-127 AT-261, 17°20.6'N, 16°27.1'W, 105 m, 10.02.1982: 10 spec. (SMF 24642).

"*Talisman*": Cape Verde, 16°52'N, 27°30'W, 400-580 m, 27.07.1883, det. E.L. BOUVIER: 1 ♂ 40.4 mm; 1 ♀ 48.4 mm (MNHN-Pa 1169).

"*Pillsbury*": stn 73, 4°40'N, 9°20'W, 366-311 m, 4.06.1964: 1 ♂ 32.0 mm (RMNH). — Stn 255, 3°49'N, 7°38'E, 269-264 m, 14.05.1965: 1 ♂ 35.5 mm (RMNH).

**SE Atlantic.** "*Prof. Mesyatshev*": Rio Grande Ridge, 12.07.1974, coll. B.N. KOTENEV: 1 ♀ 38.8 mm (ZMMU).

**Bermuda.** E. St. Davids, 540 m, July-Aug. 1960: 1 ♀ damaged (USNM 106099).

**United States.** SE Cape Fear, 34°18'N, 75°51'W, 396 m, 14.06.1957, id. F.A. CHACE as *Stereomastis* nr *grimaldii*: 1 ♂ 29.8 mm (USNM 101642).

"*Oregon*": stn 5750, 29°33'N, 79°58'W, 556 m, 19.11.1965: 1 ♀ 26.7 mm (USNM 273140).



"Gerda": stn 67, 25°31'N, 79°57'W, 351 m, 26.09.1962: 1 ♀ 30.8 mm (RMNH).

**West Indies.** "Blake": stn 246, 277 m, 1878-79: 1 ♀ 26.2 mm; 1 juv. (MNHN-Pa 32).

"Silver Bay": stn 2458, 23°40'N, 79°18'W, 522 m, 5.11.1960: 2 ♂ 23.5, 46.1 mm (USNM 273140). — Stn 2483, 26°25'N, 79°01'W, 540 m, 9.11.1960: 5 ♂ 29.7-33.3 mm; 2 ♀ 32.6, 51.3 mm (USNM 251943). — Stn 3472, 27°20'N, 78°19'W, 450-612 m, 25.10.1961: 1 ov. ♀ 34.9 mm (USNM 273140).

**Gulf of Mexico.** Dry Tortugas, 522 m, 3.07.1931, coll. & id. W.L. SCHMIDT: 4 ♂ 22.1-30.2 mm; 2 ♀ 23.6, 37.9 mm; 1 juv. (USNM 78283). — *Ibidem*, 448 m, 3.08.1932, coll. & id. W.L. SCHMIDT: 1 ♀ 37.0 mm (USNM 78260).

"Oregon": stn 489, 27°44'N, 85°09'W, 457 m, 29.09.1951: 1 ♀ damaged (USNM 92625). — Stn 1324, 24°23'N, 82°22'W, 360 m, 07.1955: 1 ♀ 48.5 mm (USNM 98652). — Stn 1407, 28°07'N, 89°59'W, 464 m, 20.09.1955: 1 ♂ 34.1 mm (USNM 99454). — Stn 3565, 14°10'N, 81°55'W, 432-450 m, 21.05.1962: 2 ♀ 38.6, 46.8 mm; 1 ov. ♀ 49.3 mm (USNM 244083). — Stn 3628, 16°57'N, 81°19'W, 450 m, 7.06.1962: 1 ♀ 43.4 mm (USNM 244083). — Stn 4337, 24°26'N, 83°23'W, 342 m, 26.07.1963: 1 ♀ 46.2 mm (USNM 273140). — Stn 4343, 24°33'N, 83°38'W, 378 m, 27.07.1963: 2 ♀ 28.4, 43.9 mm (USNM 273140). — Stn 4703, 27°55'N, 90°28'W, 540 m, 22.02.1964: 2 ♀ 32.3, 39.2 mm (USNM 273140) together with *P. perarmatus*. — Stn 5168, 29°23'N, 80°22'W, 43 m, 12.01.1965: 1 ♂ 40.9 mm (USNM 260368). — Stn 5233, 29°54.5'N, 80°10'W, 342 m, 9.02.1965: 1 ♀ 50.7 mm (USNM 273140).

**Caribbean Sea.** "Albatross": stn 2134, 19°56'05"N, 75°47'32"W, 457 m, 27.02.1884: 1 ♂ 28.1 mm (USNM).

Puerto Rico. 18°32'N, 66°21.15'W, 468-648 m, 4.02.1933, id. W.L. SCHMITT: 2 ♂ 26.4, 27.2 mm; 4 juvs (USNM 82183).

"Silver Bay": stn 5142, 19°52'N, 71°58.5'W, 630 m, 12.10.1963: 1 ♂ 41.6 mm; 1 ♀ 29.9 mm (USNM 260368). — Stn 5166, 19°48.5'N, 70°30.5'W, 396-540 m, 15.10.1963: 2 ♂ 30.7, 38.1 mm; 1 ov. ♀ 36.1 mm (USNM 260368).

"Oregon": stn 2774, 11°32'N, 62°40'W, 351-382 m, 19.04.1960: 1 ov. ♀ 42.2 mm (USNM 232276) together with *P. perarmatus*. — Stn 2776, 11°36'N, 62°42'W, 423 m, 19.04.1960: 1 ♂ 40.7 mm; 1 ♀ 43.1 mm; 1 ov. ♀ 62.2 mm (USNM 232276). — Stn 2780, 11°36'N, 62°52'W, 387-414 m, 20.04.1960: 1 ♀ 41.5 mm (USNM 232276). — Stn 3552, 17°40'N, 77°55'W, 522 m, 16.05.1962, id. F.M. BAYER as *P. agassizii*: 2 ♀ 30.6, 40.5 mm (USNM 154322). — Stn 3570, 14°08'N, 81°55'W, 360-432 m, 05.1962, id. F.M. BAYER as *P. agassizii*: 1 ♂ 37.0 mm (USNM 154323). — Stn 3627, 16°50'N, 81°21'W, 360 m, 7.06.1962, id. F.M. BAYER as *P. agassizii*: 3 ♂ 28.9-40.2 mm; 1 ov. ♀ 43.0 mm (USNM 154397). — Stn 3635, 16°58'N, 87°53'W, 450-720 m, 10.06.1962, id. F.M. BAYER as *P. agassizii*: 1 ♀ 55.2 mm (USNM 154396). — Stn 4407, 11°59'N, 69°30'W, 414 m, 27.09.1963: 1 ♂ 32.7 mm; 2 ♀ 45.3, 50.8 mm (USNM 273140). — Stn 4411, 11°55'N, 69°27'W, 468 m, 3.10.1963: 2 ♀ 39.3, 44.0 mm (USNM 273140). — Stn 4417, 11°46'N, 69°15'W, 432 m, 4.10.1963: 1 ♂ 35.0 mm; 1 juv. (USNM 273140). — Stn 4419, 11°43'N, 69°13'W, 450 m, 4.10.1963: 1 ♂ 24.1 mm; 2 ♀ 40.7, 43.8 mm (USNM 273140). — Stn 4421, 11°49'N, 69°24'W, 360 m, 4.10.1963: 2 ♂ 32.3, 33.7 mm; 2 ♀ 27.1, 30.2 mm (USNM). — Stn 4424, 11°50'N, 69°23'W, 369 m, 5.10.1963: 1 ♀ 48.7 mm (USNM 273140). — Stn 4425, 11°46'N, 69°17'W, 432 m, 5.10.1963: 2 ♀ 49.7, 58.5 mm (USNM 273140).

"Pillsbury": stn 374, 9°57'N, 76°10.6'W, 439-377 m, 14.07.1966: 4 ♀ 46.1-52.3 mm; 2 juvs (RMNH). — Stn 394, 9°28.6'N, 76°26.3'W, 421-641 m, 16.07.1966: 1 ♀ 38.5 mm; 1 juv. (RMNH). — Stn 776, 12°13.3'N, 72°50'W, 408-576 m, 29.07.1968: 1 ♀ 40.4 mm; 9 juvs (RMNH). — Stn 929, 15°29.5'N, 61°11.5'W, 503 m, 15.07.1969: 1 ♂ 38.3 mm (RMNH).

#### INDO-WEST PACIFIC.

**Fiji Is.** MUSORSTOM 10: stn CP 1316, 17°14.84'S, 178°21.99'E, 478-490 m, 6.08.1998: 2 ♂ 38.5, 39.5 mm; 2 ov. ♀ 48.3, 47.2 mm (MNHN). — Stn CP 1331, 17°02.45'S, 178°01.84'E, 694-703 m, 8.08.1988: 14 ♂ 20.0-44.4 mm; 14 ♀ 20.7-37.7 mm; 7 juvs (MNHN). — Stn CP 1332, 16°56.17'S, 178°07.86'E, 640-687 m, 8.08.1998: 3 ♂ 24.9-6.8 mm; 4 ♀ 23.8-40.6 mm; 2 juvs (MNHN). — Stn CP 1368, 18°10.92'S, 178°23.47'E, 380-469 m, 15.08.1998: 1 ♀ 32.4 mm (MNHN). — Stn CP 1369, 18°11.13'S, 178°23.44'E, 392-433 m, 16.08.1998: 1 ♂ 39.7 mm; 2 ov. ♀ 4.32, 4.30 mm (MNHN).

**New Caledonia.** BATHUS 1: stn CP 671, 20°51.18'S, 165°28.17'E, 450-470 m, 14.03.1993: 1 ♀ 32.4 mm (MNHN-Pa 1730).

BATHUS 2: stn CP 760, 22°18.9'S, 166°10.5'E, 455 m, 16.05.1993: 1 ♀ 48.0 mm (MNHN-Pa 1631). — Stn CP 764, 22°09.41'S, 166°02.93'E, 560-570 m, 17.05.1993: 1 ♂ 43.1 mm (MNHN-Pa 1632). — Stn CP 765, 22°09.6'S, 166°02.8'E, 600-630 m, 17.05.1993: 1 ♂ 44.8 mm (MNHN-Pa 1633). — Stn CP 771, 22°09.52'S, 166°01.75'E, 610-800 m, 18.05.1993: 1 ♂ 50.5 mm (MNHN-Pa 1634).

**Japan.** Kyushu I., Miyazaki Pref., 300 m, 20.12.1953, det. S. MIYAKE as *P. amemiyai* Yokoya: 1 ♀ (KMNH 419). — Shikoku I., Tosa Bay, nr Mimase, 16.01-14.02.1961, coll. K. SAKAI: 2 ♀ (SMF 24638).

**East China Sea.** 20.10.1989, coll. M. YAMADA: 1 ♂ 54.0 mm (NFU).

**Taiwan.** I-Lan County, 400 m, 21.05.1992, coll. & det. T.Y. CHAN: 2 ♀ 34.6, 53.3 mm (NTOU). — Ta-Chi, 400 m, 13.06.1995, coll. & det. T.Y. CHAN: 4 ♀ 40.3-52.5 mm (MNHN-Pa 1682).

