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Some Majid Spider Crabs from the Deep Indo-West Pacific

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ABSTRACT. Fifteen species of seven genera are discussed. The material comes from depths exceeding 200 m in the Indian Ocean (off east Africa, Indonesia and north-west Australia) and the west Pacific (Tasman Sea and Kermadec Deep). Four new species are described, one of the genus *Platymaia* and three of *Rochinia*. The known geographic range of six species is extended: *Cyrtomaia suhmi, Pleistacantha moseleyi, Rochinia pulchra* are recorded from off north-west Australia for the first time. *Platymaia fimbriata* is recorded from the Indian Ocean for the first time and the known range of *Teratomaia richardsoni* is extended to the Kermadec region. *Echinoplax pungens* is confirmed as a synonym of *Pleistacantha moseleyi* and *Rochinia riversandersoni* is shown to be a complex of several species.

GRIFFIN, D.J.G. & H.A. TRANTER, 1986. Some majid spider crabs from the deep Indo-West Pacific. Records of the Australian Museum 38(6): 351-371.

The spider crab fauna of the Indo-West Pacific has been studied intensively by a number of people in the last 15 years (Griffin, 1976; Griffin & Tranter, 1974, 1986; Guinot & Richer de Forges, 1982a, 1982b; Kensley, 1977a, 1977b; Sakai, 1976; Serène & Lohavanijaya, 1973; Takeda, 1977, 1978, 1980; Yaldwyn & Dawson, 1976).

Deep water species are, as one would expect, less well known. We are pleased to have the opportunity therefore to study a number of collections.

The now famous *Galathea* Deep Sea Expedition left Copenhagen on October 15, 1950, and returned June 29, 1952. Its numerous and significant collections have been the subject of many reports. The deep-water spider crabs of the family Majidae have not been reported on previously. Dr Torben Wolff of the University Zoological Museum, Copenhagen kindly agreed to make the small but important collection from depths of 200 m or more available to us.

Australia's north-west shelf has assumed increasing importance in the last 10 years as a site of mineral exploration as well as a potentially important area for expansion of Australia's fishing industry. The *Soela,* chartered by CSIRO's Division of Fisheries, conducted investigations there from 1979 to 1983.

The Tasman Sea and areas around New Zealand have been explored over a number of years by the New Zealand Oceanographic Institute. The research vessel *Kapala* has engaged in exploratory fishing off NSW since 1971.

Material dealt with in this report is lodged in the Australian Museum, Sydney (AM), the Museum of Victoria, Melbourne (NMV), the Zoological Museum, Amsterdam (ZMA) and the University Zoological Museum, Copenhagen (ZMC). The dimension given for each specimen is carapace length (cl.) measured from the anterior tip of the rostrum, unless otherwise stated.

Subfamily INACHINAE

Achaeopsis Stimpson

Type species. *Achaeopsis spinulosus* Stimpson, 1857, by monotypy.

Remarks. Species of this genus are distinguished by the slender, simple postorbital spine. Only one species can be confirmed as occurring in the Australian and New Zealand area at present: previous records of

A. thomsoni from Australia therefore refer to *A. ramusculus*.

Distribution. West and east Atlantic, Indo-West Pacific.

Achaeopsis ramusculus (Baker)

Stenorhynchus ramusculus Baker, 1906: 104–106, pl. 1 figs 1, 1a.
Achaeopsis thomsoni.—Rathbun, 1918: 4. [Not *Dorhynchus thomsoni* Thomson, 1873 (see opinion 712: ICZN 1964).]
Achaeopsis ramusculus.—Hale, 1927: 124, fig. 121; Griffin, 1966: 35–37, fig. 4; Griffin & Tranter 1986: 21.

Material examined. One specimen, female, 14.7 mm, AM P35486, Tasman Sea, north-east of Wollongong, 34°24′S, 151°25′E, 738 m, demersal prawn trawl, FRV Kapala, stn K 76-23-01, 13 December 1976.

Remarks. The one complete rostral spine on this adult female clearly extends beyond the end of the peduncle of the second antenna, distinguishing it from *A. spinulosus* Stimpson and *A. rostrata* Sakai with shorter rostral spines. The protogastric and anteromedial branchial regions lack the spines present in *A. thomsoni* (Thomson). There is a very small tubercle on the protogastric region, and the anteromedial angle of the branchial region is smooth.

In this specimen the rostral spine is directed straight forward and slightly upwards. There are three small ventral spines on the rostrum - two in the proximal half and one in the distal half - as in the immature female specimen from New Zealand figured previously (Griffin, 1966: fig. 6.4). There is a small spine on the margin of the orbit, anterior to the preorbital spine, not present in other specimens of *A. ramusculus* we have examined. The ambulatory legs are missing from this specimen.

Miers (1886) identified a specimen collected by the *Challenger* from off Sydney (34°13′S, 151°38′E, 738 m, stn 164B) as conspecific with specimens of "*Lispognathus thomsoni* (Norman)" collected by the *Challenger* off South Africa. However, Miers expressed some reservation with this identification as the specimen was damaged and had 'one, not two spines on each branchial region'. It was noted previously (Griffin & Tranter, 1985) that this *Challenger* specimen could be either *A. ramusculus* or *A. rostrata*. At that time though, neither of these species had been recorded from the eastern coast of Australia. It seems not unreasonable to us that since *Kapala* obtained this specimen of *A. ramusculus* from almost exactly the same locality and depth as the specimen examined by Miers, the *Challenger* specimen was in fact *A. ramusculus*.

This is the first adult female reported for this species.

The status of the genus *Dorhynchus* was discussed by Manning & Holthuis (1981: 280–281); we regard it as synonymous with *Achaeopsis*.

Distribution. Southern and south-east Australia, and New Zealand.

Cyrtomaia Miers

Type species. *Cyrtomaia murrayi* Miers, 1886, by designation of Guinot & Richer de Forges, 1982b.

Remarks. One of the most characteristic, mainly West Pacific majid genera, *Cyrtomaia* contains 17 species, many requiring further study to clarify their status.

Distribution. Indo-West Pacific.

Cyrtomaia suhmi Miers

Figs 1–2

Cyrtomaia suhmi Miers, 1886: 16–17, pl. 3 fig. 2.—Griffin, 1974: 9–10; Griffin & Brown, 1976: 252–253, fig. 6; Guinot & Richer de Forges, 1982b: 21–24, figs 10, 11A–B, 23B; Griffin & Tranter 1986: 30–31, fig. 9e–g.

Material examined. One specimen, immature female, postrostral cl. 26.6 mm, ZMC, Danish *Galathea* Deep Sea Expedition, stn 324, Straits of Malacca, 6°06′N, 96°00′E, 1130 m, sledge trawl (ST 300), globigerina ooze, 9 May 1951; one specimen, ovigerous female, postrostral cl. 70 mm, AM P35487, Indian Ocean, north-west shelf of Australia, 250 km north-west of Port Hedland, 18°40′S, 116°42′E, 584–592 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/19–20, 4 April 1982; one specimen, immature female, postrostral cl. 34.5 mm, AM P35488, Indian Ocean, north-west shelf of Australia, 220 km north-west of Port Hedland, 18°40′S, 116°44′E, 594–612 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/28-30, 6–7 April 1982.

Remarks. The large ovigerous female is similar in size and form to the largest females of *C. suhmi* we have examined from the eastern coast of Australia. As in those specimens there is a spine between the protogastric spine and the anterior branchial spine and the surface of the carapace has only small, scattered granules. As well, the eyestalk is less than half the width of the orbit and the orbital width is clearly greater (1.5) than the interorbital width (measurements taken from above the eyestalk on the eave and the tip of the postorbital spine). The cornea is small. However, there is no spine on the posterior margin of the orbit, the anterior mesogastric tubercle is quite distinct and there is a narrow ridge between the female gonopore and the anterior margin of the segment which is lacking in eastern Australian specimens. The large protogastric spines and the rostral spines are all broken off not far above their bases in this specimen but the bases of the protogastric spines are directed straight forward.

The immature female (postrostral cl. 26.6 mm) from the Straits of Malacca is less than half the size of the ovigerous female, and in this specimen the postorbital spines are directed somewhat obliquely and the protogastric spines are slightly divergent. Oblique postorbital spines and slightly divergent protogastric spines have been reported in a number of juvenile *Cyrtomaia* specimens.

The immature female from the north-west shelf of Australia (postrostral cl. 34.5 mm) has long parallel protogastric spines but the rostral spines and interantennular spine are broken off, and it is infected

with a parasite in the left branchial region. In this specimen there is a high tubercle instead of a spine between the protogastric and anterior branchial spines, and the anterior mesogastric spine is smaller than in the other two specimens.

Cyrtomaia gaillardi Guinot & Richer de Forges from the western Indian Ocean differs from these specimens in having a carapace surface with larger and more dense granules.

These specimens are distinguished from *C. maccullochi* Rathbun by their smoother carapace, shorter eyestalk and much larger (more than one and a half times) adult size.

Distribution. Southern India, Bay of Bengal, Indonesia, north-western and eastern Australia, Japan.

Physachaeus Alcock

Type species. *Physachaeus ctenurus* Alcock, 1895, by subsequent designation of Griffin & Tranter, 1986.

Distribution. Indo-West Pacific.

Physachaeus ctenurus Alcock

Physachaeus ctenurus Alcock, 1895: 175–176, pl. 3 figs 2, 2a–b. — Griffin & Tranter, 1986: 42–44, figs 8, 15f, g.

Material examined. One specimen, ovigerous female, 9 mm, ZMC, Danish *Galathea* Deep Sea Expedition 1950–52, stn 490, Bali Sea, 5°25′S, 117°03′E, 600 m, sledge trawl, sand and clay, 14 September 1951.

Remarks. We have discussed recently (Griffin & Tranter, 1986: 43–44) the variation, within this species, based on specimens from the Andaman Sea, Philippines and Japan. This specimen from the Bali Sea agrees most closely with the specimen previously recorded from Mindanao (Griffin & Tranter, loc. cit). The rostral lobes are broad, triangular and apically acute with a V-shaped hiatus between them. The mesogastric spine is very much shorter than the cardiac spine and there is no low tubercle on the posterior cardiac slope. The basal antennal article is spinulous in the distal half and about five times as long as broad. The four spines on the abdomen are more pronounced than in the other specimens and the suture between the sixth and seventh segments is not visible even in the mid-line.

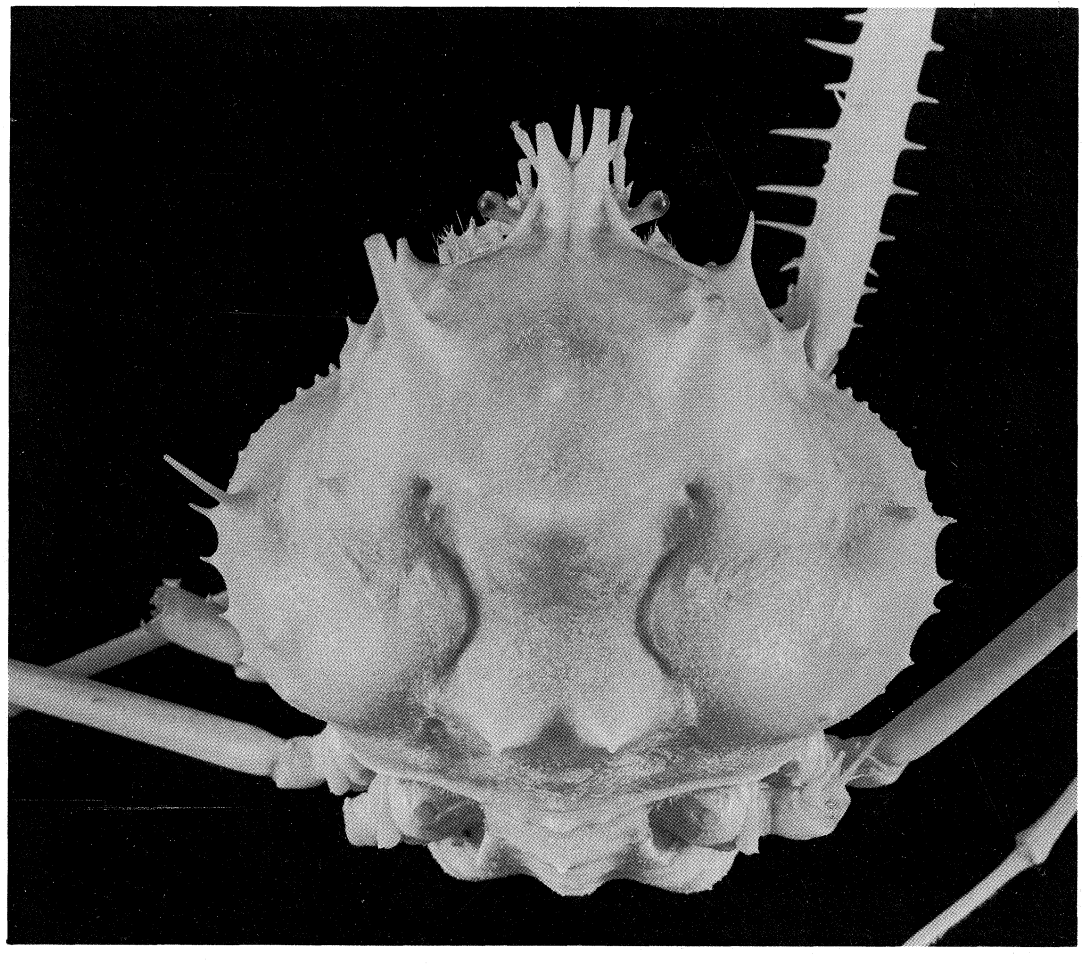

Fig. 1. *Cyrtomaia suhmi* Miers, ovigerous female, postrostral cl. 70 mm, Indian Ocean, north-west of Port Hedland, AM P35487, dorsal view of carapace.

