

Wicksten & Méndez, 1982, and *L. splendidus* Wicksten & Méndez, 1982.

*Lebbeus polaris* (Sabine) possesses a more elongate rostrum than the present species, and does not have a high-crested carapace. *Lebbeus brandtii* (Brazhnikov) has a short rostrum lacking, or with only one ventral tooth. *Lebbeus grandimanus* (Brazhnikov) has a relatively narrow rostrum, seen in lateral view, with four postorbital teeth not forming a crest. The two eastern Pacific species, *L. scrippsi* and *L. splendidus* Wicksten & Méndez both have narrow non-crested rostra with few dorsal teeth.

*Lebbeus compressus* Holthuis, 1947 (= *Spirontocaris gibberosa* Yokoya, 1933), a species possessing a toothed and crested carapace, has epipods on pereopod 1 only. (The holotypic male of this species, from 232 m at Siwoya-Zaki, Japan, was examined. Having a carapace length of 4.8 mm, the specimen probably dried out at some stage, and the carapace was damaged. It is possible that the epipod of pereopod 2 has been lost on both sides, because of this poor condition, but this seems unlikely). While Yokoya (1933) stated that the rostrum of his holotype was "broken off", there is no sign of damage in the rostral area. In fact, the rostrum is an acutely triangular, forwardly directed spine, quite unlike the present species.

**Etymology.** The species is named for Dr John Yaldwyn, director of the National Museum of New Zealand, and eminent carcinologist.

*Merhippolyte* Bate, 1888

*Merhippolyte chacei* n. sp.

Figs 18, 19

**Type material.** New South Wales: HOLOTYPE: AM P19092, 33°43'–37°S 151°55'–152°02'E, 686 m, bottom trawl, *Kapala* (K72-06-04), 19 Oct 1972; 1 ♀, cl 13.2 mm, (tip of rostrum damaged).

**Additional material examined.** AM P25038, east of Brush Island, 35°41'–44°S 150°38'–40°E, 549 m, *Kapala* (K76-19-04), 10 Nov 1976; 1 ♀, cl 9.5 mm.

**Diagnosis.** Rostrum almost 1.5X length of carapace, with 4–5 dorsal teeth, 7 ventral teeth, deepest just anterior to eye, anterior half dorsally unarmed. Pterygostomian angle rounded. Pleuron of abdominal somite 4 with small posteroventral tooth. Ocellus largely fused with cornea of eye. Epipods present on pereopods 1–4. Pereopod 2 reaching well beyond scaphocerite.

**Description.** Rostrum almost 1.5X carapace length, broadest just anterior to eye, anterior half dorsally unarmed, upswept, apex bifid; formula: 4–5/7; 2 postorbital spines present. Carapace with strong antennal spine; pterygostomian angle rounded. All abdominal somites dorsally rounded; pleura of somites 1–3 ventrally rounded; pleuron 4 broad, with small but distinct posteroventral tooth; pleuron 5 acute, triangular; somite 5 half length of

somite 6; posteroventral angle of somite 6 with small tooth; posterolateral lobe overlapping telsonic base triangular, acute. Telson dorsally gently convex, with 2 pairs dorsolateral spines in posterior half; posterior margin broadly triangular, with 3 pairs of spines, second pair longest.

Cornea of eye much wider than eyestalk, well pigmented; dorsal ocellus half fused to cornea.

Antennular stylocerite lanceolate, with small basal tooth on outer margin, reaching distal margin of basal antennular peduncle article; small tooth on ventromesial margin at about distal two-thirds; second and third peduncular articles unarmed; dorsal flagellum subequal to carapace and rostrum in length; ventral flagellum somewhat longer.

Antennal scaphocerite with outer margin straight, distal spine not reaching rounded apex of blade; basal segment with small ventrodorsal tooth; blade over-reaching antennular peduncle by about half its length.

Mandibular palp of 3 setose articles, second article broadest; incisor flattened, tapering, with 5 faint distal serrations; molar robust, distally obliquely truncate.

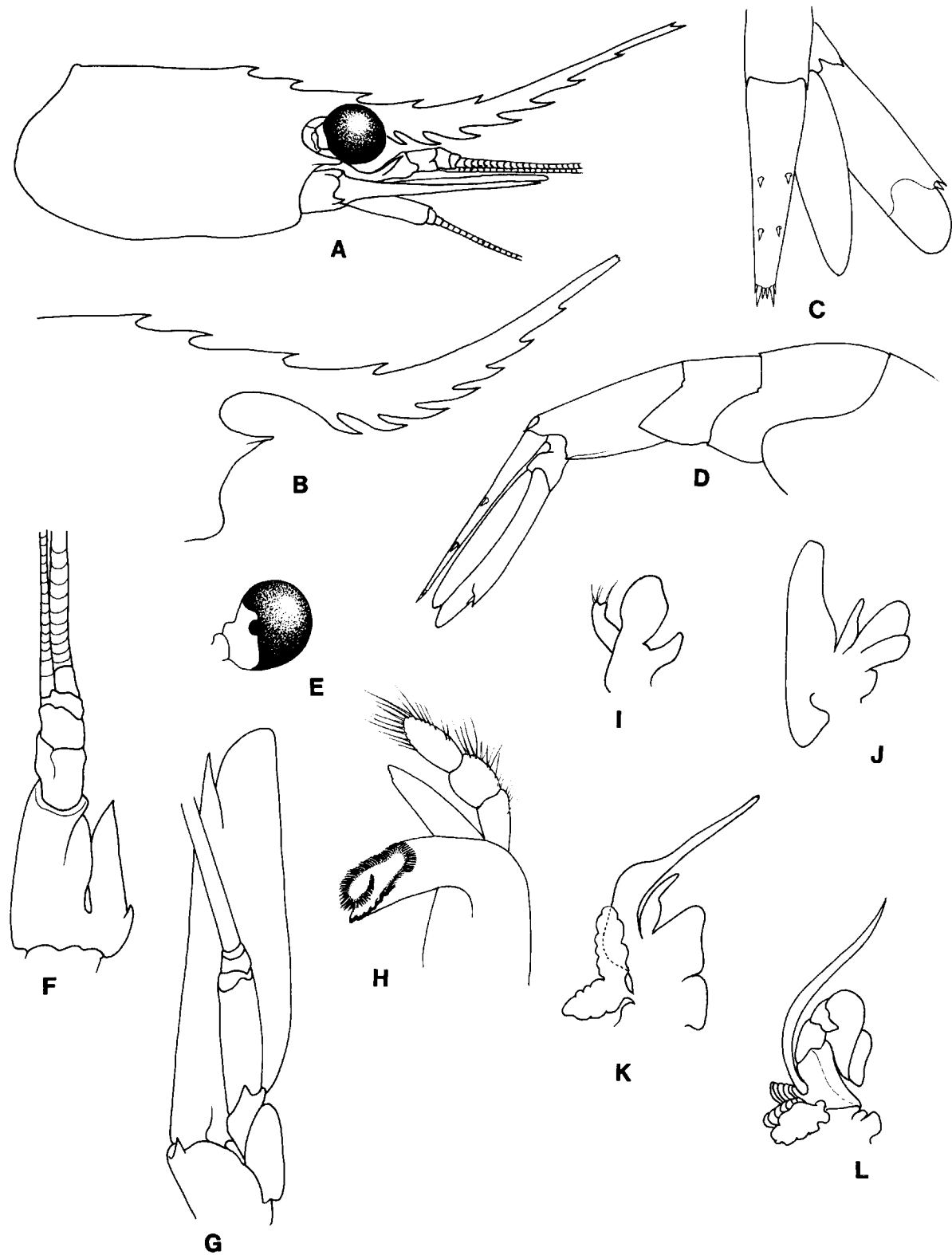
Maxilla 1, maxilla 2, maxilliped 1, and maxilliped 2 as figured.

Maxilliped 3 just over-reaching antennal blade; distal article strongly setose-spinose.

Epipods present on pereopods 1–4. Pereopod 1 reaching distal third of scaphocerite, shorter but more robust than following pereopods; fingers slightly shorter than palm; chela subequal in length to carpus; ischium produced on flexor margin into distally acute setose blade-like crest; basis with less conspicuous extension of flexor margin. Pereopod 2 over-reaching scaphocerite by distal third of carpus plus chela; fingers slightly shorter than palm; carpus consisting of 14 articles. Pereopods 3–5 similar, dactyls with strong distal corneous spine and 7 shorter spines on flexor margin; merus with 3 articulated spines on outer surface.

Uropodal basis with acute lobe overlapping outer ramus; latter extending slightly beyond inner ramus and telsonic apex, with fixed and articulated spine on outer margin at about distal three-fourths.

**Remarks.** Crosnier & Forest (1973) summarise the main differences between the five species of *Merhippolyte* described to that date. Taking the present species and working through the features listed in their Table 6, it can be seen that *M. chacei* differs from all the earlier species in several respects. The rostral formula of 4–5/7 is distinctive. The rounded pterygostomian angle only resembles *M. americana* Holthuis, 1961, and *M. kauaiensis* (Rathbun, 1906). The fourth abdominal pleuron only resembles that of *M. agulhasensis* Bate, 1888. The ocellus being largely fused with the cornea resembles *A. americana* and *M. ancistrota* Crosnier & Forest. Epipods on pereopods 1 to 4 are seen in *M. agulhasensis* and *M. calmani* Kemp & Sewell, 1912.



**Fig. 18.** *Merhippolyte chacei* n. sp. **A**, paratype in lateral view; **B**, rostrum of holotype; **C**, telson and uropod in dorsal view; **D**, abdominal somites 4-6 and tailfan in lateral view; **E**, eye; **F**, antenna 1; **G**, antenna 2; **H**, mandible; **I**, maxilla 1; **J**, maxilla 2; **K**, maxilliped 1; **L**, maxilliped 2.

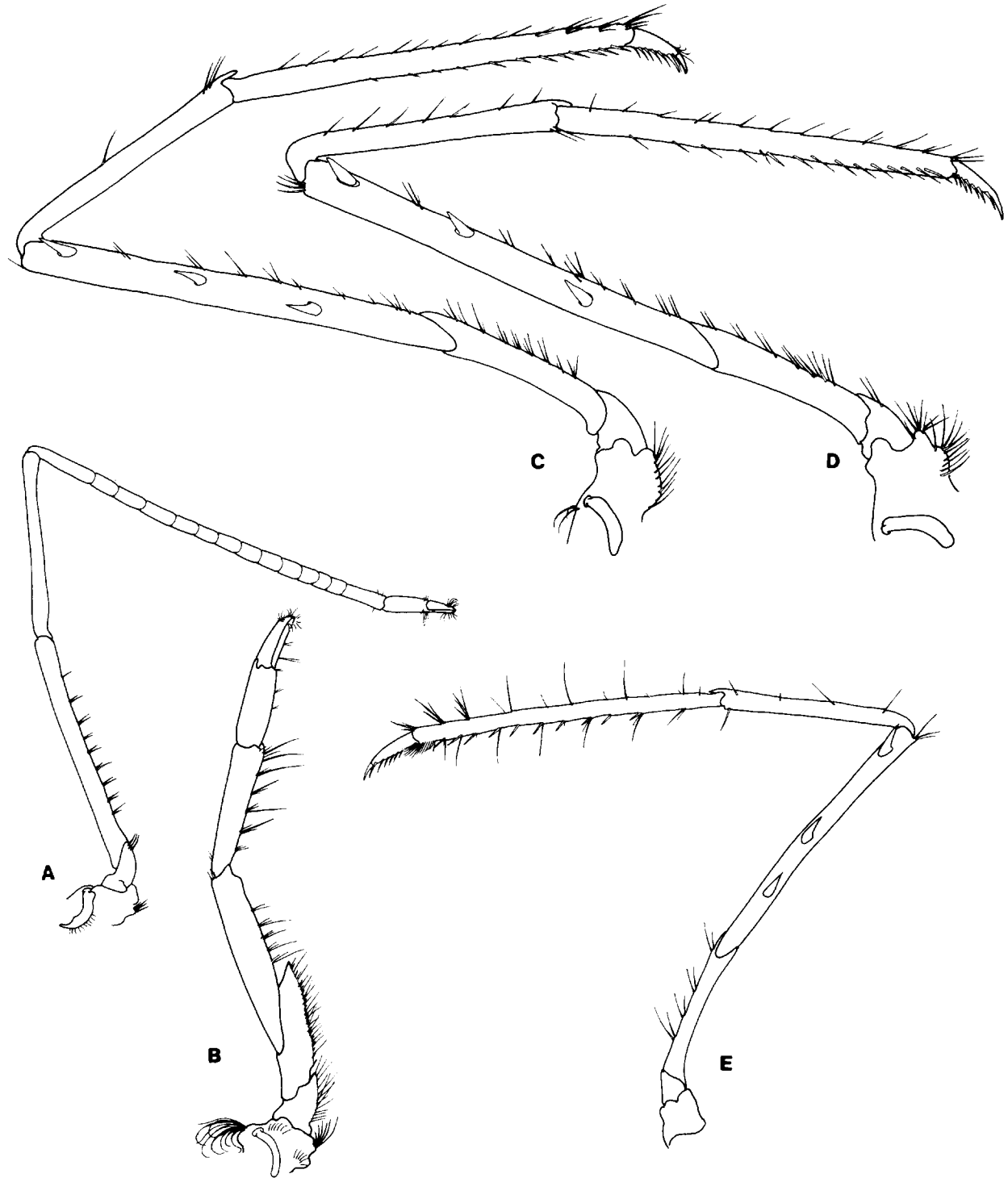


Fig. 19. *Merhippolyte chacei* n.sp. A, pereopod 2; B, pereopod 1; C, pereopod 4; D, pereopod 3; E, pereopod 5.

Further differences include the deeper rostral shape than that seen in *M. agulhasensis*, the ventrally produced ischium of pereopod 1, not seen in *M. calmani*, and pereopod 2 extending well beyond the scaphocerite, unlike *M. kauaiensis* where pereopod 2 is shorter than the scaphocerite by the length of the chela.

**Etymology.** The species is named for Fenner A. Chace, Jr. of the Smithsonian Institution, whose contributions to shrimp taxonomy are of inestimable value.

### Family PANDALIDAE

*Chlorotocus* A. Milne Edwards, 1882

*Chlorotocus novaezealandiae* (Borradaile)

*Thalassocaris novae-zealandiae* Borradaile, 1916: 84, fig. 2.  
*Chlorotocus novaezealandiae*.—Crosnier & Forest, 1973: 186; Chace, 1985: 11.

**Material examined.** New South Wales: AM P32492, north-east of Batemans Bay, 35°28'—26'S 150°44'—43'E, 40 m, trawl, *Kapala* (K76-01-03/04), 25 Mar 1976; 28 specimens (12 ovig. ♀).

**Diagnosis.** Rostrum just falling short of, just reaching, or just extending beyond, third antennular peduncle article; slender, with dorsal and ventral teeth (10—13/3—5). Carapace lacking lateral carinae; with antennal and branchiostegal spine. Pleuron of abdominal somite 5 with small posteroventral tooth. Somite 6 with short submarginal posteroventral tooth. Pereopods 1—4 each with epipod. Pereopod 1 not reaching scaphocerite apex. Pereopod 2, legs subequal, similar; chela with gape, dactylus with proximal lobe on 'cutting' margin; carpus of 2 articles.

**Remarks.** *Chlorotocus novaezealandiae* differs from the very similar and very widespread *C. crassicornis* (Costa) in two major characters: the rostrum (just reaching or barely over-reaching the distal antennular peduncle article in *C. novaezealandiae*, reaching well beyond in *C. crassicornis*), and size (ovigerous females of *C. novaezealandiae* 10.8—14.0 mm; of *C. crassicornis* 16.5—20.0 mm). The distribution of the anterior rostral teeth provides a subtle feature, becoming obsolete and close-set in the New Zealand species, but being evenly spaced in the more widespread species.

This is the first record of the species outside New Zealand waters.

**Distribution.** New Zealand; New South Wales; 140 m.

*Heterocarpus* A. Milne Edwards, 1881

*Heterocarpus sibogae* de Man

*Heterocarpus ensifer* Bate, 1888: 638—640, pl. 112, fig. 4.—Alcock, 1901: 107. (Not *Heterocarpus ensifer* A. Milne Edwards, 1881.)

*Heterocarpus sibogae* de Man, 1917: 283—284; 1920: 156, 169—171, pl. 14, figs 42—44.—Schmitt, 1926: 380—381; Calman, 1939: 206; Crosnier & Forest, 1973: 191—192 (in discussion); Chace, 1985: 36, figs 13m, 18—20.

