

## Revision of Southern Hemisphere *Austronanus* Hodgson, 1910, with two new genera and five new species of Paramunnidae (Crustacea: Isopoda: Asellota)

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### ABSTRACT

Paramunnid species of Southern Hemisphere cold-water *Austronanus* Hodgson, 1910 and related genera are characterised by simple, smooth, flattened, rather elongate oval bodies, a broadly projecting frontal head margin, well-developed, short, mostly distally bulging eyestalks with ommatidia, pereonites with lateral margins contiguous, rounded or truncate, and dorsally visible coxae V–VII. Just and Wilson (2004) rejected synonymy of *Austronanus* with *Paramunna* Sars proposed by Nordenstam (1933), following a revision of the latter genus. The type species, *Austronanus glacialis* Hodgson, 1910, is re-described based on topotypic material from McMurdo Sound, Antarctica, (the holotype is a small manca). The types of *Paramunna dentata* Nordenstam, 1933 and *P. dubia* Hale, 1937 are re-described and the two species referred to *Austronanus* together with three new Antarctic and subantarctic species, *A. aucklandensis*, *A. gelidus* and *A. mawsoni*. *Paramunna patagoniensis* Winkler, 1994 is redescribed and made the type species of a new genus, *Xigonus*. A new genus, *Stephensiellus*, is established for two new species from the subantarctic islands south of New Zealand and Australia, *S. palliolatipes* (type species) from Macquarie Island, and *S. serraticornis* (originally reported by Stephensen, 1927 as “*Paramunna (serrata)* (Richardson) ?”) from Auckland Island.

**Key words.** Isopoda, Asellota, Paramunnidae, *Austronanus* complex, southern hemisphere.

### INTRODUCTION

Hodgson (1910) described a new genus and species of Paramunnidae, *Austronanus glacialis*, from McMurdo Sound, Antarctica, based on a single tiny manca of 0.7 mm. Subsequently Nordenstam (1933) placed *Austronanus* in synonymy with *Paramunna* Sars, 1866. Until now, no further material of the genus has been reported.

In our previous contribution towards a revision of the Paramunnidae (Just & Wilson 2004), we presented a brief review of the classification of the family. We rejected Vanhöffen (1914) synonymy of *Austrimunna* Richardson, 1906, *Leptaspidia* Bate and Westwood, 1867 and *Metamunna* Tattersall, 1905 with *Paramunna*, as well as Nordenstam's (1933) synonymy of *Austronanus* with *Paramunna*. We re-established *Austrimunna* (type and only species *A. antarctica* Richardson, 1906), and considered *Leptaspidia* and *Metamunna* nomina dubia.

Richardson (1913) transferred *Austrimunna serrata* Richardson, 1908 to *Austronanus*, and Vanhöffen (1914) placed it in *Paramunna*. Just and Wilson (2004) rejected both of these proposals and made *Austrimunna serrata* the type of a new genus, *Palanana* Just and Wilson, 2004. Nordenstam (1933), followed by Amar and Roman (1974), tentatively placed *Austronanus glacialis* (as *Paramunna glacialis*) in synonymy with *Austrimunna serrata* (as *Paramunna serrata*). We do not accept this synonymy.

In this paper, we revive *Austronanus*, redescribe the type species *A. glacialis* based on new material from the type locality, and transfer *Paramunna dentata* Nordenstam, 1933 and *P. dubia* Hale, 1937 to *Austronanus*. *Paramunna patagoniensis* Winkler, 1994 is made type species for *Xigonus* gen. nov., while *Stephensiellus* gen. nov. is established for two new species from the subantarctic islands south of Australia and New Zealand.

## METHODS

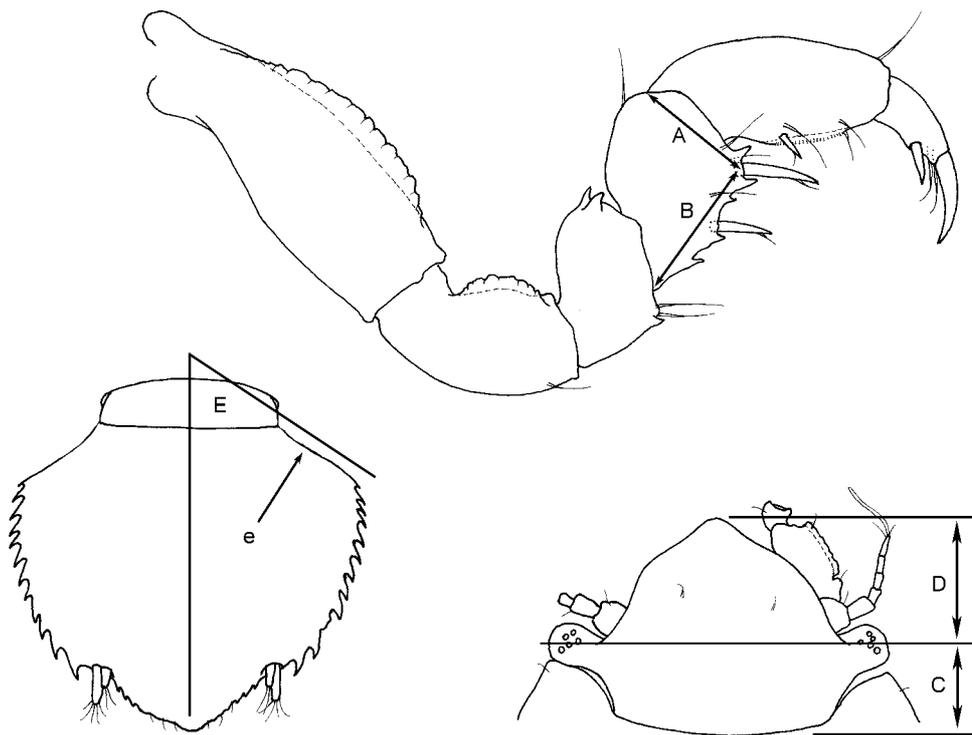
Terminology and measurements are those explained, illustrated and used in Just and Wilson (2004). To these we add the following measurements: greatest width/greatest length of pereopod I basis and ischium, and the anterior width/posterior length of carpus (Fig. 1A, B); head length posterior/head length anterior to eyestalks (Fig. 1C, D); the angle between the middorsal longitudinal axis of the body-pleon and the proximolateral margin(s) of the pleotelson (Fig. 1E); and the angle of the posterior projection of the pleotelson.

The descriptions were generated from a DELTA database (Dallwitz 1980, Dallwitz *et al.* 2000a, 2000b) and subsequently edited for clarity of language.