**Philippines.** "Albatross": stn 5111, Luzon, 13°45'15"N, 120°46'30"E, 432 m, 16.01.1908: 1 ♂ 22.0 mm; 4 ♀ 16.0-37.5 mm (USNM). — Stn 5122, Mindoro, 13°21'30"N, 120°30'33"E, 402 m, 2.02.1908: 8 ♂ 21.1-26.6 mm; 7 ♀ 18.1-45.2 mm (USNM). — Stn 5123, Mindoro, 13°12'45"N, 121°38'45"E, 518 m, 2.02.1908: 1 ♂ 30.0 mm; 4 ♀ 34.6-43.8 mm (USNM). — Stn 5124, Mindoro, 12°52'N, 121°48'30"E, 514 m, 2.02.1908: 3 ♂ 27.5-29.7 mm; 4 ♀ 18.0-33.7 mm (USNM). — Stn 5221, btw Marinduque and Luzon, 13°38'15"N, 121°48'15"E, 357 m, 24.04.1908: 3 ♀ 41.8-

49.5 mm (USNM). — Stn 5222, btw Marinduque and Luzon, 13°38'30"N, 121°42'45"E, 357 m, 24.04.1908: 2 ♂ 28.6, 29.5 mm; 2 ♀ 20.9, 47.3 mm (USNM). — Stn 5364, Luzon, Balayan Bay, 13°48'30"N, 120°43'45"E, 293 m, 20.02.1909: 4 ♂ 32.0-34.1 mm; 5 ♀ 27.6-43.5 mm (USNM). — Stn 5374, Marinduque I., 13°46'45"N, 121°35'08"E, 347 m, 2.03.1909: 1 ♂ 31.2 mm; 2 ♀ 32.9, 36.0 mm (USNM). — Stn 5404, Leyte, Dupon Bay, 10°50'N, 124°26'18"E, 347 m, 17.03.1909: 1 ♀ 39.9 mm (USNM). — Stn 5409, btw Cebu and Leyte, 10°38'N, 124°13'08"E, 346 m, 18.03.1909: 2 ♀ 31.3, 31.9 mm (USNM).

MUSORSTOM 1: stn 50, 13°49.2'N, 120°01.8'E, 415-510 m, 25.03.1979: 1 ♂ 43.4 mm; 1 ♀ 56.5 mm (MNHN-Pa 1631).

MUSORSTOM 3: stn CP 105, 13°52'N, 120°30'E, 398-417 m, 1.06.1985: 1 ♂ 25.9 mm; 3 ♀ 26.1-38.0 mm (MNHN-Pa 1636). — Stn CP 118, 11°58'N, 121°06'E, 448-466 m, 3.06.1985: 1 ♂ 25.6 mm; 2 ♀ 44.2, 44.4 mm (MNHN-Pa 1637). — Stn CP 127, 11°48'N, 121°30'E, 464-475 m, 4.06.1985: 1 ♂ 41.3 mm; 3 ♀ 28.6-50.1 mm (MNHN-Pa 1638).

**Indonesia.** "*Albatross*": stn 5622, btw Gillolo and Makyan Is, 0°19'20"N, 127°28'30"E, 503 m, 29.11.1909: 1 ♀ 50.2 mm; 2 ov. ♀ 49.0, 49.8 mm (USNM). — Stn 5624, btw Gillolo and Makyan Is, 0°12'15"N, 127°29'30"E, 518 m, 29.11.1909: 2 ♂ 37.2, 41.8 mm; 5 ♀ 24.0-63.1 mm; 1 ov. ♀ 49.8 mm (USNM). — Stn 5625, btw Gillolo and Kayoa Is, 0°07'00"N, 127°28'00"E, 421 m, 29.11.1909: 1 ♂ 25.8 mm; 1 ♀ 65.8 mm; 2 juvs (USNM). — Stn 5626, btw Gillolo and Kayoa Is, 0°07'30"N, 127°29'00"E, 485 m, 29.11.1909: 4 ♂ 18.5-29.1 mm; 5 ♀ 18.5-34.1 mm (USNM).

MORTENSEN EXPEDITION 1929: 8°30'S, 114°38'E, 450 m, 7.04.1929: 1 ♂ 31.7 mm (ZMC). — 7°29'S, 114°49'E, 240 m, 10.04.1929: 1 ♂ 24.8 mm (ZMC).

Java, 8°34'S, 114°36'E, 27.06.1981: 1 ov. ♀ 65.4 mm (USNM 356448).

KARUBAR. *Iles Kai*: stn CP 12, 5°23'S, 132°37'E, 436-413 m, 23.10.1991: 1 ♂ 44.8 mm (MNHN-Pa 1639). — Stn CP 35, 6°08'S, 132°45'E, 390-502 m, 27.10.1991: 1 ♀ 47.0 mm (MNHN-Pa 1640). — *Tanimbar Is*: stn CC 40, 7°46'S, 132°31'E, 443-468 m, 28.10.1991: 1 ♀ 56.1 mm (MNHN-Pa 1641).

**Australia.** *South East Coast. "Kapala"*: stn K78-17-21, 28°37'S, 153°50'E, 502 m, 19.08.1978, id. H.E. STODDART, as *Polycheles typhlops typhlops*: 1 ♂ 43.8 mm (AM 44911). — Stn K84-15-02, 33°34'S, 151°57'E, 549-568 m, 10.09.1984, id. H.E. STODDART as *Polycheles typhlops typhlops*: 1 ♀ 37.6 mm (AM P39741).

*North West Coast. "Soleda"*: N.W.E. Cape Lambert, 18°32'S, 117°21'E, 496-504 m, 8.04.1982: 1 ♀ 46.3 mm (WAM C13427). — N.W. of Beagle Bay, 15°13.5'S, 121°08.9'E, 352 m, 11.02.1984: 1 ♂ 45.7 mm (WAM C16912). — 16°55.0'S, 119°54.0'E, 435-434 m, 18.02.1984: 1 ♂ 47.0 mm (WAM C23523). — 16°55.1'S, 119°55.1'E, 432-434 m, 19.02.1984: 1 ♀ 57.6 mm (WAM C23524). — 16°54.1'S, 119°55.6'E, 434 m, 21.02.1984: 1 ♀ 49.9 mm (WAM C23527). — W. of Lacedpede Arch., 16°55.1'S, 119°54.8'E, 432-430 m, 22.02.1984: 1 ♂ 41.6 mm (WAM C23589). — W. Roebuck Bay, 18°04'S, 118°14'E, 400-396 m, 24.02.1984: 1 ♂ (WAM C23516). — 16°51'S, 119°48'E, 466-464 m, 28.02.1984: 1 ♀ 35.2 mm (WAM C23529).

*"Courageous"*: N.W. of Port Hedland, 17°54'S, 118°28'E, 426-427 m, 21.08.1983: 1 ov. ♀ 57.2 mm (WAM C23597). — 17°28'S, 118°52'E, 428-433 m, 18.08.1983: 1 ♀ 60.0 mm (WAM C23599). — 18°54'S, 117°02'E, 300-306 m, 13.04.1984: 2 ♀ 49.1, 60.1 mm (WAM C13428). — 18°44'S, 116°59'E, 404-406 m, 23.08.1983: 1 ♂ 45.8 mm; 1 ♀ 60.6 mm (WAM C23522). — 18°05'S, 118°10'E, 401-400 m, 17.08.1983: 1 ♂ 38.9 mm; 1 ♀ 45.0 mm (WAM C23518).

**Indian Ocean.** 29°49.82'S, 41°39'E, 486 m, 1.06.1994, coll. S.I. LUSWAZI: 1 ♀ 56.1 mm (SAM).

**Comoro Is.** BENTHEDI: stn 61F, Mayotte, W de la grande passe de l'Ouest, 510-474 m, 29.03.1977: 2 ♂ 21.5, 27.5 mm; 2 ♀ 30.3, 38.5 mm (MNHN-Pa 1708). — Stn 114 F, 12°22.3'S, 46°28.2'E, 300-600 m, 11.04.1977: 1 ♂ 32.6 mm (MNHN-Pa 1710).

**Madagascar.** "*Vauban*": stn CH 29, 12°43.1'S, 48°11.1'E, 540 m, 13.09.1972, coll. & det. A. CROSNIER: 1 ♂ 46.0 mm (MNHN-Pa 1642). — Stn 58, CH 23°36.2'S, 43°30.5'E, 510 m, 27.02.1973, coll. & det. A. CROSNIER: 1 ♂ 48.3 mm (MNHN-Pa 1643).

*"Mascareignes III"*: stn 63, 22°26.8'S, 43°05.4'E, 530 m, 20.10.1986, coll. R. VON COSEL: 1 ♀ 72.4 mm (MNHN-Pa 1644). — Stn 68, 22°24.7'S, 43°04.4'E, 525 m, 21.10.1986, coll. R. VON COSEL: 1 ♂ 57.9 mm (MNHN-Pa 1645).

**Mozambique.** "*Algoa*": 22°07'S, 35°45'E, 500 m, 9.06.1994: 1 ♂ 31.0 mm (SAM A41697). — 21°22'S, 35°40'E, 481 m, 13.06.1994: 3 ♂ 27.6-35.0 mm; 1 ♀ 25.3 mm (SAM A41698). — 17°33'S, 38°27'E, 433 m, 14.06.1994: 1 ov. ♀ 54.7 mm. — 19°27'S, 36°51'E, 486 m, 14.06.1994: 1 ♂ 30.6 mm; 1 ♀ damaged (SAM A41703). — 17°33.0'S, 38°27.0'E, 433 m, 15.06.1994: 1 ov. ♀ 54.3 mm (SAM A41704). — 16°20.0'S, 40°08.0'E, 500 m, 16.06.1994: 1 ov. ♀ 63.7 mm (SAM A41656). — 14°00'S, 37°31'E, 472 m, 17.06.1994: 1 ov. ♀ 51.6 mm; 1 ♀ 54.4 mm (SAM A41700). — 24°02'S, 35°45'E, 517 m, 20.06.1994: 1 ov. ♀ 47.4 mm; 1 ♀ 37.8 mm (SAM A41695). — Off Bazaruto I., 400-500 m, 19.06.1994: 2 ♂ 25.0, 35.2 mm (SAM A41699).

*"Galathea"*: stn 202, 25°20'S, 35°17'E, 535-580 m, 21.02.1951: 1 ♀ 34.1 mm; 8 juvs (ZMC). — Stn 203, 25°20'S, 35°17'E, 680-730 m, 21.02.1951: 1 ♀ 26.6 mm (ZMC).

**Kenya.** Mombassa. 4°31.5'S, 39°42.5'E, 21.03.1981: 1 ♀ 40.3 mm (RMNH 34706).

**Gulf of Aden.** "*Meteor 5*": stn 249, 12°29.5'N, 45°38.7'E, 1299-1314 m, 8.03.1987: 1 ♂ 24.9 mm; 1 ♀ 20.2 mm; 7 juvs (SMF 24654). — Stn 250, 12°40.4'N, 45°22.6'E, 907-917 m, 8.03.1987: 2 juvs (SMF 24655). — Stn 279, 12°52.5'N, 45°53.3'E, 1185-1186 m, 15.03.1987: 6 juvs (SMF 24656). — Stn 281, 12°38.5'N, 45°28.5'E, 1063-

1068 m, 15.03.1987: 1 juv. (SMF 24657). — Stn 286, 12°20.9'N, 44°44.7'E, 725-751 m, 16.03.1987: 1 ov. ♀ 31.1 mm; 1 juv. (SMF 24658).

