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Brachyura collected by Danish expeditions in south-eastern Australia (Crustacea, Decapoda)

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Abstract. A total of 73 species of crabs are recorded mainly from localities ranging from the southern part of the Coral Sea (Queensland) through New South Wales and Victoria to the eastern part of the Great Australian Bight (South Australia). Four species are new to the Australian fauna, viz. *Ebalia* (*E.*) *longimana* Ortmann, *Oreophorus* (*O.*) *ornatus* Ihle, *Aepinus indicus* (Alcock) and *Medaeus planifrons* Sakai. *Ebalia* (*Phlyxia*) *spinifera* Miers, *stat.nov.* is raised to rank of species; *Philyra undecimspinosa* (Kinahan), *comb.nov.* includes *P. murrayensis* Rathbun, *syn.nov.* and *Eumedonus villosus* Rathbun is a *syn.nov.* of *E. crassimanus* Haswell, *comb.nov.* Lectotypes are designated for *Puggetia mosaica* Whitelegge, *Pilumnus australis* Whitelegge and *P. monilifer* Haswell. Notes on morphology, taxonomy and general distribution are included.

From 1909 to 1914 the eastern and southern parts of the Australian continental shelf and slope were trawled by the Fisheries Investigation Ship "Endeavour". Dr. Th. Mortensen, during his Pacific Expedition of 1914-16, collected specimens from the decks of the ship as it was working along southern New South Wales during the last year of this survey and visited several other localities along the coasts of New South Wales and Victoria. The Crustacea Brachyura collected by the "Endeavour" were reported on by Rathbun (1918a, 1923) and by Stephenson & Rees (1968b). Rathbun's reports, dealing with a total of 88 species (including 23 new species), still provide a very important source of information on eastern and southern Australian crabs, the only other major report dealing with the crabs of this area being Whitelegge's (1900) account of the collections taken by the "Thetis" along the New South Wales coast in the late 1800's. Between 30 and 40 % of the total Australian decapod fauna is distributed around this area (Griffin & Yaldwyn, 1968). Mortensen's collections, on the other hand, have never been reported on - they form the basis of the present account. The Brachyura collected by Mortensen come from 15 localities from Port Jackson (N.S.W.) to Port Phillip (Victoria), from intertidal areas to depths down to 120 fms. Fortyseven species are included; four species, taken by the "Endeavour" not recorded by Rathbun, are included in the collection. However, 44 species taken by the "Endeavour" were not col-

lected by Mortensen or by the "Galathea". The vast majority of these 44 are species which appear to be relatively uncommon judging from their poor representation in other collections from the same general area. The Mortensen collection comprises a good series of generally common south-eastern Australian species.

The "Galathea" Expedition 1950-52 worked 18 inshore stations with grabs, trawls and dredges in eastern and southern Australia in November and December 1951, four in the southernmost part of the Coral Sea off southern Queensland and northern New South Wales and 14 in the easternmost part of the Great Australian Bight (Wolff, 1964). Twentythree of the 25 species of Brachyura collected at nine of these stations are reported on here; four of these species have not previously been recorded from Australia. The "Galathea" material also contained 3 new species which have been described elsewhere: *Achaeus galathea* and *A. paradicei* (not reported on here - see Griffin, 1970b) and *Ovalipes australiensis* (see Stephenson & Rees, 1968a). The "Galathea" stations off southern Queensland and northern New South Wales took an extremely interesting series of specimens. Indications are that further offshore collecting in that general area would prove as rewarding as has that off Western Australia since 1960 which has increased the number of known species in some families by as much as one fourth. Finally, a small collection from Western Australia collected by P. Heegaard in the 1930's and another from Victoria received by L. Hauschild in the 1900's are considered together with the material taken by the Mortensen and "Galathea" Expeditions; these collections are in the Zoological Museum, Copenhagen, (ZMC). The 73 species dealt with in the present report represent just less than 1/8 of the total brachyuran fauna of Australia (Griffin & Yaldwyn, 1968).

Additional specimens were examined in those cases where they provided additional information on geographic range or morphological variation of particular species. Additional material is from the Australian Museum (AM) and Western Australian Museum (WAM) and is brought together from various sources. More than fifty collectors participated, e.g. A. F. Bassett-Hull, W. Boardman, E. A. Briggs, H. O. Fletcher, C. T. Harrison, A. A. Livingstone, F. A. McNeill, K. Moller, M. Ward, E. R. Waite, and G. P. Whitley that all made larger collections.

Terminology used in this report in general follows that employed by Rathbun (1918b, 1925, 1930, 1937). The size given is the maximum carapace width (c.w.) or length (c.l.) and is exclusive of spines except in the Oxyrhyncha where the length of the rostrum is included and the portunids and xanthids where the lateral spines or "teeth" are included.

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HOMOLIDAE

Latreillopsis petterdi Grant, 1905

Material. N.S.W.: Off Broken Bay, 120 fms, xii.1955, 1 ♂, c.l. 69.0 mm (AM P.10731); E of Sydney, 110 fms, iii.1934, 2 ♂, 2 ♀, c.l. 41.0–52.0 mm (AM P.10460–5). – VICTORIA: Off Lake's Entrance, 70–120 fms, sand, 9.xi.1914, 1 ♂, 2 ♀, c.l. 21.5–47.5 mm (ZMC, Mortensen); off C. Everard, ca 75 fms, 1 ♂, c.l. 48.7 mm (AM P.11412).

Remarks. The supraocular spines in the Mortensen specimens have a small tubercle on the lateral surface distally opposite that on the medial surface, there are three tubercles on the gastric region anteriorly, the meri and carpi of the chelipeds bear spines and tubercles and the chelae are covered with minute tubercles dorsally and ventrally, the dactyls of the first ambulatory legs lack spines in the male but in the large female there are six stiff hairs near the base of each dactyl inwardly and several stiff hairs outwardly along the whole length of the propodi, the meri of the fourth ambulatories have a double series of spines on the ventral surface and the carpi bear spinules dorsally and ventrally. These are only slight differences from the type specimen which, as noted by McCulloch (1907), was a juvenile. McCulloch (1907), in describing an adult male of this species, did not mention tubercles on the medial surface of the supraocular spines but did note the presence of granules on the palm of the chela. The male specimen in the Mortensen series is peculiar in that there is an extra (third) pleopod on the left-hand side shaped like the second. In all specimens the eyestalks are less than $\frac{1}{3}$ the length of the supraocular spine.

L. petterdi possesses 15 gills on each side; the branchial formula is given below based on a female c.l. 52.0 mm (AM P.10461):

Gills	Maxillipeds			Cheliped	Ambulatory legs				Total
	1	2	3		1	2	3	4	
Epipodite	(1)	(1)	(1)	(1)	(1)	(1)	–	–	(6)
Podobranch	–	1	1	–	–	–	–	–	2
Arthrobranch	–	1	2	2	2	2	1	–	10
Pleurobranch	–	–	–	–	1	1	1	–	3
Totals		2+	3+	2+	3+	3+	2	–	15+
	(1)	(1)	(1)	(1)	(1)	(1)			(6)

The epipodites are very small on the cheliped and first two ambulatories and on the first and second ambulatories the posterior arthrobranch is smaller than

the anterior one whereas it is the same size on the remaining legs. In this feature and in the details of the spermathecal opening there is a close similarity to species of *Paromola* (see Gordon, 1950).

Distribution. South-eastern Australia from off Sydney (N.S.W.) to Eucla, Great Australian Bight; New Zealand.

Latreillia australiensis Henderson, 1888

Material. N.S.W.: Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 1♀, c.l. 8.5 mm (ZMC, Mortensen); NE of Broken Bay, 137 fms, 10.vi.1959, 1♂, c.l. 13.3 mm (AM P.13988); off Botany Bay, 50 fms, iv.1919, 1 ovig. ♀, c.l. 11.9 mm (AM P.4436); off Botany Bay, 60–75 fms, 1918, 1 ovig. ♀, c.l. 11.3 mm (AM P.4755); off Botany Bay, 53–56 fms, viii.1921, 2♂, 1♀, c.l. 7.0–12.9 mm (AM P.5551); off Point Jibbon, 8.i.1958, 1 ovig. ♀, c.l. 12.3 mm (AM P.13987); 24 miles NNE of Montague I., 80–90 fms, 12.vii.1925, viii.1925, 1♂, c.l. 15.2 mm (AM P.8209); 24 miles NNE of Montague I., 90 fms, ix.1926, 1♂, c.l. 14.4 mm (AM P.8663); 3–4 miles off Eden, 25–30 fms, vii.1922, 2♀, c.l. 8.4, 13.6 mm (AM P.5788); 12–22 miles N, ½ E from Green Cape, 39–46 fms, vi.1924, 2♂, 3♀, c.l. 10.1–15.2 mm (AM P.8259). – VICTORIA: S of Gabo I., 70–85 fms, sand, 10.ix.1914, 1♂, c.l. 6.4 mm (ZMC, Mortensen); Port Phillip, ix.1925, 1♀, c.l. 8.1 mm (AM P.8259).

Remarks. In the specimen from S of Gabo I. the right supraocular spine is missing and the left has one lateral spinule distally; this supraocular spine is ⅔ the length of the basal segment of the ocular peduncle. On the propodus of the fourth ambulatory leg the ventral (posterior) border bears a small spine just distal to the larger spine mentioned by Henderson.

Distribution. South-eastern Australia from off Sydney (N.S.W.) to Bass Strait, New Zealand.

DROMIIDAE

Platydromia thomsoni Fulton & Grant, 1902

Material. VICTORIA: Phillip I., Western Port, 1♀, c.w. 14.4 mm (ZMC, Hauschild). – S.AUSTRALIA: Encounter Bay, 60 m, sand, 6.xii.1951, 1♂, c.w. 10.5 mm (ZMC, Galathea St. 564); Investigator Straits, i.1930, 1♀, c.w. 11.4 mm (AM P.9372).

Distribution. Southern Australia from Western Port (Vict.) to Encounter Bay (S.A.).

Dromidia australis Rathbun, 1923

Material. N.S.W.: 14 miles off Bateman's Bay, 75 fms, 1930, 1♀, c.w. 6.8 mm (AM P.9451); off southern coast of N.S.W., 40 fms, 1♀, c.w. 6.5 mm (AM P.11434); off Eden, 1961, 1♂, c.w. 29.7 mm (AM P.13510); 3–4 miles off Eden, 25–30 fms, 1922, 4♂, 6♀, c.w. 7.4–34.3 mm (AM P.5777–79, 5781–82). – VICTORIA: Off C. Everard, ca 75 fms, 1942, 1♀, c.w. 6.8 mm (AM P.11413); Western Port, 1♂, 1♀, c.w. 9.0–12.5 mm (ZMC, Hauschild), same loc, 1908, 1♀, c.w. 20.5 mm (AM P.2198).

Remarks. The two small specimens from the ZMC collections agree in all essential features with the description given by Rathbun. The male possesses only the right cheliped, the palm of the chela bearing three small tubercles proximally on the dorsal surface; the chelipeds of the female are missing. The lateral spines on the carapace in the male are slightly smaller than in the female.

Distribution. Southern Australia from Eden (N.S.W.) through Victoria and Bass Strait to Eucla (S.A.).

Cryptodromia octodentata (Haswell, 1882)

Material. S. AUSTRALIA: Encounter Bay, 60 m, sand, 6.xii.1951, 3 juv., c.w. 2.4 mm (ZMC, Galathea St. 564).

Remarks. These three minute specimens all have the carapace laterally bearing very slender spines and numerous long, plumose hairs on the dorsal surface and anterior margins as illustrated by Hale (1927: fig. 105).

Distribution. Southern Australia from Western Port (Vict.) to Encounter Bay (S.A.).

Dromiopsis excavata (Stimpson, 1858)

Material. N.S.W.: Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 1♀, c.w. 21.2 mm (ZMC, Mortensen); Port Stephens, 1913, 1♀ (dry), c.w. 14.8 mm (AM P.3896); 2 miles N, 58°E of Black Head, 37 fms, vi.1916, 1♂, c.w. 35.7 mm (AM P.4089); 10–20 miles S of Montague I., 30–40 fms, 15.vii.1925, 1♂, 1♀, c.w. 20.1, 35.1 mm (AM P.8213–14); 3 miles from shore between Merrimbula and Tathra, 20–30 fms, 18.vii.1925, 1♀, c.w. 40.2 mm (AM P.8224); off Eden, 1♂, c.w. 21.1 mm (AM P.11375); 3–4 miles off Eden, 25–30 fms, 1922, 7♂, 12♀, c.w. 17.7–37.5 mm (AM P.5758–74); 7 miles N of Twofold Bay, 40–45 fms, 1950, 2♂, 1♀, c.w. 16.4–30.1 mm (AM P.9674–76); lower N.S.W. coast, 1931, 1♀, c.w. 39.7 mm (AM P.10078); 12–22 miles N, ½ E from Green Cape, 39–46 fms, vi.1924, 10♂, 4♀ (1 with young), c.w. 21.2–44.0 mm (AM P.7344–57). – VICTORIA: S of Gabo I., 70–85 fms, 10.ix.1914, 1♀, c.w. 48.2 mm (ZMC, Mortensen); Phillip I., iii.1905, 1♀, c.w. 17.8 mm (ZMC, Hauschild). – TASMANIA: 7 miles NE of Cape Pillar, 50–60 fms, 1923, 1♀, c.w. 25.9 mm (AM P.6405); Hobart, 1911, 1♂ (dry), c.w. 15.4 mm (AM P.2966); Simpson's Bay, D'Entrecasteaux Channel, 8–15 fms, 1926, 1♂, c.w. 26.4 mm (AM P.8644). – W. AUSTRALIA: Carnac I., Fremantle, 1905, 1♂, c.w. 43.5 mm (AM G.5306).

Remarks. All specimens agree with previous descriptions. The fringe of hairs along the front immediately distinguishes this species. Females have the inner face of the palm of the chela naked; in males this surface has a dense mass of hair.

Distribution. South-eastern and southern Australia from Port Stephens (N.S.W.) through Victoria and Tasmania to Fremantle (W.A.).

Petalomera lateralis (Gray, 1831). Figs. 1 a–e.