**Material examined.** Queensland: AM P25147, east of Fraser Is., 360 m, *Markwell Enterprise*, Jan 1977; 7 specimens (4 ovig. ♀). AM P33025, north-east of Danger Point, 27°55'S 154°03'E to 27°57'S 154°03'E, 540 m, prawn trawl, *Kapala* (K78-23-09), 6 Nov 1978; 4 specimens (1 ovig. ♀). AM P33211, north-east of Danger Point, 28°01'S 154°00'E to 27°58'S 154°00'E, 540 m, prawn trawl, *Kapala* (K78-17-10), 17 Aug 1978; 10 specimens (1 ovig. ♀). AM P33026, north-east of Danger Point, 28°02'S 153°59'E to 27°59'S 153°59'E, 540 m, prawn trawl, *Kapala* (K78-09-05), 2 June 1978; 41 specimens (7 ovig. ♀). New South Wales: AM P33027, east of mouth of Clarence River, 29°41'S 153°45'E to 29°32'S 153°47'E, 405 m, prawn trawl, *Kapala* (K75-09-04), 10 Oct 1975; 4 specimens (3 ovig. ♀). AM P33028, north-east of Solitary Island, 29°47'S 153°44'E to 29°49'S 153°43'E, 432 m, prawn trawl, *Kapala* (K78-16-07), 2 Aug 1978; 14 specimens (5 ovig. ♀). AM P17906, north-east of Coffs Harbour, 29°49'S 153°42'E to 29°59'S 153°38'E, 369 m, prawn trawl, *Kapala* (K71-09-04), 12 May 1971; 4 specimens (2 ovig. ♀). AM P33208, north-east of North Solitary Island, 29°51'S 153°42'E to 29°55'S 153°42'E, 405 m, prawn trawl, *Kapala* (K78-06-06), 26 Apr 1978; 17 specimens (6 ovig. ♀). AM P26575, east of Woolli, 29°52'S 153°43'E to 29°51'S 153°43'E, 495 m, trawl, *Kapala* (K77-13-10), 23 Aug 1977; 18 specimens (4 ovig. ♀). AM P33209, north-east of North Solitary Island, 29°56'S 153°43'E to 29°53'S 153°41'E, 360 m, prawn trawl, *Kapala* (K78-06-01) 25 Apr 1978; 5 specimens (1 ovig. ♀). AM P19639, offshore between Newcastle and Sydney, 33°00'S 152°31'E to 33°44'S 151°50'E, 360—351 m, trawl, *Kapala*, July 1972; 1 specimen. AM P17905, east of Sydney, 33°39'S 152°55'E to 33°50'S 152°46'E, 360 m, trawl, *Kapala* (K71-05-04), 6 Apr 1971; 3 specimens. AM P33210, east of Sydney, 33°41'S 151°53'E to 33°39'S 151°56'E, 477 m, prawn trawl, *Kapala* (K80-21-05), 16 Dec 1980; 4 specimens. AM P25207, east of Sydney, 33°43'S 151°52'E to 33°39'S 151°54'E, 441—453 m, trawl, *Kapala* (K76-24-01), 20 Dec 1976; 5 specimens. AM P33032, east of Sydney, 33°46'S 151°49'E to 33°44'S 151°51'E, 432—418 m, prawn trawl, *Kapala* (K80-21-04), 16 Dec 1980; 1 specimen. AM P19094, east of Sydney, 33°51'S 151°51'E to 33°45'S 151°55'E, 675 m, prawn trawl, *Kapala* (K72-06-03), 19 Oct 1972; 1 specimen. AM P21040, P21047, north-east of Wollongong, 34°16'S 151°26'E to 34°22'S 151°23'E, 360 m, prawn trawl, *Kapala* (K75-05-01), 8 Aug 1975; 5 specimens (1 ovig. ♀). AM P21054, north-east of Wollongong, 34°21'S 151°24'E to 34°14'S 151°28'E, 396 m, prawn trawl, *Kapala* (K75-05-02), 8 Aug 1975; 13 specimens (3 ovig. ♀). AM P33029, north-east of Wollongong, 34°21'S 151°23'E to 34°19'S 151°25'E, 432 m, demersal trawl, *Kapala* (K78-27-13), 13 Dec 1978; 6 specimens (1 ovig. ♀). AM P33030, east of Port Kembla, 34°28'S 151°19'E to 34°34'S 151°17'E, 405 m, prawn trawl, *Kapala* (K75-05-07), 20 Aug 1975; 2 specimens (1 ovig. ♀). AM P33031, east of Shoalhaven Bight, 34°50'S 151°15'E, 828 m, dredge, *Kapala* (K78-27-04), 12 Dec 1978; 1 specimen.

**Diagnosis.** Rostrum about equal to carapace length in adult, with 9—26 dorsal and 6—13 ventral

spines. Postrostral crest starting about halfway along carapace. Carapace with strong antennal, lateral, and posterior intermediate keels. Abdominal somites 2–4 strongly carinate, somites 3 and 4 with strong posterior dorsal spine. First pair of pereopods lacking chelae; second pair of pereopods markedly unequal, carpus consisting of 6–11 articles in shorter, 17–30 in longer.

**Remarks.** *Heterocarpus sibogae* is distinguished from the very similar *H. ensifer* A. Milne Edwards by the carination of the abdominal somites. In all the specimens in this series there is, on the second abdominal segment, a high carina which often projects anteriorly and is subacute at its posterior angle. There is a less pronounced carina on the posterior half of the first segment and a ridge anteriorly. We have examined specimens of *H. ensifer* (AM P9865) from Hawaii and they have only a very low indistinct ridge on both the first and second abdominal segments.

In large specimens, including ovigerous females, the rostrum is usually 0.8 to 1.1 times the carapace length while in smaller specimens (cl 17–19 mm) the rostrum is 1.3 to 1.4 times the carapace length. The rostral formula varies from 12/7 to 18/10 in the Australian material.

The species was previously recorded from southwest of Gabo Island, Victoria, by Schmitt (1926).

**Distribution.** Andaman Sea; Indonesia; southern Philippine Islands; Japan; New Caledonia; New Hebrides; Fiji; western Samoa; eastern Australia; 247–828 m.

#### *Heterocarpus woodmasoni* Alcock

*Heterocarpus Wood-Masoni* Alcock, 1901: 108.—Alcock & McArdle, 1901, pl. 51 fig. 2; de Man, 1920: 154, 156–159, pl. 13, figs 36–36c; Calman, 1939: 204.

*Heterocarpus woodmasoni*.—Kensley, 1972: 50 (in key), fig. 23D; Chace, 1985: 13q.

**Material examined.** Queensland: AM P25145, east of Fraser Island, 360 m, *Markwell Enterprise*, Jan 1977; 8 specimens.

**Diagnosis.** Rostrum longer than carapace length, with 7–12 dorsal, and 4–9 ventral spines postrostral crest starting at about anterior quarter of carapace. Carapace with antennal and lateral keels. Abdominal somites 1 and 2 dorsally rounded, somites 3–5 dorsally carinate, somite 6 with paired longitudinal carinae; somite 3 with prominent mid-dorsal hooked spine. Second pair of pereopods markedly unequal, carpus consisting of 20–26 articles in longer, 9–12 articles in shorter.

**Remarks.** *Heterocarpus woodmasoni* is distinguished from other species of the genus by the presence of a prominent hooked spine dorsally on the third abdominal somite. In the ovigerous females in this series the rostrum is 1.3 to nearly 1.5 times the

carapace length and the rostral formula is 8/6 or 8/7.

**Distribution.** Indian Ocean, Andaman Sea to Indonesia, Philippines, and South China Sea; 291–655 m.

#### *Plesionika* Bate, 1888

##### *Plesionika alcocki* (Anderson)

*Pandalus alcocki* Anderson, 1896: 92–93.—Alcock & McArdle, 1901, pl. 52, figs 2, 4; Alcock, 1901: 97–98.  
*Plesionika alcocki*.—Calman, 1939: 197; Chace, 1985: 55.

**Material examined.** Queensland: AM P35878, P34383, north-east of Point Danger, 28°03'S 154°04'E to 28°01'S 154°04'E, 724 m, demersal prawn trawl, *Kapala* (K78-23-08), 6 Nov 1978; 9 specimens (4 ovig. ♀). New South Wales: AM P25144, north-east of Broken Bay, 33°30'S 152°05'E to 33°27'S 152°07'E, 810 m, demersal prawn trawl, *Kapala* (K76-24-04), 21 Dec 1976; 3 specimens (2 ovig. ♀). AM P35876, east of Broken Bay, 33°32'S 152°06'E to 33°34'S 152°05'E, 808 m, demersal prawn trawl, *Kapala* (K79-20-13), 6 Dec 1979; 5 ovig. ♀. AM P20994, P20998, east of Broken Bay, 33°32'S 152°00'E, 810 m, demersal prawn trawl, *Kapala* (K75-05-05), 19 Aug 1975; 3 specimens. AM 26783, east of Broken Bay, 33°34'S 152°02'E to 33°31'S 152°04'E, 895 m, demersal prawn trawl, *Kapala* (K77-23-07), 6 Dec 1977; 1 specimen. AM P25151, east of Broken Bay, 33°35'S 152°01'E to 33°32'S 152°03'E, 810 m, demersal prawn trawl, *Kapala* (K76-24-03), 20 Dec 1976; 9 specimens (4 ovig. ♀). AM P35877, east of Broken Bay, 33°35'S 152°00'E to 33°33'S 152°02'E, 810 m, demersal prawn trawl, *Kapala* (K77-23-12), 8 Dec 1977; 2 specimens (1 ovig. ♀). AM P19087, south-east of Broken Bay, 33°43'S 151°56'E to 33°40'S 151°59'E, 765 m, demersal prawn trawl, *Kapala* (K72-07-14), 6 Dec 1972; 1 ovig. ♀. AM P19088, south-east of Broken Bay, 32°42'S 151°55'E to 33°40'S 151°57'E, 810 m, demersal prawn trawl, *Kapala* (K72-07-16), 7 Dec 1972; 1 specimen. AM P35872, north-east of Port Jackson, 33°47'S 151°55'E to 33°44'S 151°57'E, 806 m, demersal trawl, *Kapala* (K78-26-16), 7 Dec 1978; 11 specimens (6 ovig. ♀).

**Diagnosis.** Rostrum immovable, longer than carapace, dorsally unarmed anterior to crest, ventral margin with fewer than 20 fairly widely spaced teeth; rostral crest of 5 sharp teeth, posterior 3 teeth small and movable. Third abdominal somite unarmed posteriorly; fourth abdominal somite without posteroventral denticle on pleuron; fifth abdominal somite with posteroventral denticle on pleuron. Telson with 4 pairs of dorsolateral spines. Eyes well developed, lacking ocellus. Second pair of pereopods subequal, chelate, carpus consisting of 26–32 articles. Third maxilliped with exopod. Pereopods 1–4 with strap-like epipods.

**Remarks.** The rostrum of the adults in these specimens is just under 1.5 times the carapace length; on the ventral margin there are about eight well spaced teeth, with a further four to five very small teeth near the apex. The second pair of pereopods are subequal in length and exceed the scaphocerite by the length of the chela and the first carpal joint. There are small tufts of setae on the chelae.

In both sexes pereopods three to five have a distinct dactyl which is about one-eighth of the propod length in the fifth pereopod and about one-fifth of the propod length in the third pereopod; there are setae at the bases of the dactyls.

The rostrum of *P. alcocki* is similar to that of *P. martia* (A. Milne Edwards) in being smooth dorsally in front of the rostral crest but *P. alcocki* is distinguished from *P. martia* by having a much shorter rostrum with fewer teeth in the rostral crest and fewer more widely spaced teeth ventrally.

These specimens were collected between 28°S and 34°S in trawls to 900 m depth.

**Distribution.** Indian Ocean; western Pacific; 500–1412 m.

### *Plesionika bifurca* Alcock & Anderson

*Plesionika bifurca* Alcock & Anderson, 1894: 155.—Alcock & McArdle, 1901, pl. 51, fig. 6; de Man, 1920: 115, 136–138, pl. 12, figs 31, 31b; Calman, 1939: 199; Chace, 1985: 56, fig. 24.

*Pandalus (Plesionika) bifurca*.—Alcock, 1901: 98.

**Material examined.** New South Wales: AM P26809, P26800, north-east of Norah Head, 33°08'S 152°27'E to 33°10'S 152°24'E, 580 m, demersal prawn trawl, *Kapala* (K77-23-09), 7 Dec 1977; 2 specimens. AM P26758, north-east of Norah Head, 33°11'S 152°24'E to 33°09'S 152°25'E, 720 m, demersal prawn trawl, *Kapala* (K77-23-10), 7 Dec 1977; 4 ovig. ♀. AM P25120, east of Broken Bay, 33°35'S 152°01'E to 33°32'S 152°03'E, 810 m, demersal prawn trawl, *Kapala* (K76-24-03), 20 Dec 1976; 1 specimen. AM P19084, south-east to east of Broken Bay, 33°43'S 151°55'E to 33°37'S 152°02'E, 675 m, demersal prawn trawl, *Kapala* (K72-06-04), 19 Oct 1972; 2 specimens. AM P19085, south-east of Broken Bay, 33°44'S 151°55'E to 33°40'S 151°58'E, 720 m, demersal prawn trawl, *Kapala* (K72-07-04), 9 Nov 1972; 1 ovig. ♀. AM P19083, east to north-east of Port Jackson, 33°51'S 151°51'E to 33°45'S 151°55'E, 675 m, demersal prawn trawl, *Kapala* (K72-06-03), 19 Oct 1972; 2 specimens.

**Diagnosis.** Rostrum immovable, slightly more than half carapace length, rostral crest of 4 teeth behind orbital margin and 2–3 teeth anterior to these on dorsal margin; ventral margin with 3–6 teeth and small subapical tooth. Third abdominal somite dorsally rounded, unarmed posteriorly; fourth abdominal somite without posteroventral denticle; fifth abdominal somite with a posteroventral denticle. Telson with 5 pairs of dorsolateral spines. Eyes well developed, lacking ocellus. Third maxilliped with exopod. Second pair of pereopods chelate, unequal, carpus of shorter with 10–15 articles, of longer with 15–24 articles. Pereopods 1–4 with strap-like epipods.

**Remarks.** In these specimens the rostrum length is up to two-thirds (0.57–0.67) the carapace length. There are four teeth in the rostral crest behind the orbital margin and two or three anteriorly. On the ventral margin of the rostrum there are usually four or

five teeth and one subapical but in two specimens there are only three teeth and in one specimen six teeth as well as the subapical tooth. The telson is about one and one-third times the length of the sixth abdominal segment.

The short rostrum with few widely spaced teeth distinguishes *P. bifurca* from other species of *Plesionika* so far recorded off New South Wales.

These specimens were collected between 33°S and 34°S in trawls to depth of 810 m.

**Distribution.** Indo-west Pacific to South China Sea and Japan; 245–1412 m.

### *Plesionika edwardsi* (Brandt)

*Pandalus Edwardsii* Brandt, 1851: 122.

*Pandalus longirostris* Borradaile, 1899: 413, pl. 37, figs 10, 10a–h.

*Plesionika longirostris*.—Barnard, 1950: 681–682, fig. 126n; Crosnier, 1976: 234, fig. 4a; Kensley, 1981b: 28 (in list).

*Plesionika edwardsii*.—Crosnier & Forest, 1973: 202, figs 63b, 64b; Chace, 1985: 62, fig. 26.

**Material examined.** New South Wales: AM P35890, south-east of Point Danger, 28°17'S 153°53'E to 28°13'S 153°52'E, 198 m, demersal prawn trawl, *Kapala* (K78-17-14), 17 Aug 1978; 8 specimens (6 ovig. ♀). AM P17902, north-east of Norah Head, 33°11'S 152°20'E to 33°14'S 152°16'E, 277 m, demersal prawn trawl, *Kapala* (K71-08-01), 27 Apr 1971; 1 specimen. AM P18101, north-east of Norah Head, 33°11'S 152°20'E to 33°16'S 152°18'E, 274 m, demersal prawn trawl, *Kapala* (K71-14-05), 12 Aug 1971; 15 specimens (12 ovig. ♀). AM P26838, north-east of Batemans Bay, 35°29'S 150°46'E to 35°44'S 150°36'E, 216 m, demersal fish trawl, *Kapala* (K77-11-01/02/03), 2 Aug 1977; 1 specimen. AM P34385, P35889, south-east of Batemans Bay, 35°50'S 150°34'E to 35°46'S 150°36'E, 360 m, demersal fish trawl, *Kapala* (K79-11-04), 7 Aug 1979; 11 specimens (4 ovig. ♀).

**Diagnosis.** Rostrum immovable, about twice carapace length, with about 4 sharp teeth basally and more than 20 teeth along dorsal margin; ventral margin with more than 30 teeth. Third abdominal somite dorsally rounded, unarmed posteriorly; fourth abdominal somite without posteroventral denticle; fifth abdominal somite with posteroventral denticle. Eyes well developed, ocellus present. Third maxilliped with exopod, last and penultimate articles subequal. Second pair of pereopods chelate, subequal, carpus consisting of 21–25 articles. Pereopods 1–4 with reduced strap-like epipods.