**TYPES.** — The male (21.1 mm cl) (NHMW 9712) collected off Sicily by VON GROHMANN, is the holotype of *Polycheles typhlops* Heller, 1862.

The female (26.2 mm cl) (MNHN-Pa 32) collected by the "Blake" stn 246 off Grenada, is the holotype of *Pentacheles agassizii* A. Milne Edwards, 1880; the juvenile of the sample is the paratype. Other paratypes are at the Museum of Comparative Zoology under the registration numbers MCZ 2789 ("Blake" stn 216, 1 specimen), MCZ 2790 ("Blake" stn 47, 1 specimen), MCZ 2792, ("Blake" stn 274, 2 specimens, one broken), MCZ 3075 ("Blake" stn 285, 1 specimen), MCZ 4042 ("Blake" stn 151, 1 male).

The largest male (80.0 mm total length) (IM 6767-6770/9 collected in the Andaman Sea by the "Investigator" stn 115 (11°31'40"N, 92°46'40"S, 344-402 m) is the lectotype of *Pentacheles hextii* Alcock, 1994; the other males and the single female of the sample are paralectotypes.

The female (40 mm cl) found at Palermo's fish market, and deposited in the Zoological Museum of Palermo (registration number C 44) is the holotype of *Polycheles dodderleini* Riggio, 1895 (M. SARA, pers. comm.).

**DESCRIPTION.** — Dorsal surface of carapace setose, minutely spinulate, granulate. Frontal margin concave. Median submarginal tooth prominent. Single rostral spine antrorse. Internal angle of orbital sinus triangular, spinose; external angle of orbital sinus pectinate. Internal margin of orbit mesially pectinate, dividing orbit into two. Eystalk bearing upcurved spine. Basal antennular segment produced anteriorly to a sharp point, mesial margin spinose, anterolateral margin rounded, bispinose. Spines on lateral margins of carapace upcurved; lateral spine formula 7-9:4-5:17-20; spines successively decrease in size posteriorly. Median postrostral carina granulate, irregularly spinulate, median postcervical carina bearing paired spinules. Gastro-orbital carina obsolescent, comprising five antrorse spines, anteriormost largest. Posterior margin of cervical groove spinose between branchial carinae. Branchial carina prominent, parallel with lateral margin, bearing 12-15 spines. Region between branchial and median postcervical carinae with shallow, oblique groove anteriorly, minutely spinulose posteriorly. Posterior margin of carapace bearing three or four pairs of antrorse spines, submedian spines largest.

Abdominal tergites medially carinate. Carinae on tergites 2-5 bearing antrorse spine, increasing in size posteriorly. Tergite 6 bearing mesially twin parallel rows of granules, confluent posteriorly. Anterior margin of first tergite smooth or granulate, never more than irregularly disposed 18 granules. Anterior and posterior margins of tergites 2-5 irregularly granulate. Second pleuron ovate, margins denticulate. Pleura 3-5 with curved granulate rib mesially, margins denticulate. Telson with granulate median crest anteriorly, two minutely serrulate, convergent carinae posteriorly. Inferior surface of uropodal expopod bicarinate.

Upper margin of merus of P1 spinulate with subterminal claw-like spine, lower margin finely granulose. Carpus half as long as merus, two serrulate rows distally on upper margin, subterminal spines on upper and lower margins. Upper margin of propodus with several rows of antrorse spinules, sometimes reduced to granules; lower margin with two minutely spinulate rows. P5 simple in male, chelate in female.

**Color.** — "Medial gastric and frontal region, scaphocerite and antennular peduncles, anterolateral edges and posterior border of carapace, cervical groove, mid-dorsal carina of carapace, carinae and granulate edges of abdominal terga bright orange. Remaining portions of carapace, abdominal terga and pleura white. Cheliped with proximal portion of merus white, distal third of merus and carpus orange. Upper surface of propodus and fingers orange, shading to pinkish white on underside and distal portions. All other pereopods white." (GRIFFIN & STODDART, 1995: 243). "Body ivory. Setae light brown. Ridges, margins, tips of spinules and granules on dorsal surface orange-red. Anteromedian carapace, tail-fan and pleopods marked with orange-red patches. Eggs whitish." (CHAN & YU, 1993: 106). Color photos in BABA (1986); CHAN & YU (1993); JONES & MORGAN (1994).

**REMARKS.** — HELLER (1862) described *Polycheles typhlops* from a single specimen collected off Sicily. Not only his description is remarkably accurate, but he realized its significance: "Die meiste Uebereinstimmung zeigt die Gattung noch mit dem von Desmarest beschrieben fossilen Krebse aus dem Solenhofer Kalkschiefer, erson Cuvieri, indem auch bei diesem ein abgeflachter Cephalothorax, ahnlich gestalte Fuhler und Fusse sich vorfinden"

(HELLER, 1863: 211). WOOD-MASON (1874: 180) thought that: "a species differing in no particular of generic value from *Deidamia leptodactyla* et *crucifer*... had, years before, been described by Prof. C. Heller under the name of *Polycheles typhlops*". ADENSAMER (1898) went further and put *Willemoesia leptodactyla* in synonymy with *P. typhlops*.

A. MILNE EDWARDS (1880) described *Pentacheles agassizii* from the West Indies. BOUVIER (1905a: 480, footnote) compared "les types des *P. agassizii*, recueillis par le "Blake" avec un exemplaire de *P. typhlops* donné au Muséum par le Musée de Vienne" and considered them one species.

RIGGIO (1885: 101) described *Polycheles doderleini* from a specimen found in Palermo fish market, though aware of HELLER's opinion that "era certamente la femina del *Polycheles typhlops* da lui descritto".

ALCOCK (1894: 239) described *Polycheles hextii* quite accurately and noted "the peculiar formation of the ophthalmic notches, which superficially are divided into two portions by the meeting of the edges across the ophthalmic peduncle". BOUVIER (1905a: 481) recognized that "le *P. Hexti* Alc., présente les affinités les plus étroites avec notre *P. typhlops*", but KEMP and SEWELL (1912: 24) realized that they "correspond so precisely that the specific identity of the two forms cannot be doubted".

BALSS (1914: 599) described *Polycheles intermedius* and noted: "der frontal ist konkav; in seiner Mitte steht ein Rostraldorn". This species is without doubt a junior synonym of *P. typhlops*.

DISTRIBUTION. — Worldwide: Mediterranean, Irish Sea, Alboran Sea, West Africa, Cape Verde Is, Rio Grande Ridge, Bermuda, United States, West Indies, Gulf of Mexico, Caribbean Sea, New Caledonia, Australia, Japan, East China Sea, Taiwan, Philippines, Indonesia, Indian Ocean, Maldive Is, Comoro Is, Madagascar, South Africa, East Africa, Gulf of Aden; 77 m (present work) - 2055 m (ADENSAMER, 1898).

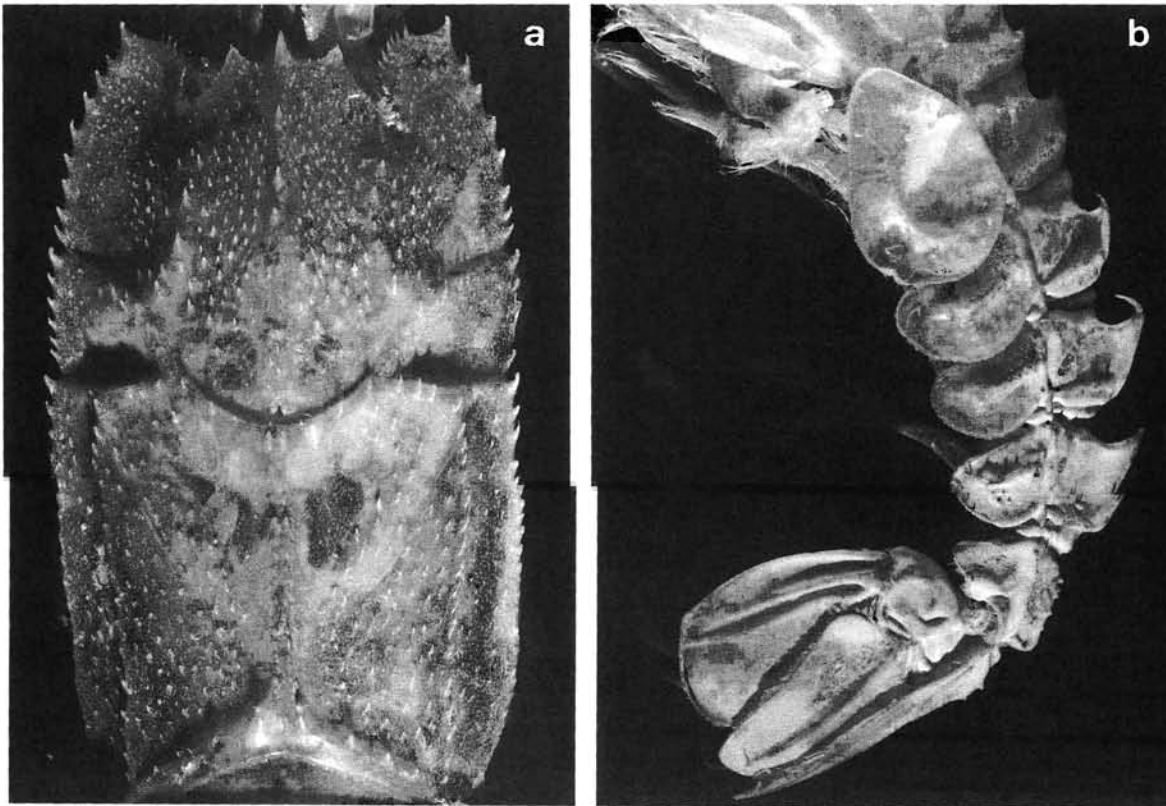


FIG. 30. — *Polycheles typhlops* Heller, 1862, ♀ 38.8 mm, Rio Grande Ridge, "Prof. Mesyatsev" (ZMMU): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

Genus *WILLEMoesia* Grote, 1873

*Willemoesia* Grote, 1873: 485. Type species by monotypy through the replaced name *Deidamia* Thomson, 1873: *Deidamia leptodactyla* Thomson, 1873: 51. Placed on the Official List of Generic names in Zoology in Opinion 519 of the ICZN. Gender feminine.

*Deidamia* Thomson, 1873: 51. Type species by monotypy, *Deidamia leptodactyla* Thomson, 1873: 51. A junior homonym of *Deidamia* Clemens, 1859. Placed on the Official Index of rejected generic names in Zoology in Opinion 579 of the ICZN. Gender feminine.

**DIAGNOSIS.** — Carapace dorsoventrally flattened, subrectangular or ovate. Antero-lateral angle of carapace produced, spiniform. Lateral margins well defined, spinose; cervical and postcervical incisions dividing margin into three parts. Front bearing single rostral spine, lacking well defined orbits. Eystalks globose, fixed beneath and parallel with anterior margin of carapace.

Cervical groove marked, arcuate, laterally bifurcate. Median postrostral and postcervical carinae well defined, unarmed, granulate or spinose. Gastro-orbital and branchial carinae present, obsolescent or well defined, unarmed, granulate or spinose. Two sublateral carinae starting near posterolateral margin of carapace, running to base of antenna and base of P1; latter more distinct.