### Implicit attributes

Unless indicated otherwise, the following character states are implicit throughout the descriptions if shared by the majority of species, except where the characters concerned are inapplicable: *Body* ovate, dorsally smooth, with scattered fine simple setae. *Head* not sexually dimorphic, male head length similar to that of females and juveniles. *Frontal margin* dorsally upcurving anteriorly, without lateral corners but indented at antennular insertion, anterior rim dorsoventrally thin and pointed in lateral view, with broadly rounded projection. *Eyestalks* prominent, without projection on posterolateral margin, shaft before apex approximately parallel. *Pereonites* 1–4 lateral margins distinctly

projecting, coxae not visible in dorsal view, pereonites 5–7 lateral margins not projecting, coxae visible in dorsal view. Pereonite 1 of male only slightly enlarged compared to adult females or juveniles. Pereonite lateral margins without sensillate setae. Pereonite lateral margins smooth. *Pleonite 1* free. *Pleotelson* laterally rounded; posterior margin produced, smooth, posterior margin set apart from lateral margins by concavity at level of uropods. *Antennula* with 6 articles, article 1 lacking spines; article 2 tubular and rounded distally, distal articles inserting apically; articles 5 and 6 with distinct articulation. *Antenna* article 3 elongate, length distinctly longer than articles 1–2 together, article 5 approximately tubular. *Mandible palp* present, shorter than incisor process, article 2 inflated, article 3 not curved, with few setae. *Pereopodal coxae* I–IV lateral margins rounded; without projections, coxae V–VII extending beyond tergite in dorsal view. *Pereopod I* basis anterior margin smooth; ischium anterodistal margin smooth; merus with smooth anterior and posterior margin; carpus triangular, posterior margin with 2 robust setae, *Pereopod II* basis smooth. *Male pleopods I* lateral lobes with rounded proximal sublobe, distal sublobe emerging adjacent to proximal lateral sublobe. *Uropods* recessed, protopod or insertion not exposed, not covered dorsally with small flap of cuticle or hood, with two rami.



**FIGURE 1.** Various measurements in descriptions of species. A, carpus distal width; B, carpus posterior length; C, length of head posterior to eyestalks; D, length of head anterior to eyestalks; E, angle between proximal margin (e) and mid longitudinal axis of pleotelson.

**Institutional abbreviations**

- AM Australian Museum, Sydney, Australia  
NHM Natural History Museum (British Museum), London, England  
NIWA National Institute of Water and Atmospheric Research, Wellington, New Zealand  
NMV Museum Victoria, Melbourne, Australia  
SAMA South Australian Museum, Adelaide, Australia  
SMNH Swedish Museum of Natural History, Stockholm, Sweden  
ZMB Zoological Museum, Berlin, Germany

**CLASSIFICATION**

The species in this small group of paramunnids are similar to species in the *Paramunna* complex (Just & Wilson 2004) in that they have simple, oval bodies, without significant spines on the head, dorsum, lateral body margin, or coxae. They differ from species in the *Paramunna* complex by their dorsally visible coxae on pereopods V–VII. We call this group the *Austronanus* complex.

Specimens from Antarctica and subantarctic islands to the south of Australia and New Zealand fall into two distinctive groups, *Austronanus* and *Stephensiellus* gen. nov. *Paramunna dentata* from the Falkland Islands fits into a subgroup of *Austronanus* sharing with *A. aucklandensis* sp. nov. five articles instead of six in the antennulae, but differs in having laterally elongate coxae V–VII. *Paramunna patagoniensis* differs from *Austronanus* by the tapering pleotelson with completely smooth lateral margins. We create a new genus, *Xigonus*, for that species.

The main difficulty in determining the number of species in this small group of paramunnids has been the scarcity of material. Four of the nine putative species are represented by a single specimen. Males are present in just four species. Furthermore, the holotype and only known specimen of *Austronanus glacialis* Hodgson, 1910 (type species of the genus) is a manca and is inadequate for diagnosing the species; hence we have based our description of the species, and the diagnosis of the genus, on new topotypic material. The type material of *Paramunna dentata* Nordenstam, 1933, is in poor condition, rendering a number of details impossible to observe, e.g., spines on the posterior margin of carpus.

We have referred *Paramunna dentata*, *P. dubia* and three new species to *Austronanus*. The inclusion of *P. dentata* in *Austronanus* is tentative, because it differs from the other species in the genus by possibly lacking denticles on article 2 of the antenna, and by having laterally projecting coxae V–VII. These differences may eventually warrant recognition of a separate genus for the species when new and better material comes to hand. We mention these differences in the diagnosis of *Austronanus*. We discriminate the other five species in the genus on subtle differences. One could argue that these species are

geographic variations of one species, and that they should all be referred to *A. glacialis*. For example, *A. gelidus* and *A. mawsoni* were both found at Davis Station, albeit on different dates (depth and precise locations not available). In making decisions, we have drawn on our experience from studying the species composition in genera of the much larger *Paramunna* complex (Just & Wilson 2004). In that study (p. 459–460), we concluded: ‘Our results show that each of the previously circumpolar species can be regarded as a species complex, with much more restricted distributions for each species’. Differences among species were often subtle but constant. This pattern was particularly well demonstrated in *Sporonana* Just and Wilson, 2004, with separate species on three subantarctic islands south of Australia–New Zealand, *Ascionana* Just and Wilson, 2004, with 11 species in Australia, seven of them in the Bass Strait region, but none taken together in samples. Similarly, *Austrimunna rostrata* Hodgson (transferred to *Pagonana* Just and Wilson, 2004), previously considered circumantarctic, was now found to be a complex of species each with narrow distribution. Considering these findings, and because differences among the putative species of *Austronanus* are of a similar order to those used to separate species in the three genera mentioned above, we treat the different forms as discrete species.

We performed a preliminary phylogenetic analysis of the *Austronanus* group with the species of the *Paramunna* complex, using the same protocols as in Just and Wilson (2004) on the taxa currently in the DELTA database (those in this paper plus those used in the previous paper: 54 taxa, rooted on *Austrosignum grande*, 100 informative characters). The results support the distinctiveness of the three genera treated in this paper. We can confirm that *Stephensiellus* gen. nov. and *Austronanus* are monophyletic and are sister groups. *Xigonus* gen. nov., however, does not form a well-resolved clade with these genera and has an unstable position among the 20 trees found. These three genera emerge basally to the species in the *Paramunna* group, with the exception that *Omonana* Just & Wilson (2004) is more basal in some topologies. Richardson’s (1913) synonymy of *Austrimunna serrata* (now in *Palanana*) with *Austronanus* is also not supported by these results. We do not report these results here because the analysis is incomplete; many Paramunnidae species with similar configurations of the coxae remain to be included.

## TAXONOMY

### Key to genera and species of the *Austronanus* complex

1. Pleotelson tapering, lateral margins smooth.....*Xigonus patagoniensis*
- Pleotelson rounded with denticles on part of or entire lateral margins ..... 2
2. Frontal margin of head evenly convex; pleotelson proximal margins equal length of lateral margins; denticles on rounded lateral corner only *Stephensiellus* gen. nov. ... 3
- Frontal margin of head forming rounded or pointed angle; pleotelson proximal mar-

- gins distinctly shorter than lateral margins; entire lateral margins denticulate ..... *Austronanus* ... 4
3. Antenna article 3 lateral margin with acute forward pointing denticles; uropods not covered by cuticular hood ..... *Stephensiellus serraticornis*, sp. nov.
- At least part of lateral margin of antenna article 3 with irregular crenate flange; uropods inserted under cuticular hood..... *Stephensiellus palliolatipes* sp. nov.
4. Antennulae with 5 articles, article 5 elongate ..... 5
- Antennulae with 6 articles, article 5 subequal to 4 and 6..... 6
5. Front margin of head with pointed angular apex, lateral margins evenly convex; coxae V–VII with large lateral projection ..... *Austronanus dentatus*
- Front margin of head with rounded apex, lateral margins convex in middle, concave either side; coxae V–VII non-projecting rings, 7 with lateral spine ..... *Austronanus aucklandensis* sp. nov.
6. Frontal margin of head adjacent to apex evenly convex, not sinuous..... 7
- Frontal margin of head adjacent to apex concave, sinuous ..... 8
7. Coxae V–VII with denticles on lateral margin. Pleotelson laterally rounded ..... *Austronanus dubius*
- Coxae V and VI smooth, VII with single lateral denticle. Pleotelson laterally angular anteriorly, straight sided more posteriorly..... *Austronanus gelidus* sp. nov.
8. Antenna article 3 slightly widening distally, with crenate flange on straight lateral and medial margins; flagellum article 1 as long as 2 and half of 3 combined. Pleotelson posterior projection with row of 4 or 5 denticles either side..... *Austronanus glacialis*.
- Antenna article 3 inflated midlength, margins curved, with crenate flange on lateral margin; flagellum article 1 as long as 2–4 combined. Pleotelson posterior projection with single proximal denticle either side ..... *Austronanus mawsoni* sp. nov.