Material. OUFENSLAND: 1♂, c.w. 18.2 mm. 1913 (AM P.3849). – N.S.W.:

Woody Head, mouth of Clarence River, 1960–61, 4♂, 1♀ (ovig.), c.w. 10.4–25.9 mm (AM P.13701–02, P.13481); Crowdy Head, bearing N by W, distance 11 miles, ix.1935, 1♂, c.w. 11.3 mm (AM P.16446); Port Stephens, viii.1908, 1♂, 1♀, c.w. 17.6–20.4 mm, 1 ovig. ♀, 20.4 mm (AM P. 815–17); Nelson's Bay, Port Stephens, 1 ovig. ♀, c.w. 16.9 mm (AM P.16828), i.1920, 1 ovig. ♀, c.w. 15.5 mm (AM P.4861) 1 ♀, c.w. 15.7 mm (AM P.4886); Bradleys Head, Port Jackson, among stones, 17.xi.1922, 4♂, 3♀, c.w. 4.8–16.7 mm (AM P.6048–49); between Sow and Pigs Reef and Shark Island, Port Jackson, 5–7 fms, 16.v.1923, 1♀, c.w. 17.3 mm (AM P.6508); Neutral Bay, Port Jackson, under stones, 1908, 2♂, 1♀, c.w. 11.2–18.8 mm (AM P.115); Port Jackson, 1908, 10♂, 18♀ (7 ovig., 2 with young), c.w. 7.4–18.1 mm, smallest ovig. ♀ 13.3 mm (AM P.116), 1923, 1 ♀ with young, c.w. 13.4 mm (AM P.6749), 4♂, 2♀ (1 ovig.), c.w. 10.4–18.3 mm, ovig. ♀ 12.2 mm (AM P.15070); off Coogee, 49–50 fms, 1898, 1♀, c.w. 8.0 mm (AM G.2373, "Thetis" St. 44); Shellharbour, between tide marks, 1923–25, 5♂, 14♀ (1 ovig.), c.w. 4.7–15.7 mm, ovig. ♀ 14.3 mm (AM P.6304, 6847, 7400, 7896, 7953); Shellharbour, in breakwater harbour, under stones, iii.1924, 5♂, 2♀, c.w. 6.7–15.8 mm (AM P.7169–70); 3–4 miles off Eden, 25–30 fms, vii.1922, 5 ♀, c.w. 7.1–12.9 mm (AM P.5775). – VICTORIA: Flinders, coast E of Port Phillip, under stones, between tide marks, 1928, 2♂, 1♀, c.w. 10.3–13.5 mm (AM P.16827); Port Fairy, 1♂, c.w. 19.0 mm (AM unreg.). – TASMANIA: Port Arthur, 1918, 2♂, c.w. 13.4–18.5 mm (AM P.4154), "Tasmania", 1879, 3♂, 8♀, c.w. 7.4–20.7 mm (AM A.5962). – W. AUSTRALIA: Albany district, 1911, 1♂, c.w. 11.4 mm (AM P.2774).

Remarks: This species differs from *P. lamellata* in a number of features (see table 1). There is a strongly marked sexual dimorphism in the pubescence of the inner surface of the palm of the chelae; in males the hairs are long and dense and in females they are short and sparse.

Table 1. Comparison of south-eastern Australian *Petalomera* species

Character	<i>P. lateralis</i>	<i>P. lamellata</i>
Dorsal surface of carapace	smooth, dense short tomentum	coarsely granular scattered short hairs
supraorbital eave	convex, medial tubercle strong	straight, medial tubercle weak
anterolateral lobes	edges uneven, first projecting	edges straight, first obtuse, not projecting
subhepatic region	bearing a strong blunt tubercle	bearing a low straight ridge
palm of chela in male	inner surface entirely covered by dense pubescence; outer surface smooth, hairs forming reticulation	inner surface with dense pubescence distally only; outer surface granular, hairs not forming reticulation
ambulatory carpi and propodi	ridges poorly developed, lobulate	ridges well developed, cristate, entire.

Distribution. Eastern and southern and western Australia from Low Isles (Qld.) to Nickol Bay, just N of North-West Cape (W.A.).

Petalomera lamellata (Ortmann, 1894). Figs. 1 f–j.

Material. N.S.W.: N of Montague I., 36–65 fms, sandy mud, 28.ix.1914, 1 carapace, 18.6 mm wide; Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 2♀, c.w. 8.6, 13.4 mm (both with attached sponges), 1 juv., c.w. ca. 2.8 mm (all ZMC, Mortensen). – VICTORIA: Hastings, Western Port, 5–10 fms, algae, 6.ix.1914, 1♂, c.w. 12.4 mm (ZMC, Mortensen); Flinders, coast E of Port Phillip, under stones between tide marks, 1929, 3♂, 8♀, c.w. 7.8–17.3 mm, 1 ovig. ♀ 16.6 mm (AM P.9353); Port Phillip, 1908, 3♂, c.w. 12.7–13.8 mm (AM P.863) (one with sacculina). – TASMANIA: Simpson's Bay, D'Entrecasteaux Channel, 8–15 fms, 1926, 1♂, 3♀, c.w. 9.0–24.7 mm (AM P.8656–57).

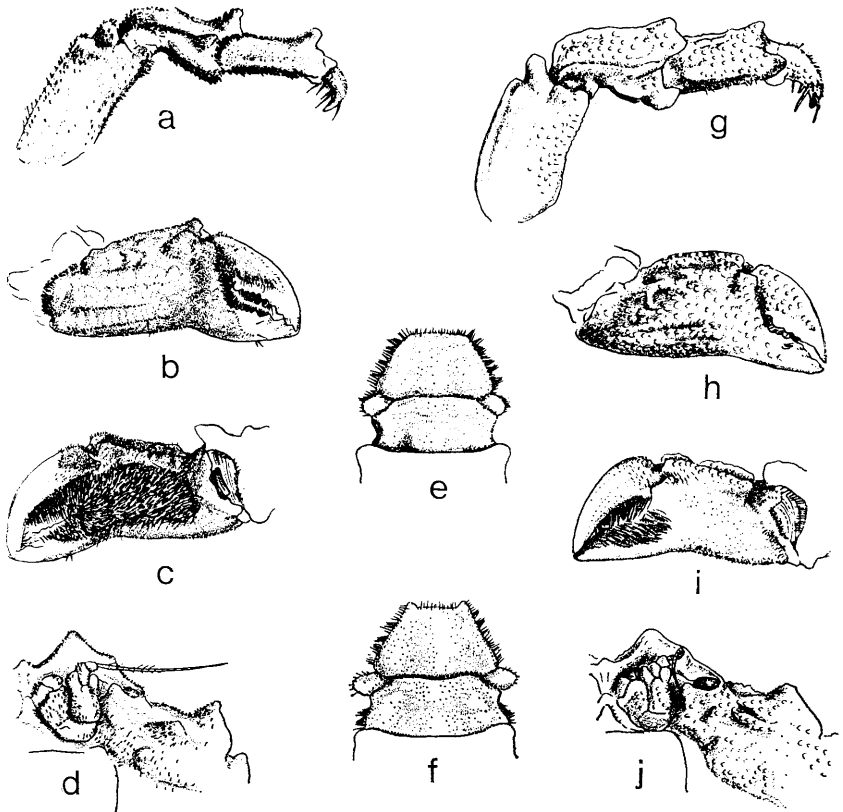


Fig. 1. *Petalomera lateralis* (Gray) (a–e) and *P. lamellata* (Ortmann) (f–j). a, g) first left ambulatory leg, anterior aspect; b, h) right chela of male, outer aspect; c, i) same, inner aspect; d, j) left side of carapace, anterior portion, ventral aspect; e, f) male abdomen, terminal two segments.

Remarks. These specimens conform in all important features with previous descriptions of this species. All have the carapace devoid of hairs but covered for the anterior two thirds dorsally by small rounded granules which also cover the subhepatic and pterygostomian regions and third maxillipeds, the lateral teeth are well developed and the crests on the ambulatory legs, best developed on the carpi and propodi are entire and expanded distally. The chelipeds are also provided with well-developed, entire crests dorsally. The chelipeds and ambulatories, like the carapace, are naked. The 2.8 mm juvenile agrees with the young of *P. lateralis* (see Hale, 1927, fig. 109), except that the lateral margin possesses two short spines behind the orbits instead of three rounded lobes.

Distribution. Torres Strait and southern Australia (Victoria and Tasmania); the Torres Strait record requires confirmation.

Petalomera wilsoni (Fulton & Grant, 1902b)

Material. VICTORIA: Off Cape Ottway, 72 m, corals, 6.xii.1951, 1 ♂, c.w. 9.0 mm (ZMC, Galathea St.571). – S.AUSTRALIA: Encounter Bay, 60 m, sand, 6.xii.1951, 2 ♂, c.w. 10.5, 10.8 mm (ZMC, Galathea St. 564). – TASMANIA: Near Currie Harbour, King I., 3.xii.1922, 1 ♂, c.w. 22.9 mm (AM P.6737), 5.xii.1922, 1 ♂, 1 ♀, c.w. 12.5, 19.7 mm (AM P.6736); off Wine-glass Bay, 80 fms, 1931, 1 ♂, c.w. 13.7 mm (AM P.10101).

Remarks. The three small specimens (ZMC) present no immediately apparent differences from previously recorded material. The ridges and pits formed by the hairs on the carapace are quite well developed.

Distribution. South-eastern Australia from Port Stephens (N.S.W.) through Victoria and Tasmania to Kingston (S.A.). New Zealand.

RANINIDAE

Lyreidus tridentatus De Haan, 1841

Material. N.S.W.: Near Eden, 20-25 fms, red mud. 1.x.1914, 2 ♀, c.l. 32.3, 16.1 mm (ZMC, Mortensen).

Remarks. As is usual in this species, the larger (adult) female has the anterolateral margins almost straight whilst the smaller (juvenile) specimen has the anterolateral margins weakly concave. This latter specimen is unusual in that the left lateral spine is bifid distally.

Distribution. Western Pacific and central Pacific from Japan and Hong Kong to New Caledonia, New Zealand and Hawaii, eastern Australia from just N of Cape Moreton (Qld.) to Bass Strait, and from NW of Bluff Pt, near Geraldton, to Rottneet I. off Perth (W.A.) (Griffin, 1970a).

LEUCOSIIDAE

Ebalia (Ebalia) longimana Ortmann, 1892

Material. QUEENSLAND: Off Cape Moreton, 55 m, very coarse gravel with shells, 5.xi.1951, 7 ♂, 5 ♀, c.l. 3.1–4.6 mm (ZMC, Galathea St.539).

Remarks. These specimens are assigned to this species, previously unrecorded from Australia*) because of the very many similarities in carapace shape and ornamentation (especially the dense granulation of the surface, the prominent posterior intestinal elevation, the presence of a group of enlarged granules along the lateral margin at the widest part of the carapace and another group posterolaterally above the margin), the shape and ornamentation of the chelipeds and ambulatory legs (especially the presence of enlarged granules along the anterior and posterior surfaces of the cheliped meri and the presence in the male of a ventral, sometimes crenulate, ventral lobe towards the distal end of the compressed ambulatory propodi), the fusion of abdominal segments 3-6 in both sexes (abdominal formula 1+2+R+T), the shape of the abdomen in the male and the presence of a broad, short, curved spine in the midline of the penultimate segment close to the distal edge.

The Australian specimens have been compared with seven specimens from Japan in the collections of the Smithsonian Institution, Washington and identified by Dr T. Sakai as *longimana* (3♂, 4♀, c.l. 4.5-6.2 mm, Sagami Bay, 50-85 m., before 1965, USNM 113402). The Australian specimens differ slightly from these Japanese specimens and from Sakai's descriptive remarks in two main features only. 1, Japanese *longimana* typically possess a prominent tubercle in the centre of the cardiac region - in the Australian specimens there is sometimes a group of enlarged granules in the centre of the cardiac region but not a prominent elevation. However, variation in the relative size of granules and tubercles on the carapace in species of *Ebalia* is well known (see Sakai, 1937: 106-107). 2, The first pleopod of the male is slightly stouter in the Australian specimens than in Japanese specimens.

Distribution. South-eastern Japan; eastern Australia off southern Queensland.

Ebalia (Ebalia) tuberculosa A. Milne Edwards, 1873

Material. N.S.W.: Disaster Bay, 30-40 fms, sand and mud, 1.x.1914, 14♂, 18♀, c.l. 2.0-72.2 mm (ZMC, Mortensen); off mouth of Manning River, trawled 45-50 fms, 1947, 1♂, c.l. 6.4 mm (AM P.11754); off Norah Head, 26-38 fms, vi.1921, 1♀, c.l. 5.7 mm (AM P.5354); 16-18 miles NE of South Head, Port Jackson, 75-80 fms, v.1924, 6♂, 9♀, c.l. 2.8-6.8 mm (AM P.7230); off Botany Bay, trawled 60-70 fms, vi.1920, 1♂, c.l. 8.1 mm (AM P.4716), trawled 33-56 fms, viii.1921, 158♂, 210♀ (47 ovig.), c.l. 2.0-9.1 mm (AM P.5524-26); off Botany to Wata Mooli, ca 50 fms, xi.1924, 3♂, 12♀, c.l. 4.4-7.3 mm (AM P.7576); 5 miles E of Point Jibbon, Port Hacking, 100 fms, mud, 24.vii.1943, 1♂, 3♀, c.l. 2.9-6.5 mm (AM P.11498, 11500); off Bateman's Bay, 80 fms, from cavities in conglomerate boulder, iv.1924, 1♀, c.l. 6.2 mm (AM P.7190); about 10 miles N of Montague I., 60 fms, viii.1929, 4♂, 1♀, c.l. 4.3-6.1 mm (AM P.9384); 3-4 miles off Eden, 25-30 fms, vii.1922, 1♂, 6♀, 6.0-7.3 mm (AM P.5785); 12-22 miles N, ½ E from Green Cape, 39-46 fms, vi.1924, 1♂, 4♀, c.l. 5.1-6.3 mm (AM P.7381). - VICTORIA: S of Gabo I., 70-85 fms, sand, 10.ix.1914, 1♂, c.l. 6.3 mm

*) Note added in proof: this species has been recorded from Moreton Bay, Qld., by Campbell & Stephenson (1971), *Mem. Qd Mus.*, 16:38-39.

(ZMC, Mortensen). – S.AUSTRALIA: S of Encounter Bay, 160 m, bryozoan gravel, 6.xii.1951, 4♀, c.l. 2.7–6.5 mm (ZMC, Galathea St.560); Encounter Bay, 85 m, bryozoan sand, 6.xii.1951, 1♀, c.l. 2.7 mm (ZMC, Galathea, St.562).

Remarks. As already noted by Whitelegge (1900:161) and by Rathbun (1925:135), the granulation of the carapace is very variable. However, there is no clear correlation with sex or size as implied by both Whitelegge and Rathbun. Small specimens have the lateral tubercles slightly longer than in the adults and the dorsal tubercles larger but still low and round.

The front is concave and quadrilobate but the medial lobes, which are longer than the laterals, are downwardly deflexed.

Distribution. Indo-West Pacific – South Africa, Japan, Hawaii and New Zealand; south-eastern and southern Australia from off Manning River (N.S.W.) to Eucla (W.A.).