Abdomen somewhat laterally depressed. First abdominal tergite narrow, pleura fused, abbreviated. Abdominal tergites 2-5 smooth or sculptured, medially carinate, carinae blunt or anteriorly spinose; sixth tergite smooth or sculptured. Second abdominal pleuron larger, clypeiform, smooth; pleura 3-4 cordiform, successively diminishing in size posteriorly; fifth pleuron triangulate. Abdominal sternites lacking median knob. Telson lanceolate, basally swollen; two submedian carinae. Uropodal exopod lamellar, posteriorly rounded, bicarinate; endopod unicarinate, lappet basally on interior margin.

Interior process of basal antennular segment lamellate, rounded, shorter than peduncle; mesial margin spinose, perpendicular to segment; anterolateral angle not spinose. Outer antennular flagellum short, inner flagellum as long as antennal flagellum. Renal process well developed, tubular, fitting into hollow on underside of basal antennular segment. Antennal scaphocerite not extending to end of peduncle.

Buccal opening subquadrate. Mandible concave, cutting edge with triangular teeth of uneven size, lateral, median teeth largest; mandibular palp biarticulate. Maxillula with two incurved lobes; anterior lobe more robust, terminating in cornute claw. Maxilla with two slender protognathal lobes of equal length; scaphognathite large, reniform, membranous. First maxilliped endopod slender; exopodal lobe membranous, extending further back than scaphognathite; exopod anteriorly divided into two lamellar lobes enclosing efferent passage. Second and third maxillipeds slender, pediform; interior margins of basal segments denticulate; dactyls ending in cornute claw; third maxilliped bearing long epipodite basally, cornute subterminal spines on interior margin of dactyl.

All pereopods chelate in both sexes; fingers of fifth pereopodal chela one sixth as long as propodus, whereas in preceding pereopods fingers about half as long as propodus. P1 elongate, slender; P 2-5 successively shorter posteriorly. Fingers of first cheliped crossing, pollex bearing on inner margin subterminal spine at right angle to finger; inner margins of both pollex, dactyl furnished with row of overlapping cornute platelets, forming serrate edge. Fingers of second and third pereopodal chelae crossing distally, their inner margins set with row of overlapping platelets; platelets not overlapping in fingers of fourth chela, missing entirely in fingers of fifth pereopodal chela. First male pleopod oar-shaped, spinulose swelling distally on inner margin, spinules distally on mesial margin, distal margin folded internally. Pleopods 2-6 slender with rod-like appendix interna, second pair in male with appendix masculina.

**REMARKS.** — *Willemoesia* is distinguished from other polychelid genera in having the five pairs of pereopods chelate in both sexes; lacking well defined orbits, its globose eystalks fixed beneath and parallel with the anterior margin of the carapace; and the pollex of the first cheliped bearing on its inner margin a subterminal spine at right angle to the finger.

Nearly a century after it was established, it was felt that "a careful revision of the entire genus is badly needed" (WOLFF, 1961: 148). KENSLEY (1968: 297) considered the "Specific delimitation in this genus ... very difficult,

particularly as the number of specimens available is very low". GORE (1984: 1) declared that "Because the range of morphological variation within the genus *Willemoesia* is not yet known, owing to paucity of specimens in the 8 known species, the taxonomic validity of several species within the genus remains uncertain". Of the eight species described, only four are recognized as valid in this work.

*Willemoesia forceps* A. Milne Edwards, 1880

Fig. 31

*Willemoesia forceps* A. Milne Edwards, 1880: 64. — FAXON, 1895: 126. — BOUVIER, 1905a: 480 (p.p.); 1905c: 3 (p.p.); 1907: 62; 1917: 32, figs 1-4, pl. 10 figs 1-2, pl. 11 figs 1-6; 1925: 424. — DE MAN, 1916: 6 (list). — SIVERSTEN & HOLTHUIS, 1956: 41, figs 30-31. — FIRTH & PEQUEGNAT, 1971: 75, figs 3, 13. — PEQUEGNAT *et al.*, 1971: 4. — RODRIGUEZ, 1980: 194. — GORE, 1984: 2. — DAWSON, 1997: 25.

*Willemoesia* sp. - GAMO, 1980: 94, fig. 7a.

not *Willemoesia forceps* - ALCOCK, 1894: 230; 1899: 33; 1902: 155 [= *W. leptodactyla* (Willemoes-Suhm, 1875)].

not *Willemoesia forceps* - BERNARD, 1953: 88, fig. 36 [= *W. pacifica* Sund, 1920].

**MATERIAL EXAMINED.** — **West Africa.** "*Talisman*": 29°01'N, 19°15'E, 2713 m, 10.07.1883: 1 ♂ 37.0 mm (MNHN).

"*Pillsbury*": stn 18, 5°01'N, 0°12'E, 3047-3129 m, 26.05.1964: 1 ♀ 77.8 mm (RMNH). — Stn 266, 1°12.5'N, 7°46'E, 2507-2562 m, 17.05.1965: 1 ♀ 71.8 mm (RMNH).

"*Walda*": 0°20.7'S, 5°48.4'E, 3244 m, 30.07.1971: 1 ♀ 74.7 mm (MNHN-Pa 537).

**West Indies.** "*Pillsbury*": stn 1178, 19°14'N, 73°14'W, 1760 m, 30.06.1970: 1 ♂ 40.1 mm (RMNH).

"*Iselin*": stn 8, 21°34'N, 74°32'W, 2745 m, 18.11.1981: 1 ♂ 73.1 mm (USNM 347932). — Stn 5, 22°03'N, 74°48'W, 2728 m, 16.11.1981: 1 ♂ 60.0 mm (USNM 347932); 2 ♂ 46.6 59.8 mm (USNM 347932). — Stn 9, 21°27'N, 74°21'W, 2714 m, 18.11.1981: 1 ♀ 40.7 mm (USNM 347932).

**Caribbean Sea.** "*Pillsbury*": stn 748, 11°24.8'N, 67°10.1'W, 1878-1784 m, 25.07.1968: 1 juv. (RMNH).

Venezuela Basin, "*Bartlett*" (id. R.H. GORE): stn 39, 15°08.93'N, 69°13.33'W, 3977-4047 m, 27-28.10.1981: 1 juv. 33.2 mm (NHM 1984:54). — Stn 93, 13°32.18'N, 64°40.54'W, 3406-3453 m, 28.11.1981: 1 ♀ 52.7 mm (USNM 210820). — Stn 94, 13°32.2'N, 64°42'W, 3427-3475 m, 28-29.11.1981: 2 ♀ 67.7, 80.8 mm (RMNH 35840).

**TYPE.** — The female (72 mm total length) (MCZ 4045) collected by the "*Blake*" stn 31 off Santa Cruz, Cuba (24°33'N, 84°23'W, 3512 m) is the holotype.

**DESCRIPTION.** — Dorsal surface of carapace nearly glabrous, densely set with antrorse spinules. Rostral spine upcurved. Frontal margin of carapace concave, external angles produced, spinose. Eystalk globose, bearing spine curved distad. Mesial margin of basal segment of antennule prominently spinose, pectinate. Lateral margin of carapace spinose; spine formula 14-19:14-15:29-40. Median postrostral carina granulose, bearing pair of larger spinules 2/3 way to cervical groove, followed by single spine. Median postcervical carina granulate, bearing larger antrorse spines posteriorly. Gastro-orbital carinae sinuous, minutely spinulate. Branchial carina prominent, spinose. Posterior margin of carapace smooth.

First abdominal tergite tuberculate medially. Median dorsal carina on tergites 2-4 bearing antrorse spine. Fifth carina blunt. Sixth tergite smooth, medially on posterior margin slight hump. Tergites 2-5 bearing well-defined, submedian transverse groove. Second pleuron subcircular, smooth. Pleura 3-5 with obsolescent rib mesially, margins unarmed. Telson with triangular hump anteriorly, smooth convergent carinae posteriorly. Margin of uropodal endopod triangular.

First chelipeds thin, elongate; upper margin of merus minutely spinose, two claw-like spines subterminally, lower margin prominently spinose; carpus 4/5 as long as merus, wider distally, spinose on upper margin. Upper margin of chela bearing several irregular files of spines; lower margin bearing two files, spines of interior file longer; single file along lower margin of finger.

**Color.** — "deep brick red overall, more brownish-red on cephalothorax, brighter red on abdominal somites. Telson and uropods almost cherry red. Antennae and antennulae deep scarlet, including flagella. Pereiopods brick red, tending toward orange-red distally. Long bunched setae and hairs ornamenting carapace ranging from pale to golden yellow." (GORE, 1984: 3).

REMARKS. — *W. forceps* differs from the other three species of the genus in having the most spines along the lateral margins of carapace, and a smooth sixth abdominal tergite except for a blunt median carina posteriorly.

DISTRIBUTION. — West Africa, Azores, Saragasso Sea, West Indies, Caribbean Sea; 1760 m (present work) - 4064 m (GORE, 1984).

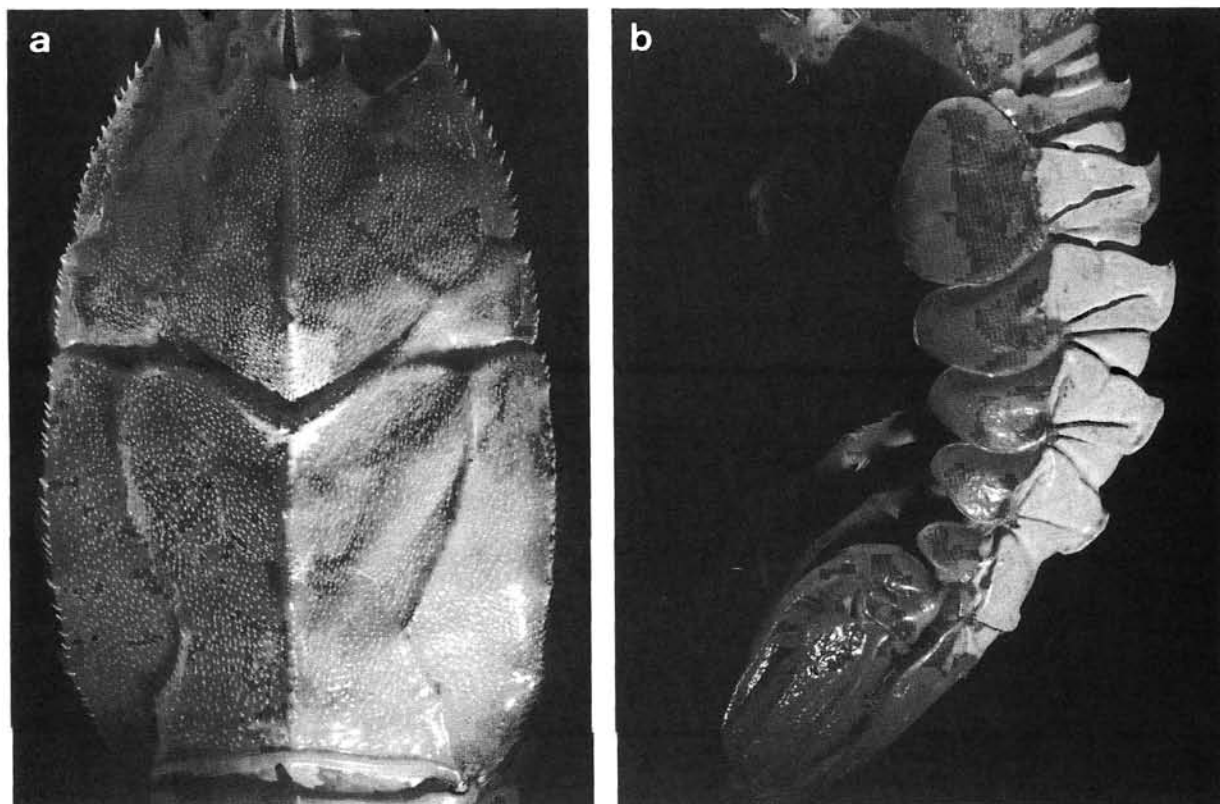


FIG. 31. — *Willemoesia forceps* A. Milne Edwards, 1880, ♀ 71.8 mm "Pillsbury" stn 266, 1°12.5'N, 7°46'E, 2507-2562 m (RMNH): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

*Willemoesia inornata* Faxon, 1893

Fig. 32

*Willemoesia leptodactyla* Bate, 1878a: 280 (p.p.); 1878c: 563 (p.p.); 1888: 163, pls 18P, 19c" (p.p.). — DE MAN, 1916: 6 (list) [non Willemoes-Suhm, 1875].