Distribution. East Africa, south-west India, Andaman Sea, Nicobar Islands, Sumatra, Bali Sea, Philippine Islands, Japan.

Platymaia Miers

Type species. *Platymaia wyvillethomsoni* Miers, 1886, by monotypy.

Remarks. Previously only two species of *Platymaia* - *P. alcocki* Rathbun and *P. turbynei* Stebbing - had been reported from the Indian Ocean. We describe here a new species of *Platymaia* from off the north-west of Australia and also record *P. fimbriata* Rathbun, previously known only from the west Pacific, from the same area.

Distribution. Indo-West Pacific.

Platymaia fimbriata Rathbun

Platymaia fimbriata Rathbun, 1916: 531-532.—Griffin & Tranter, 1986: 46, fig. 10i, j.

Material examined. Three specimens, ovigerous females, 41 mm, 41 mm, 43 mm, AM P35492, Indian Ocean, north-west shelf of Australia, 250 km north-west of Port Hedland, 18°40′S, 116°42′E, 593 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/19-20, 4 April 1982; one specimen, male, postrostral cl. 33 mm, AM P35491, Indian Ocean, north-west shelf of Australia, 250 km north-west of Port Hedland, 18°40′S, 116°30′E, 715 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/22-24, 5 April 1982; two specimens, one male, 29.5 mm, one immature female, 29 mm, AM P35489, two specimens, male, 27.5 mm, 27.7 mm, AM P35490, Indian Ocean, north-west shelf of Australia, 220 km north-west of Port Hedland, 18°40′S, 116°44′E, 603 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/28-30, 6-7 April 1982.

Remarks. These specimens agree with Rathbun's type series from the Philippine Islands in having a very spinulous carapace and in the presence of numerous spinules in irregular rows on the dorsal surface of the third and fourth pairs of ambulatory legs. As noted previously (Griffin & Tranter, 1986) specimens of *P. fimbriata* from the Kai Islands and the Ceram Sea are as spinulous as the type series but, of the many specimens examined from off the northern coast of New South Wales, a large number are less spinulous. These specimens have only granules, or at most a row of very small spinules, on the dorsal surface of the last two pairs of ambulatory legs, and also many fewer carapace spines. We have not found any other difference which would justify regarding these smoother specimens as a separate species.

This is the first record of this species from the Indian Ocean.

Distribution. North-western and eastern Australia, Indonesia, Philippine Islands and Japan.

Platymaia mindirra n. sp.

Figs 3-8

Type material. Size range cl. 35 mm - postrostral cl. 85 mm. HOLOTYPE: male, postrostral cl. 78.7 mm, AM P35493, Indian Ocean, north-west shelf of Australia, 190 km north-west of Port Hedland, 18°16′S, 118°12′E, 300 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/36, 10 April 1982. PARATYPES: one specimen, AM P35494, Indian Ocean, north-west shelf of Australia, east of Ashmore Is., 11°49′S, 124°17′E, 200 m, CSIRO *Courageous,* 10 June 1979; one specimen, AM P35497, Indian Ocean, north-west shelf of Australia, 190 km north-west of Port Hedland, 18°16′S, 118°12′E, 298-320 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/36-37, 10 April 1982; two specimens, one male, one female, AM P35495, Indian Ocean, north-west shelf of Australia, 190 km north-west of Port Hedland, 18°16′S, 118°12′E, 298-320 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/38, 11 April 1982; one specimen, immature male, 35 mm, AM P35496, Indian Ocean, north-west shelf of Australia, north-west of Port Hedland, 20°S, 117°40′E, about 40 m, fish trawl, *Soela,* 2-15 November 1983.

Description. Carapace subcircular, width almost

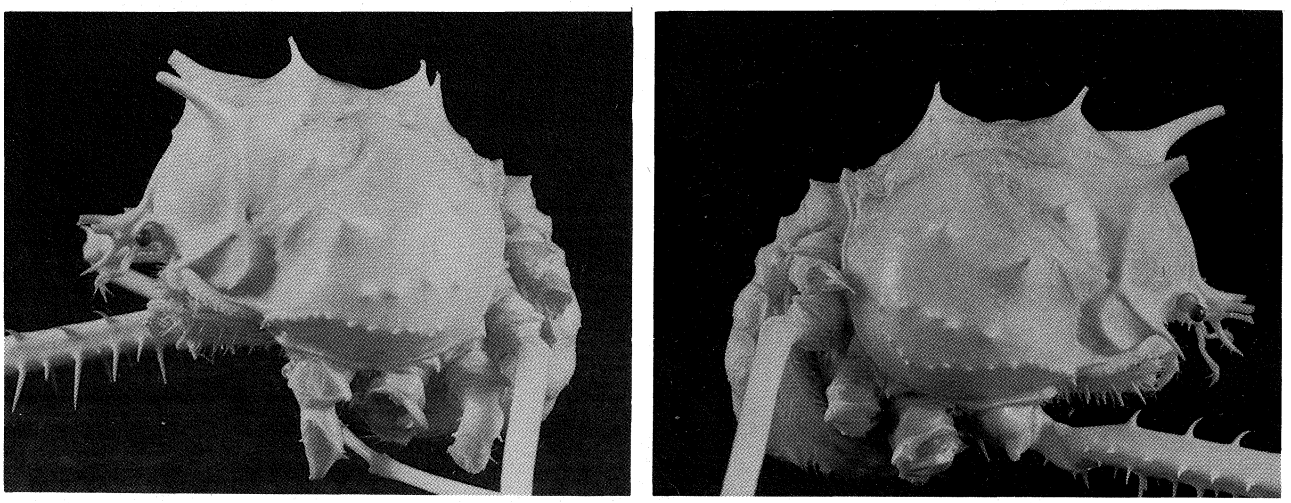

Fig. 2. *Cyrtomaia suhmi* Miers, ovigerous female, postrostral cl. 70 mm, Indian Ocean, north-west of Port Hedland, AM P35487, (left) lateral view of carapace, left side; (right) lateral view of carapace, right side.

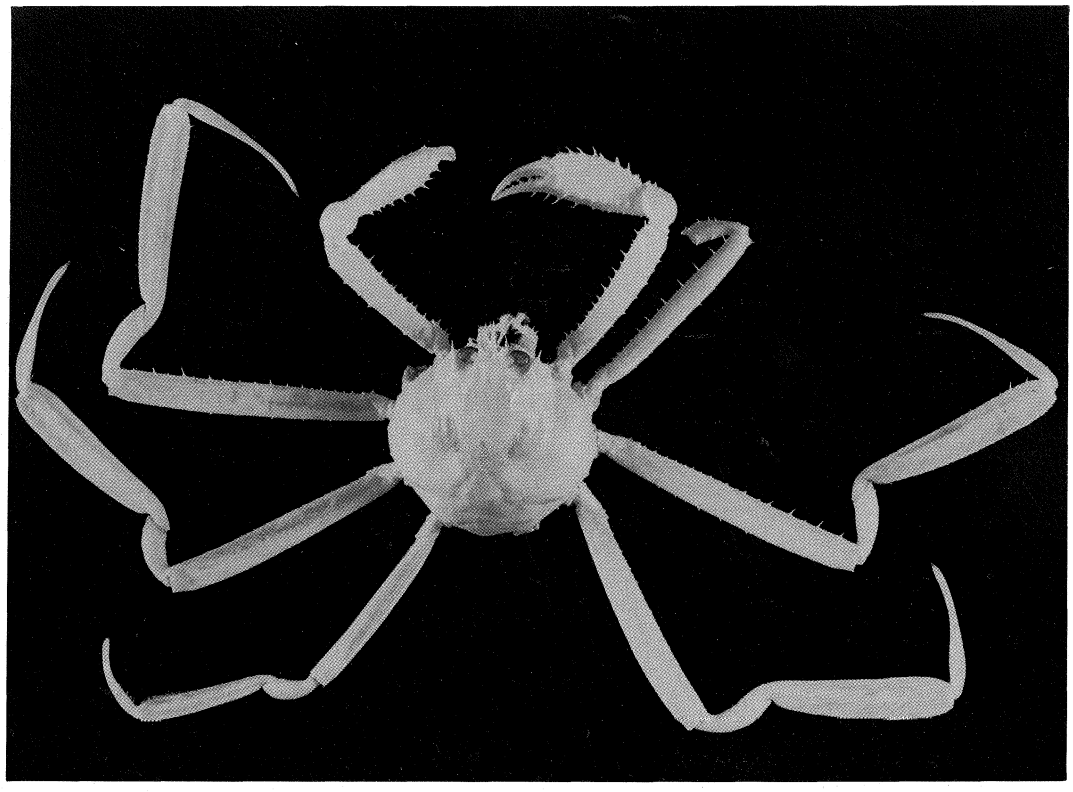

Fig. 3. *Platymaia mindirra,* holotype, male, postrostral cl. 78.7 mm, Indian Ocean, north-west of Port Hedland, AM P35493, dorsal view of whole animal.

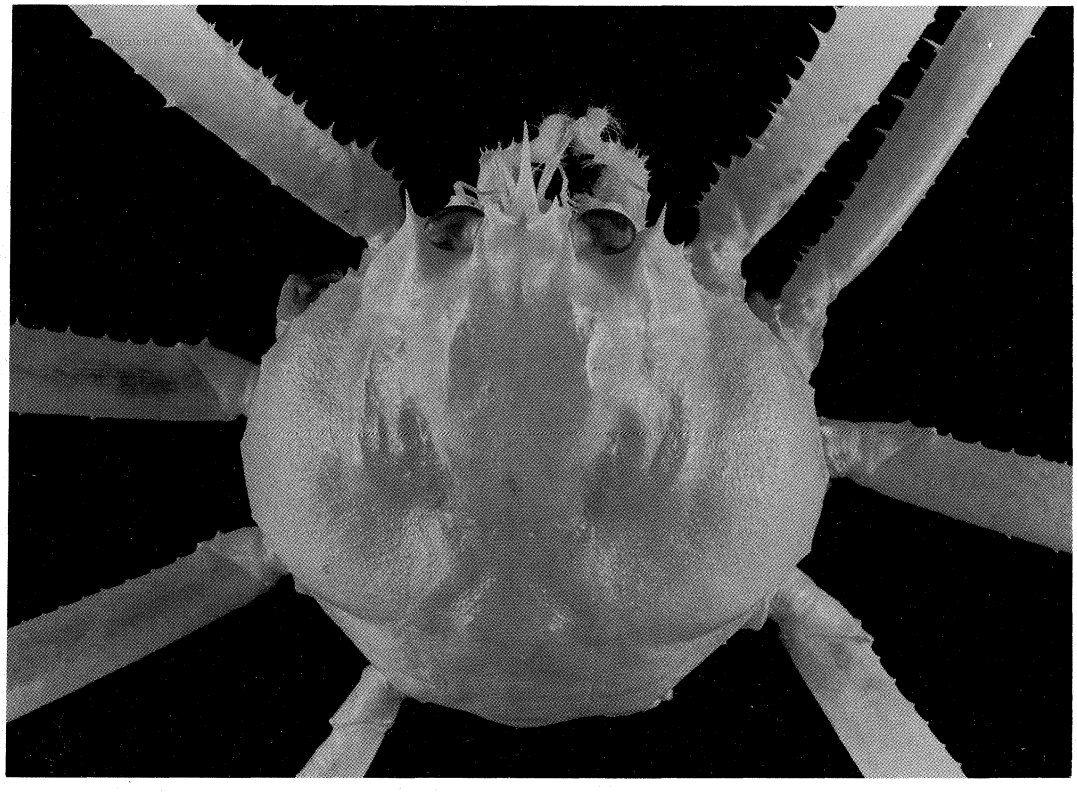

Fig. 4. *Platymaia mindirra,* holotype, male, postrostral cl. 78.7 mm, Indian Ocean, north-west of Port Hedland, AM P35493, dorsal view of carapace.

equal (0.94–1.0) to postrostral carapace length; carapace surface with fine granules, lacking prominent dorsal tubercles or spines.