### *Austronanus* Hodgson

*Austronanus* Hodgson, 1910: 49.

*Paramunna*.—Nordenstam, 1933: 230.

**Type species.** *Austronanus glacialis* Hodgson, 1910, by monotypy.

**Species included.** *Austronanus aucklandensis* sp. nov., *A. dentatus* (Nordenstam, 1933) comb. nov., *A. dubius* (Hale, 1937) comb. nov., *A. glacialis* Hodgson, 1910, *A. gelidus* sp. nov., *A. mawsoni* sp. nov.

**Diagnosis.** *Body* slender ovate, greatest width less than 50% length. Projecting *frontal margin of head* angular with pointed or blunt midpoint, dorsally upcurving anteriorly, without lateral corners but indented at antennular insertion, anterior rim dorsoventrally thin, pointed in lateral view. *Antennula* with 5 or 6 articles. *Antenna* article 2 with 2 lateral spines (not verified in *A. dentatus*). *Pereopod I* carpus triangular. *Coxae* simple rings

(coxae V–VII with lateral projection in *A. dentatus*). *Pereonite* 5 in dorsal view not extending to lateral margins of pleonites 4 and 6. *Pereonites* 5–7 lateral margins not projecting, coxae visible in dorsal view. One or more of coxae V–VII with lateral denticles. *Pleotelson* proximal margins distinctly shorter than lateral margins, lateral margins dentate along entire length.

**Remarks.** *Austronanus* differs from *Xigonus* gen. nov., by having denticles on article 2 of the antenna (no denticles in *Xigonus*; note that spines also appear to be missing in *A. dentatus*), coxa I being a simple ring (with triangular projection), and by fully dentate lateral margins of the pleotelson (smooth). *Austronanus* differs from *Stephensiellus* gen. nov., by its angular head projection (broadly convex in *Stephensiellus*), simple ring-shaped coxae (laterally projecting coxae I and V–VII; but note similar coxae V–VII in *A. dentatus*), and pleotelson with denticles along entire convex lateral margins (denticles on the midlateral angular bulges only).

### *Austronanus glacialis* Hodgson, 1910

(Figs 2–5)

*Austronanus glacialis* Hodgson, 1910: 50, pl. 8, fig. 3.

Not *Paramunna serrata* (?).– Nordenstam, 1933: 234; Amar & Roman, 1974: 577.

**Type fixation.** Holotype, manca, by monotypy, NHM 1910.3.18.95.

**Remarks on type material.** The holotype is a small unnaturally flattened specimen, apparently manca stage 1 (no development of pereopod VII); surfaces are covered with detritus and crystals, but can be seen to be smooth with little or no setation.

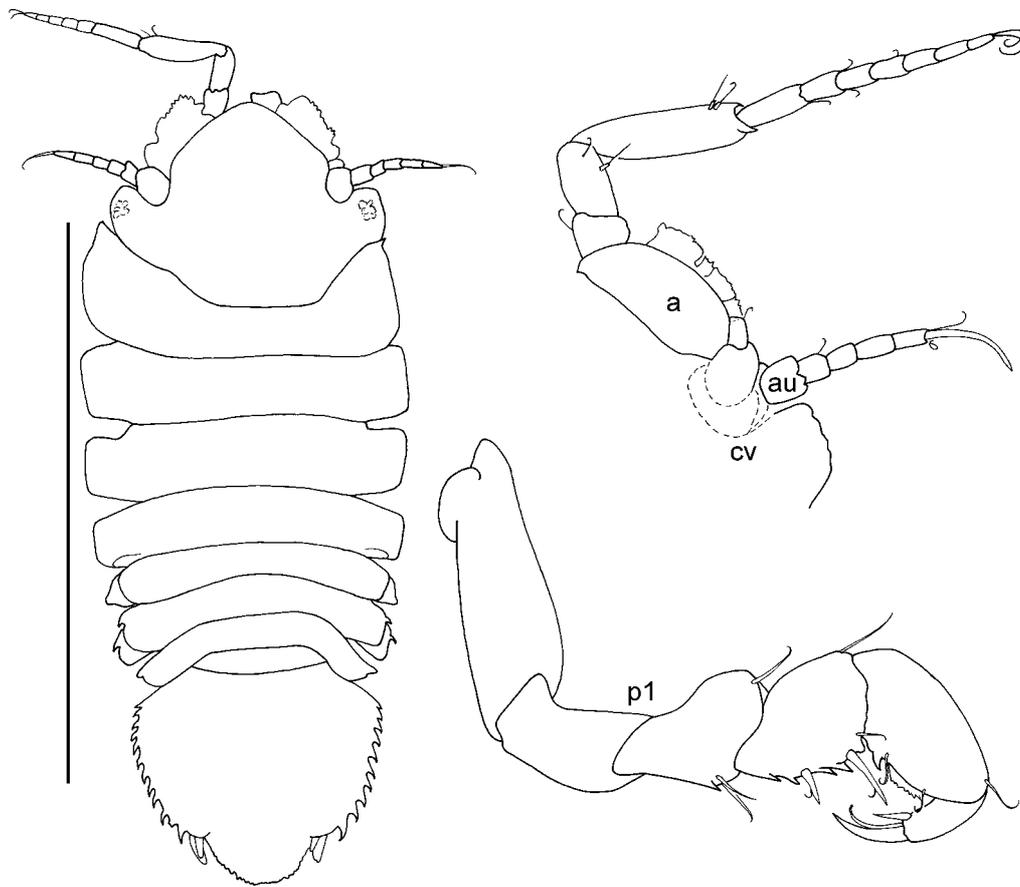
**Type Locality.** McMurdo Sound, Antarctica.

#### **Material examined**

*Holotype.* Manca, 0.7 mm, Winter Quarters, McMurdo Sound, Antarctica, inside 20 fms line [36.5 m], dredge, ii.1902, 'Discovery' coll., NHM 1910.3.18.95.

