JOURNAL OF NATURAL HISTORY, 1984, 18:697–715

Colanthura, Califanthura, Cruranthura and *Cruregens,* related genera of the Paranthuridae (Crustacea: Isopoda)

GARY C. B. POORE

Museum of Victoria, Swanston Street, Melbourne,
Victoria 3000, Australia

Introduction

Seven genera of the Paranthuridae have been described as possessing only six pereopods. For reasons which are non longer valid three of these, *Colanthura* Richardson, *Cruranthura* Thomson and *Califanthura* Schultz, were synonymized by me in my review of paranthurid genera (Poore 1980). In this contribution these three genera are revived and together with *Cruregens* rediagnosed using new criteria. *Tristanthura* Siversten and Holthuis is synonymized with *Califanthura*. The sixth genus, *Curassanthura* Kensley, is not related to the rest (Wägele 1982) and is not considered further here. The seventh, *Zulanthura* Poore is a junior synonym of *Accalathura* (Kensley 1982).

Trends in taxonomic characters in the Paranthuridae in general and in *Colanthura* and related genera in particular. Character 21 (unique to *Cruregens*) is a reversal of the usual trend in the family.

Character	plesiomorphic state	apomorphic state
1. pereopod 7	present	absent
2. antenna 1 flagellum	many articles	few articles
3. mandibular palp	present	absent
4. molar	trituritive	blade-like
5. maxilliped	seven articles	few articles
6. statocyst	present	absent
7. pereopod 1, mesial setal row	diffuse	closely-spaced
8. incisor	acute	blunt
9. head	longer than wide	as long as wide
10. pereonite 7	long	short
11. pleonites 1–5	free	fused
12. pereopod 1, propodus	elongate	compact
13. pereopod 1, palm	axial	transverse
14. pereopods, article 5	linear	quadrate
15. integument	smooth	squamose
16. pleon	as long as wide and with dorsal integumental folds	shorter than wide and without dorsal integumental folds
17. pleonite 1	as long as 2	longer than 2
18. pereopod 1, mesial setal row	long	short
19. pleonite 6	free from telson	fused to telson
20. eyes	present	absent
21. body, pereopods and uropods	unspecialised	elongate
22. pleonites 2–5	free	fused

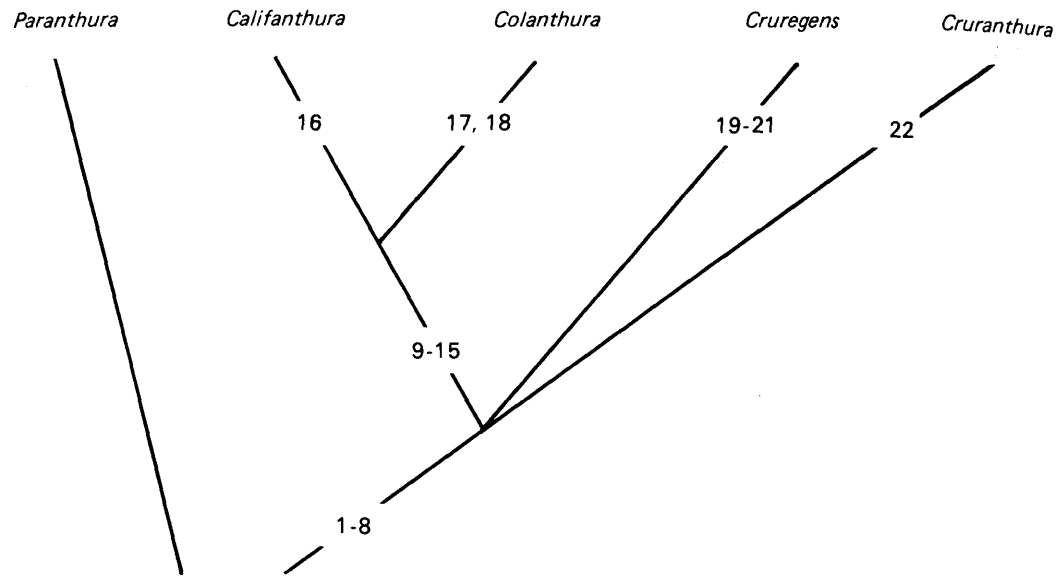

FIG. 1. Cladogram depicting character relationships of those paranthurid genera lacking pereopods 7. The genus *Paranthura* is the posited sister-group and was used as the out-group to polarise characters. Numbers refer to the synapomorphies discussed in the text and in the table.

This contribution discusses the relationsips between the four genera considered valid and diagnoses the species. Three new species are described.

In addition to absence of the seventh pereopod these genera share several advanced characters and suggest a monophyletic grouping. They are therefore amenable to a brief cladistic or phylogenetic analysis. Wägele (1981), in his phylogenetic treatment of the Anthuridea as a whole, recognized only *Colanthura* and *Cruregens*, proposing *Paranthura* as the genus most closely related to these two. *Paranthura* is here used as an out-group for discussion of relationships between *Colanthura* and its relatives.

The major taxonomic characters used in defining paranthurid genera are given in the table. There is probably little argument about the polarity of the character states, the tendency in most cases being towards shortening of segments, reduction in number, or fusion of segments. The cladogram (fig. 1) relating the four genera and *Paranthura* attempts to minimize convergences and character reversals.

Colanthura and the three related genera share eight synapomorphies (characters 1–8 in the table and fig. 1). As well as loss of pereopod 7 (character 1) the flagellum of antenna 1 has a short basal article, a second longer article and two minute terminal articles (2). The mandible is without a palp (3), and in place of the molar is a curved flange enclosing the maxilla and the hypopharynx (4). Except for a terminal minute article bearing four setae all articles of the maxilliped are fused (5). The statocyst is absent (6). The propodus of pereopod 1 is well-developed and has a row of closely spaced strong setae on its mesial surface (7). The mandibular incisor is blunt rather than acute as is typical of paranthurids (8); this is an apparent reversal towards the condition found in primitive paranthurids (Wägele 1981).

Division of the genus-pair *Colanthura* and *Califanthura* from the other two genera *Cruranthura* and *Cruregens* is based on characters 9–15.

Colanthura and *Califanthura* share several synapomorphies. The head is as long as wide (9), pereonite 7 is extremely short (10); in the primitive state these structures are more elongate. Pleonites 1–5 do not articulate (11). The propodus of pereopod 1 is

compact rather than elongate (12), its palm transverse rather than axial (13). The fifth articles of pereopods 4–6 are quadrate rather than elongate (14). The integument often bears minute squamae (15). *Cruranthura* and *Cruregens* share no apparent morphological apomorphies but do tend to contain estuarine or freshwater species rather than marine. The value of this contrasts with the other clear morphological characters used to analyse these genera and evidence for *Cruranthura* and *Cruregens* being sister taxa is not convincing. These two and the other genus-pair are therefore placed in a trichotomy (fig. 1).

The apomorphies which characterise *Califanthura* are absence of dorsal integumental folds between pleonites 1–5 and shortening of the pleonites (16). *Colanthura*, on the other hand, possesses an elongate and laterally swollen first pleonite (17) and a shortened mesial setal row on the propodus of pereopod 1 (18).

The specialized genus *Cruregens* possesses several unique morphological features which correlate with its unusual hypogean freshwater habitat. Pleonite 6 is fused to the telson (19) and the eyes are absent (20). The elongation of the body, antennae and uropodal rami (21) could be interpreted as a secondary reversal associated with the habitat of this monotypic genus. This is certainly the view of Wägele (1981) who also attributed reduced aesthetascs, oostegites and pleopod setae to its hypogean way of life.

In contrast, *Cruranthura* is distinguished by the fusion of only pleonites 2–5, the first and last pleonites remaining free (22).

Specimens of all nominal species (with two exceptions) have been obtained and are the basis of the discussion on relationships and the diagnoses of genera and species which follow. Illustrations are presented for species inadequately figured in the past and for new species.

Key to *Colanthura* and related genera of Paranthuridae

1 Pereonite 7 very short, not visible laterally; head as long as wide 2
– Pereonite 7 about one-third as long as pereonite 6; head longer than wide . . . 3
2 Pleonites 1–5 separated by integumental folds dorsally; pleonite 1 twice as long as pleonite 2 . . . . . *Colanthura*
– Pleonites 1–5 fused, rarely with integumental folds dorsally; pleonites of similar lengths . . . . . *Califanthura*
3 Pleonites 2–5 only fused; marine or estuarine; with eyes . . . . *Cruranthura*
– Pleonites all free; hypogean or freshwater; blind . . . . . *Cruregens*

Family **PARANTHURIDAE** Menzies and Glynn, 1968

Diagnosis. See Poore (1980).