Rostral spines slender, directed upward and forward, subparallel or weakly divergent, length about one tenth (0.09–0.11) postrostral carapace length. Interantennular spine curved upward distally, length more than one and a half times rostral spines. Orbital eave narrow, sometimes with low tubercles; posterior margin of orbit smooth or with a low tubercle; postorbital spine slender, sharp, length about one third rostral spine.

Hepatic margin with a single spine, immediately ventral to postorbital spine and slightly longer. Branchial margin with 3 small tubercles close together anteriorly and 3 others well spaced along posterolateral margin.

Gastric regions strongly elevated, protogastric ridges weak and smooth; a pair of small, sharp, anterior protogastric tubercles, otherwise only very small mesogastric, metagastric and posterior protogastric tubercles, sometimes indistinct. Cardiac region slightly more elevated than branchial region, with a pair of broad, blunt, submedial tubercles. Intestinal region with a low central tubercle. Branchial regions smooth dorsally, only weakly elevated at anteromedial angle.

Basal antennal article slender, cylindrical, smooth except for 2 small tubercles in distal half; distal margin not quite reaching ventral lobe of front.

Epistome short; green gland adjacent to basal antennal article and anterolateral angle of mouthfield. Eyestalk short, cornea large, elongate, reaching postorbital spine; a small dorsal, subterminal tubercle. Pterygostomian region flat, smooth, margin with a short spine and 2–5 tubercles.

Third maxilliped merus narrower than ischium. Lateral margin of ischium with 3 small spines in distal half, a spinous ridge parallel and near to lateral margin; a row of spines near and parallel to mesial margin. Merus with anterolateral angle weakly produced and bearing about 5 spines; a central row of 2–4 spines and 4–5 spines on the mesial margin. Exopod with a central, longitudinal row of spines. Palp inserted terminally.

First sternite of male sternum smooth with an anterior medial and a central spine; a pair of submedial spines behind central spine and a pair more widely spaced anterior to abdominal fossa, and another pair lateral to these last. Second sternite with 1 sharp tubercle and sternites 3 and 4 with 3 sharp tubercles on mesial half; sternites 2–4 each with 2 sharp tubercles on lateral margin.

Male abdomen of 7 free segments. Proximal width of third segment about one and a half times distal width, lateral margin convex proximally, nearly straight distally. Sixth segment as wide as long, width a little more than half (0.56) distal width of third segment. First segment with a row of 3 tubercles, segments 3 and 4 with a lateral tubercle near distal margin. Width of seventh segment about one and a third (1.3) times length.

First pleopod of male straight, curving outwards at the apex, aperture medial, just behind apex.

Female abdomen of 7 free segments; first segment with 3 tubercles, second with a ridge bearing 6 six small tubercles; segments 3–6 with a pair of distal, submedial tubercles or spines, seventh segment with a central pair of submedial spines; some spines laterally on segments 3–7. Female gonopore opening mesially.

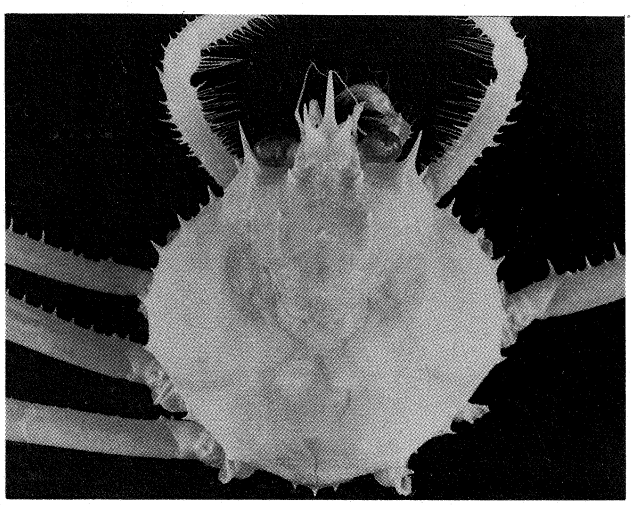

Fig. 5. *Platymaia mindirra,* paratype, immature male, cl. 35 mm, Western Australia, AM P35496, dorsal view of carapace.

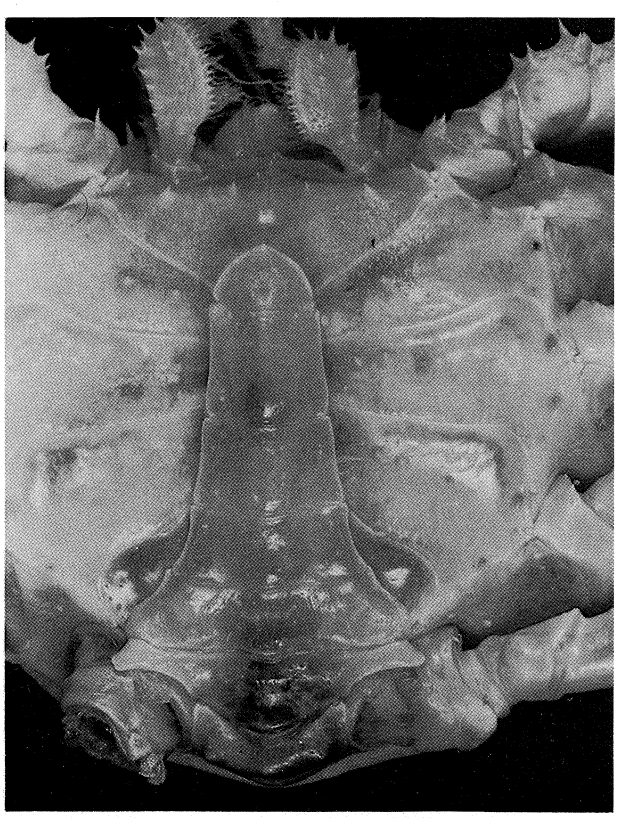

Fig. 6. *Platymaia mindirra,* holotype, male, postrostral cl. 78.7 mm, Indian Ocean, north-west of Port Hedland, AM P35493, male abdomen.

Cheliped of male about one and three quarters times (1.8) postrostral carapace length. First ambulatory leg length more than three and a half times (3.7–4.7) postrostral carapace length, relatively longer in larger specimens. Fourth ambulatory leg 3 times postrostral carapace length. Cheliped merus of male with 7 short, well spaced spines on dorsal margin; inner and outer ventral margins with double rows of longer, more closely spaced spines and a longitudinal row of 9 short spines midway along inner face. Carpus with a few small spines. Cheliped palm with a row of long spines on dorsal margin, a double row of spines on ventral margin, a longitudinal row of short spines midway along inner face and a longitudinal row of very small spines midway along outer face. Fingers more than two thirds (0.7) length of palm; dactyl with 1 or 2 proximal, dorsal spines. A moderate gape between fingers in proximal three quarters with 3–4 large teeth on each finger in the gape and a few small teeth distally.

First ambulatory leg with spines on both margins of merus, carpus, propod and dactyl. Second ambulatory leg with spines on both margins of merus and propod and posterior margin of dactyl; third ambulatory leg with spines only on anterior margin of merus and fourth leg without marginal spines. All ambulatory legs smooth dorsally. Propodi of ambulatory legs 2–4 markedly compressed and broadened, length 4–5 times width; dactyl also compressed, distal half much narrower than proximal half, terminally sharp.

Remarks. This new species is similar to other species of *Platymaia* which have a broad carapace without dorsal spines, i.e. *P. bartschi* Rathbun, *P. maoria* Dell and *P. wyvillethomsoni* Miers from the western Pacific and *P. alcocki* Rathbun from the Indian Ocean. It is distinguished from all these species by the very broad propod of the second to fourth pairs of ambulatory legs. The width of the propod of the second ambulatory leg in *P. mindirra* is a quarter to a fifth the length while in *P. alcocki* the width is less than one seventh the length. In the other three species mentioned above, the width is less than one eighth the length.

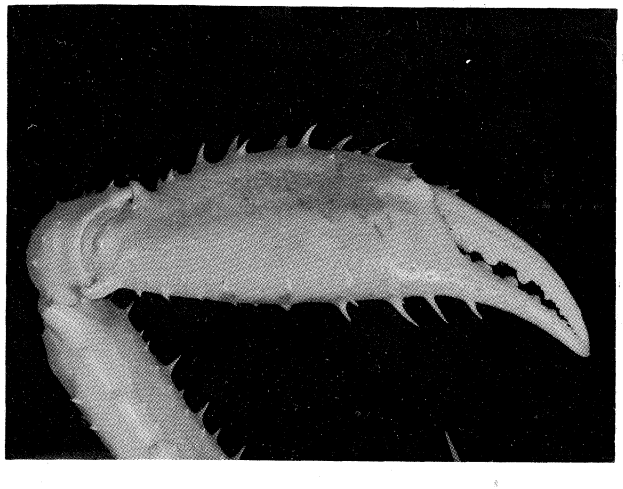

Fig. 7. *Platymaia mindirra,* holotype, male, postrostral cl. 78.7 mm, Indian Ocean, north-west of Port Hedland, AM P35493, male right chela, outer view.

As well, this series of specimens seems to indicate that this species is larger at maturity than other known species of *Platymaia.* The postrostral carapace length of *P. mindirra* is nearly one and a half times that of adult *P. bartschi.*

The smooth protogastric ridges distinguish this species from *P. wyvillethomsoni* and *P. alcocki* in which the ridges are tuberculate. This species is distinguished from *P. maoria* by the presence of three tubercles on the first segment of the male abdomen, rather than one, and by the absence of the transverse row of three spines present on the gastric region of *P. maoria.*

This species is similar to *P. bartschi* in smoothness of carapace, the length of the rostral, interantennular and postorbital spines and shape of the first pleopod of the male. It can be distinguished from *P. bartschi* by several features apart from the broader ambulatory legs and larger size. In *P. mindirra* the mesogastric tubercles are hardly raised above the surface and are often indistinct while in *P. bartschi* these tubercles, though small, are quite distinct. The carapace surface in *P. mindirra* is covered with fine granules and the first segment of the male abdomen is smooth but in *P. bartschi* both the carapace and first segment of the male abdomen are covered with coarse granules. The dactyls of ambulatory legs two to four in *P. mindirra* are broad at the base, then uniformly narrow distally, but in *P. bartschi* after the dactyl narrows it widens slightly before the apex.

The young male (35 mm) in our series has small carapace spines on the gastric regions and branchial margins which are not present in the adults. We have compared this specimen with an immature specimen of *P. alcocki* of similar size (AM G1476, 30 mm) and they differ in several features. On the posterior hepatic region and the anteromedial branchial region there is a tubercle in young *P. mindirra,* whereas in young *P. alcocki* there are well developed spines in these positions. As well, in young *P. mindirra* the carapace surface is finely granular (coarsely granular in *P. alcocki);* the interantennular spine is one and a half times the rostral spines (subequal in *P. alcocki)* and the length of the propod of the fourth ambulatory leg is five and a half times the width (seven and a half times in *P. alcocki).*

Adult and subadult specimens of *P. turbynei* Stebbing are similar in size to this young specimen of *P. mindirra* but they have a much narrower propod (i.e. length about 20 times width); the anterior protogastric spines are much closer to the midline than are the posterior protogastrics; and the carapace surface is smooth between the spines whereas in *P. mindirra* it is finely granular.