Ebalia (Phlyxia) intermedia Miers, 1886

Material. N.S.W.: S. of Montague I., 20–50 fms, sand and mud, 3.ix.1914, 15♂, 19♀, c.l. 5.3–11.7 mm; near Eden, 20–25 fms, red mud, 1.x.1914, 1♂, 1♀, c.l. 6.8–10.5 mm; Eden, 5 fms, muddy sand, 15.ix.1914, 2♂, 1♀, 10–12 mm; Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 9♂, 4♀, c.l. 5.3–11.3 mm (all ZMC, Mortensen); vicinity of Sow and Pigs Reef, Port Jackson, about 4 fms, 16.i.1928, 1♂, c.l. 11.0 mm (AM P.16445); 20 miles N of Gabo I., 65 fms, ix.1935, 1♂, c.l. 8.3 mm (AM P.11739). – VICTORIA: Hastings, Western Port, 3–4 fms, stones and algae, 5.ix.1914, 3♂, 4♀, c.l. 10.7–13.3 mm (ZMC, Mortensen); Port Phillip, ix.1925, 3♂, 1♀, c.l. 7.4–11.4 mm, 1 ovig. ♀, 8.3 mm (AM P.8261); Beaumaris, Port Phillip, i.1926, 1 ovig. ♀, c.l. 9.5 mm (AM P.8608). – TASMANIA: Port Arthur, xii.1922, 1♀, c.l. 11.6 mm (AM P.6041); Derwent Estuary, x.1910, 1♂, 1♀, c.l. 10.0–12.0 mm (AM P.2435).

Remarks. This large series for the most part agrees well with the original description and figures of small specimens (Miers, 1886). The carapace is minutely granulate in adults, not tuberculate as in juveniles. The shape of the posterior (intestinal) margin of the carapace is rather variable, as mentioned by Rathbun (1923:136); usually the lateral angles are acute but sometimes they are obtuse and the posterior margin of the lobe is convex. The posterior (intestinal) spine is large but rather blunt in adults. All the specimens are somewhat broader across the carapace than in the figure given by Miers. Small specimens sometimes have a small tubercle, additional to the usual three, on the lateral margin behind the second and the whole margin and the larger tubercles and spines may be minutely tuberculate or granulate. There are low, rounded tubercles on the dorsal surface crowded together and larger around the midline on the central part of the cardiac region, on the posterior part of the gastric regions, and laterally on the hepatic and branchial regions. In large specimens there are no traces of tubercles on the dorsal surface of the carapace. The specimens agree well with Hale (1927: fig.199).

Distribution. Southern Australia from Disaster Bay (N.S.W.) through Tasmania to Cottesloe (W.A.).

Ebalia (Phlyxia) crassipes (Bell, 1855)

Material. N.S.W.: Watson's Bay, Port Jackson, 3–5 fms, sand and mud, 8.x.1914, 2♂, 4♀, c.l. 5.9–9.7 mm (ZMC, Mortensen); between Sow and Pigs Reef and Green Point, Port Jackson, 25.viii.1923, 1♂, 2♀ (ovig.), c.l. 6.4–9.4 mm, smaller ovig. ♀ 9.4 mm (AM P.6480); between Sow and Pigs Reef and Shark I., Port Jackson, 5–7 fms, 16.v.1923, 1♂, c.l. 9.4 mm (AM P.6502); Sow and Pigs Reef, Port Jackson, ca 3 fms, 26.ix.1926, 1♂, c.l. 12.4 mm, 1 ovig. ♀, c.l. 9.6 mm (AM P.8718); near Sow and Pigs Reef, 4 fms, 18.x.1927, 1♂, c.l. 13.1 mm, 1 ovig. ♀, c.l. 9.2 mm (AM P.8931), ca 4 fms, 16.i.1925, 2♂, c.l. 7.8, 8.1 mm (AM P.9046); off Sow and Pigs Shoal, ca 6 fms, 1929, 10♂, 8♀ (1 ovig.), c.l. 7.7–10.8 mm, ovig. ♀ 9.6 mm (AM P.9407). – VICTORIA: Beaumaris, Port Phillip, 1 ovig. ♀, c.l. 10.8 mm (AM P.15517).

Remarks. The specimens agree well with Bell's original description and figure of this species; Bell does not mention the dorsal tubercles on the carapace but these are shown in his figure. The surface of the carapace is smooth and the branchial regions bear two tubercles on each side, one posteriorly (just forward of the cardiac region) and one in front of this and more lateral. The fixed finger bears a proximal tooth and the dactyl a corresponding one only in large males (see Bell, 1855: pl. XXXIV fig. 2).

The arrangement of tubercles on the carapace shown in the figure of "*Phlyxia quadridentata*" given by Stimpson (1907) is the same as that found in the present species and does not agree with Miers's figure of "*P. quadridentata* var. *spinifera*", a species here called *E. spinifera* (see below).

Distribution. South-eastern Australia from Port Stephens (N.S.W.) through Victoria and Tasmania to eastern South Australia.

Ebalia (Phlyxia) spinifera Miers, *stat.nov.*

Ebalia (Phlyxia) quadridentata var. *spinifera* Miers, 1886:309–310, pl. XXV figs 3, 3a.

(non) *Phlyxia quadridentata* Gray, 1831:40 (status unknown)

(non) *Phlyxia quadridentata*; Stimpson, 1858: 159; 1907:155–156, pl. XVIII fig.6 (= *E. (P.) crassipes* (Bell)).

Material. QUEENSLAND: Off Cape Moreton, 55 m and 86 m, coarse gravel with shells, 5.xi.1951, 19♂, 19♀, c.l. 2.7–7.8 mm (ZMC, Galathea Sts.538–39). – N.S.W.: Off Yamba, 75 m, muddy sand, 11.xi.1951, 1♂, 2♀, c.l. 4.3–7.0 mm (ZMC, Galathea St.545); Watson's Bay, Port Jackson, 3–5 fms, sand and mud, 8.x.1914, 2♀, c.l. 9.5. 9.6 mm; off Botany Bay, ca 50 fms, 1924–25, 2♀, c.l. 5.7 mm (AM P.7863).

Remarks. All of the specimens less than about 6 mm c.l. agree very well with Miers's description and figure. The present species is very similar to *E. (P.) intermedia* and is characterized by the fact that the tubercles on the carapace are extremely numerous and cover the whole surface dorsally and ventrally and the third maxillipeds laterally and distally, as well as the proximal seg-

ments of the chelipeds and ambulatories. These tubercles are slender, of equal diameter throughout and blunt apically; they tend to be longer laterally except for a group, or sometimes a single tubercle, centrally on the cardiac and intestinal regions, a pair on the mesogastric region posteriorly and one on each mesobranchial region just forward of the cardiac group and usually followed close behind and more laterally by a smaller tubercle or group of tubercles; there are also some larger tubercles, never in obvious groups, in the midline on the mesogastric region posteriorly. There are three large lateral projections on the branchial margin with a small but obvious one behind the second, which is situated at the widest part of the carapace. The posterior intestinal spine is very long and the margin of the intestinal lobe is laterally acute, the posterior margin weakly concave. All the marginal spines and the margin itself are bordered by small tubercles. The sternum and abdomen in the male bear low rounded granules.

Specimens about 8 mm carapace length are covered by low granules with prominent tubercles as follows: one central cardiac, one central intestinal, a pair of mesogastric and one or two on each mesobranchial region; and the margin bears four small lobes.

Since the specimens agree with Miers's description of *E. quadridentata* var. *spinifera* and as Gray's *P. quadridentata* has been inadvertently identified with *E. crassipes* by Stimpson (1858, 1907) and with *P. orbicularis* by Haswell (1882), its original description being extremely short, I consider Miers's name applicable to these specimens and that the form merits specific rank. I am unable to ascertain the identity of *Phlyxia quadridentata* Gray, the type locality of which was given as "New Holland".

Distribution. Eastern Australia from off Cape Moreton (Qld.) to Port Jackson (N.S.W.).

Philyra undecimspinosa (Kinahan), *comb.nov.*

Bellidilia undecimspinosa Kinahan, 1856:128, pl. iii fig.2.

Phlyxia orbicularis Haswell, 1880a:54, pl.vi fig.2.

Ebalia (Phlyxia) undecimspinosa var. *orbicularis*; Miers, 1886:309.

Philyra murrayensis Rathbun, 1923:136-137, pl.XXXIV, *syn.nov.*

Material. N.S.W.: Watson's Bay, Port Jackson, 3-5 fms, sand and mud, 8.x.1914, 1 ♂, 3 ♀, c.l. 11.1-14.6 mm; S of Montague I., 20-50 fms, sand and mud, 30.ix.1914, 1 ♂, 1 ♀, c.l. 6.7, 7.5 mm; off Disaster Bay, near Eden, 20-25 fms, red mud, 1.x.1914, 1 ♂, c.l. 10.4 mm; Eden, 5 fms, muddy sand, 13.ix.1914, 1 ♀, c.l. 5.2 mm (all ZMC, Mortensen); off Newcastle, 45 fms, vi.1955, 3 ♂, c.l. 16.7-31.3 mm, 1 ovig. ♀ c.l. 17.0 mm (AM P.12950-1); off Stockton Beach, Newcastle, 10 fms, 4.ix.1938, 2 ♂, c.l. 17.0-18.2 mm (AM P.11802); Newcastle Bight, 28-40 fms, 1899, 1 ♂, c.l. 28.3 mm (AM G.2368, "Thetis" St.21); off Newcastle, 48-42 fms, 1898, 2 ♀ (1 ovig.), c.l. 17.8 mm, ovig. ♀ 17.8 mm (AM G.2179, "Thetis" St.25); Refuge Bay, Hawkesbury River, mud flats at low tide, iii.1954, 1 ♀, c.l. 12.5 mm (AM P.12339); off Sow and Pigs Shoal, Port Jackson, ca 6 fms, 1929, 5 ♂, 7 ♀ (1 ovig.), c.l. 5.5-25.2 mm, ovig. ♀ 15.8 mm (AM P.9404-6); near Sow and Pigs Shoal, ca 5 fms, 1931,

5♂, 2♀ (1 ovig.), c.l. 15.8–18.3 mm, ovig. ♀ 17.0 mm (AM P.10081); off Steel Point, Port Jackson, 2–3 fms, in valves of dead shellfish, 1926, 1♂, 1♀, c.l. 18.9, 21.2 mm (AM P.8585); off Botany Bay, dredged in deep water, x.1924, 1♂, c.l. 6.2 mm (AM P.7862); Botany Bay, x.1934, 1♀, (AM P.11417); E of Tathra, 45 fms, iii.1934, 1♀, c.l. 31.0 mm (AM P.10459); Two-fold Bay, i.1962, 2♂, c.l. 19.6, 20.0 mm (AM P.14589). – VICTORIA: Melbourne, 4♂, 5♀, c.l. 5–25 mm (ZMC, Corneliusen); off Port Phillip, 14 fms, mud, 25.ix.1914, 3♀, (2 ovig.), c.l. 9.9–23.9 mm, smaller ovig. ♀c.l. 18.0 mm (ZMC, Mortensen). – TASMANIA: Derwent Estuary, 1910, 1♂, 1♀, c.l. 19.2, 23.9 mm (AM P.2432); Spring Bay, 3–7 fms, 23.x.1938, 1♂, 3♀ (1 ovig.), c.l. 17.6–22.5 mm, ovig. ♀ 22.4 mm (AM P.11798).

Remarks. The specimens agree well with both Kinahan's original description and Rathbun's description of *P. murrayensis*. Rathbun's description of the front is the more accurate. The probability that Rathbun's species is the same as Kinahan's was strongly suggested by H.M. Hale in a personal communication to F. A. McNeill (30.x.1926). Haswell's species was included in the synonymy of Kinahan's by Miers (1886).

In smaller specimens the posterior intestinal spine is relatively longer than in large ones and the midline is granulated posteriorly. In addition, the posterolateral areas of the carapace and the margins, including the spines, are granulated; in large specimens the margins and dorsal surface are usually smooth.

The genus *Philyra* Leach is distinguished from *Ebalia* Leach by the following features (Ihle, 1918; Sakai, 1937; Tyndale-Biscoe & George, 1962): 1, the regions of the carapace are poorly defined; 2, the epistome projects beyond the front in dorsal view; and 3, the second pleopod in the male is markedly shorter than the first.

Further, the two genera are currently placed in different sub-families on the basis of the development of the epistome and infra-orbital lobes. The present species possesses all those features characteristic of *Philyra* species and is thus placed in that genus, following Rathbun.

Distribution. South-eastern Australia from Lake Macquarie (N.S.W.) to off River Murray (S.A.).

Philyra laevis Bell, 1855

Material. VICTORIA: between Swan I. and mainland near entrance to Port Phillip, sandy bottom, shallow water, i.1926, 4♂, 4♀ (ovig.), c.l. 12.7–21.3 mm, smallest ovig. ♀ 12.7 mm (AM P.8602). – S.AUSTRALIA: Semaphore, near Adelaide, shallow water, ix.1924, 1♂, 1♀, c.l. 15.3, 15.9 mm (AM P.7488); Moonta, 1937, 1♂, c.l. 19.9 mm (AM P.10836). – W.AUSTRALIA: Oyster Harbour, Albany, i.1938, 2♂, c.l. 12.8 mm (ZMC, Heegaard).

Remarks. The two Copenhagen Museum specimens agree completely with the original description and figure given by Bell except that he states that the "palp" of the "external foot jaws" are dilated at the outer side and then narrowed towards the apex; Bell is here certainly referring to the exognath. The seven white spots on the anterior part of the dorsal surface of the carapace are well developed.

Tyndale-Biscoe & George (1962:75) describe the first pleopod of the male as sometimes apically curved. It is straight in these specimens. The second pleopod is slightly longer than the first, unlike *P. undecimspinosa* which this species resembles in carapace shape, ornamentation, keeled nature of the ambulatory propodi and dactyli and shape of the abdomen.

Distribution. Southern Australia from Western Port (Vict.) through Tasmania and South Australia to Albany (W.A.).

Merocryptus lambriformis A. Milne Edwards, 1873

Material. N.S.W.: N of Montague I., 36–65 fms, sandy mud, 28.ix.1914, 1♀, c.l. 12.2 mm; S of Montague I., 30–40 fms, sand and mud, 30.ix.1914, 3♂, 3.2–3.5 mm; Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 1♂, 9.8 mm (all ZMC, Mortensen); 11 miles NW of Crowdy Head, 50 fms, ix.1935, 1♀, c.l. 13.9 mm (AM P.11760); off mouth of Manning River, 45–50 fms, 1945, 1♂, c.l. 9.5 mm (AM P.11757); about 16–18 miles NE of South Head, Port Jackson, ca 75–80 fms, v.1924, 1♀, c.l. 12.6 mm (AM P.7229); off Botany Bay, trawled 60–70 fms, attached to starfish, vi.1920, 1♂, c.l. 7.4 mm (AM P.4717), 33–56 fms, viii.1921, 2♂, 1♀ (ovig.), c.l. 7.5–12.6 mm, ovig. ♀ 12.6 mm (AM P.5528); 14 miles off Bateman's Bay, 75 fms, i.1930, 1♂, c.l. 9.1 mm (AM P.9450); 24 miles NNE off Montague I., 80–90 fms, 12.vii.1925, 1♂, c.l. 5.4 mm (AM P.8210); 5 miles off Green Cape, 45 fms, v.1930, 5♂, c.l. 5.5–8.3 mm (AM P.9648); Disaster Bay, 50 fms, v.1930, 1♂, c.l. 9.4 mm (AM P.9650). – VICTORIA: 20 miles N of Gabo I., 65 fms, ix.1935, 1♂, c.l. 6.7 mm (AM P.11740); off Cape Everard, ca 75 fms, 1941–42, 3♀ (1 ovig.), c.l. 11.9–14.1 mm, ovig. ♀ 12.7 mm (AM P.11414). – TASMANIA: Off Wineglass Bay, 80 fms, 1931, 1♀, c.l. 13.9 mm (AM P.10100).