Califanthura Schultz

Califanthura Schultz, 1977: 839–840.
Colanthura; Menzies, 1951: 114; Poore, 1980: 60 (part).
Tristanthura Sivertsen and Holthuis, 1980: 20.

Diagnosis. Paranthuridae with eyes. Head about as wide as long. Integument usually pigmented, often covered with minute squamae. Pereonite 7 very short, not visible laterally. Pleon slightly shorter than greatest width; pleonites 1–5 fused, rarely dorsal folds visible between them; pleonite 1 not longer than pleonite 2, pleonites 5 and 6 articulating. Antenna 1 flagellum of four articles. Antenna 2 flagellum a single short cylindrical article. Mandible without a palp; incisor blunt; in place of molar a curved flange. Maxilla a sharp serrate spine. Maxillipedal articles

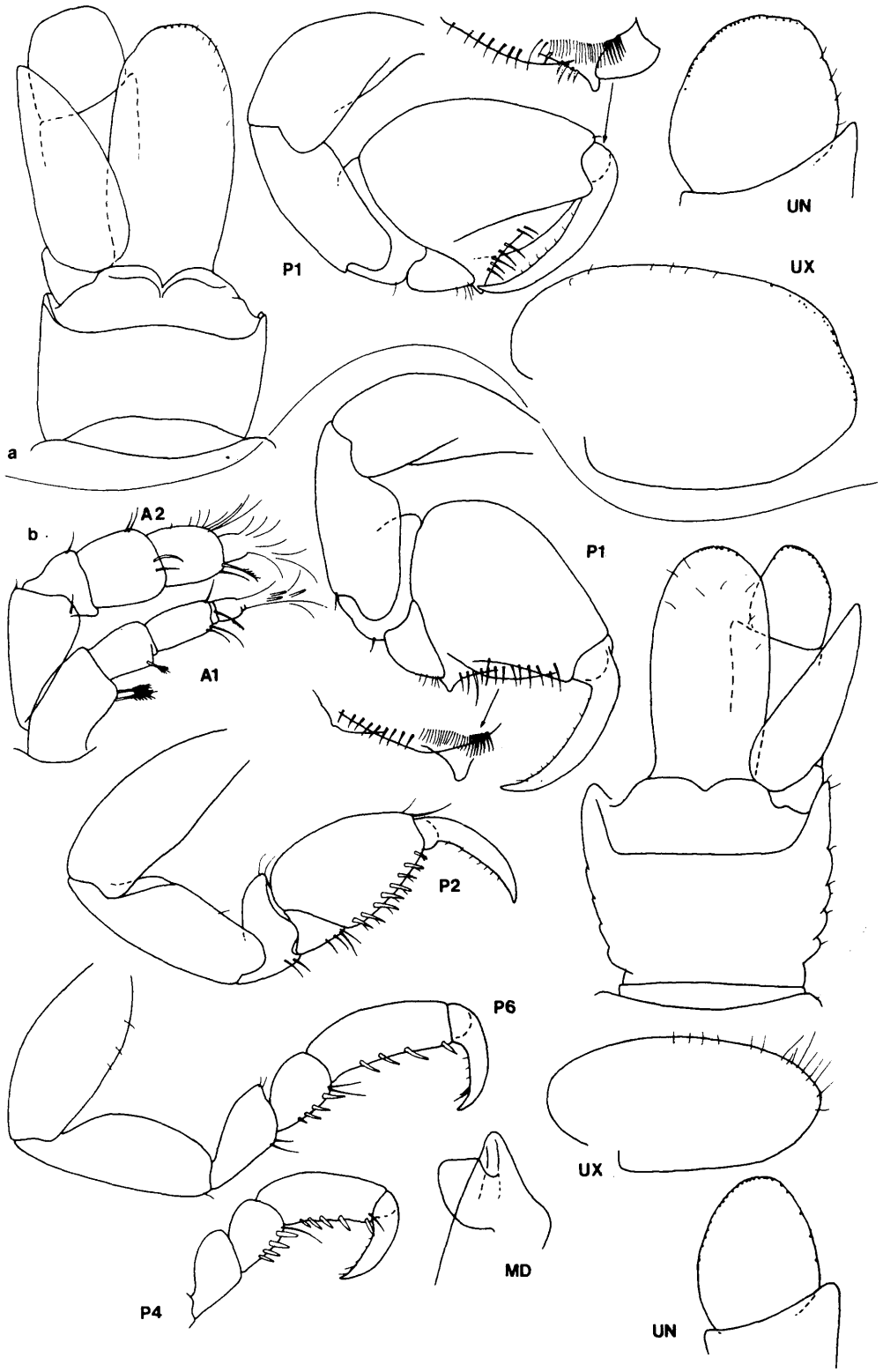

FIG. 2. *a*, *Califanthura barnardi*, female paratype (RMNH). *b*, *Califanthura lowryi* sp. nov., female holotype (NMV).

fused except for free minute terminal article. Pereopod 1 subchelate, propodus swollen and palm oblique or transverse, with a proximal mesial row of at least 10 (usually 20–30) strong setae. Pereopods 2 and 3 with propodus a little more robust than that of posterior pereopods. Pereopods 4–6 with article 5 quadrate. Pereopod 7 absent. Pleopod 1 operculiform. Adult male with antenna 1 flagellum of about five aesthetasc-bearing articles.

Type-species. Colanthura squamosissima Menzies, 1951.

Remarks. The extreme shortening and fusion of the pleonites distinguishes *Califanthura* from other genera. Although Schultz's (1977) reasons for erecting *Califanthura* are erroneous (Poore 1980), the name is the first available for species of this group. Sivertsen and Holthuis (1980) unaware of Schultz's name, erected *Tristanthura* for essentially valid reasons.

Species are separated mainly on the form of uropods and telson but also on shape of the propodus of pereopod 1.

Califanthura barnardi (Sivertsen and Holthuis)
(Fig. 2*a*)

Tristanthura barnardi Sivertsen and Holthuis, 1980: 20–25, figs. 1, 2.
Paranthura sp.; Barnard, 1965: 197.

Material examined. Nine paratypes, one female dissected (RMNH), Tristan da Cunha, Julia Point (37°15′S., 12°30′W.). One juvenile, 4·4 mm (ZMC), Tristan da Cunha, off Inaccessible Is., 134–135 m, 18 Nov. 1933 (*Discovery* stn 1187).

Diagnosis. Pleon 0·5 times as long as pereonites 6+7, 1·4 times as wide as long. Pereopod 1 propodus 1·4 times as long as wide, proximal thumb acute, with a row of ~30 mesial spines. Uropodal endopod compactly ovoid, about as long as wide; exopod 1·6 times as long as greatest width, apex broadly rounded. Telson 1·6 times as long as pleon, twice as long as wide, lateral margins convex.

Remarks. The telson of this species is not as tapered distally as the original figures suggest.

Califanthura lowryi sp. nov.
(Fig. 2*b*)

Type-material. HOLOTYPE, female 6·5 mm (NMV J4021) Macquarie Is. (Australia), Aerial Cove (54°29′S., 158°58′E.), red algae, tunicates, sponges and sediment on sheltered rock wall, 6 m, D. S. Horning (SCUBA), 2 Feb. 1978 (stn MA-386). PARATYPES, two females, 21 juveniles, 2·8–7·3 mm (NMV J4022), type locality; two females, one juvenile, 5·8 mm (AM P32611), Macquarie Is., Caroline Cove, tunicates and holdfasts of *Macrocystis pyrifera*, 13 m, J. K. Lowry (SCUBA), 16 Jan. 1978 (stn MA-306).

Diagnosis. Pleon 0·8 times as long as pereonites 6+7, 1·3 times as wide as long. Pereopod 1 propodus 1·4 times as long as wide, proximal thumb acute, with a row of ~25 mesial spines. Uropodal endopod ovoid, 1·4 times as long as wide; exopod with a broadly rounded apex, 2·1 times as long as greatest width. Telson 1·2 times as long as pleon, twice as long as wide, parallel-sided for most of width.