Etymology. The species takes its name from the aboriginal name for crab (*mindirra*) used by the Payungu language group of the north-west coast of Australia. Mr Nicholas Reid of the Australian Institute

of Aboriginal Studies kindly provided information about the Payungu language.

Distribution. Indian Ocean, off Western Australia from 11°49′S, 124°17′E to 20°S, 117°40′E.

Platymaia turbynei Stebbing

Platymaia turbynei Stebbing, 1902: 3-5, pl. 5.—Barnard, 1950: 31-32, 816 (in part), figs 6a-c; Griffin, 1974: 27; Crosnier, 1976: 241-242; Kensley, 1977b: 183, fig. 16.

Material examined. Four specimens, one male, 40 mm, one ovigerous female, 40.5 mm, two juveniles, 5 mm, 6.5 mm, ZMC, Danish *Galathea* Deep Sea Expedition, stn 202, off Natal, 25°20′S, 35°17′E, 630 m, grab, sand, 21 February 1951; fourteen specimens, one male, 39.4 mm, one ovigerous female, 39.3 mm, seven males, 9.2-14.5 mm, five females, 9.3-14.0 mm, Danish *Galathea* Deep Sea Expedition, stn 203, off Natal, 25°36′S, 35°21′E, 730 m, otter trawl, 21 February 1951.

Remarks. In this species there are 13 prominent dorsal carapace spines (4 protogastric, 2 mesogastric, 2 cardiac, 4 branchial, 1 intestinal) and the carapace surface is smooth between them; the short postorbital spine is only about a quarter the length of the rostral spines; the carapace width is slightly less (0.87-0.97 in this series) than the postrostral carapace length; the propodi and meri of ambulatory legs two to four are subequal in length and the dactyls are not broadened before the tip.

In a male (40 mm) in this series the cheliped palm is about one and a half (1.4) times as long as high, and the fingers are shorter (0.85) than the palm.

The two ovigerous females (39.3, 40.5 mm) are slightly smaller than the ovigerous females (44-47 mm) in the collection reported by Kensley (1977b).

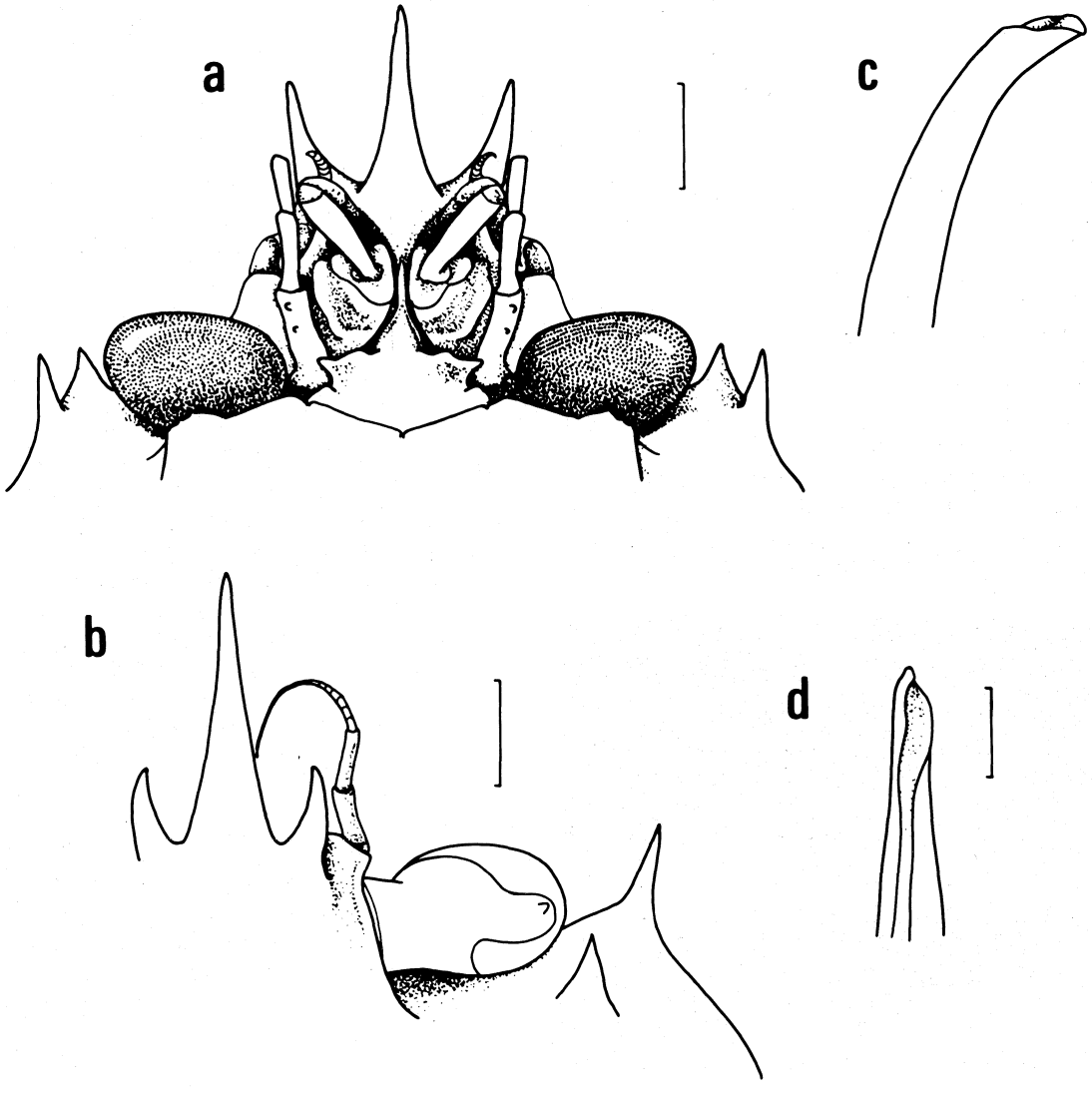

Fig. 8. *Platymaia mindirra,* holotype, male, postrostral cl. 78.7 mm, Indian Ocean, north-west of Port Hedland, AM P34593: **a,** ventral view of orbits; **b,** dorsal view of right orbit; **c,** abdominal view of first left pleopod; **d,** sternal tip of first left pleopod. Lines of scale a and b represent 5 mm, d represents 1 mm.

As noted by Crosnier (1976: 242) the specimen (male, cl. 45 mm) reported by Barnard (1950: 816) is not *P. turbynei* but an immature specimen of *P. alcocki* Rathbun.

Distribution. East coast of South Africa from Natal to southern Mozambique Channel, Madagascar, La Réunion.

Pleistacantha Miers

Type species. *Pleistacantha sanctijohannis* Miers, 1879, by monotypy.

Remarks. Considerable controversy has surrounded several species of this genus. The present study attempts again to clarify the status of *P. moseleyi.*

Distribution. Indo-West Pacific.

Pleistacantha moseleyi (Miers)

Figs 9a, 10a

Echinoplax moseleyi Miers, 1886: 32–33, pl. 4 fig. 2.
Echinoplax pungens Wood-Mason **in** Wood-Mason & Alcock, 1891: 259.—Alcock, 1895: 179; Alcock & Anderson, 1896: pl. 17 fig. 1, pl. 39 fig. 1.
Pleistacantha moseleyi.—Doflein, 1904: 76–78, pl. 24 figs 5, 6, pl. 25, pl. 26; Stebbing, 1923: 2; Barnard, 1950: 34–35, fig. 6e; Grindley, 1961: 127–128, fig. 1; Sakai, 1965: 70 (in discussion), fig. 10c; Berry & Hartnoll, 1970: 213–215, pl.1; Griffin, 1974: 27–28; 1976: 208; Guinot & Richer de Forges, 1982a: 1102–1105, fig. 6C, D, pl. 3 fig. 3; Griffin & Tranter, 1986: 49, 51, 52 (in discussion).
?Pleistacantha pungens.—Guinot & Richer de Forges, 1982a: 1110–1112, figs 6A, B, 8A-A2, pl. 3 figs 2, 2a.

Material examined. One specimen, female, 87 mm, ZMC, Danish *Galathea* Deep Sea Expedition, stn 436, Philippine Islands, east of Cebu, 10°12′N, 124°14′E, 710 m, trawl & dredge, green mud, 9 August 1951; one specimen, male, 69 mm, AM G1475, (exchange from Indian Museum, Calcutta, 1897), Andaman Sea, 234–450 m; two specimens, one male, postrostral cl. 60 mm, one female, 76.5 mm, AM P35498, Indian Ocean, north-west shelf of Australia, 18°33′S, 117°31′E, 400 m, *Soela,* 25 April 1983; one specimen,female, 61.8 mm, AM P35499, Western Australia, 20°S, 117°40′E, about 40 m, fish trawl, *Soela,* 2–15 November 1983.

Remarks. This species has been discussed recently by Guinot & Richer de Forges (1982a) and Griffin & Tranter (1986). There is disagreement as to how many species there are. We still see no reason to remove *P. pungens* from synonymy with *P. moseleyi* as Guinot & Richer de Forges suggest.

Guinot & Richer de Forges have raised several questions in discussion which may be summarised as follows:

1. Is the type of *P. moseleyi* a juvenile of *P. pungens* from the Andaman Sea?
2. Are the small specimens from east Africa reported by Doflein as *P. moseleyi* (a) juveniles of the large specimens from South Africa reported as *P. moseleyi* by Stebbing (1923), Barnard (1950), Grindley (1961) and Berry & Hartnoll (1970); (b) juveniles of the large specimens from Nicobar Islands and off Sumatra discussed by Doflein; (c) conspecific with the type of *P. moseleyi* from the Philippines but not growing to a large adult of more than 80 mm carapace length?
3. Are the large males from Malagasy (Guinot & Richer de Forges, 1982a) conspecific with the large specimens discussed by the South African authors?
4. Are either or both 2 and 3 (above) conspecific with the large specimens from the Andaman Sea and eastern Indian Ocean reported by Wood-Mason & Doflein, and those from the Philippines reported by Griffin (1976)?

Doflein (1904) considered *P. pungens* (Wood-Mason,

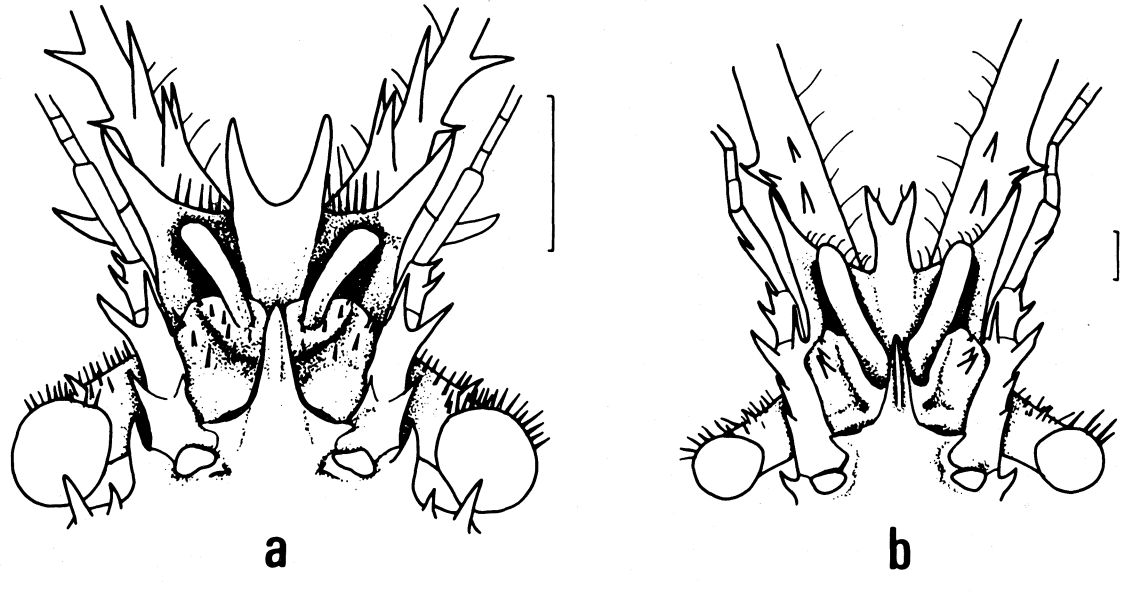

Fig. 9. Posteroventral view of interantennular spine of: **a,** *Pleistacantha moseleyi* (Miers), male, cl. 69 mm, Andaman Sea, AM G1475; **b,** *Pleistacantha oryx* Ortmann, male, cl. 40.5 mm, Sagami Sea, Japan, AM P34571. Lines of scale represent 1 mm.