Remarks. All the specimens agree with the original description. In the two large specimens the large branchial lobe projects laterally beyond the margin of the carapace, is marginally crenulate and ventrally flattened as shown in Milne Edwards's figure 1. In the male there are three broad blunt spines on the posterior surface of the cheliped meri and in the female there are four. In the small specimens the second and third marginal lobes takes the form of slender blunt spines.

Distribution. Western Pacific – Japan, Samoa, New Zealand; southern Australia from Crowdy Head (N.S.W.) through Bass Strait to Eucla (W.A.).

Actaeomorpha sculpta (Haswell, 1880). Fig. 2

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.xi.1951, 1♀, c.l. 11.1 mm (ZMC, Galathea St. 539).

Holotype. A dry specimen (c.w. 10.2 mm) (see fig. 2) mounted on opaque glass with a hand written label in ink below, "Lithadia sculpta, Hasw. Fitzroy Island." The specimen is in good condition; only the carpus and following segments of the third right ambulatory leg are missing. Originally in the Macleay Museum, University of Sydney, now in the collections of the Australian Museum.

Remarks. The present specimen agrees very well indeed with the holotype and

possesses all the diagnostic features of this species. Thus, the grooves on the carapace are granular, not honeycombed and smooth as in *A. erosa* A. Milne Edwards, the second lateral lobe is laterally markedly concave or bifid, whilst the other three are convex laterally, the chelipeds are covered with pointed tubercles and the ambulatories are covered by spines. The tubercles on the carapace are rounded and simple. Serene (1954:459) has already mentioned the difficulty of distinguishing between this species and *A. morum* Alcock. He has also given a detailed account of the mushroom-like tubercles on the body and appendages in *morum*. These are not present in the holotype of *sculpta* or in the present specimen. However, the two species do agree in carapace shape and ornamentation of the chelipeds and ambulatories.

Distribution. Southern Queensland, northern Western Australia (Cape Jau- bert) and Arafura Sea.

Oreophorus (Oreophorus) ornatus Ihle, 1918

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.xi.1951, 1 ♂, c.l. 6.8 mm (ZMC, Galathea St.539).

Remarks. This specimen agrees fairly well with the description and illustration given by Ihle (1918) and possesses the features which distinguish *O. ornatus*

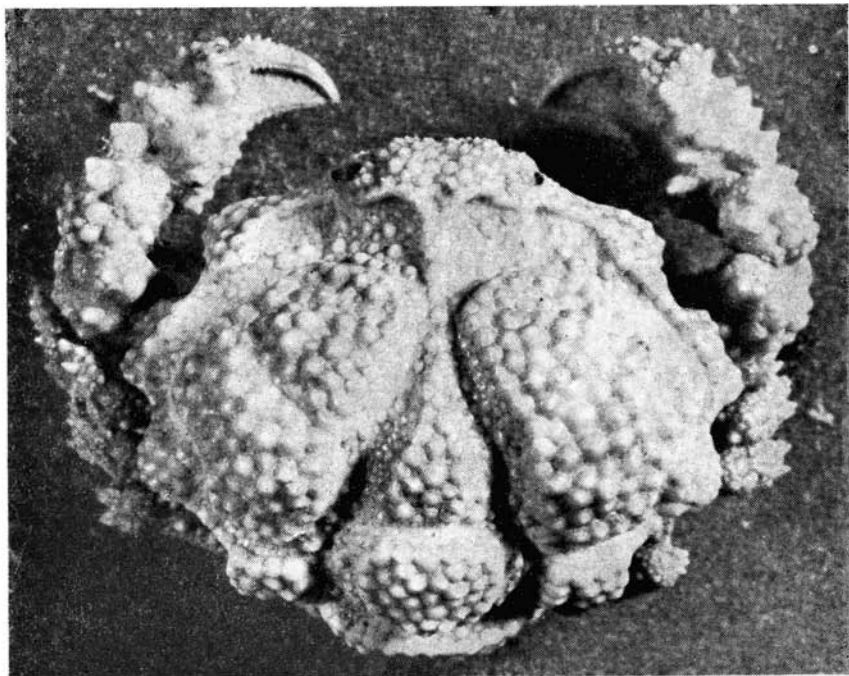


Fig. 2. *Actaeomorpha sculpta* (Haswell). Holotype, dorsal aspect. (Photo: Charles V. Turner)

from *O. rugosus* according to the keys given by Sakai (1937) and repeated by Serene (1954). Thus, the carapace is broadened posteriorly, the lateral margin is crenulate, the grooves between the elevations bear mushroom-like granules and the meri of the chelipeds bear "pearly" granules proximally.

Distribution. Southern Queensland; previously known only from Japan.

Leucosia haematosticta Adams & White, 1848

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.xi.1951, 1 ♂, c.l. 9.8 mm (ZMC, Galathea St.539).

Remarks. The single specimen agrees generally with the brief description given by Adams & White, which does not mention the pubescence on the lateral surface of the carapace, and with the more detailed description given by Sakai (1937). In colour pattern the specimen is very similar to the Japanese specimen figured by Sakai, the red spots being concentrated near the midline posteriorly; the specimens figured by Adams & White and by Tyndale-Biscoe & George (1962), on the other hand, have the spots fairly widely spaced, even near the midline.

Distribution. Indo-Pacific including Palk Strait, Singapore, Japan and Timor; within Australia previously recorded from Bowen Harbour and Port Denison (Qld.), Shark Island, Port Jackson (N.S.W.) and from Malus I., Dampier Archipelago and Cape Conture, Bernier I., Shark Bay (W.A.).

CALAPPIDAE

Calappa lophos (Herbst, 1782)

Material. N.S.W.: S of Montague I., 20–50 fms, 30.ix.1914, 1 ♂, c.l. 8.3 mm (ZMC, Mortensen).

Remarks. This very small specimen agrees with the similarly sized one from Japan figured by Sakai (1965: pl.22 fig.2) except in the absence of any trace of colour. The carapace bears several large granular tubercles anteriorly and there are obvious longitudinal and oblique furrows. The posterolateral and posterior borders are exactly as shown in Sakai's (1937) text-fig. 6a for *lophos*. There is no fringe of hair at the distal end of the cheliped merus; the dorsal edge of the palm bears seven to eight lobes; the proximal end of the ventral ridge of the palm bears a blunt tubercle and not a spine as stated by Sakai (1937:90–91). This species differs from *C. terraereginae* Ward, 1933; in that the posterior border of the carapace does not project backwards and the posterolateral teeth of the clypeiform expansions lack a fine central ridge extending to their tips. As Sakai (1937:92) notes, the lateral and frontal borders are denticulate in *lophos*, not smooth as in Ward's species. The distinction given by Tyndale-Biscoe & George (1962:69) in their key to species of *Calappa* is slightly confusing in that *lophos* is said to be almost smooth whilst *terraereginae* is said to possess bulbous tubercles. Herbst's original figure is of an adult specimen. It does not show the knobbly appearance of the anterior regions of the carapace and the grooving of the dorsal surface is inaccurately shown.

Distribution. Widespread Indo-West Pacific from east Africa to Japan; within

Australia from between Fremantle and Geraldton (W.A.), Bowen (Qld.), Sandon Bluffs and Port Jackson (N.S.W.) to southern New South Wales.

HYMENOSOMATIDAE

Halicarcinus ovatus Stimpson, 1858

Material. N.S.W.: Watson's Bay, Port Jackson, 3–5 fms, sand and mud, 8.x.1914, 1♀ (ovig.), c.l. 4.4 mm. – VICTORIA: Hastings, Western Port, 5–10 fms, algae, 6.ix.1914, 3♂, c.l. 3.0–6.8 mm (both loc. ZMC, Mortensen). – S.AUSTRALIA: Encounter Bay, 60 m, sand, 6.xii.1951, 1♂, 1♀, c.l. 3.4, 3.5 mm (ZMC, Galathea St.564). – W.AUSTRALIA: Oyster Harbour, Albany, i.1935, 3♂, 2♀ (1 ovig.), c.l. 4–6 mm (ZMC, Heegaard).

Remarks. This series of eleven specimens, although small in number, points up the large variation in this species in the form of the rostrum and hairyness of the carapace. The three rostral lobes are short and subparallel in the specimens from Western Port and Albany but they are broad in the Western Port specimens and slender in the Albany series. In the specimens from Port Jackson and the Great Australian Bight the rostral lobes are long and slender and the median lobe is slightly longer than the laterals; they are straight in the Port Jackson specimen but in the two small specimens from the Bight the lateral rostral lobes are curved outwards basally and inwards apically. The carapace is naked in the specimens from Western Port and only sparsely hairy in the others. In the male from the Great Australian Bight there are a few hairs in groups on the gastric and cardiac regions. This male, despite its small size, has the chelae inflated and the dactyli each bear the proximal tooth typical of adults of this species. In the males in the series from Albany the inner faces of the merus, carpus and chelae bear scattered, long, simple hairs.

The female from the Encounter Bay has three specimens of a species of Foraminifera attached to the dorsal surface of the carapace.

Distribution. Southern Australia from Clarence River (N.S.W.) through Tasmania and Victoria to Fremantle area (W.A.).

Halicarcinus rostratus (Haswell, 1881)

Material. N.S.W.: S of Montague I., 40–50 fms, 30.ix.1914, 1♀ (ovig.) c.l. 5.8 mm. – VICTORIA: Hastings, Western Port, 5–10 fms, algae, 5♂, c.l. 4.0–7.1 mm (both loc. ZMC, Mortensen).

Remarks. The three larger males in the series from Western Port have the chelipeds enlarged and ridged, the teeth on the proximal parts of the inner edges of the fingers of the chelae are large and the proximal half of each finger possesses a dense fringe of short hairs along the inner edge.

Distribution. Southern Australia from Western Port (Vict.) to Kangaroo Island (S.A.).

Halicarcinus australis (Haswell, 1882)

Material. W.AUSTRALIA: Swan River, 12.xii.1957, 1♂, 5♀, c.l. 9.7–11.4 mm (ZMC, Heegaard).

Syntypes. Australian Museum (Sydney) Collections – 2♀, dry, only 1 intact specimen, c.l. 12.2 mm, mounted on glass with printed label, “210 *Hymenosoma australe* Williamstown, Port Phillip”. *Hymenosoma* has been crossed out and *Halicarcinus* written in ink above; the specimens are registered as P. 15398 and this number is also written in ink on the label. The number and the word “*Syntypes*” are written in pencil on the glass. The left hand specimen has the dorsal surface of the carapace broken and mostly lost.

Remarks. Comparison of the present specimens with the syntypes shows them to agree in all important features, including shape of the carapace with prominent marginal ridge and few hairs, presence of two rounded projections on the lateral margin on each side, the posterior the larger, broad subtriangular rostrum with a small lobe on each side $\frac{1}{2}$ rostrum length from tip and weakly concave surface, weakly pubescent chelipeds and legs and almost straight, unarmed ambulatory dactyli.

The large male (c.l. 11.4 mm) has the chelae inflated and there is a large fleshy “cushion” (pulvinus) filling the proximal gape of the fingers.

Distribution. South-eastern and southern Australia from Port Stephens (N.S.W.) through Victoria and Tasmania to Swan River (W.A.).

Halicarcinus lacustris (Chilton, 1882)

Material. N.S.W.: Port Jackson, lagoon, 29.x.1914, 2♂, c.l. 9.2, 11.6 mm (ZMC, Mortensen).

Remarks. These two specimens are clearly adults and have the chelae inflated. Both possess the rounded carapace and flattened subtriangular rostrum characteristic of this species. The carapace margin is elevated and bears two obscure lobes on each side in both specimens. The carapace and appendages are pubescent. The abdomen is short and triangular and the first pleopods are extremely stout, short and apically blunt. The ambulatory dactyls are quite long; I can find no trace of a spine on the ambulatory dactyls. In both males the fingers of the chelae gape very widely for their entire length and each finger bears a small but very prominent blunt to rounded tooth projecting a little way into the gape; that on the fixed finger is almost at the base and that on the dactyl almost half way along. The ventral edge of the palm bears prominent crenulations or transverse lobules or ridges along the proximal half.

Distribution. South-eastern Australia from Port Jackson (N.S.W.) through Victoria to Tasmania and South Australia; New Zealand, Lord Howe I., and Norfolk I.

Trigonoplax unguiformis (De Haan, 1839)

Material. VICTORIA: Western Port, 5–10 fms, algae, 6.ix.1914, 1♂, c.l. 7.9 mm (ZMC, Mortensen); same loc., 2♂, c.l. 8.1, 9.2 mm (ZMC, Hauschild). – W.AUSTRALIA: Oyster Harbour, Albany, 28.i.1938, 1♂, c.l. 11.5 mm (ZMC, Heegaard).

Remarks. McCulloch (1908:59) distinguished his var. *longirostris* from *unguiformis* s.s. by the longer carapace, differently shaped front and broader ambu-

latory dactyli. The present series agree with McCulloch's specimens in these features and thus support the possibility that the Australian populations belong to a distinct species. They agree with previous descriptions of Japanese material in having the posterolateral border scalloped and the ambulatory dactyls with two spinules on the ventral edge almost at the tip, the more distal one being the smaller. However, many more specimens that are available at present need to be examined before a sensible opinion can be given on the status of the Australian species.

Distribution. Widespread Indo-West Pacific from Japan through the Malay Peninsula to the Andaman Islands (Bay of Bengal) and Indonesia; south-eastern Australia from Pt. Phillip and Western Port (Vict.) to Kangaroo Island and Nyuts Archipelago (S.A.).

MAJIDAE

Naxia tumida (Dana, 1852)

Material. N.S.W.: Port Hacking, intertidal on sand, 9.iii.1915, 1 ♂, c.l. 12.5 mm; Thirroul, intertidal, 31.x.1914, 1 ♀, c.l. 17.5 mm (both ZMC, Mortensen).

Remarks. The two specimens possess all the features of this species as described and illustrated previously by Baker (1905), McCulloch (1908, 1913) and Hale (1927). The basal antennal article is spinulose anterolaterally and the merus of the third maxilliped is well expanded laterally. The abdomen of the female comprises 5 free segments, numbers 4–6 being fused. The female from Thirroul is densely covered dorsally by short, broad fronds of seaweed (*Sargassum*).

Distribution. South-eastern Australia from Moreton Bay (Qld.) to Kangaroo I. (S.A.).