Etymology. Califanthura lowryi is named for Jim Lowry, Australian Museum, Sydney, who was largely responsible for organizing the expedition during which this material was collected.

Remarks. Like most species of *Califanthura* the integument of *C. lowryi* is pigmented dorsally and bears minute squamae. The species is similar to *C. rima* from nearby New Zealand but the uropods are more elongate.

Califanthura pingouin (Kensley)

Colanthura pingouin Kensley, 1980 b: 166–168, fig. 4; Poore, 1981 a: 337; Poore, 1981 b: 70.

Material examined. Holotype, female, 5·6 mm (NMHP), Îles des Pingouins, Crozet Is. (46°30′S., 59°20′E.), 155–187 m.

Diagnosis. Pleon 1·2 times as long as pereonites 6 + 7, as wide as long. Pereopod 1 propodus 1·4 times as long as wide, proximal thumb broadly acute, with a row of 20 mesial spines. Uropodal endopod narrow-ovoid, 1·6 times as long as greatest width; exopod with a broadly-tapering apex, twice as long as greatest width. Telson 1·5 times as long as pleon, twice as long as greatest width, lateral margins convex, widest at midpoint.

Remarks. The type specimen is the only one known. Contrary to Kensley's assertion and figure (1980 b) the pleonites are not free. The telson tapers more than the original figure suggests.

Califanthura rima (Poore)

Colanthura rima, Poore, 1981 a: 336–337, figs. 5, 6.

Material examined. Holotype, 26 paratypes, 3·7–7·9 mm (NZNM, NMV), New Zealand, The Snares (48°6′S., 166°34′E.).

Diagnosis. Pleon as long as pereonites 6 + 7, 1·4 times as wide as long. Pereopod 1 propodus 1·4 times as long as wide, proximal thumb broadly acute, with a row of ~20 mesial spines. Uropodal endopod almost quadrate, about as long as wide; exopod 1·7 times as long as wide, oval, terminally blunt. Telson 1·2 times as long as pleon, twice as long as wide, more or less parallel-sided, apex broadly rounded (Appendix masculina of male long and curved, distally hooked).

Remarks. Califanthura rima is one of only two species of the genus for which males are recorded. The extraordinarily long appendix masculina distinguishes it from *C. squamosissima*.

Califanthura squamosissima (Menzies)

(Fig. 3 a)

Colanthura squamosissima Menzies, 1951: 114–118, figs. 14–16; Menzies and Barnard, 1959: 15, 16, fig. 9; Schultz, 1969: 90, fig. 117; Nunomura, 1979, 948–950, fig. 10; Poore, 1980: 61; Poore, 1981 a: 337; Poore, 1981 b: 70.

Califanthura squamosissima; Schultz, 1977: 840 (not Brusca, 1980: 234).

Material examined. Holotype, male, 4·5 mm; allotype, ovigerous female, 5·2 mm; three paratypes (USNM), California, Tomales Bluff.

Five juveniles, 3·0–5·3 mm; one male, 5·6 mm; five ovigerous females, 4·8–5·4 mm (AHF), shelf between 32°34′N. and 34°28′N., 16–142 m, muddy and sandy sediments, Jan. 1957–Jan. 1958 (*Velero* stns 4821, 4822, 4828, 4927, 5160, 5162, 5564). One male, 4·8 mm (AHF 1715–03), Santa Rosa Island, 130 m, 14 Oct. 1975 (BLM stn 22966). Juveniles, one female, one male, 3·6 mm (AHF), La Jolla Cove, kelp bed, on *Macrocystis* holdfast, 15 m, R. Gerhlardi, 29 May 1959 (SIO stn HF-27). One juvenile (AHF), Mexico, Tangola Bay, Tangola, shore on small island in bay, 1 Mar 1934 (*Velero* stn 260–34).

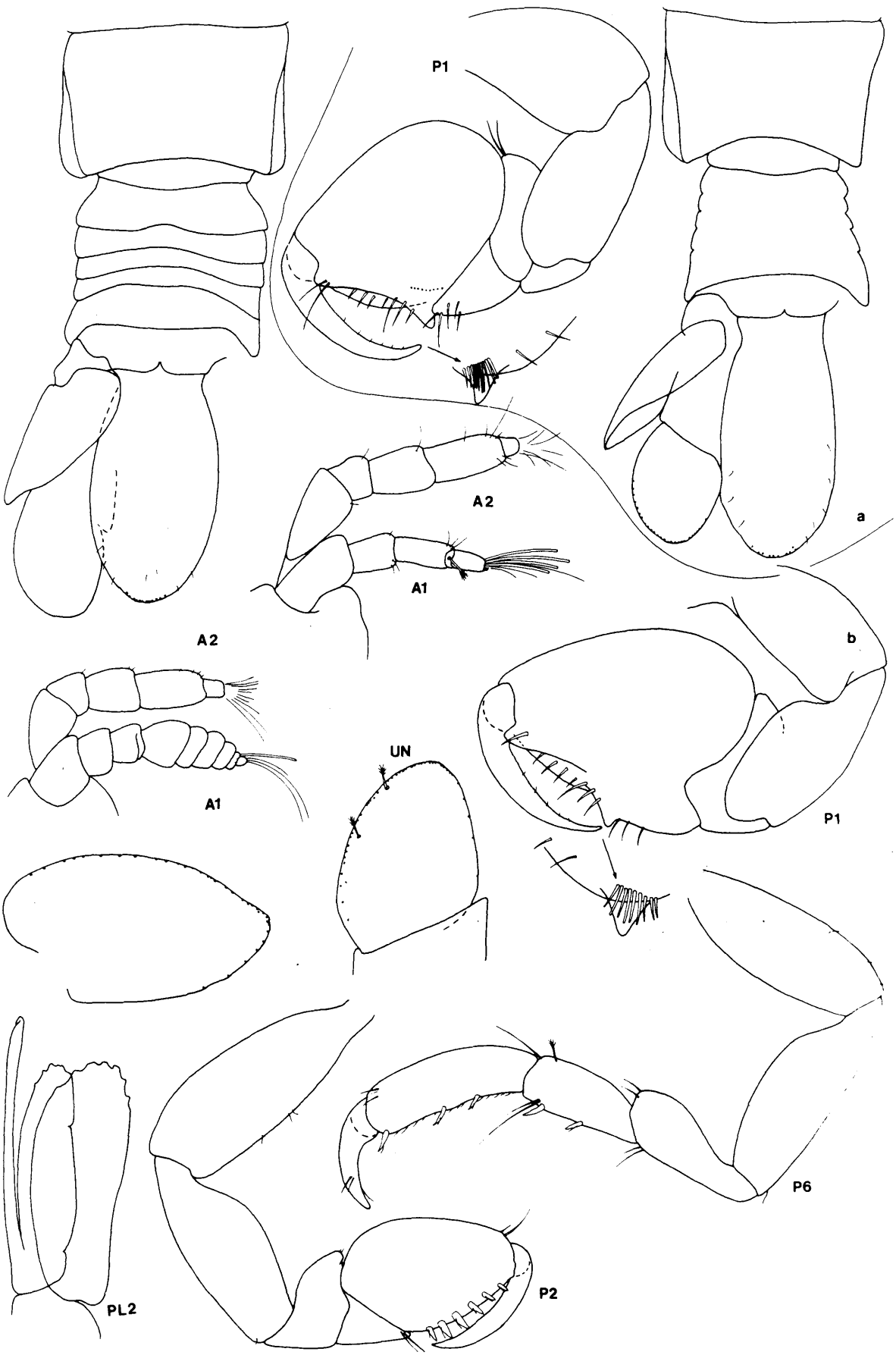

FIG. 3. *a*, *Califanthura squamosissima*, female allotype (USNM). *b*, *Colanthura bruscai* sp. nov., female holotype (AHF) and male paratype (AHF).

Diagnosis. Pleon as long as pereonites 6 + 7, 1·1 times as wide as long, Pereopod 1 propodus 1·4 times as long as wide, proximal thumb acute, with a row of ~ 10 mesial spines. Uropodal endopod narrowly ovoid, 1·4 times as long as wide; endopod twice as long as wide, with a broadly tapering apex. Telson 1·8 times as long as pleon, 2·3 times as long as greatest width, lateral margins gently convex.