1891) from the Andaman Sea to be a synonym of *P. moseleyi* (Miers, 1886) from the Philippines. The holotype of *P. moseleyi* is an immature female (15 mm) while the type material of *P. pungens* includes large adult specimens (to 88 mm). At the same time Doflein identified both the juvenile specimens from off Dar-es-Salaam and sub-adult and adult specimens from the eastern Indian Ocean, collected by the *Valdivia,* as *P. moseleyi.*

Guinot & Richer de Forges have questioned Doflein's decisions. They have examined the holotype of *P. moseleyi* but not any specimens from the Andaman Sea identified as *P. pungens.* They have identified as *?P. pungens* three large males recently collected off Malagasy.

The discovery of small but adult specimens with the large eyes and the distally smooth rostral spines of the holotype of *P. moseleyi* would justify the separation of *P. moseleyi* and *P. pungens* again. On the other hand, the series of specimens from the Philippines reported by Griffin (1976) which ranged in size from 20 mm to 97 mm supports the idea that the holotype of *P. moseleyi* is a juvenile of a large species and that the differences noted between the two by Wood-Mason and by Guinot & Richer de Forges are related to the great difference in size between the juvenile and adult in this species. For if the type of *P. moseleyi* (15 mm) is an immature female of a species which has a carapace length of 80–90 mm when adult then it could be expected to differ in a number of respects. Several of the differences noted by Wood-Mason between *P. moseleyi* and *P. pungens* - larger size, smaller eyes, more pyriform carapace, thicker legs and broader abdomen of the female - would be accounted for by *P. moseleyi* being a juvenile and not an adult female as Miers had stated. (In other species of majids, eg. *Paranaxia serpulifera,* juvenile specimens of only 15–30 mm are collected, while the adult reaches a carapace length of more than 120 mm.)

There is confusion about the degree to which the interantennular spine is divided in the various specimens which have been reported. It seems important to us to consider the degree to which the interantennular spine tapers along its length as well as the proportion which is bifid. Our series of specimens includes a large adult female (cl. 87 mm) from the same general area as the type locality of *P. moseleyi* (Philippine Islands) and a male (69 mm) from the Andaman Sea (AM G1475, exchange from the Indian Museum), the type locality of *P. pungens.* This specimen from the Andaman Sea has the interantennular spine divided for at least the distal half (Fig. 9a), though this seems to disagree with the remark made by Sakai (1976: 174) that in another specimen he examined from the Andaman Sea the interantennular spine was bifid only at the tip. In all the specimens of this series the interantennular spine has the same form and this seems, from Guinot & Richer de Forges' figure, to be similar to *?P. pungens* from Malagasy. We have also figured the interantennular spine of *P. oryx* for comparison (Fig. 9b).

Guinot & Richer de Forges remark that their specimens of *?P. pungens* have more accessory spines on the rostral spines than does the typical *P. pungens* of Wood-Mason. In our series of specimens some of the rostral spines are broken, but on those which are complete there are three to six lateral spines and three ventral spines on the rostral spines beyond the fused base. On two of the specimens there is one dorsal accessory spine. The specimen figured by Guinot & Richer de Forges appears to have five to six lateral spines, three ventral and one to two dorsal spines.

Neither of our male specimens (69 mm and postrostral cl. 60 mm) has enlarged chelae and both have the rostral spines straight and divergent from the base, not tending to be subparallel distally as in adult males.

The first pleopod of the males in our series is not so strongly curved outwards at the tip as in the specimens figured by Guinot & Richer de Forges, and the subterminal 'spine' is at right angles to the surface of the pleopod (Fig. 10a). The specimen of *?P. pungens* figured by Guinot & Richer de Forges has only a small spinule among the stiff setae on the eyestalk. In the specimens in our series there is an antero-ventral spine, which is sometimes short, and in two specimens there is a short, slender terminal spine above the cornea. These differences between the specimens described as *?P. pungens* and our series of *P. moseleyi* seem slight. It is possible, however, that the examination of further specimens will show that they, and perhaps the other large specimens from South Africa, are a new species distinct from *P. moseleyi.* If this were so then it is possible that the small specimens from east Africa, described by Doflein, could be the juveniles of this

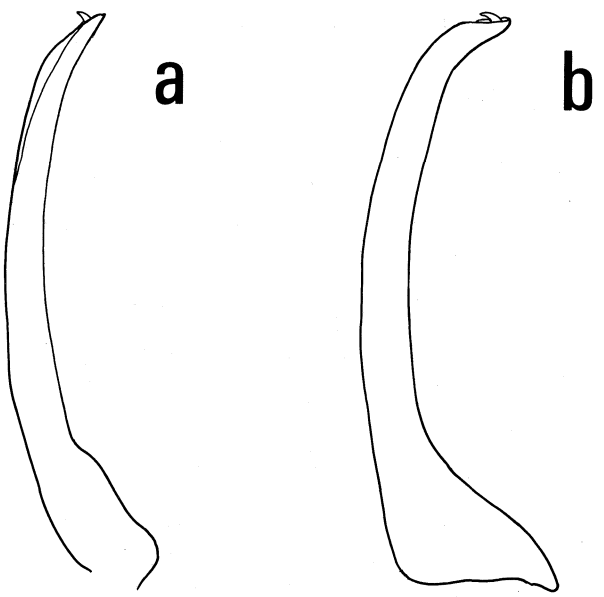

Fig. 10. Left first pleopod of male of: **a,** *Pleistacantha moseleyi* (Miers), cl. 69 mm, Andaman Sea, AM G1475; **b,** *?P. pungens,* cl. 83 mm, Madagascar, MP-B7274 (after Guinot & Richer de Forges, 1982a: fig. 8A).

species. These juveniles are at present regarded as being conspecific with the type of *P. moseleyi*. However, there is no evidence to suggest that these juveniles, with the type, represent a distinct species of which the adult remains unknown.

The arguments advanced by Guinot & Richer de Forges are not supported by the available evidence and we maintain our opinion that all the specimens from the Pacific, and the east and west Indian Oceans as well, are the single species *P. moseleyi*: we reflect this in the synonymy.

The record of this species from off northern Western Australia extends its known range considerably further south in the eastern Indian Ocean.

Distribution. Widespread Indo-West Pacific: South Africa, east Africa, Malagasy, Andaman Sea, Great Nicobars, Nias, north Western Australia, Philippine Islands.

Subfamily PISINAE

Rochinia A. Milne Edwards

Type species. *Rochinia gracilipes* A. Milne Edwards, 1875, by monotypy.

Remarks. Three new species are described here. This genus now contains 32 Indo-West Pacific species, a third of these (11) having been described since 1973. Many of these are from deep water and it seems probable that many species still await discovery. Often only a few specimens are collected, as with the new species described here, and there is a reluctance to base a new species on such a small amount of material. This tendency can lead to some confusion, as for example in the case of *Rochinia riversandersoni* (Alcock), and we discuss this in detail under *R. sibogae*.

A key to this genus was published recently (Griffin & Tranter, 1986). This key needs to be adapted to accommodate the three new species described here and also the probable new species which have been previously included in *R. riversandersoni*. These changes are discussed under *R. sibogae* and *R. soela*.

Distribution. Indo-West Pacific, Atlantic and east Pacific.

Rochinia galathea n. sp.

Fig. 11

Type material. HOLOTYPE: male, postrostral cl. 9.2 mm, ZMC, Indian Ocean, off Natal, 25°20′S, 35°17′E, 535–610 m, sand, sledge trawl, otter trawl, Danish *Galathea* Deep-Sea Expedition, stn 202, 21 February 1951.

Description. Carapace broadly pyriform, width more than two thirds (0.7) postrostral carapace length; surface with a thick tomentum and several slender spines.

Rostral spines slender, straight, weakly divergent, fused basally; length greater than one third postrostral carapace length (tip broken on one remaining rostral spine).

Orbital eave moderately expanded; a slender, sharp, preorbital spine directed forwards and slightly upwards; postorbital lobe separated from eave by a broad U-shaped hiatus; postorbital lobe short, laterally flattened, elongate in lateral view, separate from large hepatic lobe. Eyestalks short, slender; cornea terminal.

Hepatic margin not elevated; a large laterally flattened hepatic lobe, directed dorsally with apex curving over dorsal surface, height twice width, apically sharp. Lateral faces of postorbital and hepatic lobes flattened and polished.

Branchial submargin with 2 tubercles, the posterior one smaller; a prominent epibranchial spine, directed laterally and slightly upwards, in length about two fifths (0.39) carapace width.

Gastric regions weakly elevated; a slender, sharp metagastric spine; a small, low, protogastric tubercle anterolateral to spine. Cardiac region with a slender, sharp spine, about two thirds length of epibranchial spine. Branchial region anteriorly and posteriorly with a slender, sharp spine subequal to metagastric and slightly shorter than cardiac spine. Intestinal region with a slender medial spine near posterior carapace margin, as long as branchial spines. The 6 equidistant, subequal, slender spines on gastric, branchial and intestinal regions surround central cardiac spine.

Basal antennal article smooth, slightly depressed centrally; anterolateral angle produced forward into a very short, blunt tubercle; lateral margin very weakly concave; medial margin concave, produced slightly over antennal fossa; a tubercle lateral to green gland.

Pterygostomian region smooth, margin with 2–3 broad tubercles, tending to unite to form a tuberculate ridge. Third maxilliped smooth, anterolateral angle of merus moderately produced and rounded.

Cheliped of male about one and a third (1.3) times postrostral carapace length; merus smooth, trigonal, carinate on dorsal and outer ventral edges, inner ventral edge sharp; dorsal carina having a small, sharp, proximal lobe, with a rounded lobe just in front of it, and a short blunt terminal lobe; outer ventral carina with several small lobes along its length. Carpus smooth with a carinate ridge dorsally and a smaller carina on inner ventral edge. Chela with palm about one and a half (1.6) times long as high, dorsal margin carinate, ventral margin sharp; fingers nearly as long as (0.9) palm, low teeth along cutting edge of both fingers, narrow gape between fingers in proximal half.

Ambulatory legs smooth, slender, meri each with a short, conical terminal spine; dactyl of fourth leg with about 12 small teeth ventrally along its length; first leg about twice postrostral carapace length; fourth leg about half (0.55) length of first leg.

Male sternum smooth. Male abdomen of 7 free segments, smooth; third segment more than one and a half times (1.7) wider than sixth segment; sixth segment one and a half times (1.6) wide as long; seventh segment wide as long, broadly convex on terminal margin.

First pleopod of male straight, broad, apex truncate, medially rounded, laterally subacute; aperture appears to be terminal.

Remarks. This species has in common with *Rochinia riversandersoni* (Alcock) a cardiac spine surrounded by six other spines and a pair of long epibranchial spines. It is distinguished from *R. riversandersoni* by the very broad hepatic lobe, half as wide as high and tapering only near the tip. This petaloid hepatic lobe curves medially over the dorsal surface of the carapace. Doflein (1904) figured specimens of *R. riversandersoni* from off Somalia which have a distally slender hepatic spine directed dorsolaterally.

Rochinia galathea is distinguished from *R. natalensis* Kensley by the broad hepatic lobe and by the presence of only one spine (mesogastric) on the gastric region, while in *R. natalensis* there are four spines (two mesogastric and a pair of protogastric spines).