*Willemoesia inornata* Faxon, 1893: 195; 1895: 125, pl. 32 fig. 2, pl. 33 fig. 3. — SEELIGER, 1901: 46. — BOUVIER, 1917: 32 (key). — DE MAN, 1916: 6 (list). — ZARENKOV, 1969: 81. — BAYER *et al.*, 1970: 98. — FIRTH & PEQUEGNAT, 1971: 77. — GORE, 1984: 6. — DAWSON, 1997: 26.

*Willemoesia challengerii* Sund, 1920: 223. — HOLTHUIS, 1952a: 79. — BAHAMONDE, 1963: 4. — FIRTH & PEQUEGNAT, 1971: 75. — ZARENKOV, 1969: 81. — RETAMAL, 1981: 16. — GORE, 1984: 6. — WICKSTEN, 1989: 304. — DAWSON, 1997: 25.

*Willemoesia* - WOLFF, 1960: 179; 1961: 148, fig. 17.

MATERIAL EXAMINED. — EASTERN PACIFIC.

**Costa-Rica.** "Galathea": stn 716, 9°23'N, 89°32'W, 3680 m, 6.05.1952: 3 ♂ 41.6-46.1 mm; 2 ♀ 47.8, 56.1 mm; 1 ov. ♀ 47.5 mm (ZMC).

**Gulf of Panama.** "Albatross": stn 3382, 6°21'N, 80°41'W, 3227 m, 7.03.1891: 2 ♂ 34.4, 37.9 mm; 3 ♀ 42.7-48.9 mm (USNM 21078).



"Pillsbury": stn 526, 6°53'N, 79°27'W, 3193-3200 m, 5.05.1967: 2 ♂ 39.9, 37.7 mm; 6 ♀ 35.9-49.5 mm (RMNH 23527).

"Gilliss": stn 1, 6°52'N, 79°28'W, 3200-3229 m, 13.01.1972: 2 ♂ 37.5, 39.4 mm; 5 ♀ 43.3-54.6 mm (RMNH). — Stn 3, 6°47'N, 79°13'W, 3045-3158 m, 14.01.1972: 3 ♂ 38.3-44.4 mm; 5 ♀ 41.6-51.0 mm (RMNH). — Stn 4, 6°42'N, 78°56'W, 3173-3208 m, 14.01.1972: 5 ♂ 32.5-40.6 mm; 4 ♀ 40.4-45.5 mm (RMNH). — Stn 6, 6°12'N, 78°33'W, 3475-3517 m, 15.01.1972: 2 ♂ 31.5, 38.6 mm; 2 ♀ 39.8, 51.5 mm (RMNH). — Stn 18, 6°31'N, 78°20'W, 3940-3986 m, 17.01.1972: 1 ♂ 34.9 mm; 5 ♀ 43.5-58.0 mm (RMNH). — Stn 20, 6°45.2'N, 78°31.7'W, 3977-4005 m, 18.01.1972: 2 ♂ 34.0, 38.3 mm; 5 ♀ 40.0-50.6 mm (RMNH).

**Ecuador.** "Albatross": stn 3399, W Cabo de San Francisco, 1°07'N, 81°04'W, 3132 m, 24.03.1891: 2 ♂ 34.8, 38.6 mm (USNM 21079).

**Colombia.** "Galathea": stn 724, 5°44'N, 79°20'W, 2712-3330 m, 12.05.1952: 1 ov. ♀ 55.8 mm (ZMC). — Stn 726, 5°49'N, 78°52'W, 3800 m, 13.05.1952: 5 ♂ 39.6-42.9 mm; 4 ♀ 43.3-57.8 mm (ZMC).

**Galapagos Is.** "Albatross": stn 3400, 0°36'S, 86°46'W, 2380 m, 27.03.1891: 1 ♀ 34.9 mm (USNM 21080).

ARCTURUS EXPEDITION: stn 53, 1°51'S, 89°50'W, 3119 m, 25.04.1925, id. L. BOONE *Willemoesia intermedia*, type (unpublished): 1 ♂ 42.3 mm (AMNH 12402). — Stn 40, 1°51'S, 89°50'W, 2966 m, id. L. BOONE *Willemoesia intermedia*, paratypes (unpublished): 2 ♂ 35.1, 34.5 mm (AMNH 12403).

**Chile.** "Challenger": stn 298, 34°07'S, 73°56'W, 4005 m, 17.11.1875: 1 ov. ♀ 53.5 mm; 1 ♀ 45.6 mm (NHM 1888.22).

**Juan Fernandez Is.** "Challenger": stn 300, 33°42'S, 78°18'W, 2475 m, 17.12.1875: 1 ♂ 33.7 mm (NHM 1888.22).

**TYPES.** — The male (37.9 mm cl) (USNM 21078) collected by the "Albatross" stn 3382 off Panama (6°21'N, 80°41'W, 3227 m), is designated here as the lectotype of *Willemoesia inornata* Faxon, 1893; the other specimens in the samples are paralectotypes, as well as the specimens (USNM 21079) collected by the "Albatross" stn 3399 off Ecuador and those (USNM 21080) from stn 3400 off Galapagos Is.

The ovigerous female (53.5 mm cl) (NHM 1888.22) collected by the "Challenger" stn 298, off Chile (34°07'S, 73°56'W, 4005 m), is designated here as the lectotype of *W. challenger* Sund, 1920, the female of the sample is a paralectotype, as well as the male (33.7 mm cl) (NHM 1888.22) collected at stn 300 off Juan Fernandez.

**DESCRIPTION.** — Carapace oblong, margins subparallel, anteriorly convergent; surface densely covered with antrorse spinules. Frontal margin transverse. Rostral spine upcurved. Internal orbital angle bearing small granulate spine, lacking in some larger specimens. Anterolateral angle of carapace formed by large spine. Mesial margin of basal antennular segment prominently spinose, pectinate. Spine formula of lateral margins of carapace 5-8:2-4:0-10, lateral margins of carapace posterior to postcervical incision carinate. Median postrostral carina irregularly spinulate, granulate anteriorly; median postcervical carina unarmed. Gastro-orbital carinae obsolescent, unarmed. Branchial carina prominent, sinuous, unarmed, polished. Posterior margin of carapace unarmed.

First abdominal tergite smooth, bearing tubercle medially on anterior margin. Tergites 2-5 sculptured, bearing deep submedian grooves, medially carinate, carinae culminating in antrorse spine anteriorly, spines increasing in size posteriorly. Sixth tergite with margins, submedian crescents and lyre-shaped median carina swollen. Second pleuron heart-shaped, pleura 3-5 with blunt rib mesially, indented posteriorly. Telson with T-shaped hump anteriorly, smooth convergent carinae posteriorly, unarmed margins, tip rounded. Posterior margin of uropodal endopod rounded.

First chelipeds thin, elongate. Merus swollen proximally; upper margin granulate, subterminally trispinose; lower margin spinose, spines larger proximally. Carpus 4/5 as long as merus, expanded distally; upper margin spinose, distalmost spine largest. Upper margin of chela bearing two files of spines, spines of interior file longer; single file on lower margin of finger.

**Color.** — Carapace anteriorly pale orange-red, posterior to cervical groove almost colorless, with ridges, spines darker, interior organs purple-red. Abdomen pale to bright reddish-orange; uropods, margin of pleura, ridges and spines darker; legs, pleopods, antennae and antennulae bright reddish-orange (HOLTHUIS pers. obs., specimens collected by the "Gilliss" stn 3).

**REMARKS.** — HOLTHUIS (1952a: 79) found "*Willemoesia inornata* Faxon, (1895) ... closely related to, if not identical with *W. challenger*." GORE (1984: 6) tentatively placed the "*Galathea*" specimens described by WOLFF (1961), in *W. inornata*. Having examined both the "*Galathea*" and type specimens, I confirm GORE's identification.

*W. inornata* and *W. leptodactyla* both have the sixth abdominal tergite with margins, submedian crescents and lyre-shaped median carina swollen. *W. inornata* differ from *W. leptodactyla* in having the lateral margins of carapace posterior to postcervical incision bearing less than 10 spines, the upper margin of the first chela with two files of spines, the lower margin with a single file; whereas in *leptodactyla*, the lateral margins of carapace posterior to postcervical incision bear more than 20 spines, the upper margin of the first chela bears several files of spines, the lower margin bearing two files.

DISTRIBUTION. — Eastern Pacific: Gulf of Panama, Colombia, Ecuador, Chile, Juan Fernandez and Galapagos; 2380-4005 m.