Remarks. This species has been confused with *Colanthura bruscai*, herein described as new. Like most species in the two genera the two are remarkably similar in the form of antennae, pereopods and uropods and are, in fact, most easily distinguished using the generic characters. For this reason the pleon, telson and uropods of *Califanthura squamosissima* are refigured. The pereopods of *C. squamosissima* are marginally more compact than those of *C. bruscai*. *Califanthura squamosissima* is confined to coastal and shelf California with one exceptional record in southern Mexico. *Colanthura bruscai* overlaps slightly but is most frequently found in Mexico, the Gulf of California and into Central America.

One specimen taken by the *Velero* and referred to by Menzies and Barnard (1959) as *C. squamosissima* is *Colanthura bruscai*.

Colanthura Richardson

Colanthura Richardson, 1902: 287; Richardson, 1905: 79; Poore, 1980: 60 (part).

Diagnosis. Paranthuridae with eyes. Head about as wide as long. Integument usually pigmented, covered with minute squamae. Pereonite 7 very short, not visible laterally. Pleon about as long as wide; pleonites 1–5 separated from each other by a dorsal fold but not articulating; pleonite 1 about twice as long as pleonite 2 and swollen laterally, pleonites 5 and 6 articulating. Antenna 1 flagellum of four articles. Antenna 2 flagellum a single short cylindrical article. Mandible without a palp; incisor blunt; in place of molar a curved flange. Maxilla a sharp serrate spine. Maxillipedal articles fused except for free minute terminal article. Pereopod 1 subchelate, propodus swollen and palm oblique or transverse, with a proximal mesial row of less than 10 strong setae (rarely more). Pereopods 2 and 3 with propodus a little more robust than that of posterior pereopods. Pereopods 4–6 with article 5 quadrate. Pereopod 7 absent. Pleopod 1 exopod operculiform.

Adult male with antenna 1 flagellum of about five short aesthetasc-bearing articles.

Type-species. Colanthura tenuis Richardson, 1902.

Remarks. Species of *Colanthura* are distinguished from those of related genera by the elongation of pleonite 1 and free pleonites. The pleon is proportionately longer than in species of *Califanthura* and there are fewer setae in the mesial row on pereopod 1.

(HOLOTYPE) (ALLOTYPE)
77-160.1, 77-160.2,
77-160.3
(PARATYPES)

Colanthura bruscai sp. nov.
(Fig. 3*b*)

Colanthura squamosissima; Menzies and Barnard, 1959: 15, 16 (one sample only).
Califanthura squamosissima; Brusca, 1980: 234 (not Schultz, 1977: 840).

ALLOTYPE

Type-material. HOLOTYPE, female, 4·9 mm (AFH 777). PARATYPES, male, 3·6 mm (AHF 777a); ten females, 4·1–4·4 mm; 12 males, 2·5–3·4 mm; 16 juveniles, –4·5 mm (AHF 778, 22 specimens; USNM 211337, ten specimens; NMV J4158, 5 specimens) Mexico, Sonora, Peurto Peñasco (31°20′N., 113°35′W.), Station Beach reef, on *Sargassum*, R. C. Brusca, 4 Apr. 1977.

Other material. One juvenile (AHF), California, off San Clemente (33°22·9′N., 117°35·8′W.), 7·3 m, thick eeel grass over fine grey sand, 1 Sept. 1959 (*Velero* stn 6380). One male, one female, one juvenile (AHF), Mexico, Sonora, Puerto Peñasco, Station Beach reef, *Sargassum* washes from low tide zone, R. Brusca and B. Wallerstein, 10 Apr. 1976. Two males, one female, one juvenile (AHF), same locality, M. Price, 24 Mar. 1972. One female, six juveniles (AHF), same locality, M. Price, tide pools, 18 Mar. 1972. One male, one juvenile (AHF), Mexico, Jalisco, Peurto Vallarto, *Sargassum*, R. C. Brusca, P. Pepe and B. Wallerstein. Three females, one juvenile, 4·1–5·4 mm (USNM 82256), Mexico, Baja California, Magdalena Bay, 18–27 m, W. Schmidt, 18 Jul. 1938. One male, 4·5 mm (AHF), same locality, 3 May 1950 (*Velero* stn 1965). One male, three juveniles (AHF 03–14), Mexico, Baja California, 30 miles S. of San Felipe, washed from *Sargassum*, R. Brusca and B. Wallerstein, 1 Jan. 1976. One female, 4·8 mm (USNM), Costa Rica, Salinas Bay, coarse sand, 3 m, W. Schmitt, 11 Feb. 1935 (Allan Hancock 1935 Exped. stn 478).

Diagnosis. Pleon little longer than pereonites 6+7, wide as long. Pereopod 1 propodus 1·6 times as long as greatest width, proximal thumb acute, with a row of about nine mesial spines. Uropodal endopod tapering, 1·6 times as long as wide, exopod broadly tapering, 1·8 times as long as greatest width. Telson 1·3 times as long as pleon, twice as long as wide, lateral margins convex.

Etymology. Colanthura bruscai is named for Richard Brusca, Allan Hancock Foundation, Los Angeles, who collected much of the material on which this description is based and who has contributed so much to marine zoology of the west coast of North America.

Remarks. The confusion between this species and *Califanthura squamosissima* has already been noted. The only other species of *Colanthura* described from the American region is *C. tenuis* from Bermuda. *Colanthura bruscai* differs in its more elongate telson and longer, more tapering uropodal endopod.

Two other specimens of *Colanthura* from the eastern Pacific were found in the collection of the USNM:

(1) Peru, Lobos dea Afeura (6°55·7′S., 80°43·7′W.), shore, 17 Jan. 1935 (USNM Acc. No. 131571)—female, 3·8 mm, differing from *Colanthura bruscai* in its broader uropodal endopod and less acute exopod.

(2) Galapagos Is., Wenmann Is. (1°23′N., 91°47′W.), 180–270 m, 11 Jan. 1934 (USNM Acc. No. 128938)—juvenile, differing from *C. bruscai* in broader uropodal exopod and more elongate limbs.

Neither is assigned to species while each locality is represented by a single specimen and species are distinguished by such subtle character differences.

Colanthura kensleyi sp. nov.

(Fig. 4)

Type-material. HOLOTYPE, female, 3·6 mm (USNM 211338). PARATYPES, two juveniles, 2·7 mm, and two males, 2·1 and 2·7 mm (USNM 211339–211341); Philippines, SW. shore of Alibay Is, N. of Mindanao (8°44·8′., 123°12·7′E.), *Sargassum* on rubble, 2 m, C. A. Child, 1 May 1979 (stn CAC-181). One female, 3·7 mm, and one juvenile (NMV J4159); one female, 3·7 mm, and two juveniles (USNM), Philippines, Little Santa Cruz Is. (DOTY-SI stn M7). One female, 3·3 mm (USNM), Indonesia, Sangihe Islands, E. shore of Manipa Is. (3°46·0′N., 125°35·0′E.), algae, 0–6 m, Ferrari and Hendler, 18 Jul. 1979 (*Alpha Helix* stn M-134).