**Remarks.** In these specimens the rostrum is about twice (1.8–2.3) the carapace length; dorsally the rostrum has four large teeth basally and 21 to 28 anteriorly; ventrally there are 36 to 44 closely-set teeth. The telson is subequal to or slightly less than (1.0–0.9) the length of the sixth abdominal somite.

These specimens were collected between 28°13'S and 35°50'S in trawls to a depth of 360 m.

**Distribution.** Eastern and western Atlantic, Mediterranean, Gulf of Mexico, Indo-west Pacific; 50–689 m.

*Plesionika grahami* n. sp.

Figs 20, 21

**Type material.** New South Wales: HOLOTYPE: AM P35897, north-east of Port Jackson, 33°44'S 151°49'E to 33°42'S 151°50'E, 405 m, trawl, *Kapala*, 28 Sept 1975; 1 ♂, cl 18.4 mm. PARATYPES: AM P35896, east of North Solitary Island, 29°53'S 153°42'E to 29°55'S 153°42'E, 411 m, demersal prawn trawl, *Kapala* (K78-06-06), 26 Apr 1978; 4 specimens (1 ovig. ♀). AM P21583, north-east of Port Jackson, 33°44'S 151°49'E to 33°42'S 151°50'E, 405 m, trawl, *Kapala*, 28 Sept 1975; 2 specimens. AM P26576, north-east of North Solitary Island, 29°52'S 153°43'E to 29°51'S 153°43'E, 500 m, demersal prawn trawl, *Kapala* (K77-13-10), 23 Aug 1977; 2 specimens. AM P21030, north-east of Wollongong, 34°21'S 151°24'E to 34°14'S 151°28'E, 400 m, demersal prawn trawl, *Kapala* (K75-05-02), 8 Aug 1975; 1 specimen. USNM 211400, off Sydney, 33°46'S 151°50'E to 33°42'S 151°53'E, 414 m, demersal prawn trawl, *Kapala* (K80-06-01), 24 May 1980; 7 specimens.

**Additional material examined.** New South Wales: AM P35904, south-east of Cape Byron, 28°41'S 153°51'E to 28°44'S 153°51'E, 149 m, demersal prawn trawl, *Kapala* (K78-17-21), 18 Aug 1978; 1 specimen. AM P35899, north-east of North Solitary Island, 29°47'S 153°44'E to 29°49'S 153°43'E, 425 m, demersal prawn trawl, *Kapala* (K78-16-07), 2 Aug 1978, 5 specimens. AM P17897, transect from north-east of Newcastle to north-east of Port Jackson, 32°46'S, 152°46'E to 33°44'S, 151°53'E, 540 m, demersal prawn trawl, *Kapala*, Apr 1971; 1 specimen. AM P17996, transect from north-east of Newcastle to east of Port Jackson, 32°46'S 151°48'E to 33°53'S 152°42'E, 191–540 m, demersal prawn trawl, *Kapala*, Apr 1971; 1 specimen. AM P26821, south-east of Newcastle, 32°59'S 152°34'E to 33°02'S 152°42'E, 360 m, demersal prawn trawl, *Kapala* (K77-23-08), 7 Dec 1977; 1 specimen. AM P35898, south-east of Broken Bay, 33°40'S 151°54'E to 33°33'S 151°58'E, 450 m, demersal prawn trawl, *Kapala* (K74-15-25/26) 5 Dec 1974; 1 specimen. AM P35900, south-east of Broken Bay, 33°41'S 151°53'E to 33°39'S 151°56'E, 477 m, prawn trawl, *Kapala* (K80-21-05), 16 Dec 1980; 2 specimens. AM P25210, south-east of Broken Bay, 33°42'S 151°52'E to 33°39'S 151°44'E, 446 m, demersal prawn trawl, *Kapala* (K76-24-01), 20 Dec 1976; 1 specimen. AM P35903, north-east of Port Jackson, 33°46'S 151°49'E to 33°44'S 151°51'E, 425 m, prawn trawl, *Kapala* (K80-21-04), 16 Dec 1980; 2 specimens. AM P19086, east to north-east of Port Jackson, 33°51'S 151°51'E to 33°45'S 151°55'E, 675 m, demersal prawn trawl, *Kapala* (K72-06-03), 19 Oct 1972; 2 specimens. AM P18014, south-east of Wollongong, 34°30'S 151°19'E to 34°38'S 151°13'E, 522 m, demersal prawn trawl, *Kapala* (K71-11-03), 6 July 1971; 1 specimen. AM P24827, north-east of Batemans Bay, 35°28'S 150°50'E to 35°33'S 150°47'E, 594 m, demersal fish trawl, *Kapala* (K76-11-12), 8 July 1976; 4 specimens. AM P35905, north-east of Batemans Bay, 35°34'S 150°44'E to 35°30'S 150°47'E, 400 m, prawn trawl, *Kapala* (K75-12-03), 15 Dec 1975; 1 specimen (bopyrid in right branchial chamber). AM P18015, north-east of Batemans Bay, 35°35'S 150°43'E to 35°35'S 150°50'E,

360 m, demersal prawn trawl, *Kapala* (K71-13-05), 2 Aug 1971; 1 specimen. AM P35901, north-east of Point Danger, 28°06'S 153°58'E to 28°03'S 153°58'E, 404 m, demersal prawn trawl, *Kapala* (K78-09-04), 1 June 1978; 1 ♀. AM P35902, north-east of Point Danger, 27°55'S 154°03'E to 27°57'S 154°03'E, 629 m, demersal prawn trawl, *Kapala* (K78-23-08), 6 Nov 1978; 1 specimen.

**Diagnosis.** Rostrum over-reaching antennal scale, armed dorsally with 6 or 7 teeth on rostral crest, 3 or 4 posterior to orbital margin, 3 posterior-most teeth articulated; 3 subapical teeth present; armed ventrally with 18–22 teeth. Orbital margin ventrally rounded, posteriorly concave, dorsally sinuous. Abdomen with somite 3 posteriorly unarmed, dorsally compressed but not carinate. Somite 4 and 5, pleura with posteroventral tooth. Somite 6 about 13/5 longer than maximum height, with posteroventral tooth. Telson 12/5 length of somite 6. Eye somewhat compressed; ocellus large, subcircular, narrowly joined to cornea. Stylocerite just over-reaching antennular peduncle article 2. Scaphocerite 4.2X longer than wide; distal tooth not over-reaching apex of blade. Maxilliped 3 with epipod; penultimate article 2/3 length of terminal article. Pereopods 1–4 each with epipod. Legs of pereopod 2 unequal, left long and slender, carpus of about 114 articles, right with 25 articles. Pereopod 3 over-reaching scaphocerite by length of dactyl and distal 1/3 of propodus; dactyl about 1/5 length of propodus, accessory spine almost as long as main terminal spine. Pleopod 3 exopod almost half length of carapace.

**Description.** Rostrum extending well beyond scaphocerite, distally strongly upturned, about 1.6X carapace length; dorsally with supraorbital crest of 6 or 7 teeth, posterior 2 or 3 of which articulated; remainder of dorsal margin unarmed except for 3 small subterminal teeth; 3–4 teeth posterior to orbital margin; none of teeth barbed; ventral margin armed with 18–22 basally close-set teeth, becoming more widely spaced anteriorly; no postrostral carina or ridge. Orbital margin dorsally sinuous. Antennal spine stronger than pterygostomial spine.

Abdomen with somite 3 posteriorly unarmed, lacking median carina, but somewhat bilaterally compressed, forming ill-defined rounded ridge. Pleuron of somite 3 posteroventrally rounded; those of somites 4 and 5 with posteroventral tooth. Somite 6 about 1.6X length of somite 5, 1.5X longer than wide. Telson about 1.5X length of somite 6, with 4 pairs of dorsolateral spines.

Eye subpyriform, maximum diameter 2/7 length of carapace; ocellus large, subcircular, narrowly connected to cornea.

Antennular stylocerite slender, acute, barely or just over-reaching distal margin of peduncular article 2.

Scaphocerite with lateral margin straight to very slightly convex, 5/2X length of carapace, about 4.2X longer than wide, distal tooth just falling short of apex of blade.

Mouthparts as illustrated. Maxilliped 3 with epipod, over-reaching scaphocerite by  $\frac{1}{3}$  of distal article, armed with 1 distal and 4 subterminal spines; penultimate article about  $\frac{2}{3}$  length of terminal article.

Pereopods 1–4 each with straplike epipod. Pereopod 1 over-reaching scaphocerite by little more than chela, fingers small, movable finger very slightly over-reaching fixed finger. Second pereopods unequal; left elongate, slender, carpus of about 114 articles; right more robust, carpus of 26 articles. Pereopods 3 and 4 over-reaching scaphocerite by dactyl and  $\frac{1}{3}$  of propodus, with 3 spines on carpus, 7–8 spines on outer and 4 spines on mesial surface of merus. Pereopod 5 over-reaching scaphocerite by slightly more than length of dactyl, armed with 3 spines on outer surface of carpus, 7–9 on outer, and 1–3 on mesial surface of merus, single distal spine on ischium. Endopod of pleopod 1 in male with mesial margin sinuous, small rounded distal lobe bearing hooks. Appendix masculina of pleopod 2 in male longer than appendix interna, with about 16 spines on mesial and distal margin.

Mesial uropodal ramus over-reaching telson, outer ramus slightly longer, with more elongate articulated spine mesial to fixed distolateral tooth.

**Remarks.** Using the invaluable key to the Indo-Pacific species of *Plesionika* provided by Chace (1985), the present species keys out to *P. rostricrescentis* (Bate), a species known from the

Philippines and Indonesia, Japan, New Guinea, and Tonga. However, comparison with the description and with material from the Philippines and Indonesia reveals several major differences, especially in the rostrum and second pereopods (see Table 6).

**Etymology.** The species is named for Mr Ken Graham, biologist with the Fisheries Division of the NSW Department of Agriculture, who has been responsible for the collection of much of the material described in this report while working on board the FRV *Kapala*.

	<i>P. rostricrescentis</i>	<i>P. grahami</i>
rostral crest spines	7–9	6
movable crest spines	5–6	3
ventral rostral teeth	9–15	18–22
carpal articles, pereopod 2		
longer	88	114
shorter	17–21	26
pereopods 3–5		
carpal spines	2	3
meral spines	2 inner, 5 outer	4 inner, 7–8 outer
telson/somite 6 length	1.5	1.2–1.4
Maximum carapace length	18 mm	18–21.8 mm

Table 6. Comparison of *Plesionika rostricrescentis* and *P. grahami*.

#### *Plesionika martia* (A. Milne Edwards)

*Pandalus martius* A. Milne Edwards, 1883: pl.21.

*Plesionika martia*.—Schmitt, 1926: 377–380; Crosnier,

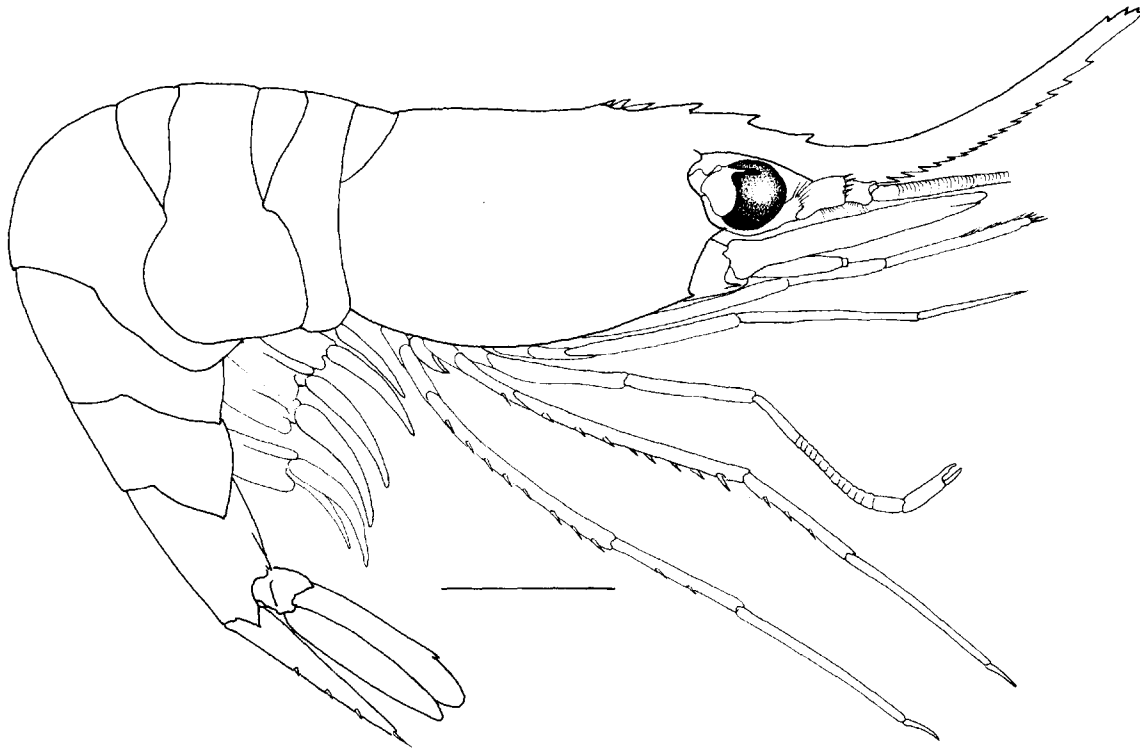


Fig. 20. *Plesionika grahami* n.sp. Lateral view. (Scale = 10 mm).



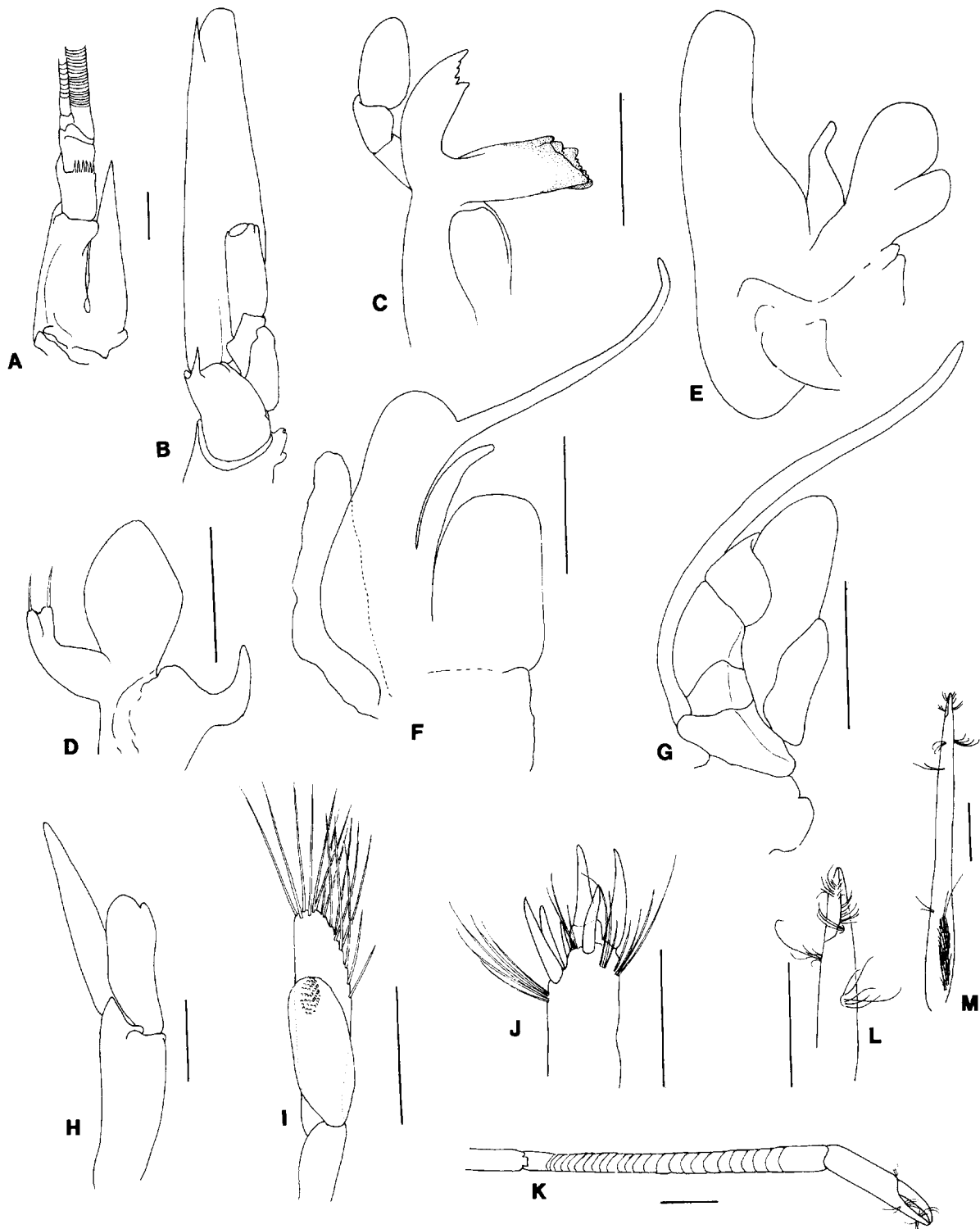


Fig. 21. *Plesionika grahami* n.sp. A, antenna 1; B, antenna 2; C, mandible; D, maxilla 1; E, maxilla 2; F, maxilliped 1; G, maxilliped 2; H, pleopod 1 ♂; I, pleopod 2 ♂, appendix interna and appendix masculina; J, apex of dactyl of maxilliped 3; K, right pereopod 2; L, pereopod 1 chela enlarged; M, pereopod 1, dactylus and propodus. (Scales: A-H, K = 2 mm, I-J, L-M = 1 mm).