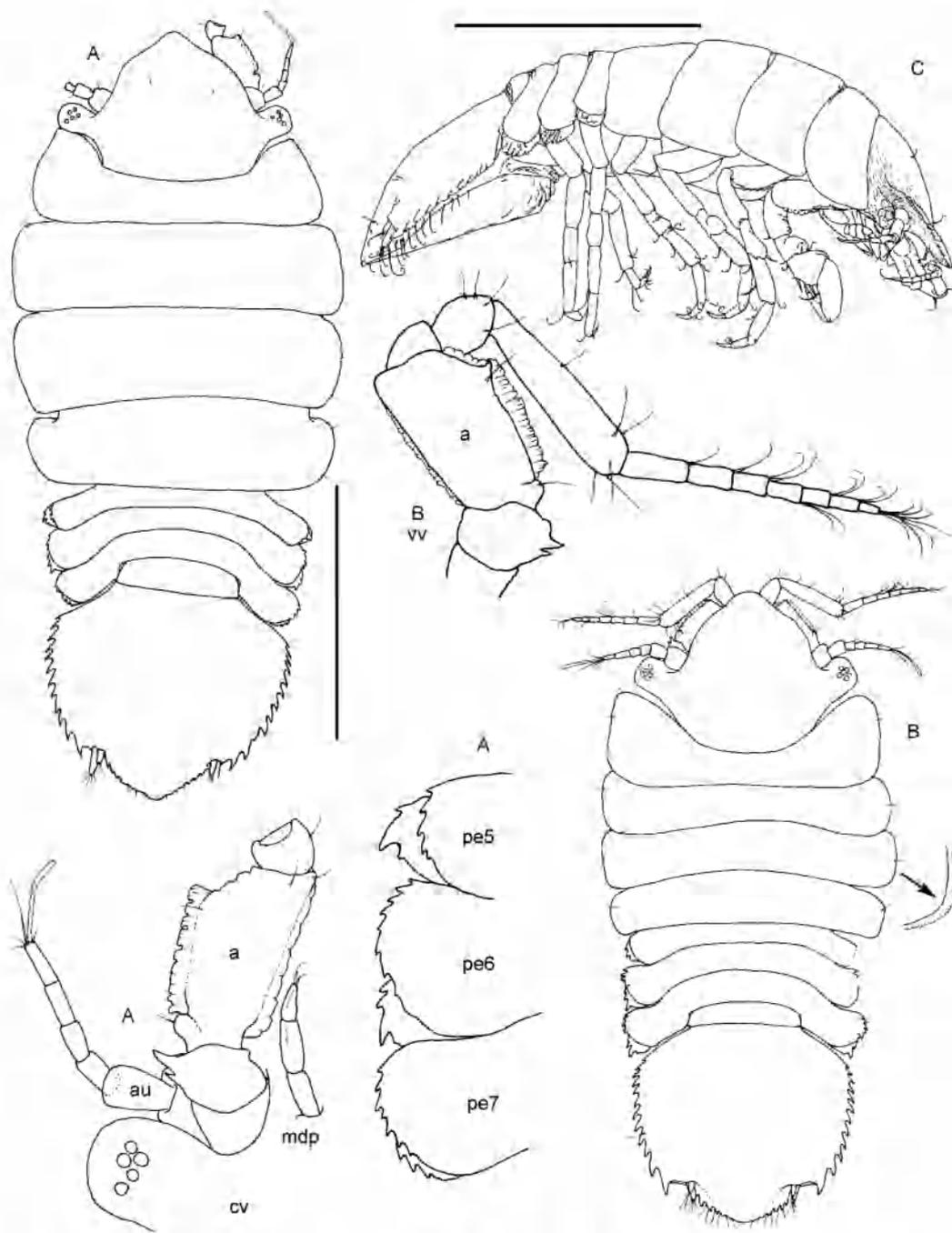
*Other material.* Ross Island, McMurdo Sound, Antarctica (positions estimated from map): Winter Quarters, 77°50.7'S 166°39'E, inside 25 fms line [45 m], 'Discovery' coll., NHM 2005.2086 (ovigerous ♀ A, 1.52 mm); Cape Royds, 77°30'S 166°10'E, J. Oliver, 13 Oct. 1974, AM P67051 (preparatory ♀); Winter Quarters Bay "Dump", J. Oliver, 9 Sept. 1974, AM P67052 (♂ B, 1.23 mm, plus 2 ♂), AM P 67054, (42 ♀, including ♀ specimen C); Cape Armitage, 77°51.4'S 166°41'E, J. Oliver, 8 Sept. 1974, AM P 67053.

**Description.** *Body* width 0.43 length in female, width 0.46 length in male, widest in female at pereonite 2 or 3, widest in male at pereonite 3. *Head* length 0.66 and 0.74 width (♂, ♀); length posterior to eyestalks 0.77 anterior length in female, 1 in male. *Frontal margin* lobe length 0.37–0.38 head length (n=3); apex broadly rounded in dorsal view, margin adjacent to apex concave, sinuous. *Eyestalks* apex broadly rounded, long axis angling forward at approximately 30° in female, 40° in male, somewhat flattened laterally in males.

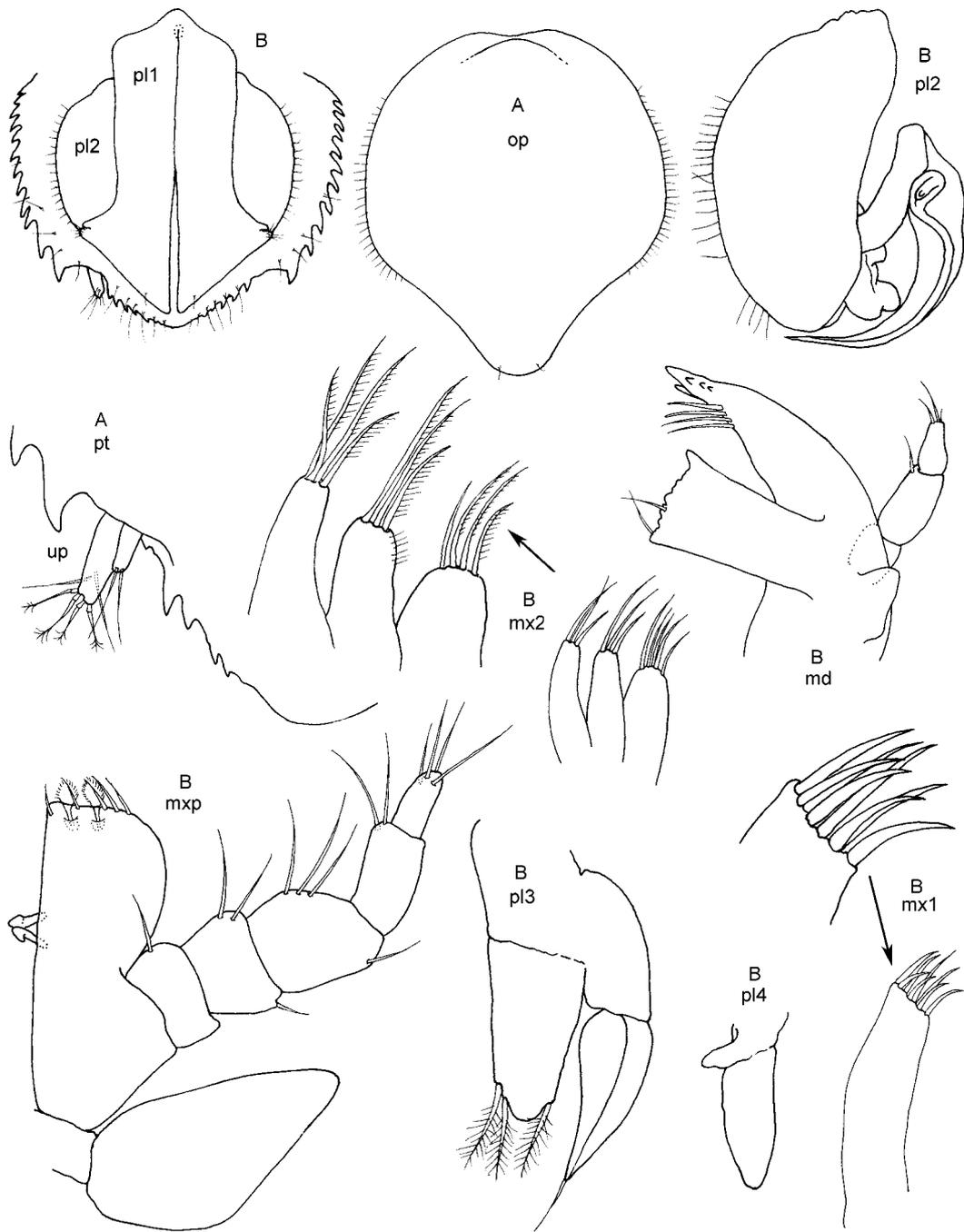


**FIGURE 2.** *Austronanus glacialis*. Holotype, manca. **a**, antenna; **au**, antennula; **cv**, ventral view of head; **p1**, pereopod I. Habitus scale: 0.5 mm.