Naxia aurita (Latreille, 1825)

Material. VICTORIA: Hastings, Western Port, 5–10 fms, algae, 6.ix.1914, 3 ♂, 3 ♀ (ovig.), c.l. 34.6–56.2 mm, smallest ovig. ♂ 39.5 mm.

Remarks. The abdomen of the female is of five free segments, numbers 4–6 being fused. The specimens agree well with the figures given by Milne Edwards in Cuvier (1837, pl.28 figs. 3, 3a, b) except that in the present series the spines of the carapace are slightly more slender and longer and the distance between the supraorbital cave and the intercalated spine is greater – about equal to the distance between the latter spine and the postorbital; the anterolateral expansion of the merus of the third maxilliped is also more pronounced than shown in Cuvier's figure. Both Cuvier and Hale (1927) figure specimens in which the intercalated spine is curved slightly posteriorly at the tip. Three of the specimens from the present series show this feature; in the others the spines are straight.

Distribution. Southern Australia from Western Port (Vict.) to Abrolhos Is. (W.A.).

Aepinus indicus (Alcock, 1895). Fig.3

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.xi.1951, 2♀ (ovig.), c.l. 7.3, 7.7 mm. – W.AUSTRALIA: NW of Pt. Cloates, 73 fms, 6.x.1963, 5♂, 4♀ (3 ovig.), (WAM 90–67, 2♂, 1 ovig. ♀ from this series now AM P.16771); SW of Pt. Cloates, 75 fms, 7.x.1963, 4♂, 4♀ (ovig.) (WAM 83–67, 282–67, 333–7); NW of Carnarvon, 71 fms, 8.x.1963, 1♂, (WAM 276–67 (part), now AM P.16779); NW of Bluff Pt., 54 fms, 9.x.1963, 1♂ (WAM 131-67). Variation: c.l. 5.5–10.5 mm, smallest ovig. ♀ 6.6 mm. (All H.M.A.S. “Diamantina” Cruise 6/63, C.S.I.R.Q. Sts. 178, 187, 197, 204, resp.). – PHILIPPINES: 2 miles from Zal I., Pearl Bank, Sulu Sea, 40–45 fms, sand and lithothamnion, 22.ii.1964, 1♂, c.l. 10.9 mm (WAM 85–67).

Remarks. These specimens agree with the original description and figures given by Alcock in arrangement of spines on the carapace, presence of knobs on the tips of the spines including the rostrum, form of the rostrum, orbit



Fig. 3. *Aepinus indicus* (Alcock). Male, c.l. 10.5 mm, SW of Point Cloates (WAM 282-67), carapace dorsal aspect.

and basal antennal article, granulation of the third maxilliped, sternum and cheliped ischium, merus and carpus, in the dorsal and ventral carination of the palm of the chela and in the separation of the sternal segments of the males by deep furrows. The only marked differences between this material and the specimens from India are 1) the cardiac region is generally low and without a spine (in 5 of the males there is a small blunt tubercle centrally – Alcock infers in his description that the cardiac region bears a slender, knobbed spine and this is shown in his figure), 2) the rostral spines sometimes lack a terminal knob and 3) in nearly all cases the medial and lateral margins of the rostral spines bear numerous small spinules. Rathbun (1911) noted that the cardiac region bore a low tubercle rather than a spine.

Distribution. Indo-West Pacific – previously known from the Red Sea, Amirante and Seychelles, Andamas and off Ceylon; now reported from the Philippines and off central eastern and north-western Australia.

Achaeus fissifrons (Haswell, 1879)

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.xi.1951, 1♀ (ovig), c.l. 5.4 mm (ZMC, Galathea St.539). – N.S.W.: Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 4♂, 3♀ (ovig.), c.l. 6.8–10.5 mm; N of Montague I., 35–65 fms, sandy mud, 28.ix.1914, 1♂, c.l. 7.5 mm; S of Montague I., 20–50 fms, sand and mud, 30.ix.1914, 1♂, c.l. 7.0 mm (all ZMC, Mortensen).

Remarks. The nine specimens all agree in essential features with the type material of *fissifrons* and the specimens discussed by Griffin & Yaldwyn (1965). Thus, the rostral spines are short and triangular, there are two prominent medial spines on the carapace and a few other spinules, the basal antennal article is spinulose and the chelipeds bear a number of spinules.

One specimen has two supraorbital spines; the supraorbital spine is relatively larger in some specimens and the hepatic margin is generally less spinulate and tuberculate than in specimens previously examined. The last two spinules on the fourth ambulatory dactyl are the best developed in nearly all specimens. The merus and carpus of the chelipeds tend to be more tuberculate in the smaller specimens. Only one small male lacks the medial spinule on the posterior intestinal border of the carapace. The specimen from Cape Moreton is the northernmost record in Australia for this species.

Distribution. Widespread in the Indo-West Pacific; eastern Australia from southern Coral Sea to Bass Strait, western Australia from near Cape Naturaliste to North-West Cape; New Zealand.

Achaeus lacertosus Stimpson, 1857

Material. N.S.W.: Watson's Bay, Port Jackson, 3–5 fms, sand and mud, 8.x.1914, 1♂, c.l. 7.3 mm (ZMC, Mortensen).

Remarks. The specimen agrees well with material previously reported upon by Griffin & Yaldwyn (1965). The spinules around the rostral lobes and along the edge of the supraorbital eave are minute.

Distribution. Widespread in the Indo-West Pacific; northern and eastern Australia from Shark Bay (W.A.) to Port Jackson (N.S.W.).

Anacinetops stimpsoni Miers, 1879b

Material. VICTORIA: Western Port, iii.1905, 1 ♂, c.l. 26.0 mm (ZMC, Hauschild).

Remarks. The specimen agrees well with the descriptions and figures provided by Miers (1879b), Baker (1905 – as *Paramicippa hispida*), McCulloch (1915 – as *Eruma hispida*) and Buitendijk (1939). Baker erroneously shows the rostral spines as distally truncate although his description (p.126) mentions them as acute. The two fissures between the three orbital spines are rather narrower than shown in most illustrations.

Distribution. Timor; northern, north-eastern Australia and Port Lincoln and Port Willunga (S.A.).

Oncinopus neptunus Adams & White, 1848

Material. N.S.W.: Watson's Bay, Port Jackson, 3–5 fms, sand and mud, 8.x.1914, 2 ♂, 3 ♀, c.l. 6.5–15.5 mm (ZMC, Mortensen).

Remarks. The genus *Oncinopus* De Haan has been considered monotypic since the mid 1880's. Very recently, however, after examination of Australian and Japanese material and of the type specimen, Takeda & Miyake (1969) have shown that there are important differences between the Australian and Japanese populations in the shape of the first pleopod in the male. The genus is now considered to comprise three species.

In the larger male from the present series the fingers are about ½ the length of the palm and gape proximally; this contrasts with what Haswell (1882b:5) stated.

Distribution. South China Sea off the Philippines (Mindoro Sea is the locality given by Adams & White); eastern Australia from Torres Strait to Spencer's Gulf (S.A.).

Pugettia mosaica Whitelegge, 1900

Material. QUEENSLAND: NE of Cape Moreton, 100 fms, viii.1964, 3 ♀, c.l. 7.0–8.8 mm (AM P.15176). – N.S.W.: N of Montague I., 36–65 fms, sandy mud, 28.ix.1914, 2 ♂, 1 ♀, c.l. 8.5–10.5 mm, 1 carapace; S of Montague I., 20–50 fms, sand and mud, 30.ix.1914, 2 ♂, c.l. 4.5–9.2 mm; Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 3 ♂, c.l. 9.5–13.3 mm (all ZMC, Mortensen); off mouth of Manning River, 45–50 fms, iii.1947, 2 ♂, c.l. 9.7–10.7 mm (AM P.11756); 11 miles NW of Crowdy Head, 50 fms, ix.1935, 2 ♂, c.l. 9.5–11.9 mm (AM P.11743); 16–18 miles NE of South Head, Port Jackson, 75–80 fms, v.1924, 1 ♂, 2 ♀, c.l. 9.2–11.0 mm (AM P.7228); off Botany Bay, 33–56 fms, viii.1921, 30 ♂, 43 ♀, c.l. 5.0–12.5 mm (AM P.5522); off Botany Bay to Wata Mooli, 50 fms, i.1925, 7 ♂, 6 ♀, 5.1–12.1 mm (AM P.7858), x.1924, 3 ♂, c.l. 9.1–14.3 (AM P.7575); off Cronulla, 200 m, 16.vi.1965, 1 ♀, c.l. 8.6 mm, 1 ovig. ♀, 10.6 mm (AM P.15174). – VICTORIA: 20 miles N of Gabo I., 65 fms, ix.1935, 1 ♂, 1 ♀, c.l. 10.0–12.5 mm (AM P.11736); off Cape Everard, 70–75 fms, vii.1930, 1 ♂, c.l. 10.5 mm (AM P.9682).

Type material. All the types are to be regarded as syntypic as Whitelegge made no mention of a type. A lectotype is chosen from this series. *Lectotype.* Male.

c.l. 14.4 mm, c.w. 9.5 mm. Both chelipeds are now detached, the anterior three ambulatory legs on the left side are also detached. The specimen is preserved in spirit. Locality: "Thetis" Exp. St. 42, off Wata Mooli, 70–78 fms, E. R. Waite (AM P.15175). This is the specimen figured by Whitelegge (1900, pl. XV fig.5). *Paralectotypes*. 14♂, 28♀, "Thetis" Exp. St's, 13, 35, 37, 41, 42, 57, off Botany Bay to Wata Mooli, (AM G.2331 to G.2336 inclusive, G.2342, P.1400). Two dry specimens (from P.1400) mounted on glass; remainder in spirit. There are no specimens from "Thetis" St's. 36 or 44 contrary to statements by Whitelegge. The male and female (G.2344) are the other specimens figured by Whitelegge (1900). Two specimens originally registered as P.1400 have been exchanged with the Muséum National d'Histoire Naturelle, Paris.

Remarks. The specimen from S of Montague Island has slightly blunter hepatic spines and the carapace is slightly less pubescent than is usual. In the specimens from Disaster Bay the large male has long and slender branchial spines, the carinae on the chelipeds are extremely well-developed and the chelipeds are naked, whereas they are pubescent in the lectotype. The branchial spines are blunt and short in the small Disaster Bay specimen. The hepatic spine tends to be short. The carapace spines tend to be knobbed and there is quite considerable variation in the length of spines. The ambulatories tend to have the posterior surfaces smooth and naked, particularly on the distal part of the merus and the whole of the carpus. Whitelegge (1900:141) states "the carapace is densely covered with minute bead-like granules." This is not strictly true since these "granules" can be easily scraped away leaving the carapace weakly tuberculate and actually covered by small vesicular hairs. Whitelegge correctly notes that the abdomen of the female is six-segmented.

Distribution. South-eastern Australia from Cape Moreton (Qld.) to Cape Everard (Vict.).

Menaethius monoceros (Latreille, 1825)

Material. N.S.W.: Watson's Bay, Port Jackson, 3–5 fms, sand and mud, 8.x.1914, 1♀, c.l. 11.3 mm (carapace only) (ZMC, Mortensen); Bottle and Glass Rocks, Port Jackson, iii.1928, 1♀, c.l. 9.5 mm (AM P.9358).

Remarks. The Mortensen Expedition specimen possesses the features typical of this species – flattened rostrum, unexpanded hepatic and weakly expanded branchial margins.

Distribution. Widespread in the Indo-Pacific from Delagoa B. (South Africa) to Japan and the Pacific; within Australia from western, northern and eastern Australia from Shark Bay (W.A.) through Torres Strait to Port Jackson (N.S.W.); Lord Howe I.

Rochinia fultoni (Grant, 1905)

Material. N.S.W.: 7 miles off Twofold Bay, 25 fms, x.1929, 1♀, c.l. 13.5 mm (AM P.9397); off Twofold Bay, 45–50 fms, x.1929, 1♂, c.l. 11.0 mm (AM P.9395). – VICTORIA: S of Gabo I., 70–85 fms, sand, 10.ix.1914, 8♂, 8♀, c.l. 8.0–27.9 mm (ZMC, Mortensen); 30 miles S. of Gabo I., 80 fms, viii.1929, 1♂, c.l. 11.0 mm (AM P.9382). – TASMANIA: Off Wineglass Bay, 80 fms,

xi.1931, 1♂, c.l. 24.5 mm, 1 ovig. ♀, c.l. 25.8 mm (AM P.10103); off Port Arthur, ix.1913, 1♂, c.l. 7.6 mm (AM P.3871); Tasmania, ix.1913, 1 ovig. ♀, c.l. 26.5 mm (AM P.3873).

Distribution. South-eastern Australia from Port Jackson (N.S.W.) to Cape Pillar (Tasmania).

Notomithrax minor (Filhol, 1885)

Material. N.S.W.: Eden, 5 fms, muddy sand, 13.ix.1914, 1♂, c.l. 12.5 mm (ZMC, Mortensen).

Remarks. The small specimen, whilst agreeing in nearly all features with material previously examined (Griffin, 1966b) possesses minute spinules at the tip of the anterolateral lobe and part way down the lateral edge of the basal antennal article.

Distribution. Eastern Australia from Port Curtis (Qld.) to Tasmania; New Zealand.

Leptomithrax t. tuberculatus (Whitelegge, 1900)

Material. QUEENSLAND: Off Cape Moreton, 55 m, gravel with shells, 5.xi.1951, 4♂, 2♀, c.l. 5.9–15.5 mm (ZMC, Galathea St.538).

Remarks. These specimens, despite their small size, show nearly all the features typical of this species including the acute postorbital lobe, tumid cardiac region surmounted by two submedial spines, four well-developed marginal branchial spines and subacute anterolateral lobe of the basal antennal article. They differ in having the orbit slightly more open, the intercalated spine shorter and the raised portion on the third maxillipeds at the junction of the ischium and merus very sparsely hairy rather than naked.

Distribution. Eastern Australia from Double Island Point (Qld.) to Wata Mooli (N.S.W.); a separate subspecies, *L. tuberculatus mortenseni* Bennett in northern New Zealand and Kermadec Islands.

Leptomithrax gaimardii (H. Milne Edwards, 1834)

Material. N.S.W.: S of Montague I., 20–50 fms, sand and mud, 30.ix.1914, 1♀, c.l. 12.9 mm; Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 3♂, 2♀, c.l. 5.9–28.0 mm (all ZMC, Mortensen); Botany Bay, 50–52 fms, 1898, 2♀, c.l. 9.3–8.9 (AM P.15178, "Thetis" St.37); off Wata Mooli, 59–54 fms, 1898, 2♀, c.l. 9.6–10.8 mm (AM, "Thetis" St.57).