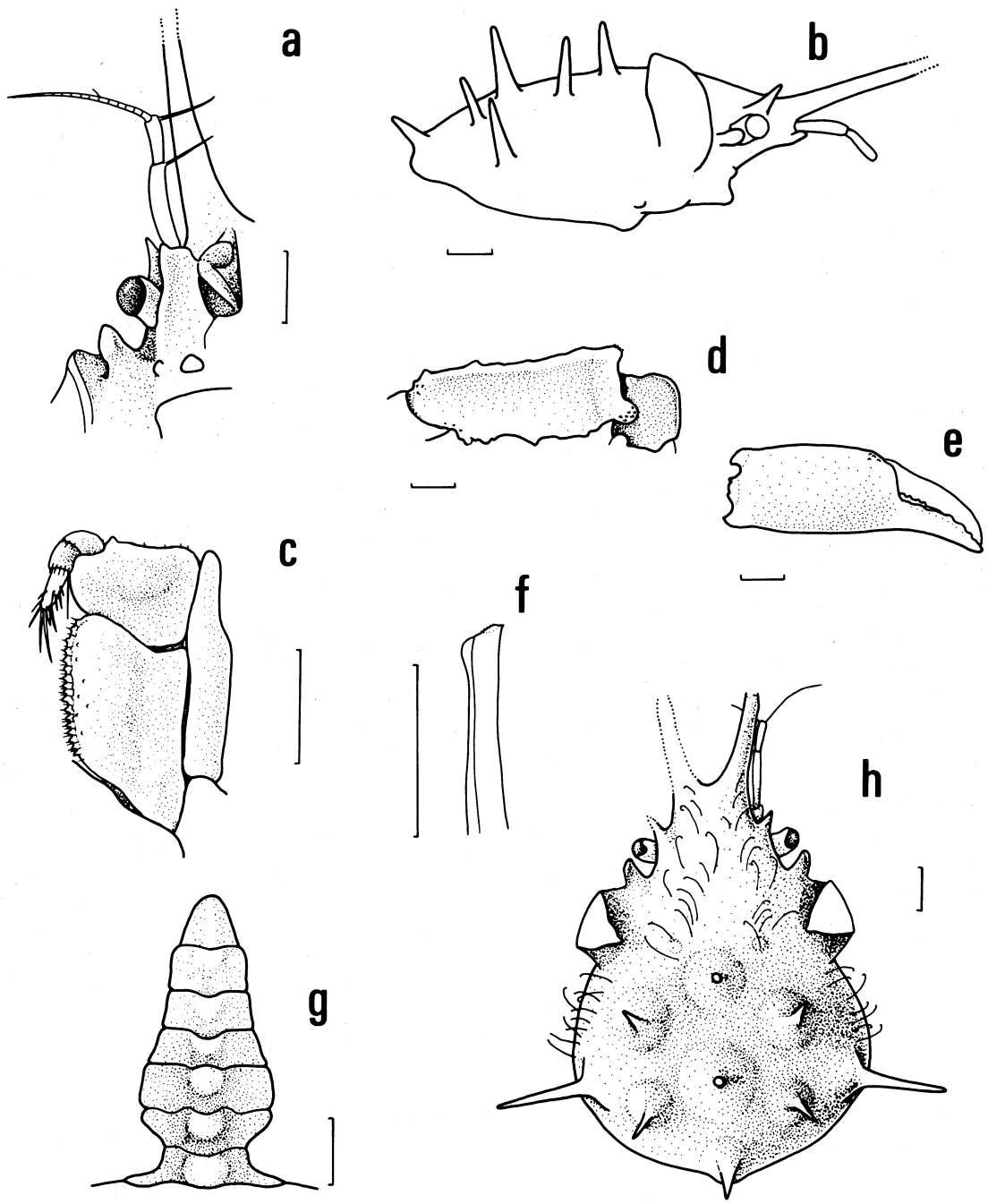

Fig. 11. *Rochinia galathea,* holotype, male, postrostral cl. 9.2 mm, off Natal, ZMC: **a,** right orbit, ventral view; **b,** carapace, lateral view; **c,** left third maxilliped; **d,** right cheliped, merus and carpus; **e,** right chela; **f,** left first pleopod, abdominal view; **g,** abdomen; **h,** carapace, dorsal view. Lines of scale represent 1 mm.

Etymology. The species is named for the Danish research vessel *Galathea.*

Distribution. Known only from the type locality, off Natal.

Rochinia luzonica (Rathbun)

Sphenocarcinus luzonicus Rathbun, 1916:539–540.—Griffin, 1976: 211–213, fig. 11a.
Rochinia luzonica.—Griffin & Tranter, 1986: 180, fig. 63c, d.

Material examined. One specimen, male, 39.3 mm, ZMC, Philippine Islands, off Mindoro, 13°07′N, 120°52′E, ca. 525 m, from the cable, stones and mud, 10 May 1930.

Remarks. In this adult male the rostral spines are strongly divergent in the distal half and also curved upward slightly; their length is 0.8 postrostral carapace length. The cardiac plate is transversely elongate (width = 1.5 x length) rather than subcircular as in specimens previously examined. In *R. stimpsoni* the width of the cardiac plate is more than twice the length.

Distribution. Indonesia, Philippine Islands.

Rochinia mosaica (Whitelegge)

Pugettia mosaica Whitelegge, 1900: 141–142, pl. 35 figs 5, 6, 7.—Griffin, 1972: 70–71.
Doclea profunda Rathbun, 1918: 16–17, pl. 7 figs 1, 2.—Hale, 1927: 134, fig. 134.
Rochinia mosaica.—Griffin & Tranter 1986: 185, figs 58, 62e, f.

Material examined. Three specimens, females, 7 mm, 9.1 mm, 8.5 mm, AM P35503, Tasman Sea, east of Sydney, 34°11.1′S, 151°26′E, 198–191 m, R. Springthorpe on *Tangaroa,* stn U207, 5 October 1982; one specimen, male, 7.6 mm, AM P35502, Tasman Sea, east of Sydney, 34°13.8′S, 151°29.1′E, 498–466 m, R. Springthorpe on *Tangaroa,* stn U208, 5 October 1982.

Remarks. These specimens agree with those previously reported.

Distribution. South-east and southern Australia from Cape Moreton (Queensland) to the Great Australian Bight (South Australia).

Rochinia pulchra (Miers)

Anamathia pulchra Miers, 1886: 26–27, pl. 4 figs 1, 1a–c.
Scyramathia pulchra.—Alcock, 1895: 202–203.—Doflein, 1904: 84, pl. 27 fig. 12.
Rochinia pulchra.—Sakai, 1938: 278–279, fig. 35, pl. 37 fig. 4; 1976: 223–224, pl. 79 fig. 1; Griffin & Tranter, 1986: 185–187.

Material examined. One specimen, ovigerous female, 43.6 mm, AM P35501, Indian Ocean, north-west shelf of Australia, 240 km north-west of Port Hedland, 18°06′S, 117°45′E, 500 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/31, 7 April 1982.

Remarks. This specimen agrees with others previously reported. The cardiac, epibranchial and dorsal branchial spines are curved slightly forwards. There is a pair of short, submedial spines just behind the anterior mesogastric spine.

This species has not been recorded from Australia before.

Distribution. Indo-West Pacific from east Africa to Philippines and Japan.

Rochinia sibogae n. sp.

Fig. 12

Type material. HOLOTYPE: female, ovigerous, postrostral cl. 11.0 mm, ZMA, Ceram Sea, east of Ceram, 3°37.7′S, 131°26.4′E, 924 m, fine grey mud, deep-sea trawl, 26 August 1899, *Siboga,* stn 170. PARATYPE: female, immature, postrostral cl. 8.5 mm (damaged), ZMA, as for holotype.

Description. Carapace broadly pyriform, width more than two thirds (0.73) postrostral carapace length; surface smooth with spines and a few low tubercles.

Rostral spines slender, straight, strongly divergent; length greater than half postrostral carapace length (tips broken); fused basally.

Orbital eave moderately expanded; a blunt, laterally flattened preorbital lobe, directed forwards and slightly upwards; postorbital lobe separated from eave by a broad U-shaped hiatus; postorbital lobe short, laterally flattened, continuous posteriorly with hepatic lobe. Eyestalks short, slender; cornea terminal.

Hepatic margin not elevated, a large laterally flattened hepatic lobe, directed dorsally, more than twice as high as wide, apically rounded and anteriorly continuous with postorbital lobe. Lateral faces of preorbital, postorbital and hepatic lobes flattened and polished.

Branchial submargin with a low tubercle; a long slender epibranchial spine directed upwards as well as laterally, nearly as long as carapace is wide.

Gastric regions elevated, a blunt metagastric tubercle; a smaller, low, protogastric tubercle anterolateral to metagastric. Cardiac region with a blunt spine, less than a third length of epibranchial spine. Branchial region with a small, blunt anterior tubercle and a smaller tubercle posterolateral to cardiac spine. Intestinal region with a strong, blunt, medial spine near posterior carapace margin, about two thirds length of cardiac spine.

Basal antennal article smooth, a shallow central groove along its length; anterolateral angle produced forward into a short, blunt tubercle; lateral margin straight; medial margin concave, produced slightly over antennal fossa; a tubercle lateral to green gland.

Pterygostomian region smooth, margin with 3 tubercles. Third maxilliped smooth, anterolateral angle of merus moderately produced and rounded.

Cheliped of female slightly longer (1.16) than postrostral carapace length; merus smooth, trigonal,

dorsal carina with large proximal lobe, a smaller lobe at proximal third and a prominent terminal spine; carpus smooth with a carinate ridge dorsally; palm about twice as long as high, margins not carinate; fingers a little shorter than palm, low teeth along all of cutting edge of both fingers.

Ambulatory legs smooth, slender, meri with a short broad terminal spine; dactyl of fourth leg with a few very small teeth amongst tomentum ventrally along its length; fourth leg about one and a quarter times postrostral carapace length. (Only chelipeds and the third and fourth ambulatory legs on right hand side still attached to specimen.)

Female sternum smooth, first sternite with a shallow depression centrally. Female abdomen of 7 free segments, smooth, covered with tomentum, a low medial ridge on segments 1–4. Female gonopore a simple subcircular aperture, opening ventrally.

Smaller specimen, an immature female, damaged anteriorly. Preorbital and hepatic lobes apically subacute; epibranchial spines very slender, length about two thirds (0.65) carapace width. Cardiac spine just