*Pereonite* lateral margin 1 linear, 2–7 rounded. Pereonite 5 in dorsal view distinctly narrower than pereonites 4 and 6. Pereonite lateral margins 5–7 finely denticulate. *Pleon* length 1.00 width in female and male. Pleotelson proximal margin length shorter than lateral margin length. *Pleonite 1* width 1.0 distance between uropods, length 0.2 and 0.3 width ( $\sigma$ ,  $\varphi$ ). *Pleotelson* proximal margin in dorsal view forming 50° angle with medial axis of pleon; lateral margins denticulate, with 12 denticles per side, increasing in size posteriorly; posterior margin in female forming 100° angle, in male forming 130° angle, posterior margin with fine denticles laterally, grading to smaller denticles posteriorly, none on posterior apex, with 4 denticles each side.



**FIGURE 3.** *Austronanus glacialis*. A, female A; B, male B; C female C. **a**, antenna; **au**, antennula; **cv**, ventral view of head; **mdp**, mandible palp; **pe5-7**, pereonites 5-7 dorsal view with coxae; **vv**, ventral view. Habitus scale bar for all three: 0.5 mm.



**FIGURE 4.** *Austroanatus glacialis*. A, female A; B, male B. **md**, mandible; **mx1-2**, maxilla 1 and 2; **mxp**, maxilliped; **op**, operculum; **pl1-4**, male pleopods I-IV; **pt**, pleotelson; **up**, uropod.

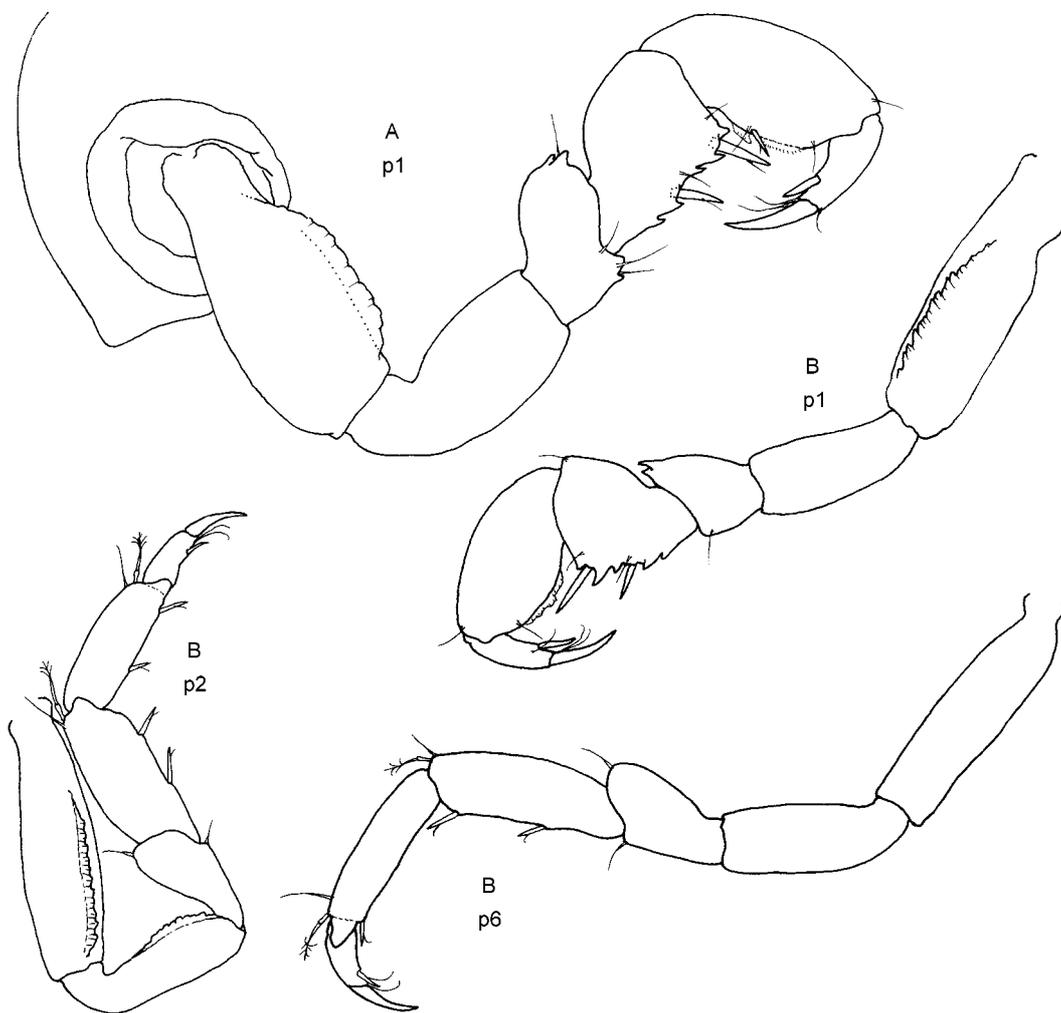


FIGURE 5. *Austronanus glacialis*. A, female A; B, male B. **p1, 2, 6**, pereopods I, II and VI.

*Antennula* articles 1 and 2 combined reaching eyestalk apex; article 1 subequal to 2, inflated, broader than 2; 5–6 of subequal length, longer than articles 3 and 4. *Antenna* article 2 lateral margin with two spines (distal spine largest); article 3 in ventral view quadrate, lateral margin expanded, width 0.63 and 0.70 length ( $\sigma$ ,  $\varphi$ ), with crenate flange on lateral and medial margins, lateral flange wider than medial flange, with 1 distolateral spine embedded in crenate margin, article 5 only slightly longer than article 4; *flagellum* with 7 articles, proximal article 1.5 length of second article.

*Pereopod* I basis with crenate ridge on anterior margin, length 2.4 width; ischium anterodistal margin with crenate ridge; merus with 2 spines on anterior margin, 1 spine on posterior margin; carpus distal width 0.81 and 0.95 posterior margin length ( $\varphi$ ,  $\sigma$ ), with 2 denticles proximal to robust setae, 2 denticles between robust setae, one denticle distal to

robust setae; propodus narrowing distally to insertion of dactylus, opposing margin with 1 robust seta, with crenate ridge. *Pereopod II* basis with crenate ridge. *Pereopods V–VII* coxae lateral margin denticulate, central spine large, smaller anteriorly and posteriorly.

*Male pleopods I* lateral lobes distinctly projecting from midlateral margin, width 0.5 distance to midline, with rounded proximal sublobe; distal projection length 0.27 pleopod total length, approximately forming right angle, with pointed apices. *Female operculum* distal part tapering with concave distolateral margins, width 0.85 length.