Remarks. The small specimens included in this series, along with the four specimens collected by the "Thetis" Expedition (not recorded by Whitelegge and originally registered with the *Pugettia mosaica* syntypes), agree with adult *gaimardii* in all essential features including possession of two lobes on the postorbital lobe's posterior margin, strongly tuberculate carapace, four marginal branchial spines and very long, pointed anterolateral lobe of the basal antennal article. However, the orbit is rather more open in the smallest specimens and the intercalated spine is very short. The expansion of the more distal secondary lobe on the postorbital lobe gives the latter an almost truncate appearance (as in *L. sternocostulatus*) and the swelling on the third

maxillipeds at the junction of the ischium and merus is brilliant white. The junction of the sternites with each other are located in transverse furrows. The small tubercles on the intercalated spine, the single tubercle on the anterior margin of the postorbital lobe at the base and the tubercles on the anterolateral lobe and lateral margin of the basal antennal article are well developed in the larger specimens in the series from Disaster Bay. In these latter specimens the swelling on the third maxillipeds is tinged with orange; in the adults and large juveniles this orange spot is readily apparent in freshly collected specimens.

Distribution. South-eastern and southern Australia from Botany Bay (N.S.W.) to Albany (W.A.).

Micippa tuberculosa (H. Milne Edwards, 1834)

Material. N.S.W.: Watson's Bay, Port Jackson, 3-5 fms, sand and mud, 8.x. 1914, 1♀, c.l. 10.4 mm (ZMC, Mortensen).

Remarks. The accessory spinules and tubercles on the major spines are well developed. The rostrum possesses at the outer corner of each truncate lobe, an outwardly directed, acute spine. The carapace is densely tuberculate. The postorbital spine is not bifid but bears a large tubercle on its anterior border half-way along (cf. Miers, 1879:13). The eyestalks have the dorsal surface flattened but are not compressed (Miers 1879:14). The orbit lacks an intercalated spine, but there is a well-developed antorbital spine. The supraorbital eave and postorbital lobe are separated by a broad, V-shaped fissure. Because of these orbital characters this species is found only with difficulty in the key given by Griffin (1966a:287-288) and should probably be placed in a distinct genus.

Distribution. South-eastern Australia from Port Jackson (N.S.W.) through Victoria to Port Lincoln (S.A.).

Micippa spinosa (Stimpson, 1857)

Material. N.S.W.: Watson's Bay, Port Jackson, 3-5 fms, sand and mud, 8.x. 1914, 4♂, 3♀, c.l. 7.7-17.2 mm (ZMC, Mortensen).

Remarks. There is good agreement between these specimens and Stimpson's original description. The specimens in this series have well developed spines dorsally, usually bearing knobs which protude through the dense mat of sand and other material covering the animal. The rostral spines are laterally tuberculate and distally acute. A number of the lateral spines of the carapace are very small; the most posterior branchial spine, which is subdorsal, is the largest. The basal antennal article is smooth and fused laterally with the postorbital lobe.

Distribution. South-eastern Australia from Port Stephens (N.S.W.) to Bass Strait and eastern South Australia.

PARTHENOPIDAE

Parthenope longimana (Linnaeus, 1758)

Material. QUEENSLAND: Off Cape Moreton, 55 m, gravel with shells, 5.xi. 1951, 1♂, c.l. 11.5 mm (ZMC Galathea St 539).

Remarks. This small specimen is referred to this species since it agrees fairly well with the description and remarks given by Alcock (1895:260). The carapace and chelipeds are tuberculate and spinulose, the carapace is sub-circular with no trace of a postorbital constriction and bears no long spines, the rostrum projects very slightly and the lateral borders are spinulose with one spinule on each side larger than the others, the ambulatory legs bear a dorsal and ventral row of short spines on the meri and a dorsal row on the carpi and propodi. There are in particular, the five series of coarse spinules on the dorsal surface of the carapace mentioned by Alcock for young specimens of this species and the palm of each chela has the outer border comprising alternating larger and smaller, flattened, acute lobes as is characteristic of this species.

The specimen differs, however, from previous descriptions of this species in having three spinules transversely on the posterior border of the carapace and in having the pair of spines on the posterior border outside these not especially enlarged. The ventral surface of the meri and propodi of the chelipeds are tuberculate and not smooth as in adult males of this species (Alcock, 1895:261). The lobes around the upper border of the orbit are separated by narrow fissures; adults of this species have these fissures closed.

Distribution. Widespread throughout the Indo-West Pacific from Mauritius to Japan and the Philippines; within Australia from Darnley I. to southern Coral Sea.

Eumedonus crassimanus (Haswell), *comb.nov.*

Gonatonotus crassimanus Haswell, 1880b:455, pl. 26 fig. 4.

Eumedonus villosus Rathbun, 1918a:27, plxiii fig.1, *syn.nov.*; Flipse, 1930:88,98; Serene, van Duc & van Luom, 1958:147,237.

Material. QUEENSLAND: Off Cape Moreton, 55 m, gravel, 5.ix.1951, 1 ♂, c.l. 6.0 mm (ZMC, Galathea St.539). – N.S.W.: Off Richmond River mouth, Ballina, 28–30 fms, amongst spines of sea urchin (*Prionocidaris australis* (Ramsay, 1885), det. Miss E. C. Pope), 7.x.1962, 2 ♂, 6 ♀ (1 ovig.), c.l. 5.7–13.9 mm (AM).

Type material: Holotype of *Gonatonotus crassimanus* Haswell: Male, c.l. 10.0 mm, dry, mounted on blue glass inside a glass tube which in turn is fixed to a glass sheet on which is pasted a printed label, "Type, *Gonatonotus crassimanus*, Hasw., loc. Port Jackson, New South Wales", in Australian Museum, Sydney, G. 5712. All the ambulatory legs on the left side are missing except the first of which only the propodus and dactyl are lacking; the legs of the right side are present except for the last and the dactyl of the third.

Remarks. Comparison of the holotype of *G. crassimanus* Haswell with the holotype of *Eumedonus villosus* Rathbun (details given in Rathbun, 1918a) reveals that the two are extremely similar in all features, especially in the shape of the carapace (except that the lateral lobes are slightly more backwardly directed in *crassimanus*), the strong tuberculation of the carapace, the shape of the rostrum, ornamentation of the chelipeds with rounded lobes and a stout spine on the inner angle of each carpus (except that the spine on *crassimanus*

is a little longer), the presence of carinae on the dorsal surfaces of the ambulatory meri and of long hairs on the distal segments of the ambulatory legs. The holotype of *crassimanus* has only a few hairs remaining on the middle of the rostrum, the centre of the carapace is bare and the covering hairs have obviously been scraped off; the same is true of the holotype of *Eumedonus villosus*.

The specimen from Cape Moreton differs most obviously from the above specimens in that the carapace is less granular but there are long hairs overlying the rostrum and arising from the anteromedial part of the carapace in two rows. The shape of the rostrum is the same with a narrow medial emargination, the two lobes having rounded tips. The lateral lobes of the carapace are blunt and not sharp as in *E. zebra* Alcock, the ventral surface of the rostrum is granular and not smooth as in that species, the abdomen is not fringed with hairs, the lobes on the merus of the cheliped are rounded apically and not sharp, the lobes on the palm of the chela are blunt, not sharp, and finally, the ambulatory meri and to some extent the carpi are carinate but the propodi are smooth and not carinate as in *zebra*.

The specimens taken off the Richmond River are pale orange in colour, strongly granulate on the carapace dorsum and the yellowish green hairs overlying the rostrum are dense in all except the largest specimen, a male, which has only a few tufts arising centrally on the carapace. Both males have the distal dorsal lobe on the palm of the chela poorly developed whereas in the females both lobes are well developed. The chelipeds and ambulatory legs bear scattered piliferous hairs which are more dense on the distal segments of the ambulatories.

It is of interest, in view of the fact that these specimens were taken from the spines of *Prionocidaris australis*, that this same cidarid urchin was taken by the F.I.S. "Endeavour" Expedition in the same haul with the type material of *Eumedonus villosus* Rathbun.

Distribution. North-eastern Australia from Double Island Point (Qld.) to Port Jackson (N.S.W.).

PORTUNIDAE

Nectocarcinus integrifrons (Latreille, 1825)

Material. N.S.W.: Long Reef, near Port Jackson, intertidal on rocky coast, 22.x.1914, 1 ♂, c.l. 23.7 mm. – VICTORIA: Hastings, Western Port, 3–10 fms, stones and algae, 5–6.ix.1914, 4 ♂, 3 ♀, (1 ovig.), c.w. 12.2–36.1 mm (all ZMC, Mortensen).

Remarks. These rather small specimens agree well with previously reported specimens of this species. Only the 36.1 mm male from Western Port has any trace of a median notch in the frontal border. In small specimens the carapace is widest at the third lateral spine; large specimens are widest at the fourth. The frontal margin of the carapace bears a fringe of hairs above which only a single row of tubercles is visible, there is a very shallow concavity above the antenna, the junction of the frontal margin and the orbit is rounded, the carpus

of the cheliped possesses several tubercles along the distal border between the main spine at the inner angle and the articulation with the chela (in the smaller specimen – 12.1 mm ♂ from Western Port – this border possesses minute spinules) and the second anterolateral spine is parallel with the first. In the males the penultimate segment of the abdomen is narrower distally than proximally and the junction with the ultimate segment forms a shallow notch.

Distribution. Southern Australia from Port Stephens (N.S.W.) through Tasmania to Cockburn Sound near Fremantle (W.A.).

Nectocarcinus tuberculosus A. Milne Edwards, 1860

Material. VICTORIA: Western Port, iii.1905, 1 ♂, c.w. 11.1 mm (ZMC, Hauschild).

Remarks. The frontal margin in this specimen bears a distinct median notch and two rows of granules are visible in dorsal view, the junction with the orbit is angled but the concavity above the antenna is shallow, the third anterolateral spine is upwardly directed and there is one spine and several spinules on the distal edge of the carpus of the cheliped between the spine at the inner angle and the dorsal articulation with the chela.

Distribution. South-eastern Australia from Port Jackson (N.S.W.) to southern Tasmania and off Murray River mouth (S.A.).

Ovalipes australiensis Stephenson & Rees, 1968

Material. N.S.W.: Port Hacking, 2–3 fms, sand and mud, 9.x.1914, 1 ♂, c.w. 12.8 mm (ZMC, Mortensen).

Distribution. Southern Australia from Wide Bay (Qld.) to Cape Naturaliste, Shark Bay (W.A.); Lord Howe Island.

Portunus pelagicus (Linnaeus, 1758)

Material. N.S.W.: Port Hacking, 2–3 fms, sand and mud, 9.x.1914, 1 ♂, c.w. 51.8 mm (ZMC, Mortensen).

Remarks. The specimens agree well in all respects with Stephenson & Campbell's description (1959:96) except that the frontal lobes are apically rounded. No trace of the characteristic colour pattern remains on this specimen; the carapace is naked and densely granular and the "eminences" on the cardiac and mesobranchial regions are obvious. The anterolateral teeth are interspersed with hairs.

Distribution. Indo-West Pacific from east Africa to the Philippines, Japan and Tahiti, circum-Australian from Fremantle (W.A.) to Victoria and eastern South Australia; New Zealand.

Macropipus corrugatus (Pennant, 1777)

Material. N.S.W.: Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 16 ♂, 5 ♀, c.w. 11.6–17.17 mm (ZMC, Mortensen).

Remarks. The specimens show no important differences from those described and figured by Stephenson & Campbell (1960:92). This species is easily

distinguished by its narrow, transversely ridged carapace and strongly bent male first pleopod. None of the males in the present series has the abdomen straight-sided. Bennett (1964) has rejected the specific name *borradailei* which previously he had suggested for the supposedly distinct New Zealand population (see also Stephenson & Campbell, 1960).

Distribution. Eastern North Atlantic, Red Sea, Japan, New Zealand; south-eastern Australia from around Cape Moreton (Qld.) through Tasmania to eastern South Australia, Western Australia at Beagle I.

Thalamita macropus Montgomery, 1931

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.xi.1951, 2♂, 2♀ (ovig.), c.w. 7.1–11.8 mm (ZMC, Galathea St.539). – N.S.W.: Off Yamba, 50 m, sand, 11.xi.1951, 1♂, c.w. 2.5 mm (ZMC, Galathea St.544); S of Montague I., 20–50 fms, sand and mud, 30.ix.1914, 2♂, 2♀ (ovig.), c.w. 7.1–11.8 mm; off Disaster Bay, near Eden, 20–25 fms, red mud, 1.x.1914, 1♀ (ovig), c.w. 16.0 mm; Disaster Bay, 30–40 fms, 1♂, 2♀, c.w. 11.3–17.6 mm: (all ZMC, Mortensen).

Remarks. The minute subsidiary basal tooth on the outer surface of the first anterolateral tooth, characteristic of the group of *Thalamita* species to which *macropus* belongs is, in the present series, more often merely an interruption in the curvature of the outer border as Stephenson & Hudson (1957) have noted for other specimens; in some of the present specimens there is not even a trace of this interruption. Such specimens consistently key out to *T. crenata* (Latreille) in the key provided by Stephenson & Hudson (1957:316) from which they differ markedly in the shape of the front and of the male abdomen and in details of the basal antennal article.

The specimens agree well with the description provided by Stephenson & Hudson in such distinctive specific characters as the details of the carapace ridges and anterolateral margins, shape of the basal antennal article, armature of the chela and shape and relative size of the frontal lobes. Some specimens possess only three ventral spines on the propodus of the fifth leg. The largest specimens have stumpy fingers.

The small specimen from off Yamba is virtually unidentifiable to species although it possesses the main features of the genus *Thalamita* including quadrilobate front and five anterolateral spines of which the fourth is the smallest; the carapace is no longer than broad with the anterolateral margins parallel to each other. It is included with *macropus* because of these features.

Distribution. Eastern Australia from Port Stephens to Eden (N.S.W.) and from Shark Bay to Abrolhos Islands (W.A.).

Charybdis bimaculata (Miers, 1886)

Charybdis (*Gonioneptunus*) *bimaculata*; Leene, 1938:126–129, figs. 70–71; Stephenson, Hudson & Campbell, 1957:504–505, figs 2J, 3K, pl.3, fig.4, pl.4H, 5A; Stephenson & Rees, 1967:12–13.

Charybdis bimaculata; Sakai, 1965:120, pl.58, fig.4.

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.xi.1951, 1♀.