1970: 235; Kensley, 1972: 50, fig. 23H; 1981b: 28; Crosnier & Forest, 1973: 212–217, figs 63d, 64c, 66.

**Material examined.** Queensland: AM P35865, north-east of Point Danger, 28°01'S 154°00'E to 27°58'S 154°00'E, 542 m, demersal prawn trawl, *Kapala* (K78-17-10), 17 Aug 1978; 7 specimens (2 ovig. ♀). AM P35866, north-east of Point Danger, 28°03'S 154°04'E to 28°01'S 154°04'E, 724 m, demersal prawn trawl, *Kapala* (K78-23-08), 6 Nov 1978; 3 specimens. New South Wales: AM P35867, east of Yamba, 29°26'S 153°49'E to 29°20'S 153°50'E, 450 m, demersal prawn trawl, *Kapala* (K75-09-08), 12 Oct 1975; 14 specimens (11 ovig. ♀). AM P35868, south-east of Cape Hawke, 32°22'S 152°51'E to 32°17'S 153°01'E, 463 m, demersal prawn trawl, *Kapala* (K75-08-03) 12 Oct 1975; 13 specimens (6 ovig. ♀). AM P17899, transect from north-east of Newcastle to east of Port Jackson, 32°46'S 151°48'E to 33°53'S 152°42'E, 191–540 m, demersal prawn trawl, *Kapala*, Apr 1971; 4 specimens. AM P19640, transect from east of Newcastle to north-east of Port Jackson, 33°00'S 152°31'E to 33°44'S 151°50'E, 355 m, demersal prawn trawl, *Kapala*, July 1972; 2 specimens (ovig. ♀). AM P17898, north-east of Norah Head, 33°11'S 152°20'E to 33°14'S 152°16'E, 277 m, demersal prawn trawl, *Kapala* (K71-08-01), 27 Apr 1971; 2 ovig. ♀. AM P35869, east of Broken Bay, 33°35'S 152°00'E to 33°33'S 152°02'E, 810 m, demersal prawn trawl, *Kapala* (K77-23-12), 8 Dec 1977; 1 specimen. AM P25209, south-east of Broken Bay, 33°42'S 151°52'E to 33°33'S 151°54'E, 446 m, demersal prawn trawl, *Kapala* (K76?24-01), 20 Dec 1976; 11 specimens (5 ovig. ♀). AM P18992, south-east of Broken Bay, 33°42'S 151°55'E to 33°40'S 151°57'E, 810 m, demersal prawn trawl, *Kapala* (K72-07-16), 7 Dec 1972; 8 specimens. AM P18983, south-east of Broken Bay, 33°43'S 151°56'E to 33°40'S 151°59'E, 765 m, demersal prawn trawl, *Kapala* (K72-07-14), 6 Dec 1972; 1 specimen. AM P21586, north-east of Port Jackson, 33°44'S 151°49'E to 33°42'S 151°50'E, 405 m, trawl, *Kapala*, 28 Sept 1975; 4 specimens. AM P18978, south-east of Broken Bay, 33°44'S 151°55'E to 33°40'S 151°58'E, 720 m, demersal prawn trawl, *Kapala* (K72-07-04), 9 Nov 1972; 1 specimen. AM P21041, P21049, north-east of Wollongong, 34°16'S 151°26'E to 34°22'S 151°23'E, 356 m, prawn trawl, *Kapala* (K75-05-01), 8 Aug 1975; 2 ovig. ♀. AM P21046, north-east of Wollongong, 34°21'S 151°24'E to 34°14'S 151°28'E, 400 m, demersal prawn trawl, *Kapala* (K75-05-02), 8 Aug 1975; 3 specimens (2 ovig. ♀). AM P35870, north-east of Wollongong, 34°24'S 151°25'E to 34°23'S 151°25'E, 738 m, prawn trawl, *Kapala* (K76-23-01), 13 Dec 1976; 1 specimen. AM P34386, south-east of Broken Bay, 33°43'S 151°54'E to 33°39'S 151°55'E, 531–423 m, prawn trawl, *Kapala* (K83-14-07), 27 Oct 1983; 3 ♂, 2 ovig. ♀.

**Diagnosis.** Rostrum immovable, about twice carapace length, rostral crest of 7–9 sharp teeth, dorsal margin anterior to crest smooth, ventral margin with 37 or more teeth. Third abdominal somite dorsally rounded, unarmed posteriorly; fourth abdominal somite without posteroventral denticle; fifth abdominal somite posteroventrally sharp, usually with denticle. Telson with 4 pairs of dorsolateral spines. Eyes well developed, ocellus present. Third maxilliped with exopod. Pereopods 1–4 with strap-like epipod. Second pair of pereopods

chelate, subequal, carpus consisting of 18–36 articles.

**Remarks.** In these specimens the rostrum is about twice the carapace length in the adults and up to 2.5 times the carapace length in smaller (cl 13–16 mm.) specimens. Most of the specimens have seven or eight spines dorsally on the rostrum but the range over all the specimens is from six to ten spines. The number of spines ventrally on the rostrum ranges from 37 to 60. The dactyl of the third pereopod is slightly less than a third the length of the propod. The length of the sixth abdominal segment is about twice the maximum height.

The rostrum of this species is, like that of *P. alcocki*, smooth on the dorsal margin ahead of the rostral crest but *P. martia* is distinguished from *P. alcocki* by its longer rostrum, more teeth in the rostral crest and more teeth more closely spaced on the ventral margin of the rostrum.

These specimens were collected between 28°S and 34°25'S in trawls to a depth of 810 m.

**Distribution.** Western and eastern Atlantic and throughout the Indo-West Pacific; 277–900 m.

#### *Plesionika reflexa* Chace

*Plesionika reflexa* Chace, 1985: 108, fig. 49.

**Material examined.** Queensland: AM P35875, north-east of Point Danger, 27°55'S 154°03'E to 27°57'S 154°03'E, 629 m, demersal prawn trawl, *Kapala* (K78-23-09), 6 Nov 1978; 2 specimens. AM P34384, north-east of Point Danger, 28°01'S 154°00'E to 27°58'S 154°00'E, 542 m, demersal prawn trawl, *Kapala* (K78-17-10), 17 Aug 1978; 3 specimens (1 ovig. ♀). New South Wales: AM P35873, transect from north-east of Newcastle to east of Port Jackson, 32°46'S 151°48'E to 33°53'S 152°42'E, 191–540 m, demersal prawn trawl, *Kapala*, April 1971; 1 specimen. AM P21587, north-east of Port Jackson, 33°44'S 151°49'E to 33°42'S 151°50'E, 405 m, trawl, *Kapala* (no stn), 28 Sept 1975; 1 specimen. AM P35874, north-east of Port Jackson, 33°46'S 151°49'E to 33°44'S 151°51'E, 425 m, demersal prawn trawl, *Kapala* (K80-21-04), 16 Dec 1980; 3 specimens. AM P21042, north-east of Wollongong, 34°16'S 151°26'E to 34°22'S 151°23'E, 356 m, demersal prawn trawl, *Kapala* (K75-05-01), 8 Aug 1975; 1 specimen.

**Diagnosis.** Rostrum immovable, posteriorly curved ventrally, anteriorly curved dorsally, about twice carapace length or longer, 5 or 6 sharp teeth proximally, remainder of dorsal margin smooth except for subapical spine, ventral margin with more than 30 teeth. Third abdominal somite with posteromedian spine slightly recurved dorsally. Eyes well developed. Maxilliped 3 with exopod. Second pair of pereopods subequal, chelate, carpus consisting of more than 3 segments. Pereopod 3 with dactyl between 0.29 and 0.4 length of propodus. Pereopods 1–4 with strap-like epipods.

**Remarks.** These specimens agree in general with the specimens figured by Suseeland & Mahomed (1968), and Crosnier & Forest (1973), as *P. ensis* (A.

Milne Edwards), but differ slightly in some of the characters. In the largest specimen (cl. 21.7mm) the rostrum is less than twice (1.8) carapace length. In all the other specimens in which the rostrum is complete or nearly so, the rostrum is more than twice (2.2–2.5) the carapace length. The denticulation on the ventral margin of the rostrum usually starts behind the anterior dorsal tooth opposite the first article of the antennal peduncle. The first and second pereopods are subequal in length and reach to about 2–4 mm behind the apex of the scaphocerite. The third pereopod is the longest, and reaches to at least the apex of the scaphocerite or more usually exceeds it by the dactyl. The dactyl of the third pereopod is about one-third the length of the propod. The length of the sixth abdominal somite is at least 2.5 times (2.5–2.9) its proximal height, and more than twice (2.2–2.5) the length of the fifth somite. The telson is about three-fourths (0.75–0.8) as long as the sixth somite. In two critical characters, the length of the dactyl of pereopod 3 compared with the propodus, and the slight recurving of the mid-dorsal spine of abdominal somite 3, the present material agrees with the description of *P. reflexa* Chace.

These specimens were collected between 27° 55'S and 34° 22'S in trawls down to 629 m.

**Distribution.** South China Sea; Indonesia; Philippines; 191–629 m.

#### *Plesionika spinipes* Bate

*Plesionika spinipes* Bate, 1888: 646–648, pl. 113, fig. 2.—Chace, 1985: 46 (in key).

*Parapandalus spinipes*.—de Man, 1920: 142–146, pls 12, 13, figs 33, 33e; Calman, 1939: 201–202; Crosnier, 1970: 236 (in discussion).

**Material examined.** New South Wales: AM P35888, north-east of North Solitary Island, 29° 47'S 153° 41'E to 29° 49'S 153° 40'E, 234 m, demersal prawn trawl, *Kapala* (K78-05-07), 19 Apr 1978; 1 ovig. ♀. AM P26839, north-east and east of Batemans Bay, 35° 29'S 150° 46'E to 35° 44'S 150° 36'E, 216 m, demersal fish trawl, *Kapala* (K77-11-01/02/03), 2 Aug 1977; 1 specimen. Queensland: AM P35871, north-east of Point Danger, 28° 02'S 153° 57'E to 28° 05'S 153° 57'E, 360 m, demersal fish trawl, *Kapala* (K78-09-03), 1 June 1978; 20 specimens (13 ovig. ♀).

**Diagnosis.** Rostrum about twice carapace length, with fewer than 50 close-set dorsal teeth, and 22–31 more widely spaced ventral teeth. Eyes well developed, ocellus present. Pereopods 1–4 lacking epipods. Pleura of abdominal somites 4 and 5 each with posteroventral denticle.

**Remarks.** These specimens agree with that figured by de Man (1920) as *Parapandalus spinipes* (Bate). The rostrum is complete in only a few specimens; in these it is nearly twice (1.7–2.0) the carapace length. The rostral teeth are similarly spaced on the dorsal and ventral margins in the distal two-thirds, while basally the dorsal spines are more closely spaced. Both the fourth and fifth abdominal somites

have a posteroventral denticle as in the figure of *P. spinipes* provided by de Man (1920); in *P. serratifrons* (Borradaile) the fourth abdominal somite lacks a denticle.

Crosnier (1976) gives a table, based principally on literature, for distinguishing *P. spinipes*, *P. serratifrons* and *P. narval*. For our specimens the measurements used are: rostral formula: 41–51/25–35; minimum width of abdominal somite 6/length of this somite: 0.37–0.4; maximum height of abdominal somite 6/length of this somite: 0.56–0.6; length of telson/length of abdominal somite 6: 1.15–1.2; length of dactyl of pereopod 5/basal width of this dactyl: 4.

There is agreement in the first three sets of figures, with those given by Crosnier (1976), but the telson is less than 1.5 times the length of abdominal somite 6, and the pereopodal dactyls are not as slender. Unfortunately, in many specimens the telson and rostrum are damaged and pereopodal dactyls are detached; we therefore provide details of the relative lengths of maxilliped 3 and pereopods 1 and 2 of our specimens. These agree with de Man's description and figures for *P. spinipes*; these appendages are longer in relation to the scaphocerite in *P. serratifrons*. In ovigerous females (cl 19 mm) maxilliped 3 exceeds the scaphocerite only by the terminal article; the penultimate article is about 1.75 times the length of the terminal article, while the exopod reaches about halfway along the antepenultimate article. Pereopod 1 exceeds the scaphocerite by the terminal article and about one-third of the carpus; it exceeds maxilliped 3 by about half the terminal article. Pereopod 2 exceeds the scaphocerite by the chela and the large terminal article of the carpus. The carpus has 21–23 articles. In a smaller specimen (cl 12.5 mm) the relative lengths are slightly different; maxilliped 3 exceeds the scaphocerite by slightly more than the terminal article, and the exopod does not quite reach halfway along the antepenultimate article.

Pereopod 1 exceeds the scaphocerite by the dactyl and just less than half the carpus, and exceeds maxilliped 3 by three-fourths of the terminal article. Pereopod 2 exceeds the scaphocerite by the chela and distal three articles of the carpus.

**Distribution.** Indo-West Pacific.

#### *Stylopandalus* Coutiere, 1905

##### *Stylopandalus richardi* (Coutiere)

*Pandalus (Stylopandalus) richardi* Coutiere, 1905: 1113. *Parapandalus richardi*.—Crosnier & Forest, 1973: 224–225, fig. 69b; Kensley, 1981a: 59, 1981b: 28. *Stylopandalus richardi*.—Chace 1985: 136, fig. 62.

**Material examined.** New South Wales: AM P35879, north-east of Norah Head, 33° 05'S 153° 05'E to 33° 13'S 153° 05'E, 630 m, midwater trawl, *Kapala* (K79-19-03), 28 Nov 1979; 1 ovig. ♀. AM P35880, east to north-east of

Norah Head, 33°20'S 153°04'E to 33°12'S 153°13'E, 630 m, midwater trawl, *Kapala* (K79-19-05), 28 Nov 1979; 5 specimens (4 ovig. ♀). AM P35881, south-east of Norah Head, 33°20'S 152°32'E to 33°24'S 152°31'E, 360 m, midwater trawl, *Kapala* (K77-24-09), 14 Dec 1977; 1 ovig. ♀. AM P35882, north-east to east of Broken Bay, 33°28'S 152°34'E to 33°36'S 152°35'E, 630 m midwater trawl, *Kapala* (K77-24-10), 14 Dec 1977; 2 ovig. ♀. AM P35883, north-east of Broken Bay, 33°31'S 152°20'E to 33°28'S 152°22'E, 569 m, midwater trawl, *Kapala* (K77-24-02), 12 Dec 1977; 1 ovig. ♀. AM P35884, east of Broken Bay, 33°33'S 152°18'E to 33°31'S 152°18'E, 216 m, midwater trawl, *Kapala* (K77-24-01), 12 Dec 1977; 2 specimens (1 ovig. ♀). AM P35885, P34387, north-east of Wollongong, 34°10'S 151°59'E to 34°09'S 152°05'E, 0—about 60 m, midwater trawl, *Kapala* (JP71-3), 24 Mar 1971; 19 specimens (4 ovig. ♀). AM P26558, north-east of Wollongong, 34°10'S 152°04'E to 34°12'S 152°02'E, 540 m, midwater trawl, *Kapala* (K77-18-01), 26 Oct 1977; 4 specimens (1 ovig. ♀). AM P35886, north-east to east of Wollongong, 34°20'S 151°56'E to 34°25'S 151°54'E, 630 m, midwater trawl, *Kapala* (K77-24-12), 14 Dec 1977; 2 specimens (1 ovig. ♀). AM P26602, north-east of Cape Howe, 37°24'S 150°30'E to 37°28'S 150°33'E, 540 m, midwater trawl, *Kapala* (K77-19-03), 1 Nov 1977; 2 specimens (1 ovig. ♀). AM P35887, north-east of Wollongong, 34°10'S 152°04'E to 34°12'S 152°02'E, 540 m, midwater trawl, *Kapala* (K77-18-01), 26 Oct 1977; 1 specimen.