*Uropods* on lateral margin of pleotelson.

*Size.* Largest female 1.50 mm, largest male 1.20 mm.

**Distribution.** McMurdo Sound, Antarctica.

**Remarks.** One of us (GW) has studied the holotype (Fig. 2). Being a manca and in poor condition of conservation, it is not well suited to define *Austronanus glacialis* and provide the basis for a diagnosis of the genus. The single adult female (Fig. 3A) reported here from Winter Quarters, McMurdo Sound (NHM 2005.2086), the type locality of *A. glacialis*, was discovered by us in the large syntype series of *Austrimunna rostrata* Hodgson, 1910 (now *Pagonana rostrata*, see Just and Wilson 2004). In addition, we have had at our disposal 46 specimens collected more recently from Winter Quarters, McMurdo Sound. Females of that sample are identical to the female mentioned above. We feel confident that all these specimens represent *Austronanus glacialis*, and we have based our diagnosis of the genus and description of the type species on this new material.

*Austronanus glacialis* shares with *A. aucklandensis* sp. nov. and *A. mawsoni* a rounded apex of the head and two concavities on the anterolateral margins; but *A. aucklandensis* has only 5 articles in the antennulae as opposed to 6 in the other two species. *Austronanus glacialis* differs from *A. mawsoni* in the more angular shape of antenna article 3 with a distolateral spine (slightly inflated in middle, no lateral spine) and in the posterior margin of pleotelson with 4 or 5 denticles each side (single denticle).

### ***Austronanus aucklandensis* sp. nov.**

(Figs 6–7)

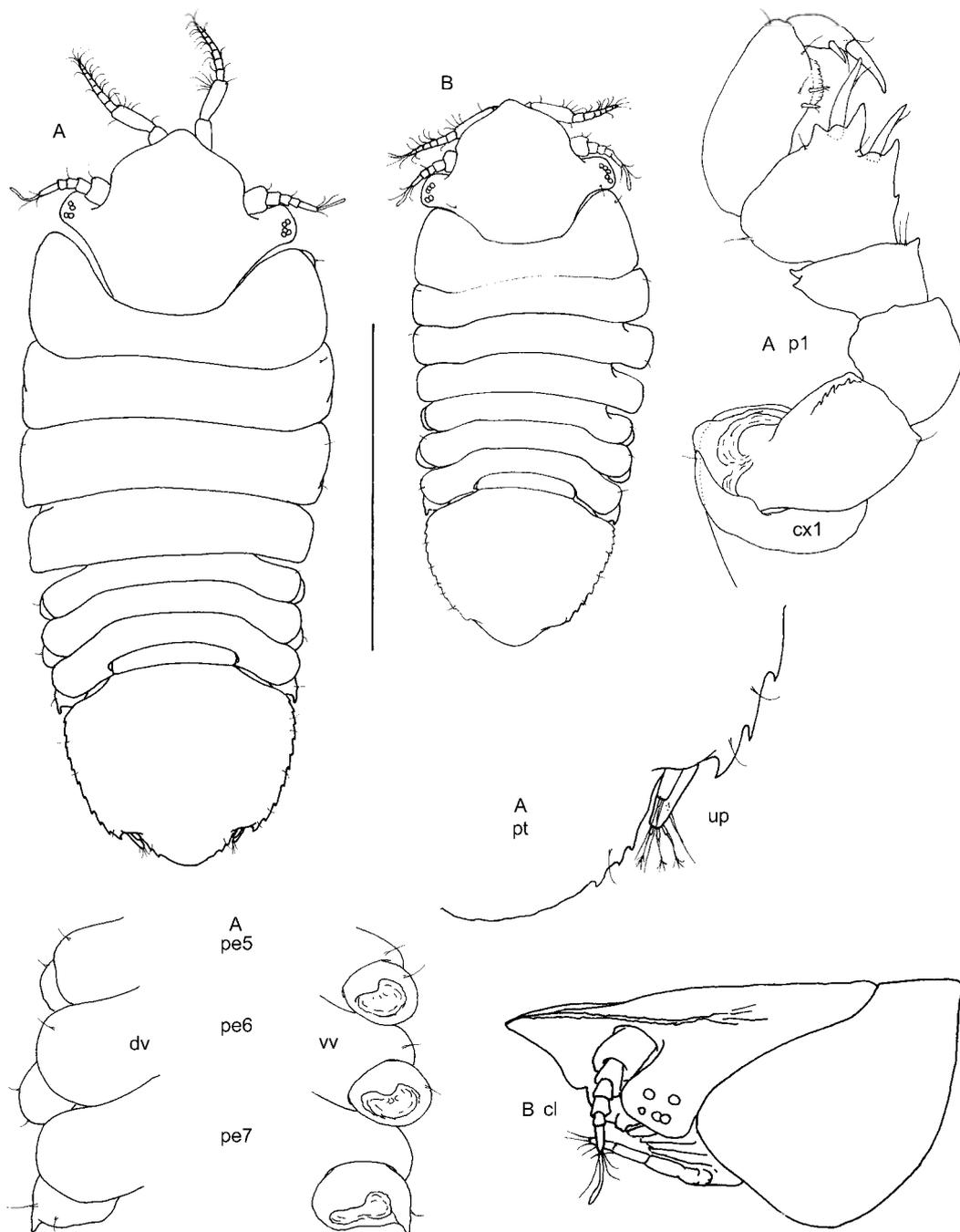
**Etymology.** The species is named for Auckland Island south of New Zealand.

#### **Material examined**

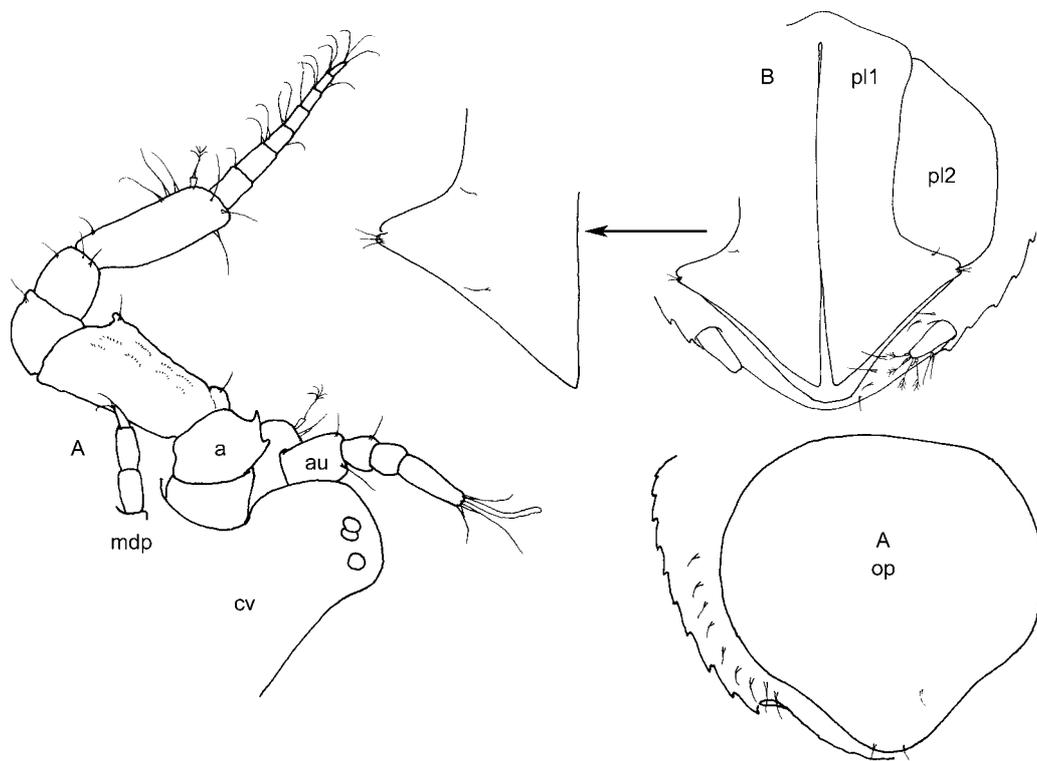
*Holotype.* Ovigerous ♀, 1.14 mm, Auckland Island, New Zealand, Ranui Cove, 166°17'E 50°32.5'S, 7 February 1973, *Macrocystis pyrifera* holdfasts and red algae on anchor of “Acheron”, J.K. Lowry, stn SA-1485, NIWA 18949.