Remarks. In the larger specimen the antennal flagellum stands within the orbit, the basal antennal article not joining the front. Such a feature characterises the subgenus *Gonioneptunus* Ortmann, 1893 to which four species were assigned by Leene (1938). All of these four, *Gonioneptunus subornatus* Ortmann, 1893, *G. whiteleggei* Ward, 1933, *Charybdis (Gonioneptunus) africana* Shen, 1935 and the present one, have been considered to be a single species by recent authors (see refs. above). The specimen agrees with the figures provided by Stephenson, Hudson & Campbell and with the description given by Sakai (1939:410-412, text-figs 10, 11, pl. XXXVI fig.2, pl. XLV fig.5), especially Sakai's text-fig. 10c, the last anterolateral spine being slightly larger than the others and the remaining anterolateral spines being acute and not truncate as they are in larger specimens. The transverse ridges on the carapace are exactly as shown in Leene's fig. 70 and the cheliped merus has three spines anteriorly and one posteriorly exactly as shown in Stephenson, Hudson & Campbell's pl.3 fig.4, the most proximal anterior spine being the smallest and situated close to the middle anterior spine. The larger specimen differs from previous descriptions only in that the junction of the posterolateral and posterior borders is rounded and hardly forms an obtuse angle, the median frontal lobes are noticeably more advanced than the submedians and laterals and there are no coloured spots on the carapace as described by Sakai (1939). The fact that the last anterolateral spine is slightly larger than the others in this specimen at first suggests a species of *Portunus*. There is a narrow stridulatory ridge on the under surface of the carapace near the anterolateral border as in *C. nipponensis* (Sakai, 1939).

The smaller of the present specimens agrees with *C. bimaculata* in shape and tuberculation of the carapace but there is no spine on the merus of the swimming legs and the last anterolateral spine is much longer than the others which are short and not clearly distinguished from each other.

Distribution. Indo-West Pacific from India to the Philippines and Japan; eastern Australia from Warrior Reef (Qld.) to Botany Bay (N.S.W.) and Western Australia from Barrow I.

XANTHIDAE

Actaea peronii (H. Milne Edwards, 1834)

Material. N.S.W.: Watson's Bay, Port Jackson, 3-5 fms, sand and mud, 8.x.1914, 1 ♂, c.w. 8.4 mm; N of Montague I., 36-65 fms, sandy mud, 28.ix.1914, 1 ♂, c.w. 7.2 mm (both ZMC, Mortensen). - S.AUSTRALIA: Encounter Bay, 60 m, sand, 6.xii.1951, 1 ♂, c.w. 15.7 mm (ZMC, Galathea St.564).

Remarks. All specimens possess prominent tubercles on the anterolateral areoles of the carapace and smaller tubercles on the anteromedial regions whilst the posterior part of the dorsal surface is irregular and uneven. The tubercles on the carpus and palm of the cheliped are very large, closely spaced and conical or subacute apically. The ambulatory carpi and propodi bear very long blunt spines dorsally in ill-defined rows. All these are features characteristic of this species.

Distribution. South-eastern Australia from Port Stephens (N.S.W.) to Spencer

Gulf (S.A.). Two named subspecies have been recorded once from Torres Straits and south-western Australia (Griffin & Yaldwyn, 1971).

Calvactaea tumida Ward, 1933

Material. N.S.W.: Watson's Bay, Port Jackson, 3–5 fms, sand and mud, 8.x.1914, 1 ♂, c.w. 20.9 mm; Port Hacking, 2–3 fms, sand and mud, 9.x.1914, 1 ♂, c.w. 16.3 mm (both ZMC, Mortensen).

Remarks. These two specimens agree with previous descriptions by Ward (1933) and Sakai (1965) in carapace shape and granulation. They possess a short tomentum covering the whole body and legs and long thick hairs in dense clumps on the third maxillipeds and adjacent parts of the body – anterior part of the sternum and medial parts of the pterygostomial regions – and fringes of similar hairs on the dorsal and ventral margins of the ambulatory legs and cheliped merus and on the inner face of the cheliped carpus distally. The tomentum is not mentioned by Ward. In the smaller specimen most of the outer face of the palm of the chela is naked and the granules on the dorsal surface show through the tomentum but in the larger specimen only the fingers are naked and the dorsal granules are concealed. The dromiid-like chelae, globose carapace and dense clumps of hairs covering the mouthparts immediately distinguish this species.

Distribution: South-eastern Japan; Port Jackson and Port Hacking (N.S.W.), Freycinet Reach (W.A.).

Xanthias elegans (Stimpson, 1858)

Material. N.S.W.: Long Reef, near Port Jackson, intertidal on rocky coast. 22.x.1914, 1 ♂, 1 ♀, c.w. 9.4–11.3 mm (ZMC, Mortensen).

Remarks. The two specimens show no important differences from previous descriptions by Stimpson and by Haswell (1882: 49–50, pl.i fig. 1 – under the name *Xanthodes atromanus*) and the first pleopod of the male is not noticeably different from that figured by Forest & Guinot (1961). The elevations near the anterolateral margins of the carapace and the tubercles on the cheliped carpi and palms of the chelae are more prominent in the smaller, female specimen than in the male.

Distribution. Western Pacific – South-eastern Japan, Formosa, Norfolk I.; eastern Australia from the Capricorn Group to Port Jackson; Western Australia from Monte Bello Is. to the Abrolhos.

Medaeus planifrons Sakai, 1965

Material. QUEENSLAND: Off Cape Moreton, 55–86 m, gravel, 5.xi.1951, 2 ♂, c.w. 5.6 and 9.1 mm (ZMC, Galathea Sts.538–39).

Remarks. These two specimens agree with the description and figures given by Sakai in the obvious granulation of the carapace, presence of prominent elevations in the protogastric, hepatic and epibranchial regions, in the number of anterolateral teeth and in the shape and ornamentation of the chelipeds although the inner dorsal edge of the palm of the chela bears no more than

three obvious lobes. The only leg is anteriorly carinate and dentate as described by Sakai. The front of the carapace is very deeply divided medially and the two lobes are obviously set off laterally from the orbital border and the front, as a whole, is not so prominent as shown in Sakai's figure. Finally the first pleopod of the male is short, stout and outwardly curved with many long hairs arising from the medial edge close to the tip, very short spinules along the medial edge and short hairs along the lateral edge not far from the apex as shown in Sakai's figure.

Guinot (1967) has suggested that this species may belong in her new genus, *Paramedaeus*.

Distribution. Previously known only from Sagami Bay and Tosa Bay, Japan and the Banda Sea; now recorded from off southern Queensland.

Megametope rotundifrons (H. Milne Edwards, 1834)

Material. VICTORIA: Phillip I., 1♀, c.w. 24.7 mm (ZMC, Hauschild).

Remarks. The synonymy of this species has been reviewed by McNeill (1926). The present specimen agrees well with descriptions and figures given by McCulloch (1908; 54-56, pl. xii figs 5, 5a - under the name *Gabriella haswelli*) and by Hale (1927; 156-157, fig. 157) in carapace shape, lack of distinct granulation, punctulation of the carapace anteriorly and of the sternum and abdomen and in lack of carinae on the palm of the chelipeds dorsally.

Distribution. Southern Australia from Western Port (Vict.) to Port Lincoln (S.A.).

Pilumnus contrarius Rathbun, 1923

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.ix.1951, 1♂, c.w. 4.1 mm (ZMC, Galathea St.539); Moreton Bay, ½ mile W of Naval Research Beacon, 4.5 fms, sandy mud, 24.ix.1962, 1 ovig. ♀, c.w. 25.4 mm (AM P.15213).

Remarks. Despite its extremely small size, this specimen taken by the "Galathea" is clearly referable to Rathbun's species in having long hairs overlying the front of the carapace but not attached to the eyestalk as in *P. digitalis* Rathbun, blunt anterolateral lobes ornamented with minute spinules, and granulate areas posterolaterally and laterally near the third anterolateral spine.

Distribution. North-eastern Australia from just N of Bowen to Moreton Bay (Qld.).

Pilumnus australis Whitelegge, 1900

Material. N.S.W.: N of Montague I., 36-65 fms, sandy mud, 28.ix.1914, 1♀, c.w. 7.9 mm (ZMC, Mortensen); 16-18 miles NE of South Head, Port Jackson, 75-80 fms, off conglomerate boulders taken by trawler v.1924, 1♀, c.w. 12.4 mm (AM P.7222); Shellharbour, intestine of Nannygai (a berycid fish, *Centroberyx affinis* (Gunther, 1859)), 1925, 1♂, c.w. 10.8 mm (AM P.8442); off Bateman's Bay, 80 fms, from cavities in conglomerate boulder, 1924, 1♂, c.w. 12.3 mm (AM P.7193).

Type material. There are five type specimens; all are to be considered syntypes since Whitelegge did not designate any one specimen as type. All specimens are in the collections of the Australian Museum, Sydney. A lectotype is selected as follows. *Lectotype.* Male, c.w. 8.1 mm, off Port Kembla, 75 fms, E.R. Waite, March 1899 ("Thetis" Sta. 49). The specimen is dry and mounted on blue glass inside a glass tube fixed to glass which bears a typed label "G.2350 (registered number) TYPE *Pilumnus australis* 'Thetis' Sta. 49". The right third and fourth and left third ambulatory legs are the only ones remaining; the chelipeds are fixed separately to the glass. *Paralectotypes.* Four females (1 ovig.), c.w. 7.0–9.0 mm, ovig.♀, 8.6 mm, off Coogee, 49–50 fms, E. R. Waite, March 1899 ("Thetis" Sta. 44). Specimens in spirit (registered number G.2351); all are in good condition but legs are detached from most.

Remarks. The single specimen collected by Mortensen possesses the extraordinarily long spines on the anterolateral margin, chelipeds and ambulatories characteristic of this species. The external orbital angle is extremely blunt and there are two spines close together on the left frontal lobe but none on the right; the dorsal surface of the carapace bears a few long simple hairs anteriorly and a close pubescence posteriorly. The merus of the second left ambulatory leg (the only one remaining in this specimen) bears two spinules midway along the dorsal edge and a longer curved spine more distally as well as one above the distal edge; the carpus bears three long dorsal spines. The other specimens from New South Wales all agree closely with the type material.

Distribution. Known only from eastern Australia, from off Coogee to Montague Island (N.S.W.).

Pilumnus etheridgei Rathbun, 1923

Material. VICTORIA: Hastings, Western Port, 3–10 fms, stones and algae, 5–6.ix.1914, 1♂, c.w. 10.9 mm, 2♀, c.w. 4.5–5.5 mm, 1 ovig. ♀, c.w. 9.0 mm (ZMC, Mortensen); off Lakes Entrance, ii.1952, 1 ovig. ♀, c.w. 10.0 mm (AM P.12144); Flinders, coast E of Port Phillip, iii.1929, 1♂, 4♀, c.w. 7.5–12.5 mm (AM P.9354). – TASMANIA: ix.1924, 1♂, c.w. 9.9 mm (AM P.7419). – W. AUSTRALIA: King Georges Sound, Albany, 23.iii.1922, 1 ovig. ♀, c.w. 12.9 mm (AM P.5674); Lovers Beach, Dempsters Point, Esperance Bay, 27.iii.1922, 1♂, c.w. 11.1 mm (AM P.5688).

Remarks. All specimens possess scattered long simple hairs on the anterior half of the dorsal surface of the carapace and on the chelipeds and legs, there is a prominent spine on each anterolateral lobe (including that forming the external orbital angle) and the tubercles on the carpus and palm of the chelae are much more pointed than elsewhere; the tubercles on the minor chela are in longitudinal rows. In the largest specimen the first and second anterolateral spines have a smaller spine on their posterior slope near the base and the hairs on the carapace near the front are longer than elsewhere but do not form a fringe. The smallest specimen also has long hairs anteriorly but the ovigerous specimen possesses rather shorter hairs. The largest specimen lacks ambulatories but in all others the meri have about

6 short curved spines dorsally, there are up to 4 longer dorsal spines on the carpi and 1 or 2 dorsal spines on the propodi; these spines are most prominent on the first and second ambulatory legs.

Distribution. Southern Australia from eastern Tasmania through Victoria to off Fremantle (W.A.); no records from South Australia.

Pilumnus monilifer Haswell, 1881

Material. VICTORIA: Hastings, Western Port, 5–10 fms, algae, 6.ix.1914, 2 ♂, 3 ♀, c.w. 5.5–10.5 mm (ZMC, Mortensen); Flinders, coast E. of Port Phillip, 1929, 1 ♀, c.w. 16.5 mm, 1 ovig. ♀ 13.6 mm (AM P.9356); Seaport, Port Phillip, 1926, 1 ovig. ♀, c.w. 16.7 mm (AM P.8697); Beaumaris, Port Phillip, rocky shore below low tide mark, 1927, 3 ♂, 1 ♀, c.w. 15.8–21.8 mm (AM P.9231–3). – TASMANIA: Three Hummocks I., Bass Strait, 17.i.1954, 1 ovig. ♀, c.w. 12.5 mm (AM P.12462); Simpson's Bay, D'Entrecasteaux Channel, 8–15 fms, 1926, 1 ♂, c.w. 18.8 mm (AM P.8648).

Type material. Haswell's description was based on a series of specimens but he made no mention of a type; the specimen thus have syntype status and a lectotype is here designated. *Lectotype.* Male (dry), c.w. 18.8 mm, mounted on glass with printed label, "*Type PILUMNUS MONILIFERA, Haswell. Loc. Tasmania*", and registered as P.733 (also printed on label); Australian Museum. This is clearly the specimen figured by Haswell. The specimen is in good condition but has only two ambulatory legs, the right fourth and the left third. *Paralectotypes.* Eight specimens (dry), c.w. 7.1–19.1 mm; mounted on glass with printed label bearing same locality information as the lectotype but bearing the words *Co-types* and registered as P.2262 (Australian Museum). Three specimens (2 ♂, 1 ♀) (dry) c.w. 11.9–15.4 mm; mounted on glass with handwritten label "*Pilumnus monilifera, Tasmania*" (Macleay Museum collections now on permanent loan to Australian Museum).

Remarks. These specimens agree in all features with the material from Port Phillip reported on elsewhere (Griffin & Yaldwyn, 1971) including density and type of tomentum, form of anterolateral lobes and shape of first pleopod in the males.

Distribution. Southern Australia from eastern Tasmania, Victoria and South Australia.

Pilumnus tomentosus Latreille, 1825

Material. N.S.W.: S of Montague I., 20–50 fms, sand and mud, 30.ix.1914, 16 ♂, 11 ♀, c.w. 3.5–18.5 mm; Disaster Bay, 30–40 fms, sand and mud, 1.x. 1914, 1 ♀, c.w. 3.0 mm (all ZMC, Mortensen); near Coffs Harbour, i.1925, 1 ♀, c.w. 25.7 mm (AM P.12957); off Norah Head, 26–38 fms, vi.1921, 1 ♂, 2 ♀, c.w. 17.1–23.4 mm (AM P.5348); off Botany Bay, 33–56 fms, viii.1921, 1 ♂, 2 ♀, c.w. 18.0–25.4 mm (AM P.5530); between Point Perpendicular and Wreck Bay, 30–40 fms, xi.1941, 1 ♀, c.w. 17.6 mm (AM P.11391); 10–20 miles S of Montague I., 30–40 fms, 13.vii.1925, 1 ♂, c.w. 26.2 mm (AM P.8215); between Merrimbla and Tathra, 3 miles from shore, 20–30 fms, 18.vii.1925, 1 ♀, c.w. 35.9 mm (AM P.8226); 3–4 miles off Eden, 25–30 fms,

1922, 7♂, 10♀ (4 ovig.), c.w. 4.3–17.3 mm, smallest ovig. ♀ 13.9 mm (AM P.5784); 12–22 miles N. $\frac{1}{2}$ E. from Green Cape, 39–46 fms, vi.1924, 16♂, 21♀, c.w. 6.1–36.7 mm (AM P.7358–70).