**Diagnosis.** Rostrum immovable, 2.5–3X carapace length, both dorsal and ventral margins with rather well spaced teeth along their length, 2 larger teeth at base of the rostrum. Carapace with no distinct longitudinal carina except behind rostral crest. Third abdominal segments armed posteriorly with minute medial spine; both fourth and fifth abdominal segments without a posteroventral denticle; length of sixth abdominal segment about 3X its maximum height. Eyes well developed. Third maxilliped with exopod. Second pair of pereopods chelate, subequal, carpus consisting of 7–13 articles. Pereopods 1–4 without epipods.

**Distribution.** Indo-west Pacific, Philippines, north and south Atlantic; surface to 3600 m.

#### Family PHYSETOCARIDIDAE

*Physetocaris* Chace, 1940

##### *Physetocaris microphthalmia* Chace

*Physetocaris microphthalmia* Chace, 1940: 196, figs 62, 63.—Holthuis, 1955: 128, fig. 93; Crosnier & Forest, 1973: 228, fig. 72.

**Material examined.** New South Wales: AM P33107, north-east of Broken Bay, 33°31'S 152°20'E to 33°38'S 152°22'E, 569 m, midwater trawl, *Kapala* (K77-24-02), 12 Dec 1977; 1 specimen.

**Diagnosis.** Integument thin and fragile. Rostrum a broadly triangular inflated prolongation of carapace, latter inflated, with 2 lateral carinae. Abdomen lacking dorsal carinae or spines. Telson

dorsally deeply sulcate, apically broadly truncate. Eyes reduced, set on outer surface of stalk. Mandible lacking palp and incisor process. First pereopods simple. Second pereopods chelate, carpus of 4 articles. Exopods absent from third maxilliped and all pereopods.

**Distribution.** Eastern and western Atlantic, north-west Pacific; surface to 1600 m.

#### Family GLYPHOCRANGONIDAE

*Glyphocrangon* A. Milne Edwards, 1881

##### *Glyphocrangon assimilis* de Man

*Glyphocrangon assimilis* de Man, 1918: 294; 1920: 217, 227–230, pl. 19, figs 57–57h.—Calman, 1939: 217; Chace, 1984: 9.

**Material examined.** Queensland: AM P33151, north-east of Danger Point, 28°03'S 154°04'E to 28°01'S 154°04'E, 720 m, demersal prawn trawl, *Kapala* (K78-23-08), 6 Nov 1978; 2 specimens. New South Wales: AM P33152, east of Broken Bay, 33°34'S 152°04'E to 33°31'S 152°06'E, 720 m, demersal prawn trawl, *Kapala* (K79-20-04), 4 Dec 1979; 2 specimens (1 ovig. ♀). AM P26823, east of Broken Bay, 33°35'S 152°00'E to 33°33'S 152°02'E, 810 m, demersal prawn trawl, *Kapala* (K77-23-12), 8 Dec 1977; 1 ovig. ♀.

**Diagnosis.** Integument not pubescent. Rostrum dorsoventrally compressed, shorter than carapace, with 2 pairs of lateral spines. Carapace with 4 prominent lateral carinae; anterior antennal carina present, with anterior spine behind and slightly ventral to antennal spine, carina extending only halfway to lateral groove, with 2 tubercles in line behind it; anterior lateral carina with small anterior spine well posterior to orbital margin.

**Remarks.** These specimens agree well with the description and figures given by de Man (1920).

The length of the rostrum is about four-fifths (0.77–0.81) of the carapace length in the largest male and the two females (cl 16.5–18.5 mm), while in the two smaller males (cl 13, 15 mm) it is subequal (0.96–1.0).

The submedian carinae are made up of distinct tubercles. The anterior intermediate carina consists of four to five distinct tubercles of which at least the two most anterior are acute. The posterior intermediate carina is variable, sometimes consisting of four to five tubercles, in other cases of three broad tubercles, or a ridge with two notches or even an unnotched ridge. None of the other carapace carinae are tuberculate. The anterior antennal carina has an anterior spine behind and slightly below the antennal spine and the carina extends backwards only halfway to the lateral groove, with two to three small tubercles in line between the end of the carina and the groove. This character distinguishes this species from *G. dentatus* Barnard and *G. gilesii* Wood-Mason, in both of which the carina extends all the way to the lateral

groove. The anterior lateral carina has an anterior spine and the carina extends back to the lateral groove. Neither the posterior antennal nor the posterior lateral carina has an anterior spine.

The carapace surface between the submedian carinae is smooth and between the other carinae there are only very small tubercles which are near the posterior border in the males, and scattered over the posterior two-thirds in the females.

The antennal spine is longer than the branchiostegal spine. There are dorsal carinae present on all the abdominal segments.

These specimens were collected from 28°S to 33°40'S and at depths between 720 and 810 metres. This species has not been recorded previously from Australia.

**Colour.** The colour in life is white with the submedian, intermediate, and abdominal carinae orange red. The rostrum, antennal, and branchiostegal spines are coloured pale orange only at the tips.

**Distribution.** Zanzibar, Bali Sea, eastern Australia; 538–810 m.

*Glyphocrangon holthuisi* n. sp.

Figs 22, 25C

**Type material.** New South Wales: HOLOTYPE: AM P35906, south-east of Cape Byron, 28°41'S 153°52'E to 28°44'S 153°51'E, 153 m, prawn trawl, *Kapala* (K78-17-21), 18 Aug 1978; 1 ovig. ♀, cl 25.1 mm. PARATYPES: AM P33157, south-east of Cape Byron, 28°41'S 153°52'E to 28°44'S 153°51'E, 153 m, prawn trawl, *Kapala* (K78-17-21), 18 Aug 1978; 16 ovig. ♀. Queensland: PARATYPES: USNM 211397, north-east of Danger Point, 28°01'S 154°00'E to 27°58'S 154°00'E, 540 m, prawn trawl, *Kapala* (K78-17-10), 17 Aug 1978; 5 ♂, cl 19.2–22.0 mm, 5 ovig. ♀, 21.2–24.9 mm.

**Additional material examined.** AM P33153, north-east of Danger Point, 27°55'S 154°03'E to 27°57'S 154°03'E, 540 m, prawn trawl, *Kapala* (K78-23-09), 6 Nov 1978; 8 ♂, cl 15.2–21.8 mm, 17 ovig. ♀, cl 18.5?–25.2 mm, 5 ♀, cl 14.0–18.4 mm. AM P33154, north-east of Danger Point, 28°01'S 154°00'E to 27°58'S 154°00'E, 540 m, prawn trawl, *Kapala* (K78-17-10) 17 Aug 1978; 34 ovig. ♀, 64 ♂. AM P33155, north-east of Danger Point, 28°02'S 153°59'E to 27°59'S 153°59'E, 540 m, prawn trawl, *Kapala* (K78-09-05), 2 June 1978; 63 specimens (16 ovig. ♀). AM P33156, north-east of Danger Point, 28°03'S 154°04'E to 28°01'S 154°04'E, 720 m, prawn trawl, *Kapala* (K78-23-08), 6 Nov 1978; 11 specimens.

**Diagnosis.** Integument firm, finely tomentose. Rostrum anteroventrally tricarinate, with 2 pairs of lateral spines and faint mid-dorsal ridge. Posterior first (submedian carina) of 3 or 4 discrete tubercles. Anterior second (intermediate) carina with anterior tubercle acute; posterior second (intermediate) carina tuberculate. Anterior third (antennal) carina absent; posterior third (antennal) carina anteriorly right-angled to rarely acute, usually consisting of 2 elongate and 1 short posterior tubercles. Anterior

fourth (lateral) carina expanded into large ventically compressed undivided lamina, apically acute, obliquely directed; posterior fourth (lateral) carina divided into 2 elongate anterior, and 2 or 3 smaller apically acute posterior tubercles. Branchial region with tubercles between carinae. Smooth antennal spine very faintly mesially curved, more than half length of branchiostegal spine. All abdominal somites with mid-dorsal carina, notched on somite 6. Scaphocerite lacking marginal tooth. Maximum carapace length 25.2 mm (ovigerous female).

**Description.** Integument finely tomentose. Rostrum in adults about two-thirds (0.59–0.71) carapace length, armed with 2 pairs of lateral teeth, anterior pair at about proximal two-fifths; faint mid-dorsal ridge present with transverse septa sometimes present anteriorly, but often indistinct; anteroventrally tricarinate. Submedian (1st) carina composed of elongate laterally compressed tubercles, acute or subacute at the anterodorsal angle, anterior carina with 6 tubercles, posterior carina with 3–4 tubercles. Anterior intermediate (2nd) carina usually with all 4 tubercles dentiform (as in submedian carina), posterior carina with 4 (sometimes 3 or 5) tubercles, usually not dentiform. Anterior antennal (3rd) carina absent. Posterior antennal (3rd) carina usually unarmed anteriorly, rarely with small tooth, carina divided by 2 or 3 notches. Anterior lateral (4th) carina not continuous with branchiostegal spine, expanded into large, ventically compressed, undivided lamina, apically acute, directed forward beyond level of the posterior margin of the orbit. In adults, width across tips of these spines less than (0.93–0.96), or rarely equal to, carapace length. Posterior lateral (4th) carina usually with 3 notches but varying from 2–4, and rarely with only 1 notch or entire; usually with small anterior spine but quite often with only a sharp angle.

Tubercles between carapace carinae small, usually acute, rows often irregular. Usually 3 rows of tubercles between third and fourth carinae, tubercles of central row largest, with row of small tubercles above and below. Area of carapace immediately posterior to eye usually with 3–5 tubercles (occasionally with 6–7 or with only 1–2).

Antennal spine curved mesially, smooth, about three-fourths (0.74–0.91) as long as the branchiostegal spine. Tip of branchiostegal spine not exceeding propodus of pereopod 1, nor reaching distal end of penultimate segment of maxilliped 3.

Abdomen with median dorsal carinae on all somites, somite 1 with distinct anterior tubercles in addition to row of narrow tubercles along posterior margin, lateral-dorsal carina on somite 1 with anterior height equal to about half basal length of carina. Somite 5 with 2 marginal spines on pleuron. Somite 6 with 1 posterior marginal spine on pleuron, width of somite across these spines only slightly greater than (1.1–1.25) anterior width of somite 6.

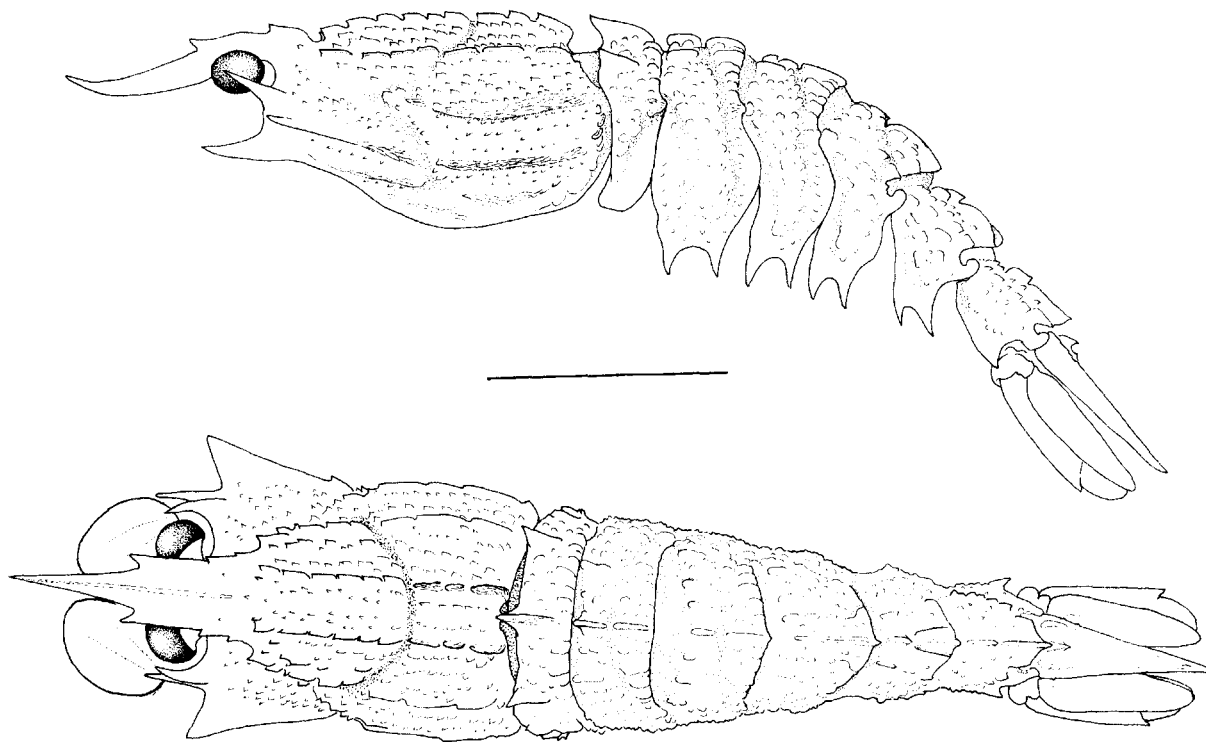


Fig. 22. *Glyphocrangon holthuisi* n.sp. Lateral and dorsal view. (Scale = 10 mm).

Telson with about  $1/5$  of its length extending beyond uropods.

Antennal scale about one and three-fourths (1.68–1.81) times as long as broad, nearly twice as long as broad in small specimens (cl 15 mm). Maxilliped 3 extending as far as, or very slightly past, end of antennal peduncle. Pereopod 2 shorter on left side (19–20 carpal articles) than on right side (29 carpal articles). Left pereopod 2 on just reaching to end of antennal scale; on right, exceeding antennal scale by chela and about 8 carpal articles. Pereopod 3 reaching as far forward as pereopod 2 on left side. Pereopod 4 reaching to about end of propod of pereopod 3. Pereopod 5 reaching about  $2/3$  along propod of pereopod 4. Pereopods 3 to 5 with propod about  $1\frac{1}{4}$  to  $1\frac{1}{2}$  as long as carpus; dactyl about  $1/3$  to  $2/5$  length of propod.

**Etymology.** The species is named for Dr L. B. Holthuis, of the Rijksmuseum van Natuurlijke Historie, Leiden, in recognition not only of his valuable work on the genus *Glyphocrangon*, but also of his incomparable contributions to the knowledge of crustaceans.

**Remarks.** See Remarks section of *G. novacastellum*.

### *Glyphocrangon lowryi* n. sp.

Figs 23, 25D

**Type material.** Queensland: HOLOTYPE: AM P33158, north-east of Danger Point, 28°03'S 154°04'E to 28°01'S 154°04'E, 720 m, prawn trawl, *Kapala* (K78-23-08), 6 Nov 1978; 1 ovig. ♀, cl 31.5 mm.

**Diagnosis.** Integument firm, lacking tomentum. Rostrum with 2 pairs lateral spines, with rounded mid-dorsal ridge, anteriorly with faint transverse septa, anteroventrally bicarinate. Anterior third (antennal) carina absent, posterior third carina with acute flattened flared spine. Anterior fourth (lateral) carina anteriorly expanded into large vertically compressed undivided apically acute lamina; carapace width across these tips subequal to carapace length. Tubercles of submedian carina laterally compressed; tubercles between carapace carinae high, laterally compressed.