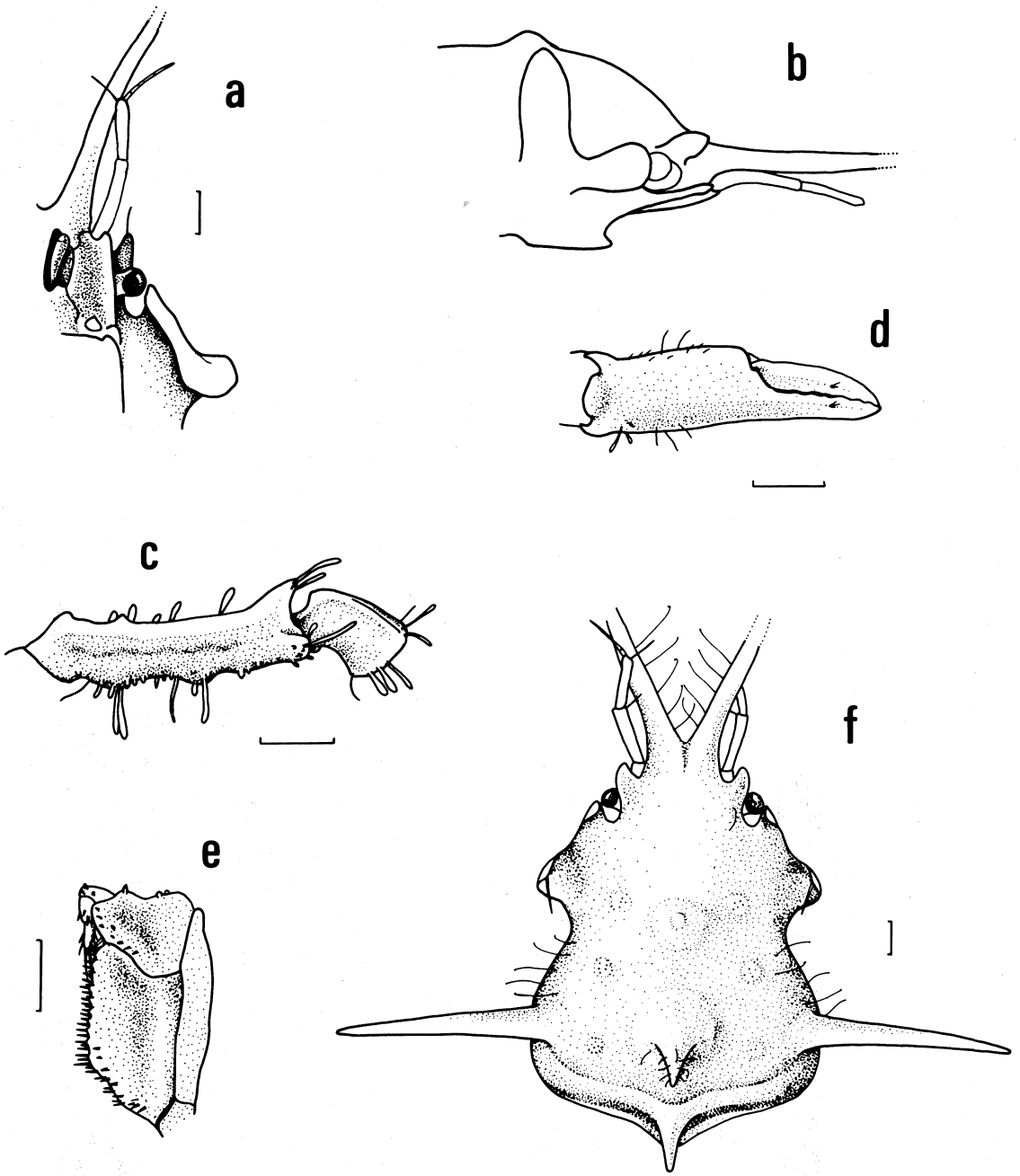

Fig. 12. *Rochinia sibogae,* holotype, ovigerous female, postrostral cl. 11.0 mm, Ceram Sea, ZMA: **a,** left orbit, ventral view; **b,** right anterior carapace, lateral view; **c,** right cheliped merus and carpus; **d,** right chela; **e,** left third maxilliped; **f,** carapace, dorsal view. Lines of scale represent 1 mm.

showing above tomentum and intestinal region with a tubercle concealed in tomentum rather than a spine as in adult.

Remarks. These two specimens were previously identified, with reservations, as *R. riversandersoni* by Griffin & Tranter (1986). At that time it was noted that, in the past, specimens with long epibranchial spines but differing slightly from Alcock's original description, have been recorded as *R. riversandersoni* by several authors. However, when these recorded specimens are compared with one another it becomes clear they are not conspecific. The characters in which they differ are ones which we know, from our examination of almost all the species of this genus, are not highly variable. These include the orbit, the hepatic spine, dorsal branchial spines, gastric, cardiac and intestinal spines.

Specimens of *R. riversandersoni* have been recorded from: south-west India - Malabar coast by Alcock (1895), Alcock & Anderson (1896); Somali coast and Nicobar Islands by Doflein (1904); South China Sea by Serène & Lohavanijaya (1973); Kermadec Islands and New Zealand by Yaldwyn & Dawson (1976); Jolo Sea, Philippines by Griffin (1976); Ceram Sea, Moluccas by Griffin & Tranter (1986). We have not examined all this material and in some cases our conclusions are drawn from the literature.

Alcock (1895) describes the holotype as having 'a salient hepatic spine' which in the figures (Alcock & Anderson, 1896) is shown as directed laterally and upwards. Serène & Lohavanijaya describe the hepatic spine of their specimen as blade-like. From the photograph it is clearly broader than that of the holotype and also broader than the apically narrow hepatic spine of the specimen figured by Yaldwyn & Dawson. In the specimens from the Jolo Sea and the Ceram Sea the hepatic spine is laterally flattened and directed dorsally but in the Ceram Sea specimen it is also continuous anteriorly with the postorbital spine.

Alcock describes the holotype as having 'six sharply conical tubercles evenly and equidistantly arranged in a circle round a central cardiac tubercle.' However, the figures indicate short, conical spines rather than tubercles. In the specimen attributed to this species by Serène & Lohavanijaya the dorsal branchial spines are blade-like, there are protogastric spines similar in size to the metagastric and there is a cardiac tubercle rather than a spine. The specimens described and figured by Yaldwyn & Dawson agree with the holotype in the arrangement and uniformity of the spines but the spines are long and slender. These Kermadec and New Zealand specimens seem quite distinct from the specimen figured by Serène & Lohavanijaya. The specimens reported from the Jolo Sea by Griffin have short dorsal branchial spines but only a tubercle on the metagastric region. The specimens from the Ceram Sea (now described here as *R. sibogae)* have blunt tubercles on the metagastric and dorsal branchial regions, and so are distinct from those with either long, slender or blade-like branchial spines.

Our examination of most of the species of this genus has shown that sometimes, within a species, where there is a conical tubercle on one specimen, on another specimen there may be a short blunt spine; similarly where there is a low tubercle on one specimen, on another specimen there may be nothing. However, it seems improbable that within one species the branchial region of different specimens may sometimes have slender, cylindrical spines, sometimes blade-like spines and at other times low tubercles. We have not found this difference in other species of *Rochinia* and for that reason we consider that among the specimens that have been reported there are probably four separate species distinct from *R. riversandersoni.*

The specimens reported by Doflein appear to agree with those described by Alcock. These all come from the Indian Ocean. On the other hand, in the western Pacific there appears to be four distinct species: one from the South China Sea with a blade-like hepatic spine directed obliquely outwards, a metagastric spine, blade-like dorsal branchial spines, a cardiac tubercle and a tubercle at the base of the intestinal spine; one from the Jolo Sea with a laterally flattened hepatic spine directed dorsally, a metagastric tubercle and short conical spines on the cardiac, intestinal and dorsal branchial regions; one from the Kermadecs and New Zealand with a slender hepatic spine directed obliquely outwards and long, slender, cylindrical spines on the metagastric, cardiac, intestinal and dorsal branchial regions; one from the Ceram Sea (described here as *R. sibogae)* with a laterally flattened hepatic spine directed dorsally and continuous with the postorbital lobe, tubercles on the metagastric and dorsal branchial regions and a spine on the cardiac and intestinal regions.

Another new species described here, *R. galathea* from off Natal, is also in this group of species distinguished by a circle of spines around the cardiac spine and prominent epibranchial spines. It differs from other species in this group by its very broad hepatic spine which is separate from the postorbital lobe and which curves over the dorsal surface of the carapace.

Among the known species of *Rochinia* with strong preorbital spines and prominent epibranchial spines, only *R. sibogae* and *R. soela* have a large hepatic plate fused to the postorbital lobe. *Rochinia soela* is distinguished from *R. sibogae* by the presence of a tubercle rather than a spine on the cardiac region, and the presence of a well developed plate parallel to the posterior carapace margin. Other differences are discussed under *R. soela.*

There are thus seven species and probable species which need to be distinguished. In the key to this genus published previously (Griffin & Tranter, 1986) the specimen of *R. riversandersoni* from the South China Sea and *R. soela* would be separated from the others by the presence of a tubercle rather than a spine on the cardiac region. In the other species where the cardiac region has a spine, the epibranchial region has a long spine and the protogastric region has a single spine or tubercle they would key out at *R. riversandersoni.* They could be then separated as follows:

1. Postorbital and hepatic lobes fused; dorsal branchial region with tubercles. ..... *R. sibogae*
——Postorbital and hepatic lobes separated; dorsal branchial region with spines. 2
2. Hepatic spine very broad (w = ½ht), petaloid, and curving medially over dorsal surface. ..... *R. galathea*
——Hepatic spine broad near the base and tapering, directed dorsally or dorsolaterally. 3
3. Long slender spines on dorsal branchial region. .....
Kermadec species (see Yaldwyn & Dawson, 1976)
——Short conical spines on dorsal branchial region. 4
4. Hepatic spine directed dorsally. ....
..... Jolo Sea species (see Griffin, 1976)
——Hepatic spine directed dorsolaterally.
..... *R. riversandersoni* (Alcock).

Etymology. The species is named for the Dutch research ship *Siboga.*

Distribution. Known only from the type locality, Ceram Sea.

Rochinia soela n. sp.

Fig. 13

Type material. HOLOTYPE: female, adult, postrostral cl. 21.5 mm, AM P35500, Indian Ocean, north-west shelf of Australia, 250 km north-west of Port Hedland, 18°40'S, 116°42'E, 600 m, Engel trawl, J.R. Paxton on *Soela,* stn S02/82/19-20, 4 April 1982.

Description. Carapace pyriform, width about two thirds (0.66) postrostral carapace length; surface smooth with a few large tubercles and spines.

Rostral spines slender, straight, divergent; length greater than one third postrostral carapace length (tips broken), fused basally.

Orbital eave moderately expanded; a broad, laterally flattened, subacute, preorbital lobe directed upwards and slightly forwards; postorbital lobe separated from eave by a narrow U-shaped hiatus; postorbital lobe short, broad, laterally flattened, fused posteriorly with hepatic lobe. Eyestalks short, slender; cornea terminal.

Hepatic margin not elevated, a large laterally flattened hepatic lobe, directed dorsally, more than twice as high as wide, apically sharp (apex broken) and anteriorly continuous with postorbital lobe. Lateral faces of preorbital, postorbital and hepatic lobes flattened and polished.

Branchial submargin with a small tubercle; a large epibranchial spine (broken). A broad polished rim on carapace margin from anterior branchial region to medial intestinal spine.

Gastric regions weakly elevated, surmounted by a broad, low, mesogastric tubercle and a smaller low, posterior protogastric tubercle.

Cardiac region with a large, conical tubercle; branchial region with a large anterior conical tubercle and a narrower tubercle posterolateral to cardiac tubercle.

Intestinal region with a strong medial spine near posterior carapace margin; a broad polished rim on carapace margin.

Basal antennal article smooth, slightly depressed centrally; anterolateral angle produced forward into a very short, blunt tubercle; lateral margin almost straight; medial margin concave, produced slightly over antennal fossa; a tubercle lateral to green gland.

Pterygostomian region smooth, margin with 3–4 broad tubercles, nearly united on right hand side to form a tuberculate ridge.

Third maxilliped smooth, anterolateral angle of merus moderately produced and rounded.

Cheliped of female slightly longer (1.15) than postrostral carapace length; merus smooth, carinate on dorsal and inner ventral edges, outer ventral edge rounded, a prominent terminal spine not separate from carina; carpus smooth with a carinate ridge dorsally; palm about one and a third times as long as high, dorsal margin carinate; fingers as long as palm; low teeth along cutting edge of both fingers.

Ambulatory legs smooth, slender, meri with a short, conical, terminal spine; dactyl of fourth leg with a few very small teeth amongst tomentum, ventrally along its length; first leg about one and a half times postrostral carapace length (dactyl missing); fourth leg more than two thirds length of first leg.

Female sternum smooth, first sternite with a shallow depression centrally. Female abdomen of 7 segments, smooth, a broad medial tubercle on segments 1–4, a lower tubercle on segments 5 and 6; a low lateral tubercle on segments 2–5. Female gonopore a simple subcircular aperture opening ventrally.

Remarks. This species is similar to *Rochinia velutina* (Miers) in having a laterally flattened hepatic spine, a broad cardiac tubercle and robust rostral and epibranchial spines. This species is distinguished from *R. velutina* by: the postorbital lobe which is continuous with the hepatic spine (separate in *R. velutina);* no flat plate on the branchial submargin (present in *R. velutina);* the preorbital lobe is compressed, laterally flattened and directed dorsally (not compressed in *R. velutina,* laterally flattened only in distal half and directed forwards); intestinal region with a spine and a marginal plate which extends to the pterygostomian margin (intestinal region with a tubercle in *R. velutina,* and a marginal plate which reaches only to the epibranchial spine).