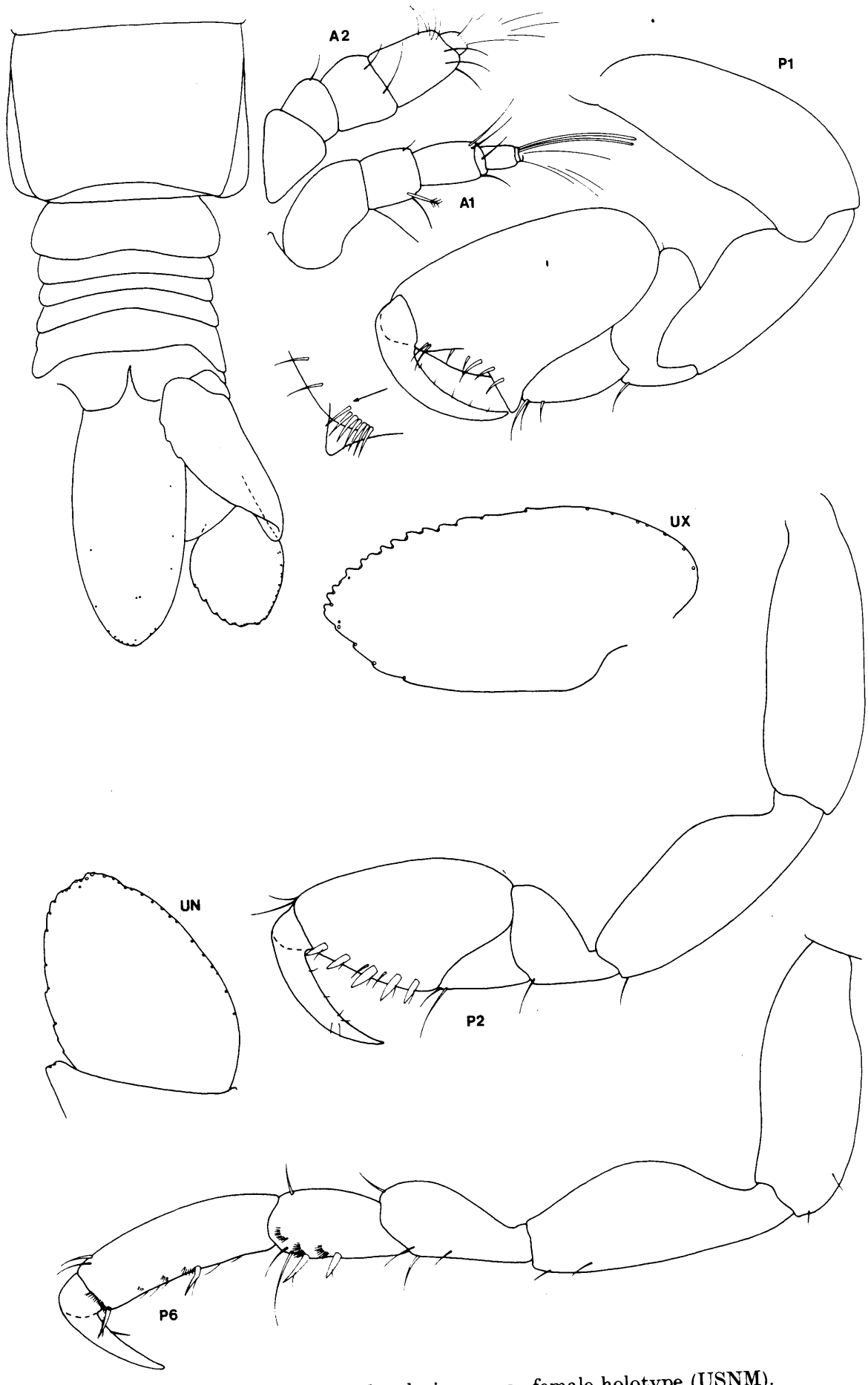

FIG. 4. *Colanthura kensleyi* sp. nov., female holotype (USNM).

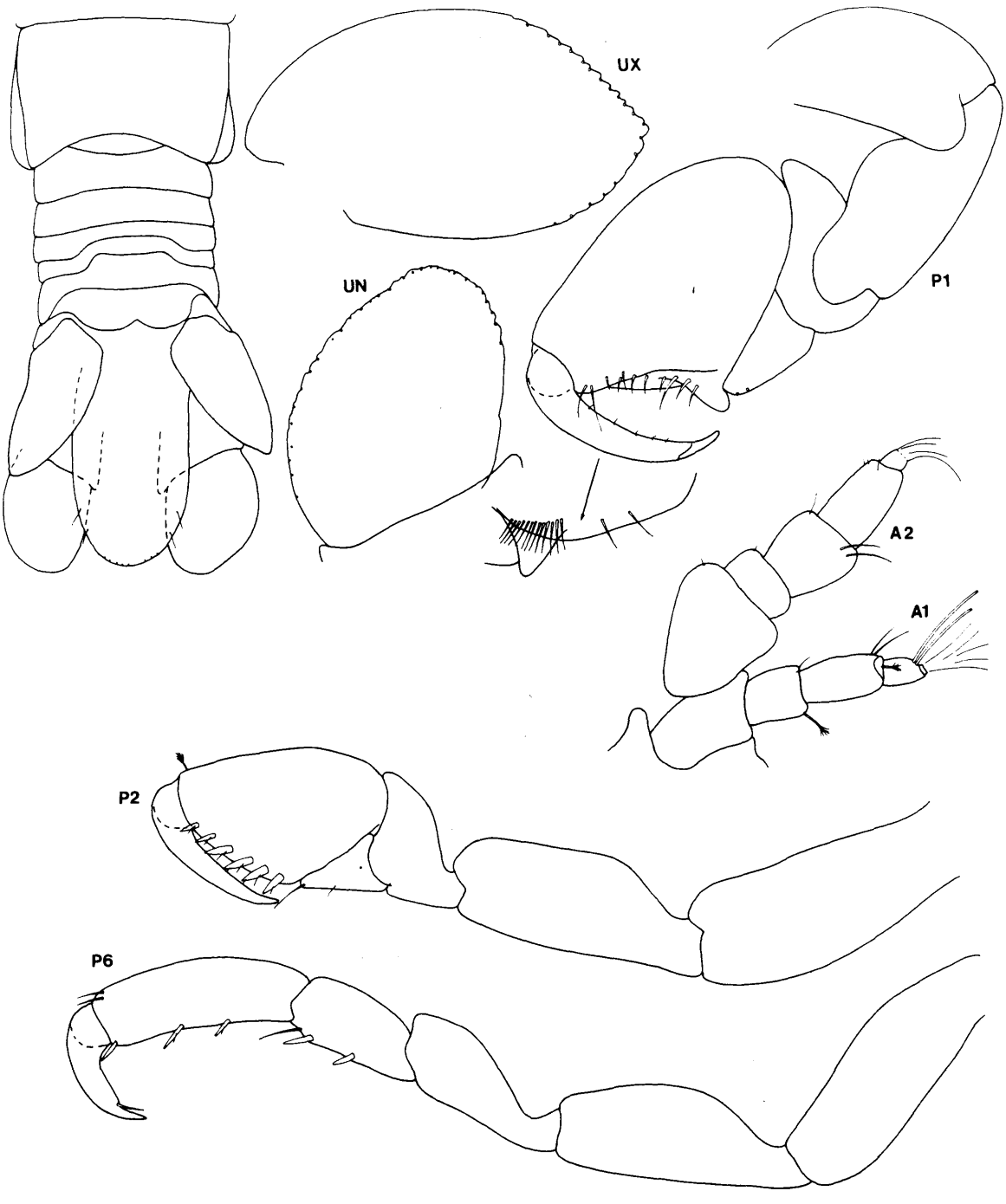

FIG. 5. *Colanthura nigra*, female, 5·3 mm (AMBL).

Diagnosis. Pleon 1·1 times as long as pereonites 6+7, little longer than wide. Pereopod 1 propodus 1·8 times as long as wide, proximal thumb acute, with a row of seven mesial spines. Uropodal endopod ovoid, 1·5 times as long as greatest width, lateral margin strongly convex; exopod lateral margin gently convex, apex with crenulated margin, twice as long as greatest width. Telson 1·3 times as long as pleon, 2·1 times as long as wide, lateral margins convex and tapering to rounded apex.

Etymology. Colanthura kensleyi is named for Brian Kensley in recognition of his continuing contribution to isopod and anthuridean taxonomy.

Remarks. Colanthura kensleyi is a small species differing from *C. nigra* from Japan in the slightly more elongate form of the pereopods, uropods and telson.

Colanthura nigra Nunomura

(Fig. 5)

Colanthura nigra Nunomura, 1975: 20–23, figs. 4–5; Nunomura, 1977: 89; Poore, 1980: 61; Poore, 1981 b: 70.

Material examined. One female, 5·3 mm (AMBL), Japan, Kumamoto Prefecture, off Uze, Tomioka (37°20′N., 141°00′E.), 45 m, T. Kikuchi, 14 Apr. 1964 (see Nunomura 1977). One ovigerous female, 5·7 mm (ZMC), Misaki, from Gorgonia, Dr Th. Mortensen, 25 Jul. 1914.