**Description.** Integument naked. Rostrum in adult female greater than half carapace length (tip broken, estimated between 0.5 and 0.6), armed with 2 pairs of lateral teeth, anterior pair at about proximal third; medial ridge present, tuberculate proximally with 2 pairs of submedial tubercles near base;

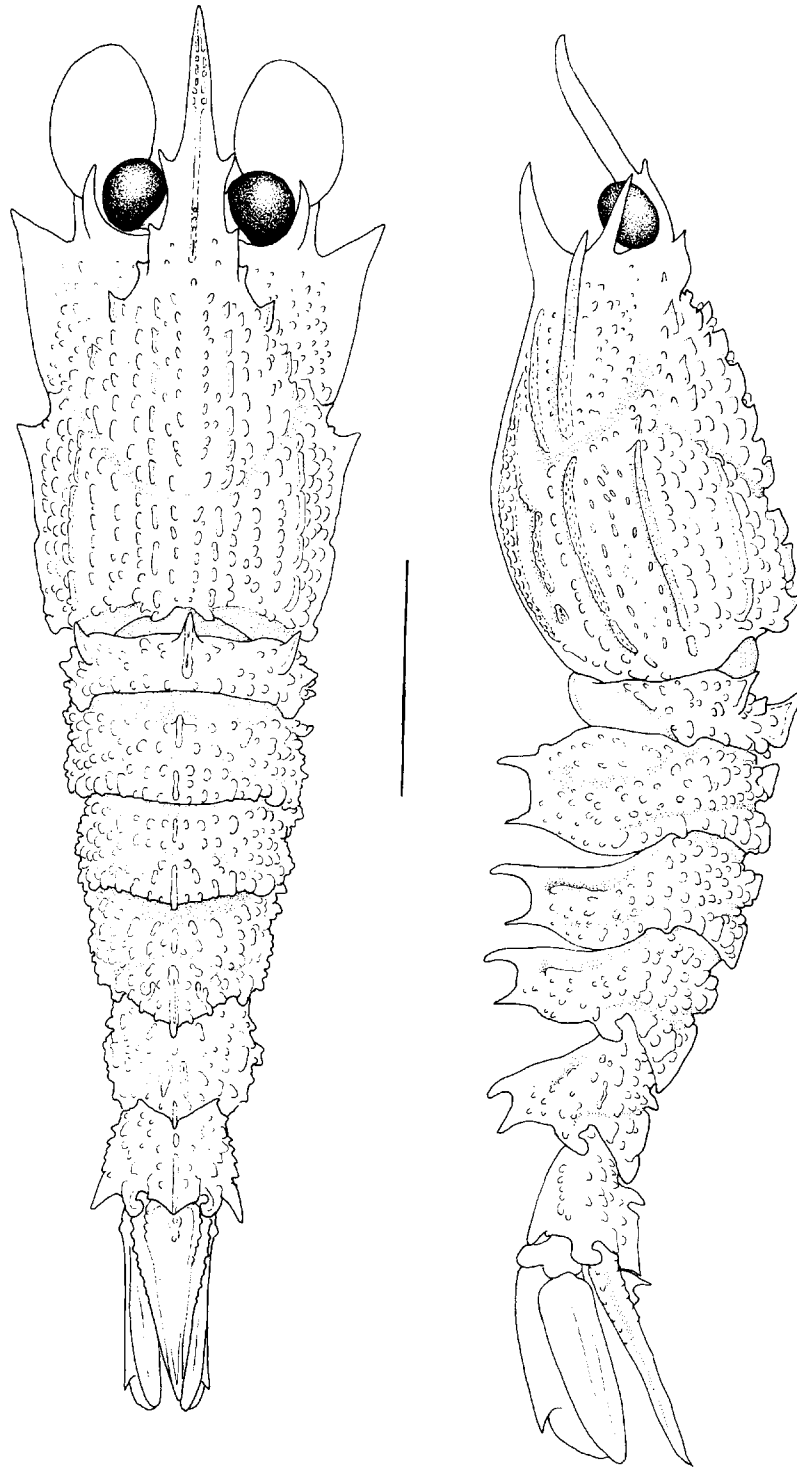


Fig. 23. *Glyphocrangon lowryi* n.sp. Lateral and dorsal view. (Scale = 10 mm).

indistinct transverse septa anteriorly; 2 lateral, but no anteromedial ridge ventrally on rostrum. Submedian (1st) carina composed of elongate laterally-compressed tubercles, only a few anterior tubercles subacute anteriorly, remainder blunt, anterior carina with 6 tubercles; posterior carina with 4 or 5 tubercles. Anterior intermediate (2nd) carina of 4 tubercles, some hardly distinguishable from large tubercles between the carinae, 2 anterior tubercles anterodorsally; posterior carina of 4 blunt elongate tubercles. Anterior antennal (3rd) carina absent; posterior antennal carina with spine anteriorly, carina with 2 notches, one at about midlength, one near posterior extremity. Carapace width across spines of posterior pair about nine-tenths (0.89) of carapace length (0.92 cl in immature specimens, cl 17.8 mm). Anterior lateral (4th) carina not continuous with branchiostegal spine, expanded into large compressed undivided apically acute lamina, directed forward beyond level of posterior margin of orbit. In ovigerous female, width across these spines slightly less (0.97) than carapace length. Posterior lateral carina entire except for one notch at about posterior sixth, anteriorly unarmed and curving slightly dorsally. Tubercles between carinae high, laterally compressed, not as elongate as carinae tubercles, often in regular rows. About 5 tubercles on carapace immediately behind eye, high tubercle lateral to posterior lateral rostral spine. Antennal spine weakly curved mesially, smooth, about  $\frac{3}{4}$  length of branchiostegal spine. Tip of branchiostegal spine just exceeding propod of pereopod 1, reaching distal margin of penultimate segment of maxilliped 3.

Abdomen with median dorsal carina on all somites, somite 1 with prominent anterior tubercles in addition to row of tubercles along posterior margin, lateral dorsal carina on somite 1 with anterior height equal to basal length of carina. Somite 5 with 2 marginal spines on pleuron. Somite 6 with 1 posterior marginal spine on pleuron, width across these spines more than one and one-third (1.42) times anterior width of somite 6 (1.5X in immature specimen, cl 14.2 mm). Telson with less than  $\frac{1}{5}$  of its length extending beyond apex of uropods; submedian carina tuberculate on proximal quarter, marginal carina tuberculate on proximal half.

Antennal scale about one and one-half (1.6) times as long as broad, extending about  $\frac{1}{5}$  of its length beyond antennal peduncle. Pereopod 2 shorter on left (20 carpal articles) than on right side (29 carpal articles). On left side, pereopod 2 exceeding antennal scale by chela and 1 carpal article, on right side exceeding antennal scale by chela and about 10 carpal articles. Pereopod 3 exceeding antennal scale by length of dactyl. Pereopod 4 reaching about halfway along dactyl of pereopod 3. Pereopod 5 reaching to base of dactyl of pereopod 4. Propod of pereopods 3 and 4 more than one and one-third (1.4) times as long as carpus; on pereopod 5,  $\frac{1}{3}$ X as long. Dactyl of

pereopod 3 about one-third (0.3) length of propod; dactyl of pereopods 4 and 5 more than one-third (0.41 and 0.37 respectively) length of propod.

**Colour.** The preserved ovigerous female has orange tips on the apical and lateral spines of the rostrum, on the antennal and branchiostegal spines, and on the tip of the anterior lateral carina. Also the last segment of maxilliped 3, and the propod and dactyl of pereopod 1 are orange. On abdominal somites 1–4 the tips of the carinae and spines on the pleura are orange, as is the tip of the telson.

**Etymology.** The species is named for Dr James K. Lowry, head of the Crustacean Section of the Australian Museum, in thanks for his hospitality to, and many stimulating discussions with, the first author.

**Remarks.** See Remarks section at end of *G. novacastellum*.

### *Glyphocrangon novacastellum* n. sp.

Figs 24, 25E

**Type material.** New South Wales: HOLOTYPE: AM P26766, south-east of Newcastle, 33°08'S 152°27'E to 33°09'S 152°25'E, 720 m, demersal trawl, *Kapala* (K77-23-10), 7 Dec 1977; 1 ovig. ♀, cl 25.0 mm. PARATYPES: AM P20995, P20996, east of Broken Bay, 33°32'S 152°00'E to 33°38'S 152°04'E, 823 m, demersal trawl, *Kapala* (K75-05-05), 6 Dec 1979; 2 ♂, cl 15.9–16.0 mm, 10 ovig. ♀, 21.1–24.6 mm, 1 ♀, cl 15.9 mm. AM P33160, east of Broken Bay, 33°32'S 152°06'E to 33°34'S 152°05'E, 810 m, demersal prawn trawl, *Kapala* (K79-20-13), 6 Dec 1979; 1 ovig. ♀, cl 24.3 mm. AM P19096, east of Long Reef, 33°43'S 151°55'E to 33°37'S 152°02'E, 675 m, bottom trawl, *Kapala* (K72-06-04), 19 Oct 1972; 1 ovig. ♀, cl 20.7 mm. USNM 211399, off Shoalhaven Bight, 34°55'S 151°13'E to 34°53'S 151°14'E, 810 m, demersal trawl, *Kapala* (78-27-05), 12 Dec 1978; 1 ♂, cl 18.3 mm, 2 ovig. ♀, cl 20.1 mm, 2 ♀, cl 16.2–18.3 mm. USNM 211398, south-east of Newcastle, 33°08'S 152°27'E to 33°10'S 152°24'E, 576 m, demersal trawl, *Kapala* (K77-23-09), 7 Dec 1977; 1 ovig. ♀, cl 25.0 mm.

**Additional material examined.** New South Wales: AM P33161, east of Broken Bay, 33°34'S 152°04'E to 33°31'S 152°06'E, 720 m, prawn trawl, *Kapala* (K79-20-04), 4 Dec 1979; 1 ♀, cl 16.0 mm. AM P26822, east of Broken Bay, 33°34'S 152°02'E to 33°31'S 152°04'E, 891 m, demersal trawl, *Kapala* (K77-23-07), 6 Dec 1977; 1 specimen. AM P19099, east of Sydney, 33°42'S 152°50'E to 33°48'S 152°54'E, 765 m, bottom trawl, *Kapala* (K72-07-15), 7 Dec 1972; 1 ♂, cl 22.6 mm.

**Diagnosis.** Body integument very firm, covered with fine tomentum. Rostrum dorsally with septa very faint to obsolete, anteroventrally tricarinate. Carapace tubercles low, rounded. Carapace with 4 prominent lateral carinae; anterior antennal (3rd) carina absent, posterior antennal carina usually with small anterior spine; anterior lateral (4th) carina expanded anteriorly into large vertically compressed, undivided lamina, apically acute, carapace width across tips of these spines slightly greater than



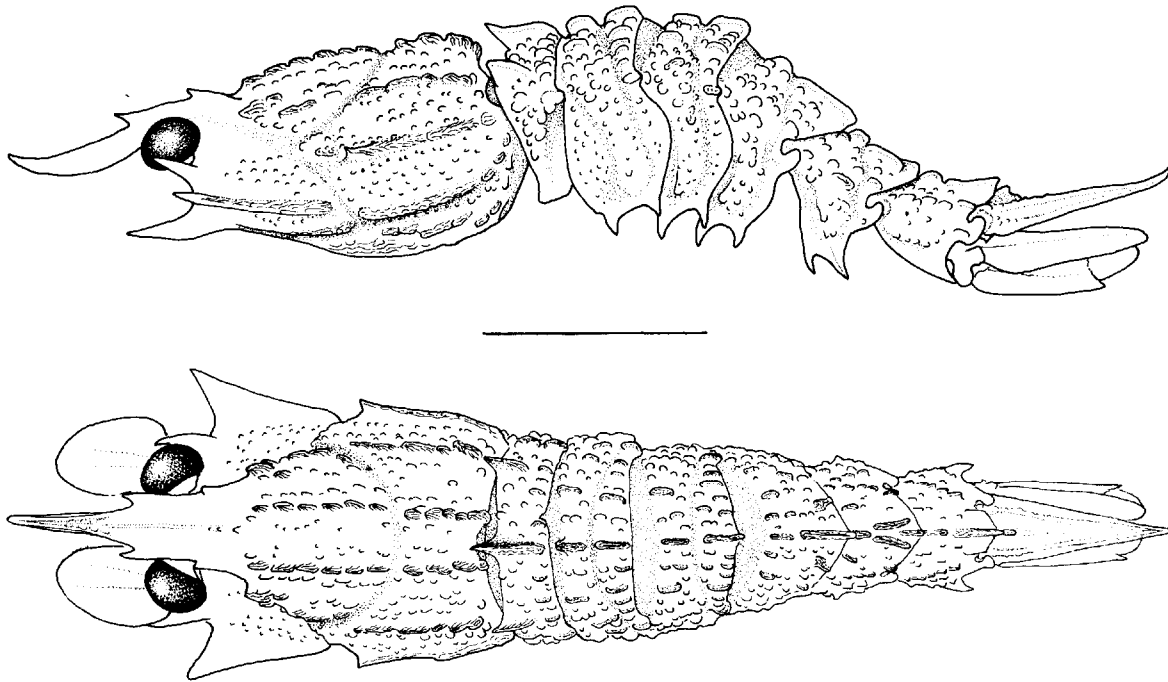


Fig. 24. *Glyphocrangon novacastellum* n.sp. Lateral and dorsal view. (Scale = 10 mm).

carapace length; tubercles of submedian carinae not laterally compressed, but broad and striate; tubercles between carinae low and blunt.

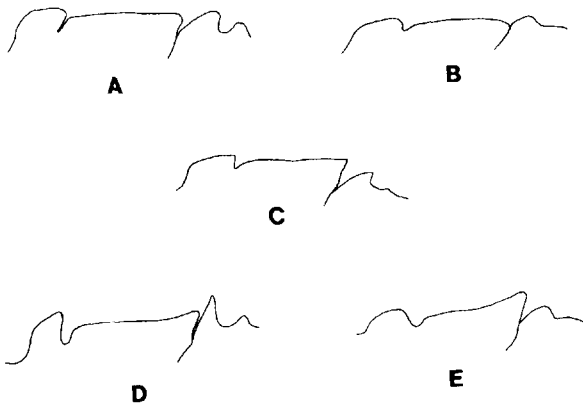


Fig. 25. Dorsal profile of pleonite 6 and anterior telson. A, *G. investigatoris*, Indonesia, USNM 205134; B, *G. regalis*, Indonesia, USNM 205128; C, *G. holthuisi*, paratype USNM 211397; D, *G. lowryi*, holotype AM P33158; E, *G. novacastellum*, paratype AM P26806.

**Description.** Integument weakly pubescent. Rostrum in adults about seven-tenths (0.68–0.75) carapace length, armed with 2 pairs of lateral teeth, anterior pair at about proximal two-fifths. Longitudinal ridge present along dorsal surface with transverse septa sometimes faintly present in anterior part but often indistinct. Longitudinal ridge also on ventral surface anteriorly, flanked by lateral ridges. Submedian (1st) carina composed of low subconical tubercles (not laterally compressed), directed obliquely forwards; anterior carina of 6 tubercles, posterior carina of 4 tubercles. Anterior intermediate (2nd) carina with first tubercle dentiform or subdentiform (as in submedian carina), remaining 3 or 4 tubercles low, sometimes indistinct. Posterior intermediate carina with 3–4 dentiform tubercles. Anterior antennal (3rd) carina absent. Posterior antennal (3rd) carina divided by 2, or occasionally 3, notches and armed with small acute spine anteriorly. Anterior lateral (4th) carina not continuous with branchiostegal spine, expanded into large vertically compressed, undivided lamina, directed forwards beyond level of posterior margin of orbit, apex acute and curved upwards slightly. Width across tips of these spines in adults equal to or usually greater (1.0–1.2) than carapace length. Posterior lateral carina entire or with 1 or 2, often shallow, notches, rarely

with 3 notches; usually unarmed, occasionally with small inconspicuous anterior tooth.

Tubercles between carapace carinae low, blunt, often in irregular rows. Row of tubercles midway between 3rd and 4th carinae with row of small, less distinct tubercles above and below. Carapace immediately posterior to eye smooth or with 1 or 2 small tubercles (occasionally up to 4 tubercles).

Antennal spine curved slightly mesially, smooth, about two-thirds (0.64–0.69) as long as branchiostegal spine. Tip of branchiostegal spine exceeding propod of pereopod 1 and reaching at least to end of penultimate segment of maxilliped 3.

Abdomen with median dorsal carinae on all somites. Somite 1 with anterior tubercles low; anterior height of dorsolateral carina greater than half and often subequal to basal length of carina. Somite 5 with 2 marginal spines on pleuron. Somite 6 with one posterior marginal spine on pleuron, directed slightly laterally with width across tips of these spines more than one and one-third (1.36–1.47) times anterior width of somite 6.

Telson with about one-fifth to one-quarter (0.18–0.29) of its length extending beyond apex of uropods.

Antennal scale more than one and one-half (1.62–1.77) times as long as broad. Maxilliped 3 extending as far as or very slightly beyond end of antennal peduncle. Pereopod 2 shorter on left hand side (20–21 carpal articles) than on right hand side (30–31, or 27 in juvenile, carpal articles). Length of pereopod 2 in relation to antennal scale seeming to vary with sex and age. Pereopod 2 on the LHS reaching about  $\frac{2}{3}$  of way along antennal scale in young specimen (cl 16 mm), not quite reaching to apex of scale in ovigerous females but slightly exceeding antennal scale in male of cl 23 mm. On RHS, pereopod 2 exceeding apex of antennal scale by chela and about 9 carpal articles in both male and ovigerous female but in specimen of cl 16 mm, only reaching apex of antennal scale. Pereopod 3 of ovigerous female reaching to end of antennal peduncle, i.e., nearly to end of antennal scale, pereopod 4 slightly shorter than 3, pereopod 5 reaching to end of propod of pereopod 4. In male of 23 mm (P19099), pereopod

3 extending past end of antennal peduncle and antennal scale; pereopod 4 slightly shorter than 3; pereopod 5 reaching halfway along propod of pereopod 4. On pereopods 3–5, propod about  $1\frac{1}{3}X$  as long as carpus, dactyl between  $\frac{2}{5}$  and  $\frac{3}{5}$  length propod.