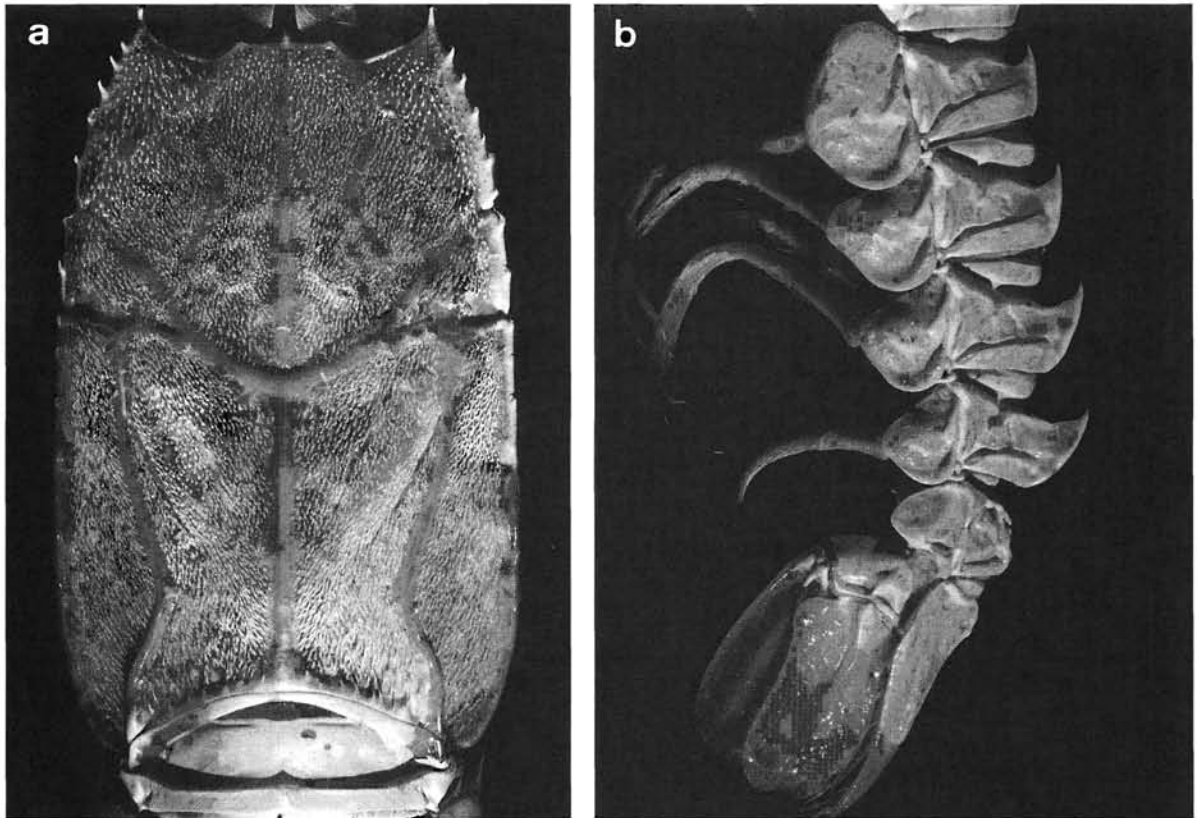


FIG. 32. — *Willemoesia inornata* Faxon, 1893, ♂ 37.9 mm, Eastern Pacific, Panama, "Albatross" stn 3382, 6°21'N, 80°41'W, 3227 m (USNM 21078): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

*Willemoesia leptodactyla* (Willemoes-Suhm, 1875)

Fig. 33

- Deidamia leptodactyla* Willemoes-Suhm, in THOMSON, 1873: 51, 247, fig. 2. — WOOD-MASON, 1874: 180. — HOLTHUIS, 1956: 114. — HEMMING, 1958: 138. — WOLFF, 1960: 180.
- Willemoesia leptodactyla* - GROTE, 1873: 485. — HUMBERT, 1874: 130. — WILLEMoes-SUHM, 1875a: 50, pl. 13 figs 1-9; 1875b: 577; 1875c: xxxiii. — THOMSON, 1877: 187, fig. 42. — BATE, 1878a: 280, pl. 13 figs 4-5 (p.p.); 1878b: 484 (p.p.); 1878c: 563 (p.p.); 1888: 163, pls 18-20 (p.p.). — NORMAN, 1879: 175. — PAGENSTECHEER, 1879: 37. — CARUS, 1885: 486. — PERRIER, 1886: 293. — W. MARSHALL, 1888: 266. — STEBBING, 1893: 201. — FAXON, 1895: 118. — MURRAY, 1897: 388. — GIGLIOLI, 1912: 158. — DE MAN, 1916: 5 (list). — BOUVIER, 1917: 33, pl. 1 figs 6-15. — SUND, 1920: 221. — STEPHENSEN, 1923: 64. — SIVERTSEN & HOLTHUIS, 1956: 42. — ZARENKOV, 1969: 81. — FIRTH & PEQUEGNAT, 1971: 79. — GORE, 1984, tab. 2. — DAWSON, 1997: 27.
- Polycheles leptodactyla* - WOOD-MASON, 1875: 132 (p.p.).

- Willemoesia forceps* - WOOD-MASON & ALCOCK, 1891: 199. — ALCOCK, 1894: 230; 1899: 33; 1902: 155. — BOUVIER, 1905a: 480 (p.p); 1905c: 5 (p.p) [non A. Milne Edwards, 1880].  
*Willemoesia indica* Alcock, 1901b: 178, pl. 1 figs 1-1a. — ALCOCK & McARDLE, 1903, pl. 57 fig. 5. — BOUVIER, 1917: 32 (key). — DE MAN, 1916: 6 (list). — FIRTH & PEQUEGNAT, 1971: 77. — GORE, 1984: 5. — DAWSON, 1997: 26.  
*Willemoesia secunda* Sund, 1920: 223. — FIRTH & PEQUEGNAT, 1971: 80.  
 not *Willemoesia leptodactyla* - GIGLIOLI, 1881: 358; 1882: 5 [= *P. sculptus* Smith, 1880].  
 not *Willemoesia (Polycheles) leptodactyla* - GIGLIOLI, 1912: 186 [= *P. sculptus* Smith, 1880].  
 not *Willemoesia leptodactyla* - BAGE, 1938: 9 [= *W. pacifica* Sund, 1920].

**MATERIAL EXAMINED.** — ATLANTIC OCEAN. NE Atlantic. "Talisman". 42°19'N, 23°36'E, 4060 m, 24.08.1883: 1 ♂ 35.0 mm; 2 ♀ damaged (MNHN-Pa 3). — 1 ♀ 52.2 mm (MNHN-Pa 1172).

DORA 2: 46°59.5'N, 14°58.3'W, 4776 m, 29.03.1984: 1 juv. (RMNH).

INCAL 2. 48°20.4'N, 15°14.6'W, 4823 m, 1.08.1976: 1 ♀ 42.0 mm (MNHN-Pa 535).

BBC-96. 49°00.37'N, 13°41.42'W, 4488 m, 29.07.1966: 1 juv. (RMNH).

Canary Is. CANCAP 3: stn 3.105, 29°50'N, 15°46'W, 3400-3550 m, 24.10.1978: 1 ♀ 49.8 mm (RMNH).

CANCAP 4: stn 4.135, 28°27'N, 18°27'W, 4000 m, 1.06.1980: 1 ov. ♀ 71.1 mm (RMNH). — Stn 4.166, 29°48'N, 15°56'W, 3427-3570 m, 6.06.1980: 1 ♀ 37.8 mm (RMNH). — Stn 4.180, 32°48'N, 15°18'W, 3315-3499 m, 9/10.06.1980: 1 ♂ 43.7 mm; 1 ♀ 60.7 mm (RMNH).

Cape verde Is. CANCAP 6: stn 6.002, 14°39'N, 23°21'W, 3650-3840 m, 4-5.05.1982: 1 ♀ 53.8 mm (RMNH). — Stn 6.023, 14°40'N, 24°51'W, 3900-3875 m, 6.06.1982: 3 juvs. (RMNH). — Stn 6.036, 15°04'N, 25°01'W, 4030-4130 m, 8.06.1982: 1 ♂ 49.0 mm; 1 ♀ 41.5 mm (RMNH).

West Africa. "Gilliss": stn 93, 6°30.5'N, 22°06'W, 3446 m, 19.08.1973: 3 juvs. (RMNH 31671). — Stn 94, 5°03.8'N, 20°48.2'W, 2784 m, 20.08.1973: 1 juv. (RMNH). — Stn 99, 0°37.8'N, 18°20.8'W, 4620 m, 22.08.1973: 1 juv. (RMNH 31672).

"Pillsbury": stn 66, 3°31'N, 7°34'W, 4045-4008 m, 2/3.06.1964: 1 ♀ 65.4 mm (RMNH).

WALDA: 18°52.1'S, 7°23.1'E, 5124 m, 06.06.1971: 1 ♂ 54.4 mm; 3 ♀ 49.6-64.4 mm; 2 juvs (MNHN-Pa 653). — 18°28.5'S, 10°31.5'E, 3530 m, 28.06.1971: 1 ♀ 57.9 mm (MNHN-Pa 536). — 17°30'S, 9°27.5'E, 4335 m, 30.06.1971: 1 ♀ 47.4 mm (MNHN-Pa 650). — 12°21.4'S, 11°02.7'E, 3431 m, 11.07.1971: 1 ♂ 40.7 mm; 2 ♀ 52.3, 54.3 mm (MNHN-Pa 652). — 9°26'S, 10°33'E, 4080 m, 15.07.1971: 1 ♂ 45.9 mm (MNHN-Pa 649). — 3°59'N, 3°42.9'E, 3225 m, 14.08.1971: 1 ♀ 51.5 mm; 1 juv. (MNHN-Pa 651).

S. Atlantic. "Challenger": stn 133, 35°41'S, 20°55'W, 3420 m, 11.10.1873: 1 ♀ 38.1 mm (NHM 1888.22).

NW Atlantic. "Challenger": stn 13, 21°38'N, 44°39'W, 3420 m, 4.03.1873: 1 ♀ broken (NHM 1888.22).

Jamaica. "Pillsbury": stn 1180, 18°55'N, 73°53'W, 3109-3493 m, 1.07.1870: 1 ♂ 46.0 mm (RMNH).

Venezuela Basin. "Bartlett": stn 39, 15°08.93'N, 69°13.38'W, 3977-4047 m, 27-28. 10.1981, id. R.H. GORE as *W. indica*: 1 ♂ 51.5 mm; 1 ♀ 58.8 mm (NHM 1984.52); 2 ♂ 35.5, 48.4 mm; 2 ♀ 37.5, 38.5 mm; 4 juvs (NHM 1984.55). — Stn 65, 13°51.8'N, 67°52.4'W, 5000 m, 10.11.1981, id. R.H. GORE as *W. indica*: 1 ♂ 68.2 mm; 1 ♀ 69.3 mm (LAM ex AHF 2491-02); 1 ♂ 38.0 mm (LAM ex AHF 2491-03). — Stn 87, W Aves ridge, 13°36.36'N, 64°6.12'W, 3640 m, 25.11.1981: 1 ♂ 33.8 mm; 1 ♀ 66.5 mm; 2 juvs (USNM 210821); 1 ov. ♀ 82.2 mm (USNM 210822); 3 ♀ 55.6-78.5 mm; 2 juvs (USNM 210823).

INDIAN OCEAN. Tasman Sea. "Galathea": stn 607, 44°18'S, 166°46'E, 3930 m, 7.01.1952: 1 ♀ 35.6 mm (ZMC).

Java Deep. "Galathea": stn 474, 9°49'S, 114°13'E, 3920 m, 11.09.1951: 1 ♀ 58.2 mm (ZMC).

Bay of Bengal. "Investigator": stn 117, 11°58'N, 88°52'17"E, 3197 m, 13.12.1890: 1 ♂ 53 mm (IM 6871/9).

"Galathea": stn 299, 17°10'N, 84°34'E, 2935 m, 24.04.1951: 7 ♂ 37.2-51.9 mm; 1 ♀ 80.9 mm; 1 ov. ♀ 80.1 mm (ZMC). — Stn 314, 15°54'N, 90°17'E, 2610 m, 3.05.1951: 5 ♂ 35.3-42.0 mm; 7 ♀ 37.2-45.3 mm (ZMC).