Diagnosis. Pleon 0·8 times as long as pereonites 6 + 7, as long as wide. Pereopod 1 propodus 1·6 times as long as wide, proximal thumb acute, with a row of ~13 mesial spines. Uropodal endopod ovoid, 1·4 times as long as greatest width, lateral margin strongly convex; exopod lateral margin strongly convex, apex acute, 1·8 times as long as greatest width. Telson 1·4 times as long as pleon, 2·0 times as long as wide, more or less parallel-sided.

Remarks. This species is refigured to enable it to be distinguished from the similar but smaller *Colanthura kensleyi*, also found in the Western Pacific.

Colanthura pigmentata Kensley

Colanthura pigmentata Kensley, 1980 a: 5–7, figs. 2, 3; Poore, 1981 b: 70.

Material examined. Holotype, 3·4 mm; six paratypes (USNM), Madagascar, Nosi Bé, 1·5 m.

Diagnosis. Pleon 0·8 times as long as pereonites 6 + 7, as long as wide. Pereopod 1 propodus 1·6 times as long as wide, proximal thumb acute; with a row of seven mesial spines. Uropodal endopod ovoid, 1·5 times as long as wide; exopod with a broadly-acute apex, 1·7 times as long as greatest width. Telson 0·8 times as long as pleon, 2·3 times as long as wide, lateral margins very gently convex.

Remarks. Kensley's (1980 a) figures and description clearly characterize this species.

Colanthura tenuis Richardson

(Fig. 6 *a*)

Colanthura tenuis Richardson, 1902: 287–288, pl. 38, figs. 23–28; Richardson, 1905: 79–80, fig. 64; Barnard, 1925: 158; Schultz, 1969: 89, fig. 116; Poore, 1980: 61; Poore, 1981 b: 70. *Paranthura infundibulata*; Schultz, 1977: 839 (not Richardson, 1902).

Material examined. Holotype, ovigerous female, 4·1 mm (YPM); paratype, juvenile, 3·7 mm (USNM), Bermuda, 0·6 m.

Diagnosis. Pleon 1·3 times as long as pereonites 6 + 7, 1·1 times as long as wide. Pereopod 1 propodus 1·5 times as long as wide, proximal thumb narrow, with a row of seven mesial spines. Uropodal endopod ovoid, 1·3 times as long as wide, lateral margin strongly convex; exopod 1·7 times as long as greatest width, lateral margin strongly convex, apex moderately acute. Telson as long as pleon, with gently convex lateral margins, 2·1 times as long as greatest width.

Remarks. Schultz's (1977) reasons for sinking *Colanthura tenuis* into *Paranthura infundibulata* have already been disputed (Poore 1980). New figures of type material of this poorly figured species are presented.

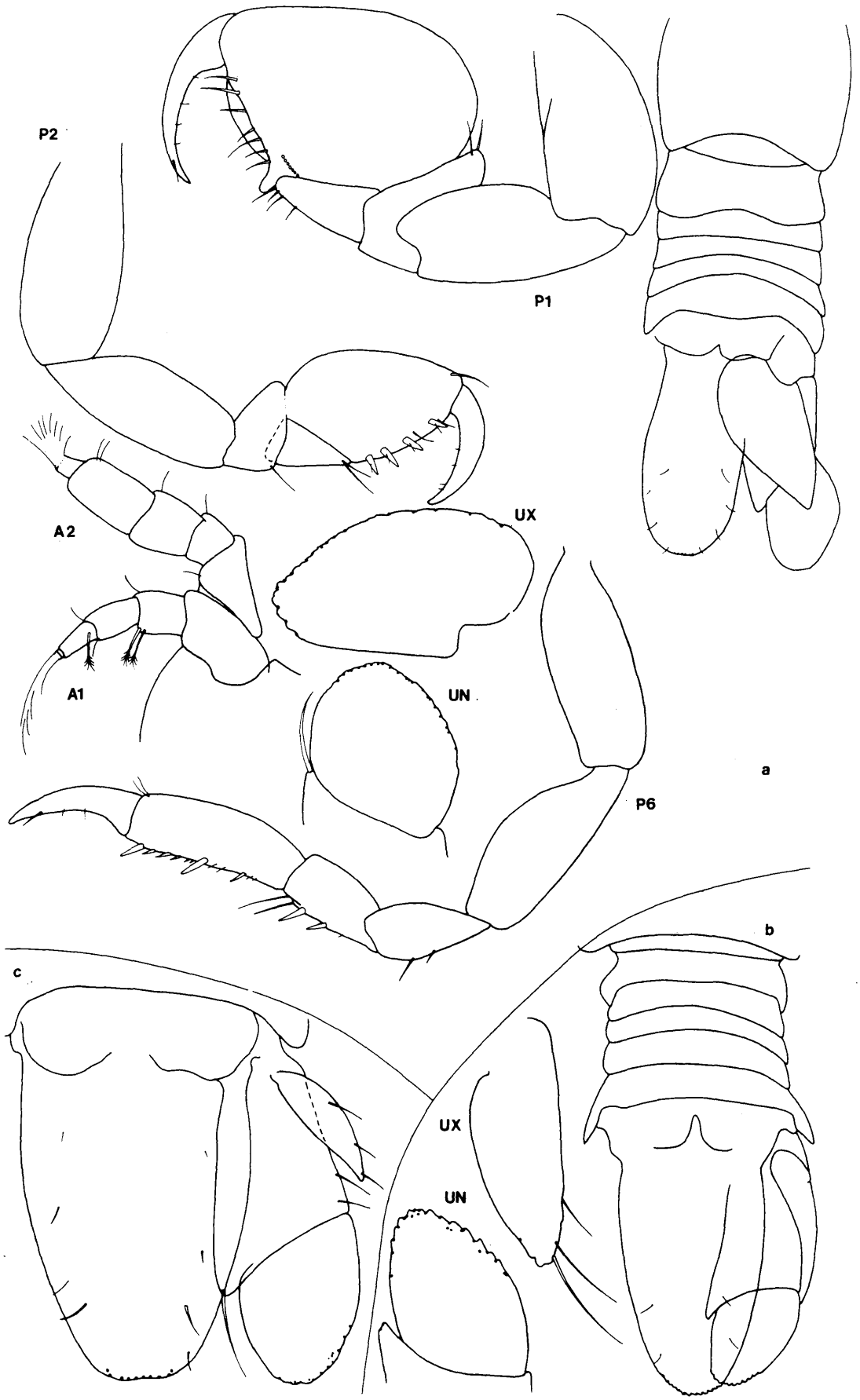

FIG. 6. *a*, *Colanthura tenuis*, juvenile paratype (USNM). *b*, *Colanthura uncinata*, female paratype (SAM). *c*. *Colanthura* sp., juvenile (USNM 189038).

Colanthura uncinata Kensley
(Fig. 6*b*)

Colanthura uncinata Kensley, 1978: 12–16, figs. 7, 8; Poore, 1981 b: 70.

Material examined. 22 type-specimens, 3·9–4·5 mm (SAM, USNM), Indian Ocean, off Natal, South Africa, 550 m, 680 m (28°31′S., 32°34′E. and 27°59′S., 32°40′E.).

Diagnosis. Pleon 0·9 times as long as pereonites 6+7, about as long as wide. Pereopod 1 propodus 1·8 times as long as wide, proximal thumb blunt, with a mesial row of six spines. Uropodal endopod tapering, 1·6 times as long as greatest width; exopod lanceolate, 2·8 times as long as greatest width. Telson 1·2 times as long as pleon, and fused to it; widest proximally and tapering, 1·7 times as long as greatest width.

Remarks. The unusually tapering telson, more so than in Kensley's figure, and narrow uropodal exopod serve to characterize this species.

Colanthura sp.
(Fig. 6c)

Material examined. One juvenile, 3·6 mm (USNM 189038), Venezuela, 5 km N. of Coche Is. (10°50′N., 63°59′W.), 38–60 m, 15 Apr. 1939.

Diagnosis. Pleon 0·8 times as long as pereonites 6+7, 1·1 times as long as wide. Pereopod 1 propodus 1·4 times as long as wide, proximal thumb small, with a mesial row of four spines. Uropodal endopod 1·5 times as long as wide; exopod a narrow short scale, not reaching to end of peduncle. Telson 1·1 times as long as pleon and fused to it, widest proximally and tapering, 1·4 times as long as greatest width.

Remarks. This single very small specimen is not formally named although it is in all probability a new species. The strongly tapering telson allies the specimen to *C. uncinata* from the Indian Ocean but the uropodal exopod is extremely reduced.