A key to this genus has been published recently (Griffin & Tranter, 1985). In this key, at couplet 11(10), the species are divided into (a) those with a plate on the branchial submargin and a cardiac tubercle or low plate and (b) those lacking such a branchial plate but with a cardiac spine or elevated plate. *Rochinia soela* has a blunt cardiac tubercle but no plate on the branchial

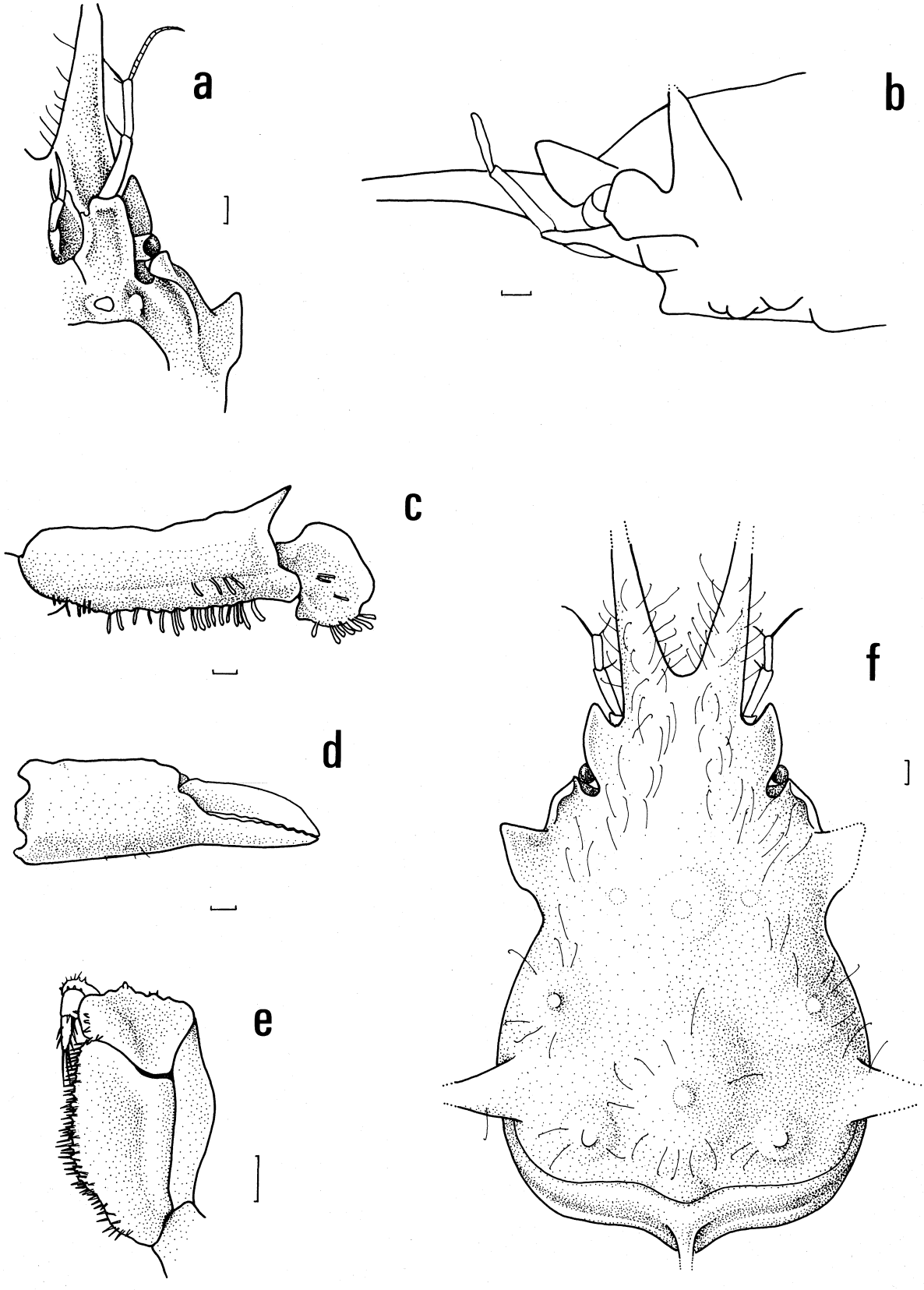

Fig. 13. *Rochinia soela,* holotype, adult female, postrostral cl. 21.5 mm, Indian Ocean, north-west of Port Hedland, AM P35500: **a,** left orbit, ventral view; **b,** left anterior carapace, lateral view; **c,** right cheliped merus and carpus; **d,** right chela; **e,** left third maxilliped; **f,** carapace, dorsal view. Lines of scale represent 1 mm.

submargin. If at couplet 11(10) the species were separated on the form of the cardiac region alone, then *R. soela* would key out with *R. velutina* and these two species would be separated by the presence/absence of the plate on the branchial submargin.

Rochinia soela has in common with *R. sibogae,* described here, a postorbital lobe continuous with the hepatic spine, a mesogastric tubercle, one pair of protogastric tubercles, two pairs of dorsal branchial tubercles, a large epibranchial spine and an intestinal spine. However, *R. soela* is distinguished from *R. sibogae* by the following features: rostral spines robust and broad (slender and cylindrical in *R. sibogae*); the preorbital lobe directed upward and apically sharp (directed forward and upward and apically blunt in *R. sibogae*); cardiac region with a tubercle (a spine in *R. sibogae*); dorsal branchial tubercles prominent (small in *R. sibogae*); intestinal region with a well developed marginal plate (only a low ridge parallel to posterior margin in *R. sibogae*); the cheliped palm is dorsally carinate (not dorsally carinate in *R. sibogae*).

Etymology. This species is named for the *Soela,* the research vessel chartered by CSIRO for research purposes.

Distribution. Known only from the type locality, north-west shelf of Australia, 18°40′S, 116°42′E.

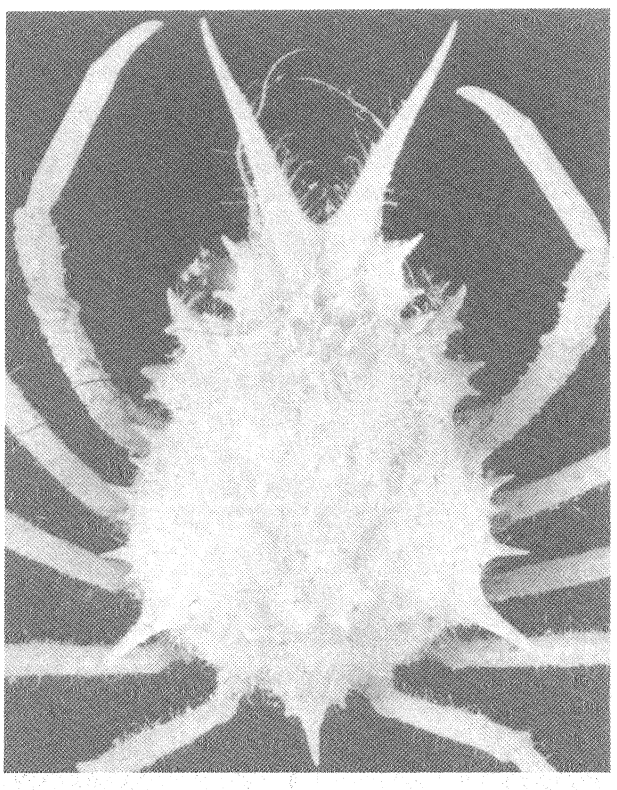

Fig. 14. *Teratomaia richardsoni* (Dell) immature female, cl. 25.7 mm, Tasmania, AM P35504, dorsal view of carapace.

Rochinia suluensis Griffin & Tranter, 1986

Rochinia suluensis Griffin & Tranter, 1986: 189–190, figs 60, 64a, b.

Material examined. One specimen, male, 13.7 mm, ZMC, Danish *Galathea* Deep-Sea Expedition, stn 500, Arafura Sea, 7°34′S, 132°44′E, 390 m, dredge, coralline sand, 25 September 1951.

Remarks. This specimen is slightly larger than the specimens of the type series (cl. 10.5–11.5 mm). The laterally flattened postorbital lobe is separate from the conical hepatic spine and there is a small, sharp epibranchial tubercle.

There are small differences in the cheliped which are probably related to size. The terminal spine on the cheliped merus is continuous with the dorsal carina, not separate from it as in the type series, and the length of the palm is twice, not two and a half times, as long as high. There is only a small proximal gape between the fingers so this male is probably not adult.

In this specimen there are two to four smaller tubercles in addition to the anterior branchial tubercle above the base of the cheliped. There is also a low, blunt tubercle posteriorly on the first sternite not present in the type series.

This specimen extends the range of this species further south.

Distribution. Sulu Archipelago, Halmahera Sea, Arafura Sea.

Subfamily MAJINAE

Teratomaia Griffin & Tranter, 1986

Type species. *Leptomithrax richardsoni,* Dell, 1960, by monotypy.

Remarks. The range of the single species is now known to extend well beyond New Zealand's Chatham Rise where it was first discovered.

Distribution. South-west Pacific.

Teratomaia richardsoni (Dell)

Fig. 14

Leptomithrax richardsoni Dell, 1960: 2–4, fig. 3, pl. 2.—Griffin, 1966: 79–81, figs 16, 23, pls 3, 4; Griffin & Brown, 1976: 253.

Teratomaia richardsoni.—Griffin & Tranter, 1986: 252–253.

Material examined. Four specimens, 2 females, 60 mm, 31.4 mm, 2 juveniles, 13.6 mm, 12.7 mm, ZMC, Danish *Galathea* Deep Sea Expedition, stn 626, Tasman Sea, north-west of Greymouth, 42°10′S, 170°10′E, 610 m, sledge trawl, globigerina ooze, 20 January 1952; one specimen, male, 14.1 mm, ZMC, Danish *Galathea* Deep Sea Expedition, stn 651, Kermadec Deep, 32°10′S, 177°14′E, 7140–7160 m, otter trawl, clay, 16 February 1952; two specimens, one male, 23.3 mm, one female, 25.7 mm, AM P35504, Tasman Sea, 19 km east of Maria I., 42°38′S, 148°05′E, 450 m, B. Griffiths on

Soela, S03/84/77, 25 June 1984; one specimen, male, 70.2 mm, NMV, Southern Ocean, off north-west coast, Tasmania, 41°01′S, 143°52′E to 41°08′S, 143°59′E, M. Cameron on *Margaret Phillipa,* 1 September 1983.

Remarks. The adult male (north-western coast of Tasmania, 70.2 mm) and the adult female (60 mm, *Galathea* stn 626) agree with other specimens we have examined. One of the immature females (31.4 mm, *Galathea* stn 626) is about the same size as the holotype (38.9 mm) figured by Dell (1960: pl. 2) and the relative lengths of the marginal branchial spines are as shown in the photograph of the holotype. That is, the second spine is the smallest and the other four spines increase in size posteriorly. The five remaining specimens are all smaller still (12.7–25.7 mm). In these specimens, while the second marginal branchial spine is still the shortest and the fifth spine the longest, the remaining spines are nearly uniform in length and only a quarter or less the length of the fifth spine (Fig. 14). In the very smallest specimens (12.7–14.1 mm) the rostral spines are relatively longer, up to three quarters postrostral carapace length.

These juveniles differ quite markedly from the adults and, because of their small size, preorbital spine and form of the first pleopod of the male, they could be confused with *Thacanophrys goldsboroughi* (Rathbun) or *Thacanophrys occidentalis* (Griffin). *Teratomaia richardsoni* is distinguished from these species by having the following features: a prominent medial intestinal spine near the posterior carapace margin (rather than two submedial spines or none); a pair of submedial tubercles or spines centrally on the intestinal region (rather than a single medial spine); the most anterior branchial spine cylindrical (rather than lamellate); the hepatic spines cylindrical (rather than lamellate); the merus of the ambulatory legs with only a few scattered tubercles (rather than high tubercles or spines in four rows along its length).

A specimen (male, 19 mm, AM P19643) from off Gabo I., Victoria, discussed previously (Griffin & Tranter, 1986: 258) as similar to, but distinct from, *Thacanophrys goldsboroughi* has proved to be a juvenile of *T. richardsoni.*

These specimens extend the known range of this species to the south-west (off Tasmania) and to the north-east (Kermadec Deep).

Distribution. South-eastern Australia, South Island of New Zealand, Campbell I., Chatham Rise, Kermadec Deep.

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