*Paratypes.* Same data as holotype, AM P70534 (♂B, 0.77 mm), AM P70535 (8 specimens).

**Description.** *Body* width 0.42 length in female, 0.43 length in male, widest in female at pereonite 2 or 3, widest in male at pereonite 2.



**FIGURE 6.** *Austronanus aucklandensis*, sp. nov. A, holotype, female; B, paratype, male. B. **cl**, lateral view of head; **cx1**, coxa I; **dv**, dorsal view; **p1**, pereopod I; **pe5-7**, pereonites 5-7 with coxae; **pt**, pleotelson; **up**, uropod; **vv**, ventral view. Habitus scale bar for both: 0.5 mm.



**FIGURE 7.** *Austronanus aucklandensis*, sp. nov. A, holotype, female; B, paratype, male. **a**, antenna; **au**, antennula; **cv**, ventral view of head; **mdp**, mandible palp; **op**, operculum; **pl1-2**, pleopods I and II.

*Head* length 0.74 and 0.79 width ( $\sigma$ ,  $\text{♀}$ ); length posterior to eyestalks 1.1 anterior length in female and male. *Frontal margin* lobe length 0.29–0.31 head length ( $\text{♀}$ ,  $\sigma$ ); apex bluntly angular in dorsal view. *Eyestalks* lateral apex somewhat flattened, long axis angling forward at approximately  $30^\circ$  in female,  $10^\circ$  in male.

*Pereonite lateral margin* 1–4 linear, 5–7 rounded. Pereonite 5 in dorsal view distinctly narrower than pereonites 4 and 6.

*Pleon* length 0.94–0.95 width. *Pleotelson* proximal margin length shorter than lateral margin length. *Pleonite* 1 width 1.0 distance between uropods; length 0.17 width. *Pleotelson* proximal margin in dorsal view forming  $60^\circ$  angle with medial axis of pleon; lateral margins denticulate, with 10–11 denticles per side, denticles low and posteriorly directed; posterior margin in female forming  $110^\circ$  angle, in male forming  $120^\circ$  angle, posterior margin with uniformly fine denticles laterally, with 3 denticles each side.

*Antennula* with 5 articles, 1 and 2 combined shorter than eyestalk; article 1 longer and broader than 2, inflated, article 5 longer than articles 3 and 4 combined. *Antenna* article 2 lateral margin with two spines; article 3 in ventral view distally expanded, lateral distal

margin angular, width 0.56 length, with 1 spine distally, fine cuticular combs on ventral side; article 5 only slightly longer than article 4; *flagellum* with 7 articles, proximal article subequal to more distal articles.

*Pereopod I* basis with crenate ridge on anterior margin (fine denticles only), length 1.5 width; merus with 2 spines on anterior margin, 1 spine on posterior margin; carpus distal width 1.0 posterior margin length, with 2 denticles proximal to robust setae (1 large, 1 small), one denticle between robust setae (massive, larger than other denticles), one denticle distal to robust setae (medium sized); propodus narrowing distally to insertion of dactylus, with 2 robust setae, with crenate ridge. Pereopod VII coxa lateral margin with small denticle.

*Male pleopods I* lateral lobes distinctly projecting from midlateral margin, width 0.46 distance to midline; distal projection length 0.30 pleopod total length, forming obtuse angle, with pointed apices. *Female operculum* distal part tapering with concave distolateral margins, width 0.96 length.

*Uropods* on lateral margin of pleotelson.

*Size.* Largest female 1.14 mm, largest male 0.77 mm.

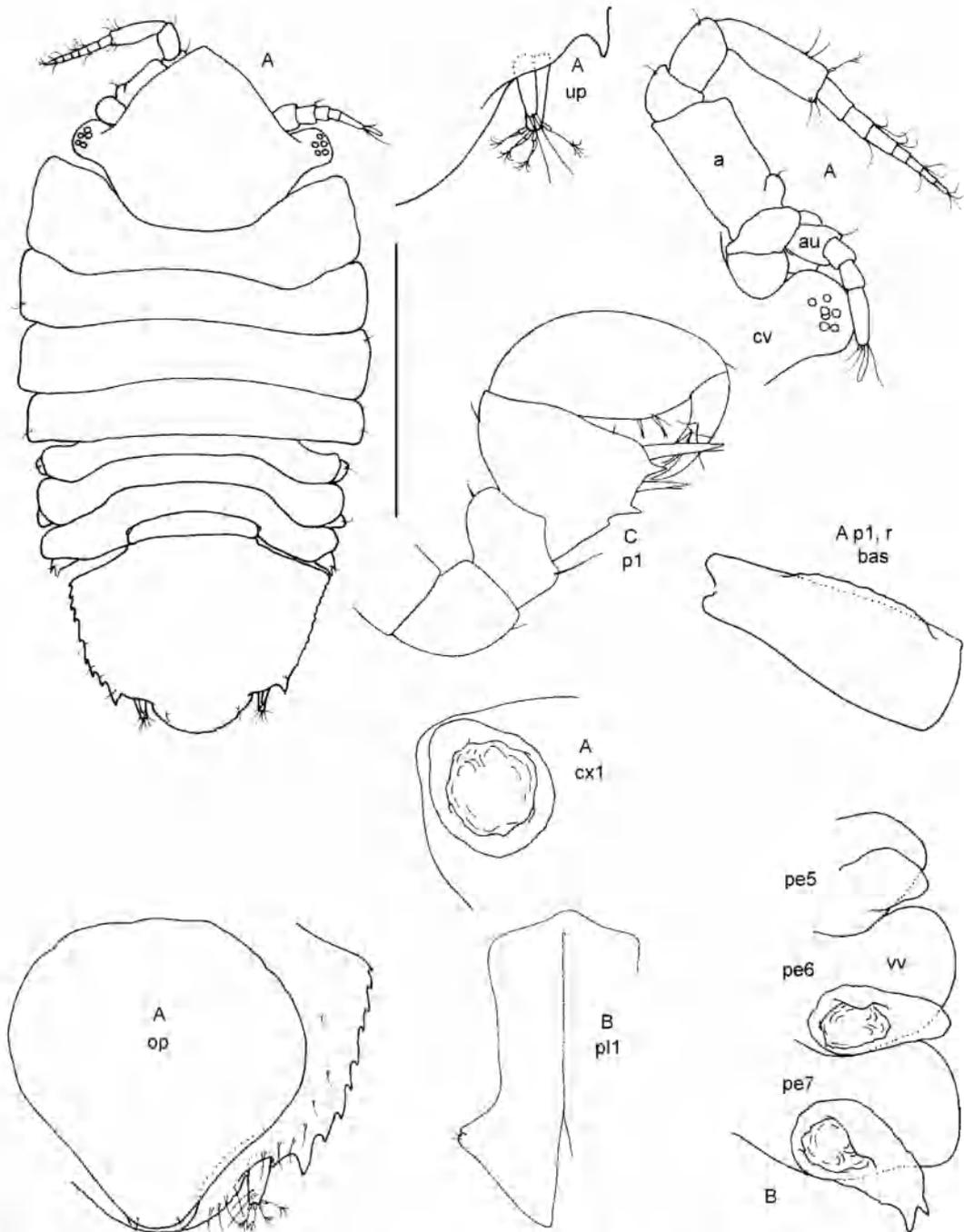
**Distribution.** Known only from the type locality.