Remarks. These specimens agree with the material previously reported on by Rathbun (1923) and by Griffin & Yaldwyn (1971) in the hairyness and ornamentation of the carapace, chelipeds and ambulatory legs, the carpi and propodi of which lack spines.

Distribution. Southern Australia from off Newcastle (N.S.W.) through Tasmania to Albany (W.A.).

Pilumnus rufopunctatus Stimpson, 1858

Material. N.S.W.: Long Reef, near Port Jackson, intertidal on rocky coast, 22.x.1914, 2♂, 5♀ (1 with sacculina), c.w. 8.5–14.8 mm, 1 ovig. ♀, 11.7 mm (ZMC, Mortensen); Shelly Beach, Yamba, Angourie, 25.xii.1939, 1♂, c.w. 14.4 mm (AM P.11248); on coast 2 miles S of entrance of Tuggerah Lakes, from rockpool, 3♂, 4♀ (1 ovig.), c.w. 10.2–12.8 mm, ovig. ♀ 11.2 mm (AM P.6909); Sandy Point, Broken Bay, 1926, 1♂, c.w. 15.5 mm (AM P.8536); Long Reef, Collaroy, 6.xi.1922, 2♂, 3♀, c.w. 7.4–15.2 mm (AM P.6551); Fairybower, Manly, 20.x.1922, 2♂, 6♀, c.w. 7.4–14.5 mm (AM P.6518); Freshwater, near Manly, 6–10 ft. below low tide mark, associated with cunjevoi, 5.i.1924, 1♂, c.w. 8.2 mm, 1 ovig. ♀ 11.8 mm (AM P.6857); Bottle and Glass Rocks, Port Jackson, between tide marks, x.1925, 1♂, c.w. 17.3 mm (AM P.8410); between Sow and Pigs Reef and Shark Island, Port Jackson, dredged 5–7 fms, 16.v.1923, 1♂, c.w. 9.0 mm (AM P.6500); between Sow and Pigs Reef and Green Point, Port Jackson, 25.viii.1923, 1♂, 4♀, c.w. 6.9–11.2 mm (AM P.6482); Coogee, in rockpools, 15.xii.1921, 1♂, 2♀, c.w. 5.7–9.2 mm (AM P.6069); Shellharbour, between tide marks, i.1924–iii.1929, 15♂, 6♀ (4 ovig.), c.w. 6.7–14.6 mm, smallest ovig. ♀ 7.8 mm (AM P.6294, 6607, 6844, 7174, 7247, 7894, 8431, 9333).

Remarks. These specimens all have the carapace, chelipeds and ambulatories densely covered by short feathered hairs which are slightly longer and brownish in colour on the lateral parts of the carapace and on the chelipeds; longer, brownish, simple hairs form a longitudinal fringe on the anterodorsal and posterodorsal surfaces of the ambulatory carpi and propodi. The blunt to sharp spines on the carapace, chelipeds and ambulatory carpi and propodi project through this dense tomentum. The spine on the summit of each anterolateral lobe has a smaller spine behind it in the larger specimens. There are also a few isolated spines near the anterolateral borders of the carapace and on or near the midline in the mesogastric and protogastric regions. The supra-orbital border possesses a few small spines. The major chela palm has the outer surface mostly covered by large, round, sharp tubercles leaving little more than the ventral part smooth and naked. The first pleopod of the males is apically outwardly curved and fringed laterally by long hairs.

This species is similar to *P. monilifer* Haswell but lacks tufts of long hairs on the carapace. It is compared with other south-eastern Australian *Pilumnus* species by Griffin & Yaldwyn (1971).

Distribution. South-eastern Australia from near Clarence River (N.S.W.) to Spencer Gulf (S.A.).

GONEPLACIDAE

Litocheira bispinosa Kinahan, 1856

Material. VICTORIA: Hastings, Western Port, 5–10 fms, algae, 6.ix.1914, 2♂, 2♀ (ovig.), c.w. 6.3–10.8 mm, smaller ovig. ♀, 9.4 mm (ZMC, Mortensen); Western Port, 1♂, c.w. 9.1 mm (ZMC, Hauschild); near Swan I., Port Phillip, ca 1 fm. iii.1926, 1♀, c.w. 7.9 mm (AM P.8611). – TASMANIA: Spring Bay, 23.x.1938, 1♂, c.w. 10.7 mm (AM P.11799). – W. AUSTRALIA: King George's Sound, near Albany, iii.1922, 1♀, c.w. 11.3 mm, 1 ovig. ♀, 8.2 mm (AM P.5676).

Remarks. This material agrees in all important features with previous descriptions (McCulloch, 1913) and with that collected by the Port Phillip Survey 1957–63 (Griffin & Yaldwyn, 1971). The front is double edged, the merus of the cheliped possesses a broad dorsal tubercle distal to the middle, the last segment of the abdomen in males is deeply inserted into the penultimate segment and the sternal grooves in the female do not meet anteriorly.

Distribution. Southern Australia from Western Port (Vict.) and Tasmania to Albany (W.A.).

Carcinoplex meridionalis Rathbun, 1925

Material. N.S.W.: Disaster Bay, 30–40 fms, sand and mud, 1.x.1914, 1♂, 1♀, c.w. 12.5–13.9 mm (ZMC, Mortensen).

Remarks. Both specimens show barely a trace of the low ridge on the branchial regions, the medial depression anterior to the cardiac region is prominent (as in the holotype) and the inner spine of the carpus of the cheliped in the male bears two broad accessory spinules on the distal border whilst the spine on the other cheliped carpus lacks spinules or tubercles; the spine on the outer angle of the carpus is distally directed. The sexual differences noted by Rathbun for adults in regard to the extent of the colouration on the fingers and palm of the cheliped are true for these small specimens. The abdomen in the male is weakly concave laterally from the third segment to the tip as in the holotype.

Distribution. Southern Australia from Port Jackson (N.S.W.) to Eucla (W.A.) in the Great Australian Bight.

Rhizopa gracilipes Stimpson, 1858

Material. QUEENSLAND: Off Cape Moreton, 86 m, gravel, 5.xi.1951, 3♀, c.w. 3.5–5.5 mm (ZMC, Galathea St.539).

Remarks. These small specimens agree well with those from Moreton Bay, Queensland, reported on elsewhere (Griffin & Campbell, 1969).

Serene (1964) has earlier recorded specimens of this species taken by Mortensen in Port Jackson.

Distribution. Gulf of Siam, China Sea; Australia from Cape Moreton (Qld.) to Port Jackson (N.S.W.).

Hexapus sexpes (Fabricius, 1798)

Material. N.S.W.: Off Yamba, 50 m, sand, 11.xi.1951, 1 ♂, c.w. 4.7 mm (ZMC, Galathea St.544).

Remarks. This extremely small specimen agrees with previous descriptive remarks of this species and is clearly referable to this species in having a medial trench in the first sternite close to the anterior margin, oblique striae on the pterygostomial regions, densely tomentose chelipeds and ambulatory legs and well developed dactyl on the third maxillipeds. The carapace, sternum, abdomen and appendages are covered by close-set, round granules and the propodi and dactyls of the second and third ambulatory legs are fringed by very long distally plumose hairs.

Distribution. Indo-West Pacific – Iranian Gulf, Japan, Thailand and New Caledonia; eastern Australia from Moreton Bay (Qld) to Port Jackson (N.S.W.). The Cape of Good Hope specimens described by Stebbing as *H. sexpes* have been considered a distinct species by Barnard (1950:299). Australian specimens may belong to a distinct species (Campbell & Stephenson (1970), *Mem. Qd Mus.*, 15:286–7).

GRAPSIDAE

Leptograpsus variegatus (Fabricius, 1793)

Material. N.S.W.: Long Reef, near Port Jackson, intertidal on rocky coast, 22.x.1914, 1 ♂, c.w. 44.1 mm (ZMC, Mortensen), – W. AUSTRALIA: Fremantle, x.1937, 1 ♀, c.w. 18.7 mm (ZMC, Heegaard).

Remarks. Both specimens show all the characteristic features of this widely distributed species. In the larger one, however, there are no traces of the usual tubercles on the posteroventral distal border of the fourth ambulatory merus. The fixed finger of the right chela has the basal portion toothed and there are several tubercles on the dorsal surface of the palm of the right chela as is usual but very few on the outer surface. There are no transverse ridges on the third maxillipeds such as are usually found in this species. The small specimen has the narrower carapace and less tuberculate chelae which characterise juveniles of this species.

Distribution. Southern warm temperate Indian and Pacific Oceans from Western Australia to Chile; eastern, southern and western Australia from Rockhampton (Qld.) to the North-West Cape area (W.A.).

Leptograpsodes octodentatus (H. Milne Edwards, 1837)

Material. VICTORIA: 2 ♀, c.w. 10.1–10.3 mm (ZMC, Hauschild).

Remarks. The convex lateral margins, with three “teeth” behind the external orbital angle immediately distinguish this species. In the present specimens, the branchial regions have fairly well-developed oblique ridges laterally and

the carapace is also fairly densely tuberculate dorsally near the lateral margins from the orbits backwards as is typical of juveniles of this species.

Distribution. Southern Australia, from Tasmania and Victoria to the Abrolhos Islands (W.A.).

Cyclograpsus granulatus H. Milne Edwards, 1853

Material. VICTORIA: 2♀, c.w. 10.1 and 10.3 mm (ZMC, Hauschild).

Remarks. The carapace of this specimen is strongly granular anteriorly, the ambulatories are also granular and the propodi of the first and fourth ambulatories have felt dorsally only. These characters are all typical of *granulosus* (see Campbell & Griffin, 1966).

Distribution. Restricted to Australia; Victoria and Tasmania to Kangaroo I. (S.A.).

Paragrapsus quadridentatus (H. Milne Edwards, 1837)

Material. VICTORIA: 1♂, 2♀, c.w. 12.0–18.7 mm (ZMC, Hauschild).

Remarks. These specimens agree well with previous descriptions of this species. The carapace is granulate dorsally near the front and anterolaterally and the anterolateral tooth is well-developed in all specimens. The "cushion" between the fingers of the chelae are weakly developed in the 12.0 mm male. The propodus of the first ambulatory leg possesses on the anterior face distally two short lines of felt, a wide dorsal one and a more slender central one; a line of felt also extends part way around the distal border. This is little different from that exhibited by most specimens.

Distribution. Restricted to Australia; confined to Tasmania and Victoria.

Plagusia chabrui (Linnaeus, 1758)

Material. N.S.W.: Long Reef, near Port Jackson, intertidal on rocky coast, 22.x.1914, 2♀, c.w. 9.8, 10.9 mm (ZMC, Mortensen). – VICTORIA: 1♀, c.w. 17.2 mm (ZMC, Hauschild).

Remarks. These very small specimens possess the features typical of juveniles of this species including absence of tubercles on the dorsal surface of the carapace behind the orbits and few spines on the frontal margin and dorsal edges of the ambulatory meri.

Distribution. Temperate southern Indian and Pacific Oceans from South Africa to Chile; southern Australia from around Sydney (N.S.W.) to Abrolhos Is. (W.A.).

OCYPODIDAE

Macrophthalmus punctulatus Miers, 1884

Material. QUEENSLAND: Sandgate, Brisbane R., 1925, 4♂, c.w. 6.6–10.5 mm (AM P.7917); Brisbane R., in mud banks, 10.iv.1957, 4♂, 2♀, (1 ovig.), c.w. 6.8–7.5 mm (AM P.12908); Brisbane R., 6 miles upstream under stones near low water neap, 2.xii.1956, 3♂, c.w. 5.5–10.6 mm (AM P.13134);

Bribie I., Moreton Bay, from burrows in mud at low water, 6.iii.1956, 5 ♂, 2 ♀, c.w. 3.5–8.0 mm (AM P.15154). – N.S.W.: Woodford B, Lane Cove R., 14.i.1923, 3 ♂, c.w. 7.5–10.9 mm (AM P.6691). – W.AUSTRALIA: Albany district, vi.1911, 2 ♂, 4 ♀ (ovig.), c.w. 6.7–9.1 mm (AM P.2776).

Remarks. All these specimens agree well with Miers's description and figures except that the front is weakly concave, the lateral margins weakly convex, the antennal peduncle is rather stout, the epistome weakly concave, the merus of the third maxilliped weakly concave at its summit, the ambulatory carpi and propodi are sometimes densely pubescent laterally. The orbits are obliquely sloping backwards laterally, not straight.

The merus and chela are densely fringed with hairs in males only, a feature which permits discrimination between the sexes down to a carapace width of 5.5 mm. In males of this size the tooth on the dactyl is still present but the inner edge of the fixed finger shows only a trace of the large tooth present in large specimens; these teeth are larger midway along the inner edge. The hairs on the posterolateral part of the dorsal surface of the carapace are arranged in a diffuse line extending obliquely posteromedially from the third anterolateral tooth; there is a patch of hair behind this and a transverse row of hairs parallel to the posterior border laterally. The ambulatories have transverse bands of dark pigment across them.

Distribution. Eastern Australia from Brisbane R. (Qld.) to Port Jackson (N.S.W.), Western Australia at Albany.

MICTYRIDAE

Mictyris platycheles H. Milne Edwards, 1852

Material. N.S.W.: Port Hacking, intertidal on sand beach, 71 ♂, 39 ♀, c.l. 5.9–16.5 mm (ZMC, Mortensen). – VICTORIA: Melbourne, 2 ♂, 1 ♀, c.l. 10.7–14.9 mm (ZMC, Corneliusen).

Remarks. The specimens possess the triangular front characteristic of this species and the carapace and maxillipeds are covered by large granules. The males possess an extremely broad triangular proximal tooth on the dactyl of the chela which passes behind the fixed finger when the fingers are closed.

Distribution. Eastern Australia from Moreton Bay (Qld.) to Tasmania.

Mictyris longicarpus Latreille, 1806

Material. N.S.W.: Middle Harbour, Port Jackson, intertidal, 4.iii.1915, 53 ♂, 7 ♀ (2 ovig.), c.l. 16.5–24.5 mm; southern N.S.W. coast, 28.ix.1914, 1 ♂, 2 ♀, c.l. 19.0–23.6 mm (all ZMC, Mortensen).

Remarks. This series possesses the smooth carapace, subpentagonal rostrum and greatly produced posterior border characteristic of this species. The males have only a small proximal tooth on the dactyl of the chela. The lower border of the chela is usually almost straight and not conspicuously curved as in the male illustrated by McNeill (1926, pl. IX fig. 2).

Distribution. Indo-West Pacific; western, northern and eastern coasts of Australia, from Fremantle (W.A.) to southern New South Wales.

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