Mid Indian Basin. SAFARI 2: stn 2-CP 03, 5°48'N, 78°43'E, 3450 m, July-Sept. 1981: 1 ♀ 58.7 mm (MNHN). — Stn 35-CP 28, 12°52.9'S, 79°32.1'E, 4950 m, July-Sept. 1981: 1 ♀ (MNHN-Pa 1751).

Madagascar. "Galathea": stn 235, 4°47'S, 46°19'E, 4940 m, 11.03.1951: 1 juv. (ZMC).

South Africa. "Galathea": stn 192, 32°00'S, 32°41'E, 3615 m, 5.02.1951: 3 ♂ 25.4-50.1 mm (ZMC).

**TYPES.** — The female (broken) (NHM 1888.22) collected by the "Challenger" stn 13 in the NW Atlantic (21°38'N, 44°39'W, 3420 m), is the holotype of *Willemoesia leptodactyla* (Willemoes-Suhm, 1875).

The male (53 mm cl) (IM 6871/9) collected by the "Investigator" stn 117 in the Bay of Bengal (11°58'N, 88°52'17"E, 3197 m), is the holotype of *Willemoesia indica* Alcock, 1901.

The female (38.1 mm cl) (NHM 1888.22) collected by the "Challenger" stn 133 in the South Atlantic (35°41'S, 20°55'W, 3420 m), is the holotype of *Willemoesia secunda* Sund, 1920.

**DESCRIPTION.** — Carapace oblong, lateral margins subparallel, anteriorly convergent. Dorsal surface of carapace densely covered with antrorse spinules. Rostral spine upcurved. Frontal margin of carapace transverse. Internal angle of orbital sinus spinose. Eyestalk bulbous, bearing short curved spine. Mesial margin of basal

antennular segment spinose, pectinate. Lateral margins of carapace spinose, spines increasing in size anteriorly, anteriormost largest; spine formula 8-10:5-7:15-25. Median postrostral carina prominent, granulate; spine formula variable; spines on median postcervical carina larger posteriorly. Gastro-orbital carina sinuous, sparsely spinulose. Branchial carina sinuous, prominent, spinose. Posterior margin of carapace smooth.

First abdominal tergite smooth, bearing tubercle medially on anterior margin. Tergites 2-5 sculptured, with deep submedian grooves, medially carinate, carinae culminating in antrorse spine anteriorly, spines increasing in size posteriorly. Sixth tergite with swollen margins, submedian crescents and lyre-shaped median carina; median carina more prominent posteriorly. Second pleuron heart-shaped; pleura 3-5 with blunt rib mesially, indented posteriorly. Telson with T-shaped hump anteriorly, smooth convergent carinae posteriorly, unarmed margins, tip rounded. Posterior margin of uropodal endopod rounded.

First chelipeds thin, elongate. Merus swollen proximally; upper margin granulate, distally bispinose, distalmost spine larger; lower margin spinose, spines larger proximally. Carpus 3/4 as long as merus expanded distally; upper margin spinose, distalmost spine largest. Upper margin of chela bearing several irregular files of spines; lower margin bearing two files, spines of interior file longer; single file along lower margin of finger.

*Color.* — "very beautiful... it was of a fine red, while the hairs bordering it were yellowish" (WILLEMOES-SUHM, 1875a: 53). "...brick orange to light pinkish orange overall... juveniles white, or translucent pink with reddish highlights on cephalothorax. Sensory appendages and pereopods usually a solid salmon red or pink in larger individuals, translucent white in smaller specimens." (GORE, 1984: 7).

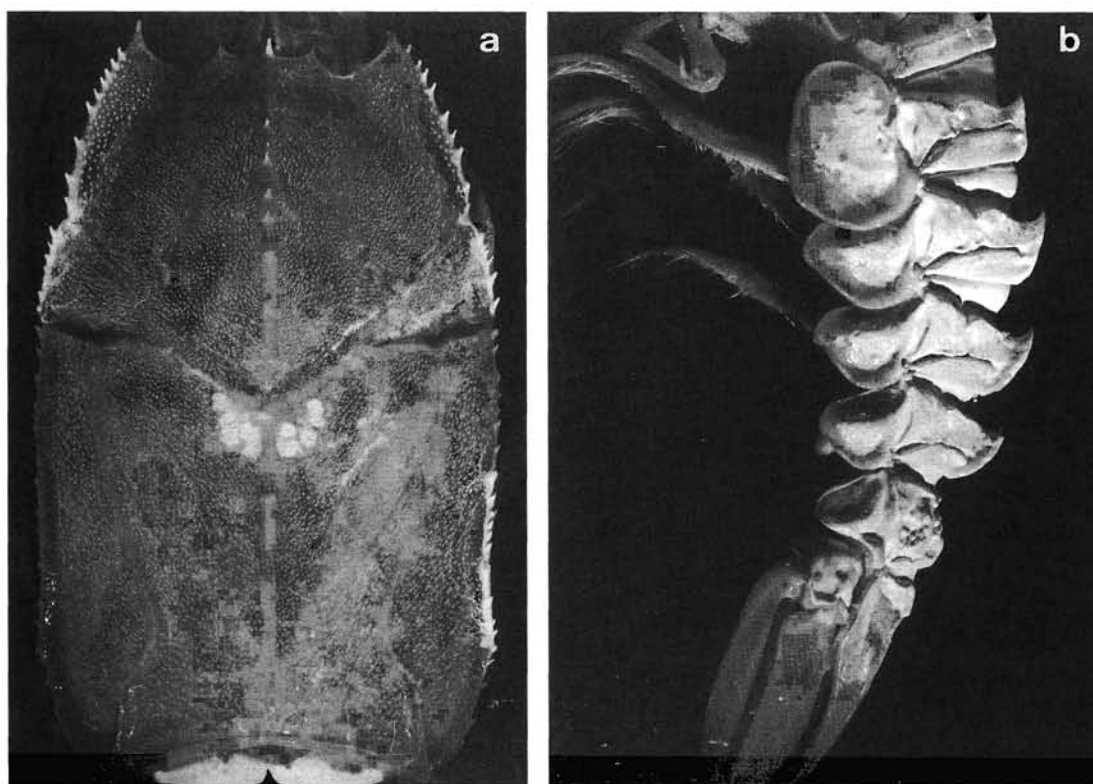


FIG. 33. — *Willemoesia leptodactyla* (Willemoes-Suhm, 1875), ♀ 66.5 mm, Venezuela Basin, "Bartlett" stn 87, 13°36.36'N, 64°46.12'W, 3640 m (USNM 210821): a, cephalothorax, dorsal view; b, abdomen, lateral view.

REMARKS. — "*W. leptodactyla* does not have the embossment, as is clearly seen from WILLEMOES-SUHM's (1875) illustration" (GORE, 1984: 8) - an omission of the characteristic lyre-shaped median carina and submedian crescents from the early illustrations of *W. leptodactyla*, coupled with BATE's (1878a: 280) erroneous count of the lateral spines, contributed to the creation of several synonymies.

DISTRIBUTION. — Worldwide: east Atlantic and west Atlantic (Jamaica to Venezuela), Indo-West Pacific (Tasman Sea, Philippines, Bay of Bengal, Madagascar, South Africa); 2396 m (ALCOCK, 1906) - 5124 m (present work).

*Willemoesia pacifica* Sund, 1920

Figs. 34

*Willemoesia leptodactyla* Bate, 1878a: 280 (p.p.); 1878c: 563 (p.p.); 1888: 163, pl.19 fig. c (p.p). — DE MAN, 1916: 6. — BAGE, 1938: 9 [non Willemoes-Suhm, 1875].

*Willemoesia pacifica* Sund, 1920: 223. — HOLTHUIS, 1952a: 79. — BAHAMONDE, 1963: 4. — ZARENKOV, 1969: 81. — FIRTH & PEQUEGNAT, 1971: 80. — RETAMAL, 1981: 16. — WICKSTEN, 1989: 304.

*Willemoesia forceps* - BERNARD, 1953: 88, fig. 36 [non A. Milne Edwards, 1880].

*Willemoesia bonaspei* Kensley, 1968: 294, figs 4-5; 1974: 69; 1981b: 29. — GORE, 1984, tab. 2. — GRIFFIN & STODDART, 1995: 251, figs 16-17. — DAWSON, 1997: 25.

MATERIAL EXAMINED. — South Africa. Cape Point, 34°36'S, 17°00'E, 2745 m, 10.12.1959: 1 ov. ♀ 48.4 mm (SAM A10543).

Juan Fernandez Is. "Challenger": stn 300, 33°42'S, 78°18'W, 2475 m, 17.12.1875: 1 ♂ 46.3 mm (NHM 1888.22).

Kermadec Trench. "Dana": stn 3627, 30°08'S, 176°50'W, 5000 m, 14.12.1928: 1 juv. (ZMC 3274).

New Zealand. NZOI: stn U195, 34°31.5'S, 166°21.0'E, 2930-2928 m, 23.09.1982: 1 ♂ 32.5 mm (NIWA). — Stn V196, 33°03'S, 165°22.4'E, 3118-3120 m, 24.09.1982: 1 ♂ 38.4 mm (NIWA).

TYPE. — The male (46.3 mm cl) (NHM 1888.22) collected by the "Challenger" stn 300, off Juan Fernandez Is (33°42'S, 78°18'W, 2475 m), is the holotype of *Willemoesia pacifica* Sund, 1920.

The female (48.4 mm cl) (SAM A10543) collected off Cape Point, South Africa, is the holotype of *Willemoesia bonaspei* Kensley, 1968.

DESCRIPTION. — Carapace oblong, lateral margins subparallel, convergent anteriorly. Dorsal surface of carapace close-set with antrorse spinules. Rostral spine long, upcurved. Frontal margin of carapace trigonally excavate, internal angle of orbital sinus prominently spinose. Eyestalk bulbous, bearing curved spine. Mesial margin of basal antennular segment prominently spinose. Lateral margins of carapace spinose, spines increasing in size anteriorly, spine formula 6-10:5-8:18-30. Median postrostral carina well defined, spine formula variable; postcervical median carina irregularly spinose, spines larger posteriorly. Gastro-orbital carina obsolescent, sinuous, spinose. Branchial carina sinuous, prominent, spinose. Posterior margin of carapace smooth.

Abdominal tergites lacking obliquely transverse grooves, medially carinate; carinae 1-3 anteriorly dentate, denticle increasing in size posteriorly. Tergites 4-5 carinate, lacking antrorse denticle. Sixth tergite smooth. Abdominal pleura smooth, margins unarmed; second pleuron subcircular. Telson with triangular hump anteriorly, polished submedian carinae posteriorly, margins spinulate, tip acuminate. Margin of uropodal endopod triangulate.

First cheliped long, thin. Upper margin of merus granulate, distally with claw-like spine; lower margin spinose, spines longer proximally. Carpus 3/4 as long as merus; upper margin spinose, subterminal claw-like spines on upper and lower margins. Upper margin of chela with two spinose rows, spines on interior row longer; lower margin with single row of spinules, continuing to finger.