The strong development of integumental squamae on the pleon of this specimen obscures the dorsal sutures between pleonites but in all other respects the specimen is typical of *Colanthura*.

Cruranthura Thomson

Cruranthura Thomson, 1946: 46–49.
Colanthura; Mezhov, 1976: 23–24; Poore, 1980: 60 (part); Poore, 1981 b: 70.

Diagnosis. Paranthuridae usually with eyes. Head longer than wide. Integument usually pigmented, without squamae. Pereonite 7 about one-third length of pereonite 6, visible laterally. Pleon longer than greatest width; pleonites 1 and 6 free, 2–5 fused dorsally; pleonite 1 of similar length to pleonite 2. Antenna 1 flagellum of four articles. Antenna 2 flagellum a single short cylindrical article. Mandible without a palp; incisor blunt; in place of molar a curved flange. Maxilla a sharp serrate spine. Maxillipedal articles fused except for a free minute terminal article. Pereopod 1 subchelate, propodus swollen but elongate; palm axial, with a mesial row of about 30 strong setae. Pereopods 2 and 3 with propodus more swollen than posterior pereopods. Pereopods 4–6 with article 5 linear-quadrate. Pereopod 7 absent. Pleopod 1 operculiform. Adult male with antenna 1 flagellum of five aesthetasc-bearing articles.

Type-species. Cruranthura simplicia Thomson, 1946.

Remarks. Species of *Cruranthura* are immediately recognized by the presence of a free pleonite 1 on a rather elongate pleon. Although pleonites 2–5 are fused dorsally the folds between these segments extend well up the sides of the pleon, further than in other genera. My decision to synomize *Cruranthura* with *Colanthura* (Poore 1980) did not take into account the more elongate pereonite 7 and free pleonite 1 of these four species, characters I now believe to be of generic rank.

Two species, *C. simplicia* and *C. peroni*, possess non-setose, two-articled endopods on pleopods 2–5.

Cruranthura caeca (Mezhov)

Colanthura caeca Mezhov, 1976: 24–27, figs. 3, 4; Poore, 1980: 61; Poore, 1981 b: 70, 73.

Remarks. Material of this species was not available for further study but Mezhov's (1976) figures enable it to be placed in *Cruranthura* without difficulty. The narrow, tapering telson separates the species from all others. Unlike *C. peroni* and *C. simplicia*, the endopod of pleopods 2–5 bears terminal setae.

Cruranthura furneauxi (Poore)

Colanthura furneauxi Poore, 1981 b: 70–73, figs. 9–11.

Material examined. Holotype, 11 paratypes, 5·2–9·1 mm (NMV), Tasmania, Australia. One juvenile (NMV J1509), Tasmania, Greens Beach, reef platform, intertidal pool, G. Poore, Feb. 1980. One juvenile (NMV J1508), Victoria, Phillip Is., sublittoral, W. F. Seed, 29 Sept. 1974. One juvenile (NMV J1607), Victoria, Apollo Bay, *Macrocystis* holdfasts, W. F. Seed, 28 Dec. 1970.

Diagnosis. Pleon 0·8 times as long as pereonites 6+7, about as wide as long. Pereopod 1 propodus 1·7 times as long as wide, proximal thumb broadly based; with a row of about 35 mesial spines. Uropodal endopod ovate, about as long as wide; exopod with an excavate apex, 1·4 times as long as greatest width. Telson 1·3 times as long as pleon, 2·5 times as long as wide, lateral margin gently convex. Pleopods 2–5 with endopod setose.

Remarks. New material of this species extends its distribution to the southern coast of the Australian mainland. The species is distinguished from others by its broad excavate uropodal exopod.

Cruranthura peroni (Poore)

(Fig. 7a)

Colanthura peroni Poore, 1981 b: 73–76, figs. 12–13; Poore, 1982: 911.

Material examined. Holotype and 12 paratypes (AM, NMV), Australia, Tuross River (type locality) and other New South Wales estuaries. 59 specimens (QM, 27 lots) from Serpentine Creek, Jacksons Creek and Pine River, Brisbane, Queensland. 160 specimens (NMV J1510-1515) from Gippsland Lakes, Victoria.

Diagnosis. Pleon 0·8 times as long as pereonites 6+7, 0·9 times as wide as long. Pereopod 1 propodus 1·6 times as long as wide, palm axial, proximal thumb broad and obtuse, with a row of up to 25 mesial spines. Uropodal endopod tapering, 1·5 times as long as wide; exopod with an obliquely truncate apex, 2·1 times as long as greatest width. Telson 1·3 times as long as pleon, 2·2 times as long as wide, lateral

FIG. 7. *a*, *Cruranthura peroni*, juvenile paratype (NMV). *b*, *Cruranthura simplicia*, juvenile, 5·3 mm (NMV). *c*, *Cruregens fontanus*, juveniles, 13·1 mm and 12·3 mm (TM).

margins convex and tapering to a broadly acute apex. Pleopods 2–5 with endopod of two articles without setae.

Remarks. Material from Brisbane extends the range of this species further north. The Gippsland Lakes is the probable westward limit of this species along the south coast of Australia. The species is confined to estuaries and distinguished from *C. simplicia* in Western Australia by the narrower pereopod 1 propodus, the narrower telson, narrower uropodal endopod and truncate apex of the uropodal exopod.

Cruranthura simplicia Thomson

(Fig. 7b)

Cruranthura simplicia Thomson, 1946: 46–49, fig. 4.
Colanthura simplicia; Poore, 1980: 61; Poore, 1981 b: 70, 76.

Material examined. One juvenile, 5·3 mm (NMV J5686), Western Australia, Swan River, Freshwater Bay, G. C. B. Poore, .30 May 1983.

Diagnosis. Pleon 0·8 times as long as pereonites 6 + 7, 0·9 times as wide as long. Pereopod 1 propodus 1·3 times as long as wide, palm oblique, proximal thumb narrow, with a row of 12 mesial spines. Uropodal endopod ovate, 1·6 times as long as wide; exopod with an acute apex, twice as long as greatest width. Telson 1·3 times as long as pleon, twice as long as wide, lateral margins convex and tapering to a broadly rounded apex. Pleopods 2–5 with endopod of two articles without setae.

Remarks. Type material of this species is lost. The only specimen available is topotypic but enables the species to be clearly separated from *C. peroni* in eastern Australia. Until a larger series becomes available it seems not worthwhile to select a neotype.

Cruregens Chilton

Cruregens Chilton, 1882: 175; Chilton, 1894: 209–211; Poore, 1980: 61; Wägele, 1982: 52–55.

Diagnosis. Paranthuridae without eyes. Head longer than wide. Integument not pigmented, without squamae. Pereonite 7 about one-third length of pereonite 6, visible laterally. Pleon longer than greatest width; pleonites 1–5 free, pleonite 6 fused to telson; pleonite 1 not dorsally longer than pleonite 2. Antenna 1 flagellum of three articles. Antenna 2 flagellum of one long cylindrical article and a minute terminal article. Mandible without a palp; incisor blunt; a flange in place of molar. Maxilla a sharp serrate spine. Maxillipedal articles fused except for a free minute terminal article. Pereopod 1 subchelate, propodus swollen but elongate; palm axial, with a mesial row of about 70 setae. Pereopods 2 and 3 with propodus more swollen than in posterior pereopods. Pereopods 4–6 with article 5 linear. Pereopod 7 absent. Pleopod 1 operculiform. Uropodal rami elongate. Adult male with antenna 1 flagellum of five articles bearing short aesthetascs.

Type-species. Cruregens fontanus Chilton, 1882 (monotypic).

Cruregens fontanus Chilton

(Fig. 7 c)

Cruregens fontanus Chilton, 1882: 175–176, pl. 9; Chilton, 1894: 211–218, pl. 18, figs. 1–23; Lewis, 1976: 154–156, 158, 162, 233, 234, figs. 10.5(b), 10.6; Schmincke and Noodt, 1968: 184; Hurley and Jansen, 1977: fig. 10; Poore, 1980: 61; Wägele, 1982: 52–58, figs. 4–7.
Cruregens fontinalis (lapsus); Stout 1969: 473.

Material examined. New Zealand, Eyreton, in artesian wells, C. Chilton: two specimens, 12·3 and 13·1 mm (TM G463/16700) (probable syntypes).