**Colour.** Colour in life white with orange markings. Antennae orange, also distal third of rostrum, spines around orbit, submedian and intermediate carinae and small tubercles between carinae. On abdomen, dorsal carinae, a few dorsal tubercles, and posterior dorsal margin of each segment orange, also telsonic submedian and marginal carinae.

**Remarks.** The three new species of *Glyphocrangon* described here have the following features in common: the anterior antennal carina is not continuous with the antennal spine; there are two pairs of lateral rostral teeth; the pleuron of abdominal somite 5 has two teeth; the anterior lateral carina is expanded into a vertically compressed acute lamina; the posterior antennal carina ends anteriorly in a small tooth, or lacks a tooth; the intercarinal areas are tuberculate; the eyes are pigmented. These features would place all three into the *G. regalis*-*G. investigatoris* group of species. (Chace (1984) notes that only one feature separates *G. smithii* from *G. regalis*, viz. the small acute tooth on the posterior antennal carina in the former, but expressed uncertainty about the constancy of this character). Table 7 summarises the differences between the three new species and *G. regalis* and *G. investigatoris*. The features used show considerable constancy for the number of specimens examined (which admittedly for *G. lowryi* is only one, but 25 and 229 for *G. novacastellum* and *G. holthuisi* respectively).

While some degree of uncertainty must be admitted regarding the validity of these new species, there would nevertheless seem to be a complex of at least five (or six) closely related taxa. By formally naming the three taxa separated here, attention is drawn to the differences. Future workers with more material available will thus be prompted to verify or demolish these findings.

Character	<i>G. regalis</i>	<i>G. investigatoris</i>	<i>G. holthuisi</i>	<i>G. lowryi</i>	<i>G. novacastellum</i>
Carapace integument	pubescent	glabrous	pubescent	glabrous	pubescent
Rostrum: dorsal septa	present, faint	present, strong	absent	present, fairly strong	present, faint
Rostrum: anteroventrum	tricarinate	flattened	tricarinate	bicarinate	tricarinate
Carapace: tubercles	rounded	rounded	acute, low	acute, flattened	rounded, low
Submedian carina: tubercles	broad, reticulate	broad, rounded	narrow	narrow, flattened	broad, striated
Posterior antennal carina	anteriorly with distinct tooth	anteriorly with right-angle	anteriorly with right-angle	anteriorly with strong tooth	anteriorly with small tooth
Dorsal profile, pleonite 6	see Fig. 25	see Fig. 25	see Fig. 25	see Fig. 25	see Fig. 25

Table 7. Comparison of five species in the *Glyphocrangon regalis* complex.

**Etymology.** The specific name is derived from Newcastle, the coastal city closest to the holotypic locality.

### Family CRANGONIDAE

*Pontocaris* Bate, 1888

*Pontocaris lacazei* (Gourret)

*Pontocaris lacazei*.—Crosnier & Forest, 1973: 250, fig. 81; Chace, 1984: 42.

**Material examined.** New South Wales: AM P21031, north-east of Wollongong, 34°16'–22'S 151°26'–23'E, 356 m, demersal prawn trawl, *Kapala* (K75-05-01), 8 Aug 1975; 2♀. AMP5589, off Botany Bay, 34°00'S 151°11'E, 60–102 m, State Trawler *Goonambee*, Aug 1921; 2♀. AMP7864, off Botany Bay, 33°59'S 151°12'E, Trawler *Thistle*, Oct 1924; 1♀. AM P16278, off Cronulla, 100 m, dredged; 1♀. AM P24473, north-east of Brush Island, 35°30'S 151°48'E, 329 m, *Kapala* (K76-08-01), 8 June 1976; 1♀.

**Diagnosis.** Rostrum with one pair of basal teeth. Second lateral carine interrupted by hepatic groove. Median carina armed with 4 teeth. Tubercles absent between median and first lateral carina. Abdominal somite 4 with pair of dorsolateral carinae diverging posteriorly.

**Distribution.** Eastern Atlantic, Mediterranean, South Africa, Indo-Pacific to Philippines, Japan, Hawaii, New Zealand; 30–759 m.

*Pontocaris rathbunae* (de Man)

*Aegeon Rathbunae* de Man, 1918: 304; 1920: 300, pl. 24, fig. 74b, pl. 25, fig. 74a.

*Pontocaris rathbunae*.—Chace, 1984: 44.

**Material examined.** New South Wales: AM P28798, off Ulladulla, 35°30'S 150°48'E, 512 m, prawn trawl, *Kapala* (K79-11-06), 8 Aug 1979; 1♀. AM P20211, east to north-east of Port Jackson, 33°51'S 151°51'E to 33°45'S 151°55'E, 675 m, demersal prawn trawl, *Kapala* (K72-06-03), 19 Oct 1972; 1 ovig. ♀. AM P21782, south-east of Yamba, 29°41'S 153°45'E to 29°32'S 153°47'E, 403 m, demersal prawn trawl, *Kapala* (K75-09-04), 10 Oct 1975; 1 ovig. ♀.

**Diagnosis.** Rostrum with pair of basal teeth. Second lateral carina not interrupted by hepatic groove. Median carina with 5 teeth. No tubercles between median and first lateral carina. Abdominal somite 4 with 3 pairs of posterior diverging dorsolateral carinae.

**Distribution.** Off Indonesia, Hawaii; 11–1600 m.

### Zoogeography

The present collection comprises 73 species of shrimps, almost all of which have come from depths ranging between 200 and 800 m. Some of these, such as the species of the genus *Gennadas*, are true pelagics, but the majority are benthic inhabitants.

That 46 species (63%) should prove to be new records for the Australian fauna, is not surprising; as noted in the introduction, very little collecting at these depths has been done. That 11 undescribed species (15%) were encountered further illustrates the relatively unknown character of the fauna. Obviously, without further information on distribution, it is not possible to comment on the zoogeographical affinities of these new species. Several, such as the species of *Pasiphaea* and *Glyphocrangon* probably have distributions beyond the east coast of Australia; others such as the benthic *Lebbeus yaldwyni* probably have a more restricted range and could well be regarded as part of an endemic fauna.

The largest component of this fauna, seen from a zoogeographic viewpoint, is that which occurs in all the major oceans. This group of 32 species (five of which also occur in the Mediterranean Sea) includes most of the true mesopelagics as well as some of the deeper-dwelling benthics — 11 penaeoids, 12 species of oplophorids, two pasiphaeids, and four pandalids. To some extent, the composition of this group off New South Wales could have been predicted.

The next largest component of the fauna is a group of 27 species having an Indo-West Pacific distribution. These include 11 species of shallow- and bottom-dwelling penaeoids, e.g. *Solenocera* and *Hymenopenaeus*, and six species of pandalids. There may also be a southern subgroup in this component, as three species, viz. *Campylonotus rathbunae*, *Chlorotocus novaezeelandiae* and *Lipkius holthuisi*, have only been collected in the region of New Zealand and southern Australia.

The deepwater shrimp fauna off New South Wales would seem to be, in terms of composition and numbers, comparable to that of southern Africa (see Kensley, 1981b). About 90 deepwater shrimp species have been recorded from this region, which includes parts of both the southern Atlantic and south-western Indian ocean. Undoubtedly, further collecting would yield an even larger fauna off New South Wales, given that this region is close to centers of high diversity such as those around the Philippines and Indonesia.

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### References

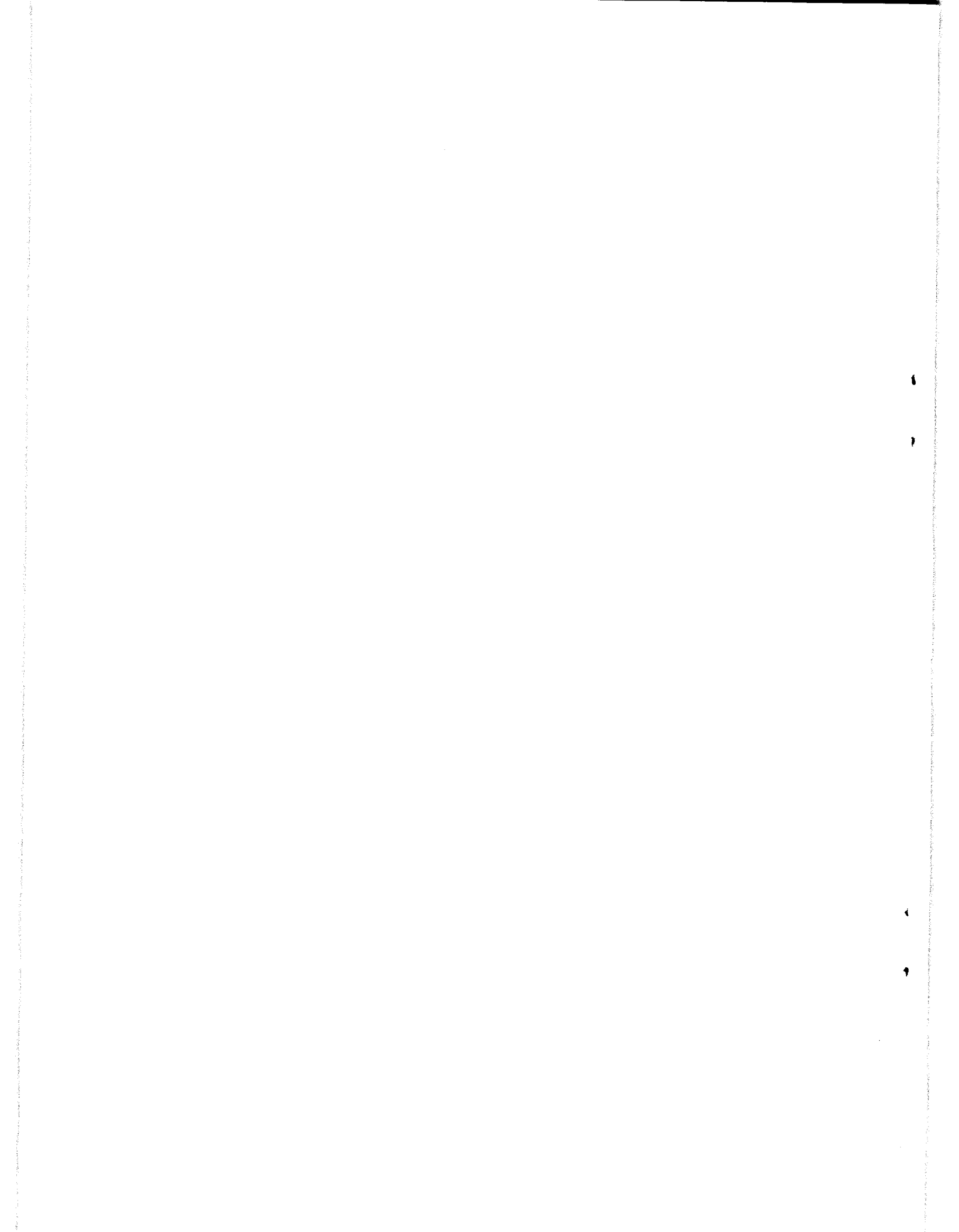
- Alcock, A., 1901. A descriptive catalogue of the Indian deep-sea Crustacea Decapoda Macrura and Anomala, in the Indian Museum. Being a revised account of the deep-sea species collected by the Royal Indian Marine Survey ship *Investigator*. Calcutta: Indian Museum, 286 pp.
- Alcock, A. & A.R. Anderson. 1894. Natural History Notes from H.M. Indian Marine Survey steamer 'Investigator', Commander C.F. Oldham, R.N., commanding. Series II, No. 14. An account of a recent collection of deep-sea Crustacea from the Bay of Bengal and Laccadive Sea. *Journal of the Asiatic Society of Bengal* 63 (II-3): 141-185.
- 1899. Natural History Notes from H.M. Royal Indian Marine Survey ship 'Investigator', Commander T.H. Heming, R.N., commanding. Series III, No. 2. An account of the deep-sea Crustacea dredged during the surveying-season of 1897-98. *Annals and Magazine of Natural History* (7)3: 1-27, 278-292.
- Alcock, A. & A.F. McArdle, 1901. Crustacea. Part 9. Illustrations of the Zoology of the Royal Indian Marine Survey ship *Investigator*, under the command of Captain T.H. Heming, R.N. (Retired), plates 49-55. Calcutta.
- Anderson, A.R.S., 1896. Natural history notes from the R.I.M. Survey steamer 'Investigator', Commander C.F. Oldham, R.N., commanding. Series II, No. 21. An account of the deep sea Crustacea collected during the season 1894-95. *Journal of the Asiatic Society of Bengal* 65(II-2): 88-106.
- Balss, H., 1927. Macrura der Deutschen Tiefsee-Expedition. 3. Natantia, Teil B. *Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition 'Valdivia'* 23: 245-275.
- Barnard, K.H., 1950. Descriptive catalogue of South African decapod Crustacea (crabs and shrimps). *Annals of the South African Museum* 38: 1-837.
- Bate, C.S., 1881. On the Penaeidea. *Annals and Magazine of Natural History* (5)8: 169-195.
- Bate, C.S., 1888. Report on the Crustacea Macrura collected by H.M.S. Challenger during the years 1873-1876. Report of the Voyage of the Challenger 1873-1876, 24: 1-942.
- Borradaile, L.A., 1899. On the Stomatopoda and Macrura brought by Dr Willey from the South Seas. In Willey, Zoological results based on material from New Britain, New Guinea, Loyalty Islands and elsewhere, collected during the years 1895, 1896, and 1897, 4: 395-428.
- 1916. Crustacea, Part 1.—Decapoda. British Antarctic ("Terra Nova") Expedition, 1910. *Natural History Report. Zoology* 3(2): 75-110.
- Bouvier, E.L., 1905. Sur les Peneides et les Stenopides recueillis par les expéditions francaises et monegasques dans l'Atlantique oriental. *Comptes rendus hebdomadaires des Séances de l'Académie de Sciences, Paris* 140: 980-983.
- 1906. Suite aux observations sur les *Gennadas* ou Peneides bathypelagiques. *Comptes rendus hebdomadaires des Séances de l'Académie des Sciences, Paris* 142: 746-749.
- Brandt, J.F., 1851. Krebse. In *Middendorff's Reise in den aussersten Norden und Osten Sibiriens* 2(1): 79-148.
- Brashnikov, V., 1907. Beiträge zur Fauna der russischen ostlichen Meere, gesammelt von dem Schoner "Storosh" in die Jare 1899-1902. *Memoires de l'Académie des Sciences, St. Petersburg ser. 8* 20(6): 1-185.
- Bruce, A.J., 1966. *Hymenopenaeus halli* sp. nov., a new species of penaeid prawn from the South China Sea (Decapoda, Penaeidae). *Crustaceana* 11(2): 216-224.
- Brullé, M., 1839. Crustacés. In Webb and Berthelot: *Histoire Naturelle des Îles Canaries* 2(2): 15-18.
- Calman, W.T., 1925. On macrurous decapod Crustacea collected in South African waters by the S.S. 'Pickle'. Report of the Fisheries and Marine Biological Survey of the Union of South Africa 4 (special report 3): 1-26.
- 1939. Crustacea Caridea. *Scientific Reports of the John Murray Expedition 1933-34*, 6(4): 183-224.
- Casanova, J.-P., 1976. Crustacés Decapodes pelagiques de la province Atlanto-Méditerranéenne — Notes taxonomiques et biogéographiques. *Rapports de la Commission internationale pour l'Exploration scientifique de la Mer Méditerranée* 23 (9): 63-64.
- Casanova, J.-P. & D.C. Judkins, 1977. Les décapodes pelagiques en Méditerranée. Répartition et secteurs faunistiques. *Rapports de la Commission internationale pour l'Exploration scientifique de la Mer Méditerranée* 24(10): 125-127.
- Chace, F.A. Jr., 1940. Plankton of the Bermuda Oceanographic Expeditions. 9. The bathypelagic caridean Crustacea. *Zoologica New York* 25(2): 117-209.
- 1983. The caridean shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition, 1907-1910, Part 1: Family Styrodactylidae. *Smithsonian Contributions to Zoology* 381: i-iii, 1-21.
- 1984. The caridean shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition, 1907-1910, Part 2: Families Glyphocrangonidae and Crangonidae. *Smithsonian Contributions to Zoology* 397: i-iv, 1-63.
- 1985. The caridean shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition, 1907-1910, Part 3: Families Thalassocarididae and Pandalidae. *Smithsonian Contributions to Zoology* 411: 1-143.
- 1986. The caridean shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition, 1907-1910, Part 4: Families Ophrophoridae and Nematocarcinidae. *Smithsonian Contributions to Zoology* 432: i-iv, 1-82.
- Coutière, H. 1905. Sur quelques Crustacés provenant des campagnes de la *Princesse-Alice* (Filet à grande ouverture). *Comptes rendus hebdomadaires des Séances de l'Académie des Sciences, Paris* 140: 1113-1115.