REMARKS. — BATE (1888: 169) described one of the Juan Fernandez specimens as having "the telson longer and more pointed and the outer foliaceous plates of the rhipidura somewhat pointed at the extremity" but thought it "a decided variety of *Willemoesia leptodactyla*". KENSLEY (1968: 297) found *W. bonaspei* "closely related to several described species, such as *leptodactyla* (Willemoes-Suhm), *pacifica* Sund, or *challengeri* Sund", but mostly it "resembles Bate's 1888 plate 19 C (a specimen captured off the coast of Chile and named *pacificus* by Sund in 1920)". GRIFFIN & STODDART (1995: 251) thought *W. bonaspei* "is very close to *W. pacificus* and, as suggested by Kensley, may be found to be synonymous with it when more material becomes available". Examination of both types proved them right.

*W. pacifica* differs from its congeners in lacking the deep submedian grooves on its abdominal tergites, in its entirely smooth sixth abdominal tergite, and its acuminate telson.

DISTRIBUTION. — The southern ocean: South Africa, Juan Fernandez Is, Kermadec Trench, New Zealand; 2475-5000 m.

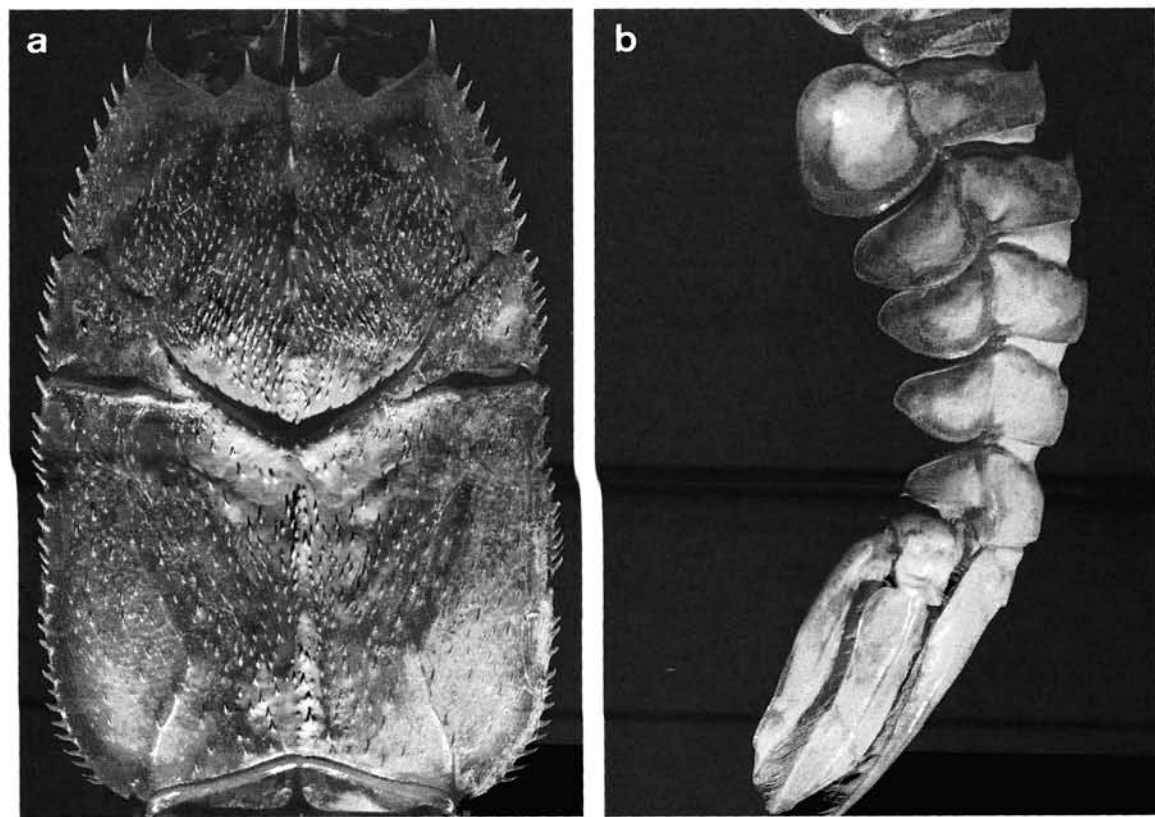


FIG. 34. — *Willemoesia pacifica* Sund, 1920, ♂ 46.3 mm, holotype, Juan Fernandez I., "Challenger" stn 300, 33°42'S, 78°18'W, 2475 m (NHM 1888.22): a, dorsal view of the cephalothorax; b, lateral view of the abdomen.

### CONCLUSIONS

The polychelids are prominent members of the deep sea biota, yet, choosing the bathyal as their abode, they are considered rare. Though there are a few reports of abundant hauls, like that of the "Pillsbury" off West Africa, where surplus specimens were shoveled overboard (HOLTHUIS, 1991), most are known from a small number of specimens scattered among distant museums. The polychelid collections assembled through the MUSORSTOM deep-sea cruises allowed for examination of large series of specimens and analysis of the validity of characters used to separate species and genera. The resulting taxonomic revision replaced the long established "three living genera in the *Polychelidae*: *Polycheles* Heller, 1862; *Stereomastis* Bate, 1888; and *Willemoesia* Grote 1873" (FIRTH & PEQUEGNAT, 1971:5), with five genera of which only *Willemoesia* retains its primary meaning. The study of extensive collections and most type specimens revealed many synonymies, and helped reduce the number of polychelid species known from single specimens from twelve (FIRTH & PEQUEGNAT, 1971: 32) to one - *Homeryon asper* (Rathbun, 1906). This taxonomic rearrangement resulted in reshuffling of geographic and bathymetric ranges. Accordingly, five polychelid species are now known to occur only in the Atlantic, nineteen occur solely in the Indo-Pacific, whereas eight are found in both oceans - contrary to the notion "Most polychelid species appear to be endemic to particular ocean basins" (FIRTH & PEQUEGNAT, 1971: 16). Of the five species listed by FIRTH & PEQUEGNAT (1971: 16) as endemic to the Atlantic, one, *validus*, occurs from the eastern



Pacific to the Indian Ocean, another, *leptodactyla*, from the Tasman Sea to South Africa, and a third, *secunda*, is but a junior synonym of the latter. Two taxa, *Polycheles perarmata* and *Willemoesia forceps*, occur on both sides of tropical Atlantic, whereas *Willemoesia inornata* was found on both sides of the isthmus of Panama. *Willemoesia pacifica* and *Polycheles suhmi* inhabit the southern oceans, both Atlantic and Indo-Pacific. Some species such as the above mentioned *Homeryon asper*, *Pentacheles gibba*, *Polycheles cerata* and *Polycheles trispinosus*, all described nearly a century ago, are presumably rare and of limited range.

TABLE 1. — Geographical distribution of the Polychelidae.

	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Cardus crucifer</i>		+		+	+								
<i>Homeryon armarium</i>								+					
<i>Homeryon asper</i>									+				
<i>Pentacheles gibbus</i>												+	
<i>Pentacheles laevis</i>		+	+		+		+		+	+	+	+	
<i>Pentacheles obscurus</i>									+	+	+	+	+
<i>Pentacheles snyderi</i>		+							+			+	
<i>Pentacheles validus</i>		+	+	+	+	+	+		+	+		+	
<i>Polycheles aculeatus</i>										+	+		
<i>Polycheles auriculatus</i>									+	+	+		
<i>Polycheles baccatus</i>									+	+	+		
<i>Polycheles ceratus</i>										.	+	+	
<i>Polycheles coccifer</i>										+	+		
<i>Polycheles enthrix</i>									+	+	+		
<i>Polycheles evexus</i>							+						
<i>Polycheles helleri</i>								+		+	+	+	
<i>Polycheles nanus</i>		+	+	+	+			+	+	+	+	+	+
<i>Polycheles pacificus</i>							+						
<i>Polycheles perarmatus</i>			+			+							
<i>Polycheles phosphorus</i>								+	+	+	+	+	
<i>Polycheles politus</i>											+		
<i>Polycheles sculptus</i>	+	+	+	+	+	+	+	+		+	+	+	+
<i>Polycheles suhmi</i>				+			+			+			
<i>Polycheles surdus</i>							+		+	+		+	+
<i>Polycheles talismani</i>			+	+									
<i>Polycheles tanneri</i>							+						
<i>Polycheles trispinosus</i>											+		
<i>Polycheles typhlops</i>	+	+	+		+	+				+	+	+	+
<i>Willemoesia forceps</i>			+			+							
<i>Willemoesia inornata</i>						+	+						
<i>Willemoesia leptodactyla</i>		+	+			+				+	+	+	+
<i>Willemoesia pacifica</i>				+			+		+	+			

1. Mediterranean Sea; 2. Northeast Atlantic; 3. West Africa; 4. South Africa; 5. Northwest Atlantic; 6. Tropical West Atlantic; 7. East Pacific; 8. Northeast Pacific; 9. Central Pacific; 10. Southwest Pacific (New Guinea, Australia, New Caledonia, New Zealand); 11. Southeast Asia (South China Sea, Philippines, Indonesia); 12. Indian Ocean; 13. East Africa



All but four polychelid species occur only beyond the continental shelf, most are found in the mid-bathyal depths of 500-1500 m. However, the four species of *Willemoesia* inhabit the abyssal, occurring exclusively at depths greater than 2000 m - a specimen of *leptodactyla* even hauled from 5060 m.

On the 125th anniversary of the first deep-sea cruise, we note that the challenge of the "*Challenger*" has not been met - there is still much to discover on the bottom of the sea.

TABLE 2. — Vertical distribution of the Polychelidae

Depth (m)	0-200	-500	-1000	-2000	-3000	-4000	-5000
<i>Cardus crucifer</i>			+	+	+		
<i>Homeryon armarium</i>			+				
<i>Homeryon asper</i>				+			
<i>Pentacheles gibbus</i>				+			
<i>Pentacheles laevis</i>		+	+	+	+		
<i>Pentacheles obscurus</i>				+	+	+	
<i>Pentacheles snyderi</i>			+	+	+		
<i>Pentacheles validus</i>			+	+	+	+	
<i>Polycheles aculeatus</i>	+	+	+	+			
<i>Polycheles auriculatus</i>			+	+			
<i>Polycheles baccatus</i>		+	+	+			
<i>Polycheles ceratus</i>				+			
<i>Polycheles coccifer</i>	+	+	+				
<i>Polycheles enthrix</i>		+	+	+			
<i>Polycheles evexus</i>				+	+		
<i>Polycheles helleri</i>			+	+	+		
<i>Polycheles nanus</i>		+	+	+	+	+	
<i>Polycheles pacificus</i>			+	+	+	+	
<i>Polycheles perarmatus</i>	+	+	+				
<i>Polycheles phosphorus</i>		+	+	+			
<i>Polycheles politus</i>		+	+	+			
<i>Polycheles sculptus</i>		+	+	+	+	+	
<i>Polycheles suhmi</i>		+	+	+	+		
<i>Polycheles surdus</i>		+	+	+			
<i>Polycheles talismani</i>	+	+	+	+	+		
<i>Polycheles tanneri</i>			+				
<i>Polycheles trispinosus</i>			+				
<i>Polycheles typhlops</i>	+	+	+	+	+		
<i>Willemoesia forceps</i>					+	+	+
<i>Willemoesia inornata</i>					+	+	+
<i>Willemoesia leptodactyla</i>					+	+	+
<i>Willemoesia pacifica</i>					+	+	+

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