Remarks. Wägele's (1982) figures of new material of this species enable it to be identified easily. The figures presented here of what is probably type material show the telson to be somewhat broader than Wägele's figure suggests. Wägele (1982) discussed at length the features of this species which are adaptations to its hypogean way of life.

Summary

The relationships between the genera *Colanthura* Richardson, *Califanthura* Schultz, *Cruranthura* Thomson and *Cruregens* Chilton are discussed and presented from a cladistic point of view. Of the 17 species known three are described as new, *Colanthura bruscai*, *Colanthura kensleyi* and *Califanthura lowryi*.

Acknowledgments

This work was made possible by the generous loan of material from several institutions to which I am grateful: Allan Hancock Foundation, Los Angeles (AHF) (R. Brusca); Amakusa Marine Biological Laboratory, Kumamoto (AMBL) (T. Kikuchi); Museum National d'Histoire Naturelle, Paris (MNHP); Queensland Museum, Brisbane (QM) (P. Davie); Rijksmuseum van Natuurlijke Histoire, Leiden (RMNH) (L. Holthuis); South African Museum, Cape Town (SAM); Tasmanian Museum and Art Gallery, Hobart (TM) (A. Green); Smithsonian Institution (USNM) (B. Kensley); Yale University, Peabody Museum, Cambridge (YPM); Zoologisk Museum, Copenhagen (ZMC) (T. Wolff).

Additional material from Australia and New Zealand is deposited in the Australian Museum, Sydney (AM), the Museum of Victoria (formerly the National Museum of Victoria), Melbourne (NMV) and the National Museum of New Zealand, Wellington (NZNM). Many thanks to Graham Milledge who inked the figures and to the Australian Biological Resources Study for financial support.

I am particularly indebted to Dr. R. C. Brusca for valuable comment.

Note added in proof

Two additional species were described while this paper was in press: *Colanthura anophthalma* Kussakin and Vasina, 1982, and *C. latimana* Kussakin and Vasina, 1982. Both were taken from near the Kerguelen Islands, southern Indian Ocean, and both can be referred to *Califanthura* Schultz, a possibility considered by their authors.

References

Barnard, K. H., 1925, A revision of the family Anthuridae (Crustacea Isopoda), with remarks on certain morphological peculiarities. *Journal of the Linnean Society*, **36**, 109–160.

—— 1965, Isopoda and Amphipoda collected by the Gough Island scientific survey. *Annals of the South African Museum*, **48**, 195–210.

Brusca, R. C., 1980, *Common intertidal invertebrates of the Gulf of California* (Second edition). Tucson: University of Arizona Press, 513 pp.

Chilton, C., 1882, On some subterranean Crustacea. *Transactions of the New Zealand Institute*, **14**, 174–180.

—— 1894, The subterranean Crustacea of New Zealand: with some general remarks on the fauna of caves and wells. *Transactions of the Linnean Society of London (2) Zoology*, **6**, 163–284.

Hurley, D. E., and Jansen, P., 1977, The marine fauna of New Zealand: family Sphaeromatidae (Crustacea Isopoda: Flabellifera). *New Zealand Oceanographic Institute Memoir*, **63**, 1–95.

Kensley, B., 1978, The South African Museum's *Meiring Naude* cruises. Part 8. Isopoda Anthuridea. *Annals of the South African Museum*, **77**, 1–25.

—— 1980 a, Anthuridean isopod crustaceans from the International Indian Ocean Expedition, 1960–1965, in the Smithsonian collections. *Smithsonian Contributions to Zoology*, **304**, 1–37.

—— 1980 b, Marine isopods from the Marion, Prince Edward, and Crozet Islands (Crustacea, Isopoda). *Annals of the South African Museum*, **82**, 155–185.

—— 1982, Revision of the South African Anthuridea (Crustacea, Isopoda). *Annals of the South African Museum*, **90**, 95–200.

KUSSAKIN, O. G., and VASINA, G. S., 1982, Addition to the fauna of benthic Isopoda and Gnathiida (Crustacea) of subantarctic waters of the Indian Ocean. 1. Isopoda (Flabellifera and Anthuridea). *Tethys*, **10**, 261–273.

LEWIS, M. H., 1976, Isopoda. Chapt. 10, pp. 153–166 in *An Introduction to the Freshwater Crustacea of New Zealand* (Editors M. A. Chapman and M. H. Lewis) Auckland: Collins.

MENZIES, R. J., 1951, New marine isopods, chiefly from northern California, with notes on related forms. *Proceedings of the United States National Museum*, **101**, 105–156.

MENZIES, R. J., and BARNARD, J. L., 1959, Marine Isopoda on coastal shelf bottoms of southern California: systematics and ecology. *Pacific Naturalist*, **1**, 3–35.

MEZHOV, B. V., 1976, New species of Anthuridea from the upper part of the sublittorial zone of the Middle Kurile Islands. *Biologiya Morya (Vladivostok)*, **5**, 19–27. [In Russian].

NUNOMURA, N., 1975, Marine Isopoda from the rocky shore of Osaka Bay, Middle Japan (1). *Bulletin of the Osaka Museum of Natural History*, **29**, 15–35.

—— 1977, Marine Isopoda from Amakusa, Kyushu (1). *Publications from the Amakusa Marine Biological Laboratory*, **4**, 71–90.

—— 1979, Tanaidaceans and anthuridean isopods collected on the Presidential Cruise of 1938. *Proceedings of the Biological Society of Washington*, **91**, 936–952.

POORE, G. C. B., 1980, A revision of the genera of the Paranthuridae (Crustacea: Isopoda: Anthuridea) with a catalogue of species. *Zoological Journal of the Linnean Society*, **68**, 53–67.

—— 1981 a, Marine Isopoda of The Snares islands, New Zealand. 1. Gnathiidea, Valvifera, Anthuridea, and Flabellifera. *New Zealand Journal of Zoology*, **8**, 331–348.

—— 1981 b, Paranthurid isopods (Crustacea, Isopoda, Anthuridea) from southeastern Australia. *Memoirs of the National Museum of Victoria*, **42**, 57–88.

—— 1982, Benthic communities of the Gippsland Lakes, Victoria. *Australian Journal of Marine and Freshwater Research*, **33**, 901–915.

—— 1984, *Paranthura* (Crustacea, Isopoda, Paranthuridae) from south-eastern Australia. *Memoirs of the National Museum of Victoria*, **45**, in press.

RICHARDSON, H., 1902, The marine and terrestrial isopods of the Bermudas, with descriptions of new genera and species. *Transactions of the Connecticut Academy of Science*, **11**, 277–310.

—— 1905, A monograph on the isopods of North America. *Bulletin of the United States National Museum*, **54**, 1iii + 727 pp.

SCHMINCKE, H. K., and NOODT, W., 1968, Discovery of Bathynellaceae, Stygocaridacea and interstitial Crustacea in New Zealand. *Naturwissenschaften*, **55**, 184–185.

SCHULTZ, G. A., 1969, *How to know the marine isopod crustaceans*. Dubuque: Wm Brown, 359 pp.

—— 1977, Anthurids from the west coast of North America, including a new species and three new genera (Crustacea, Isopoda). *Proceedings of the Biological Society of Washington*, **90**, 839–848.

SIVERTSEN, E., and HOLTHUIS, L. B., 1980, The marine isopod Crustacea of the Tristan da Cunha Archipelago. *Gunneria*, **35**, 1–128.

STOUT, V. M., 1969, The invertebrate fauna of the rivers and streams. Chapt. 28, pp. 471–497 in *The Natural History of Canterbury* (Editor G. A. Knox) Wellington: Reed.

THOMSON, J. M., 1946, New Crustacea from the Swan River estuary. *Journal of the Royal Society of Western Australia*, **30**, 35–73.

WÄGELE, J. W., 1981, Zur Phylogenie der Anthuridea (Crustacea, Isopoda) mit Beitragen zur Lebensweise, Morphologie, Anatomie und Taxonomie. *Zoologica, Stuttgart*, **132**, 1–127.

—— 1982. The hypogean Paranthuridae, *Cruregens* Chilton and *Crurassanthura* Kensley (Crustacea, Isopoda), with remarks on their morphology and adaptations. *Bijdragen tot de Dierkunde*, **52**, 49–49.