- Crosnier, A. 1970. Crustacés décapodes brachyours et macroures recueillis par l' "Undaunted" au sud de l'Angola. Description de *Scyllarus subarctus* sp. nov. Bulletin du Muséum National d'Histoire Naturelle, Paris (2) 41(5): 1214–1227.
- 1976. Données sur les crustacés décapodes captures par M. Paul Gueze à l'Île Réunion lors d'essais de pêche en eau profonde. Travaux et Documents ORSTOM 47: 225–256.
- 1978. Crustacés Décapodes Peneides Aristeidae (Benthescyminae, Aristeinae, Solenocerinae). Faune de Madagascar 46: 1–197.
- 1985a. Crustacés Décapodes: Penaeidae. Les espèces indo-pacifiques du genre *Parapenaeus*. Résultats des Campagnes Musorstom I et II. Mémoires du Muséum national d'Histoire naturelle, Paris ser. A, Zoologie 133: 303–353.
- 1985b. Crevettes pénéides d'eau profonde récoltées dans l'océan Indien lors des campagnes BENTHEDI, SAFARI I et II, MD 32/RÉUNION. Bulletin du Muséum National d'Histoire Naturelle, série 4, Section A, Tome 7, no. 4: 839–877.
- Crosnier, A. & J. Forest, 1973. Les crevettes profondes de l'Atlantique oriental tropical. Faune Tropicale 19: 1–409.
- Dall, W., 1957. A revision of the Australian species of Penaeinae (Crustacea Decapoda: Penaeidae). Australian Journal of Marine and Freshwater Research 8(2): 136–230.
- Fabricius, J.C., 1798. Supplementum Entomologiae Systematicae. Copenhagen.
- Figueira, A.J.G., 1971. Materials for a revision of the family Styrodactylidae (Crustacea Decapoda: Caridea) 1. Description of a new genus and of a new species. Arquivos do Museu Bocage ser. 2, 3(1): 1–8.
- Gourret, P., 1887. Sur quelques Décapodes macroures nouveaux de Golfe de Marseille. Comptes rendus de l'Académie des Séances de la Sciences, Paris 105: 1033–1035.
- Grey, D.L., W. Dall & A. Baker, 1983. A Guide to the Australian Penaeid Prawns. Darwin: Northern Territory Government Printing Office. 140 pp.
- Griffiths, F.B. & S.B. Brandt, 1983. Mesopelagic Crustacea in and around a Warm-core Eddy in the Tasman Sea off Eastern Australia Australian Journal of Marine and Freshwater Research 34: 609–623.
- Hall, D.N.F., 1956. The Malayan Penaeidae (Crustacea, Decapoda). Part 1. Introductory notes on the species of the genera Solenocera, Penaeus and Metapenaeus. Bulletin of the Raffles Museum 27: 68–90.
- 1962. Observations on the taxonomy and biology of some Indo-West Pacific Penaeidae (Crustacea, Decapoda). Colonial Office, Fisheries Publications No. 17. Her Majesty's Stationery Office, London. 229 pp.
- Hayashi, K.-I. & S. Miyake, 1969. Bathypelagic caridean shrimps collected by "Koyo Maru" during the International Indian Ocean Expedition. OHMU 2(4): 59–77.
- Holthuis, L.B., 1947. Nomenclatural notes on European macrurous Crustacea Decapoda. Zoologische Mededeelingen 27: 312–322.
- 1949. The Caridean Crustacea of the Canary Islands. Zoologische Mededeelingen 30: 227–255.
- 1951. The caridean Crustacea of tropical West Africa. Atlantide Report 2: 7–187.
- 1955. The recent genera of the caridean and stenopodidean shrimps (Class Crustacea, Order Decapoda, Supersection Natantia) with keys for their determination. Zoologische Verhandlungen 26: 1–157.
- 1961. A new species of *Merhippolyte* (Decapoda Natantia) from east American waters. Crustaceana 2: 1–5.
- Holthuis, L.B. and E. Sivertsen, 1967. The Crustacea Decapoda, Mysidacea and Cirripedia of the Tristan da Cunha Archipelago, with a revision of the "*frontalis*" subgroup of the genus *Jasus*. Results of the Norwegian Scientific Expedition to Tristan da Cunha 1937–1938, 52: 1–55.
- Johnson, J.Y., 1867. Description of a new genus and a new species of macrurous decapod crustaceans, belonging to the Penaeidae, discovered at Madeira. Proceedings of the Zoological Society of London 1867: 895–901.
- Kemp, S., 1906. On the occurrence of the genus *Acantheephyra* in deep water off the west coast of Ireland. Department of Agriculture and Technical Instruction for Ireland. Fisheries Branch. Scientific Investigations 1905, 1: 1–28.
- 1909. The decapods of the genus *Gennadas* collected by H.M.S. 'Challenger'. Proceedings of the Zoological Society of London 11: 718–730.
- 1913. Pelagic Crustacea Decapoda of the Percy Sladen Trust Expedition in H.M.S. "Sealark". Transactions of the Linnean Society of London (2) Zoology 16: 53–68.
000001939. On *Acantheephyra purpurea* and its allies (Crustacea, Decapoda, Hoplophoridae). Annals and Magazine of Natural History (11)4: 568–579.
- Kemp, S. & R.B.S. Sewell, 1912. Notes on Decapoda in the Indian Museum, III. Records of the Indian Museum 7(1): 15–32.
- Kensley, B., 1968. Deep sea decapod Crustacea from west of Cape Point, South Africa. Annals of the South African Museum 50(12): 283–323.
- 1971. The genus *Gennadas* in the waters around southern Africa. Annals of the South African Museum 57(12): 271–294.
- 1972. Shrimps and prawns of southern Africa. South African Museum, Cape Town. 65 pp.
- 1977. The South African Museum's *Meiring Naude* cruises. Part 5. Crustacea, Decapoda, Reptantia and Natantia. Annals of the South African Museum 74(2): 13–44.
- 1981a. The South African Museum's *Meiring Naude* cruises. Part 12. Crustacea Decapoda of the 1977, 1978, and 1979 cruises. Annals of the South African Museum 83(4): 49–78.
- 1981b. On the zoogeography of southern African Decapod Crustacea, with a checklist of the species. Smithsonian Contributions to Zoology 338: i–iii, 1–64.
- Kubo, I., 1937. One new and an imperfectly known deep-sea shrimps. Journal of the Imperial Fisheries Institute, Tokyo 32: 93–103.
- 1942. On two new species of Decapoda Macrura. Annotationes Zoologicae Japonensis 21(1): 30–38.
- 1943. Diagnosis of a new species of the genus *Penaeus*. Suisan Kenkyusi 38(11): 200–201.
- 1949. Studies on penaeids of Japanese and its adjacent waters. Journal of the Tokyo College of Fisheries 36(1): 1–467.
- Lucas, H., 1849. Observations sur un nouveau genre de l'ordre des décapodes (Solenocera, Philippi, Luc.).

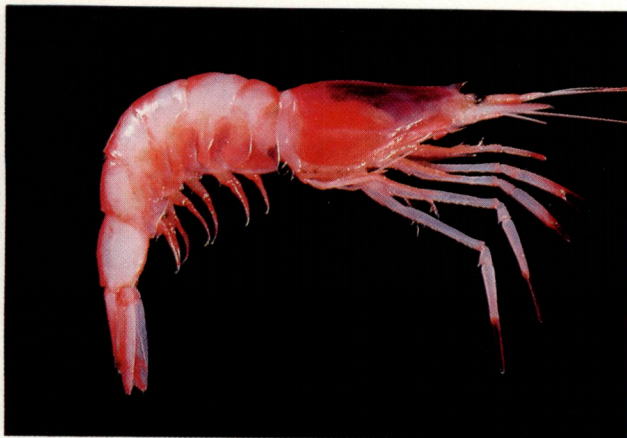
- Annales de la Soci t  Entomologique, Paris (2)8: 215–224.
- MacPherson, E. 1984. Crust ceos Dec podos del Banco Valdivia (Atl ntico sudoriental). Resultados Expediciones Cientificas 12: 39–105.
- Man, J.G. de, 1907. Diagnoses of new species of macrurous decapod Crustacea from the "Siboga Expedition". Notes from the Leyden Museum 29(2): 127–146.
- 1911. The Decapoda of the Siboga Expedition. Part 1. Family Penaeidae. Siboga Expeditie, monographie 39a: 1–131.
- 1917. Diagnoses of new species of macrurous decapod Crustacea from the Siboga-Expedition. Zoologische Mededeelingen Leiden 3(4): 279–284.
- 1918. Diagnoses of new species of macrurous decapod Crustacea from the Siboga-Expedition. Zoologische Mededeelingen Leiden 4(3): 159–166.
- 1920. The Decapoda of the Siboga Expedition. Part 4. Families Pasiphaeidae, Stylodactylidae, Hoplophoridae, Nematocarcinidae, Thalassocaridae, Pandalidae, Psalidopodidae, Gnathophyllidae, Processidae, Glyphocrangonidae, and Crangonidae. Siboga-Expeditie monographie, 39a3: 1–318.
- Man, J.G. 1931. On a new species of the genus *Hoplophorus* (*Oplophorus*) H.M. Edw., *Hoplophorus novae-zealandiae*, sp. n. Journal of the Linnean Society of London 37: 369–378.
- Milne Edwards, A., 1881. Description quelques Crustac s macroures provenant des grandes profondeurs de la Mer des Antilles. Annales des Sciences Naturelles, Zoologie (6) 11(4): 1–16.
- 1882. Rapport sur les travaux de la Commission charg e d' tudier la faune sous-marine dans les grandes profondeurs de la M diterran e et de l'oc an Atlantique. Archives des Missions scientifique et Litt raires (3)9: 1–59.
- 1883. Recueil de figures de Crustac s nouveaux ou peu connus, 3 pp., 44 pls.
- Milne Edwards, H., 1837. Histoire Naturelle des Crustac s Vol. 2, 531 pp. Librairie Encyclopedique de Roret, Paris.
- Nataraj, S., 1945. On two species of *Solenocera* (Crustacea Decapoda: Penaeidae) with notes on *Solenocera pectinata* (Spence Bate). Journal of the Asiatic Society of Bengal 11(1): 91–98.
- P rez Farfante, I., 1977. American solenocerid shrimps of the genera *Hymenopenaeus*, *Haliporoides*, *Pleoticus*, *Hadropenaeus* new genus and *Mesopenaeus* new genus. United States Fisheries Bulletin 75(2): 261–346.
- 1977. *Penaeopsis eduardoi*, a new species of shrimp (Crustacea: Penaeidae) from the Indo-West Pacific. Proceedings of the Biological Society of Washington 90(1): 172–182.
- P rez Farfante, I. & B. Kensley, 1985. *Cryptopenaeus crosnieri*, a new species of shrimp, and a new record of *C. sinensis* (Penaeoidea: Solenoceridae) from Australian waters. Proceedings of the Biological Society of Washington 98(1): 281–287.
- Potter, M.A. & M.C.L. Dredge, 1985. Deepwater Prawn resources off southern and central Queensland. Pp. 221–229, in P.C. Rothlisberg, B.J. Hill & D.J. Staples (eds), Second Australian National Prawn Seminar, NPS2, Cleveland, Queensland, Australia.
- Racek, A.A. & W. Dall, 1965. Littoral Penaeinae (Crustacea Decapoda) from Northern Australia, New Guinea and Adjacent Waters. Verhandelingen der Koninklijke Nederlandse Akademie van Wetenschappen, Afd. Natuurkunde (2) 56(3): 1–116.
- Ramadan, M.M., 1938. Crustacea, Penaeidae. Scientific Reports of the John Murray Expedition 5: 35–76.
- Rathbun, M.J., 1906. The Brachyura and Macrura of the Hawaiian Islands. Bulletin of the United States Fish Commission 23(3): 827–930.
- 1902. Descriptions of new decapod crustaceans from the west coast of North America. Proceedings of the United States National Museum 24: 885–905.
- Risso, A., 1816. Histoire naturelle des crustac s des environs de Nice. 1–175. Librairie Grecque-Latine-Allemande, Paris.
- 1827. Histoire naturelle des principales productions de l'Europe meridionale et particulierement de celles des environs de Nice et des Alpes-Maritimes 5, (I-VIII): 1–403.
- Sabine, E., 1824. Invertebrate Animals. In W.E. Parry, 'Journal of a Voyage for the Discovery of a Northwest Passage from the Atlantic to the Pacific; Performed in the Years 1819–20 in His Majesty's Ships *Hecla* and *Griper*' pp 219–239. J. Murray, London.
- Schmitt, W.L., 1926. Report on the Crustacea Macrura (Families Penaeidae, Campylonotidae, and Pandalidae) obtained by the F.I.S. "Endeavour" in Australian seas. Biological Results of the Fishing Experiments carried on by the F.I.S. "Endeavour" 1909–14, 5(6): 311–381.
- Smith, S.I., 1882. Report on the Crustacea. Part 1. Decapoda. Reports on the results of dredging, under the supervision of Alexander Agassiz, on the east coast of the United States, during the summer of 1880, by the U.S. Coast Survey Steamer "Blake", Commander J.R. Bartlett, U.S.N., commanding. Bulletin of the Museum of Comparative Zoology at Harvard College 10(1): 1–108.
- 1884. Report on the decapod Crustacea of the Albatross dredgings off the east coast of the United States in 1883. Report of the United States Fish Commission 10: 345–426.
- 1885. On some new or little known decapod Crustacea, from recent Fish Commission dredgings off the east coast of the United States. Proceedings of the United States National Museum 7: 493–511.
- 1886. The abyssal decapod Crustacea of the 'Albatross' dredgings in the North Atlantic. Annals and Magazine of Natural History (5)17: 187–198.
- Stebbing, T.R.R., 1914. South African Crustacea. Annals of the South African Museum 15: 1–55.
- Suseelan, C. & K.H. Mohamed, 1969. On the occurrence of *Plesionika ensis* (A. Milne Edwards) (Pandalidae, Crustacea) in the Arabian Sea with notes on its biology and fisheries potentialities. Journal of the Marine Biological Association of India 10(1): 88–94.
- Thompson, J.R., 1966. The caridean superfamily Bresilioidea (Decapoda Natantia). A revision and a discussion of its validity and affinities. Crustaceana 11(2): 129–140.
- White, A., 1847. List of the specimens of Crustacea in the collection of the British Museum. British Museum, London, 143 pp.
- Wicksten, M.K. & M. Mendez, 1982. New records and new species of the genus *Lebbeus* (Caridea: Hippolytidae) in the Eastern Pacific Ocean 81(3): 106–120.
- Wood Mason, J. & A. Alcock, 1891. Natural history notes from H.M. Indian Marine Survey steamer 'Investigator', Commander R.F. Hoskyn, commanding.

- Series II. No. 21. Note on the results of the last season's deep-sea dredging. *Annals and Magazine of Natural History* (6)7: 186–202.
- \_\_\_\_\_. 1892. Natural history notes from H. M. Indian Marine Survey steamer 'Investigator', Commander R. F. Hoskyn, R.N., commanding. Series II. No. 1. On the results of deep-sea dredging during the season 1890–91. *Annals and Magazine of Natural History* (6)9: 358–370.
- \_\_\_\_\_. 1893. Natural History notes from H.M. Indian Marine Survey steamer 'Investigator', Commander R.F. Hoskyn, R.N., commanding. Series II. No. 1. On the results of deep-sea dredging during the season 1890–91. *Annals and Magazine of Natural History* (6)11: 161–172.
- Yaldwyn, J.C., 1960. Biological results of the Chatham Islands 1954 Expedition. Part 1. Crustacea Decapoda Natantia from the Chatham Rise: a deep water bottom fauna from New Zealand. *Bulletin of the New Zealand Department of Scientific and Industrial Research* 139(1): 13–53.
- \_\_\_\_\_. 1967. A summary of the composition and relationships of the New Zealand macruran and anomuran fauna. Australian-New Zealand Meeting on Decapod Crustacea, Sydney October 24–28, 1967. 7 pp.
- \_\_\_\_\_. 1971. Preliminary descriptions of a new genus and twelve new species of natant decapod Crustacea from New Zealand. *Records of the Dominion Museum, Wellington* 7(10): 85–94.
- Yokoya, Y., 1933. On the Distribution of Decapod Crustaceans inhabiting the Continental Shelf around Japan, chiefly based upon the Materials collected by S.S. Soyo-Maru, during the Year 1923–1930. *Journal of the College of Agriculture, Tokyo Imperial University* 12: 1–226.

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A. *Pasiphaea berentsae*, Paratype, AM P26797.



B. *Lebbeus yaldwyni*, Paratype, AM P24769.



C. *Plesionika grahami*, Paratype, AM P21030.



D. *Glyphocrangon novacastellum*, Paratype, AM P20995.

ERRATUM: Frontispiece, C. Glyphocrangon novacastellum, Paratype, AM P20995.

D. Plesionika grahami, Paratype, AM P21030.