**Remarks.** *Austronanus aucklandensis* is unusual in having an exceptionally short and stocky basis to pereopod I. Although the lateral margin of the broad pleotelson is denticulate, the lateral spines are low and directed posteriorly. This species shares with *A. dentatus* a 5-articulate antennula (all other species in have 6; note that *A. specimen A*, see below, also has 5). *Austronanus aucklandensis* differs from *A. dentatus* in the shape of the frontal margin of the head, and in the latter having laterally projecting coxae on pereopods V–VII.

***Austronanus dentatus* (Nordenstam, 1933), comb. nov.**  
(Fig. 8)

*Paramunna dentata* Nordenstam, 1933: 139–141, fig. 65.

**Remarks on type material.** Nordenstam (1933: 239) designated 'Male and female, length about 1 mm.' as 'Types', and reported (p. 241) an additional 6 specimens, all from the Swedish Antarctic Expedition 1901–1903, stn 51. We have examined a sample labelled 'Type-777 syntypes' in the Swedish Museum of Natural History. It contains two microvials, one of which is labelled 'Type specimens' and holds 2 males, one without pleopod I. The other holds 4 females, 2 of which are badly damaged lacking the head. We do not know of the whereabouts of the remaining 2 syntypes. All specimens are in a poor state of preservation, being covered with a 'felt' of fine needle-like crystalline precipitate that cannot be physically removed.



**FIGURE 8.** *Austronanus dentatus*. A, lectotype, female; B, paratype, male B; C, (reproduced from Nordenstam 1933, fig.65e). **a**, antenna; **au**, antennula; **bas**, basis; **cv**, ventral view of head; **cx1**, coxa I; **l**, left; **op**, operculum; **p1**, pereopod I; **pe5-7**, pereonites 5-7 with coxae; **r**, right; **up**, uropod; **vv**, ventral view. Habitus scale bar: 0.5 mm.

In addition to the habitus drawing mentioned (no sex given), Nordenstam (his fig. 65) illustrated the following details: pereopods I and II (female), left antenna (female), right mandible (no sex given), lower lip (no sex given), pleopods I and II (male), operculum (female). We have examined 12 slides in the Swedish Museum of Natural History, all labelled *Paramunna dentata* n. sp., Type no. 777, Old number 2680, also No. 6123, all from stn 51. All slides are in a poor condition due to drying out, shrinkage and graininess of the medium. Parts are strongly flattened, sometimes distorted, and fine details often cannot be interpreted with certainty. A list of the slides with Nordenstam's annotations in quotation marks (translated from the Swedish) and the results of our scrutiny in square brackets follow. We have numbered the slides from 1 to 12 and inserted the number on the slides. The slides may deteriorate further without professional restoration.

1. '1<sup>st</sup> pereopod, ♀', [one pereopod I].
2. 'Mouthparts and pereopod 1, ♀', [one pereopod I; one pereopod II; the distal part of one antenna; and both mandibles; all in poor condition].
3. 'Mouthparts and 1<sup>st</sup> pair of pereopods, ♀', [two pereopods I too poor condition for illustration, but appear similar to pereopod I of slide 2; right mandible, quality too poor for illustration, but appears similar to those of slide 2; one maxilliped and one maxilla 1].
4. '1<sup>st</sup> pereopod, ♀; operculum, ♀', [one pereopod I, too poor condition for illustration, but appears similar to that of slide 2; one pereopod of the series 2–7, and the operculum].
5. 'Left 1<sup>st</sup> pereopod, ♀', [one pereopod I badly dried out, not suitable for illustration; it appears similar to that of slide 2].
6. 'Left 2<sup>nd</sup> pereopod, ♀', [one pereopod II].
7. 'Pereopods 1 and 2, ♀', [one pereopod I in very poor condition, not suitable for illustration, it appears similar to that of slide 2; one pereopod II].
8. 'Left pereopods, ♀', [four pereopods of the series 2–7, all dried out or embedded in shrinkage ridges, none suitable for illustration].
9. 'Maxilla 1 and maxillipeds, ♀', [all three].
10. 'Left antennula and antenna, ♀', [nothing; medium strongly evaporated].
11. 'Left 1<sup>st</sup> pereopod, ♂; 1<sup>st</sup> pair of pleopods, ♂; 2<sup>nd</sup> pleopod, ♂', [all three].
12. 'Left 1<sup>st</sup> pereopod', sex not given, [nothing].

The number and juxtaposition of pereopods I in slides 1–10 indicate that at least four females, and possibly six, are involved, while one male is represented by slide 11. We can only speculate that one of the female mandibles of slide 2 is the one illustrated in Nordenstam's fig. 65c, that the female operculum of slide 4 is the one illustrated in his fig. 65i, and that the male pleopods I and II of slide 11 are those of his fig. 65g and h. The undissected male from the microvial labelled 'Type specimens', possesses pleopods I and

II in place. Hence slide 11 must refer to another male, possibly the smaller, dissected male in the same microvial. We consider all slides to form part of the paralectotype material.

We have designated the largest, least damaged female as lectotype. We have studied the outline of its single somewhat flattened pereopod I, but could confirm the presence of only one robust seta on the propodal margin due to damage and precipitate; and for the same reasons, we could not see possible carpal spines among the robust setae. We have, therefore, reproduced Nordenstam's (1933, fig. 65e) illustration of pereopod I and have based our description on it, except for description of the basis.

**Type Locality.** Port Williams, Falkland Islands.

**Material examined**

*Lectotype*, here designated. ♀, 1.20 mm, Port Williams, Falkland Islands, 51°40'S 57°42'W, 22 m, sand 3 September 1902, Swedish Antarctic Expedition 1901–1903, stn 51, SMNH type no. 777.

*Paralectotypes*. Same data as lectotype, SMNH type no. 6135 (♂ B, 0.90 mm), SMNH type no. 6135 (6 specimens); also 12 slides (see above), all labelled 'Type no. 777, SMNH no. 6123 (Old number 2680).

**Description.** *Body* width 0.46 length in female (illustrated female 0.50, flattened and hence broader than other females in material), width 0.60 length in male, widest at pereonite 2 or 3.

*Head* length 0.70 and 0.75 width (♀, ♂); length posterior to eyestalks 0.92 anterior length in female, 1.1 in male. *Frontal margin* lobe length 0.47 head length; apex sharply angular in dorsal view. *Eyestalks* lateral apex somewhat flattened, long axis angling forward at approximately 30°, not extending to lateral margin of pereonite 1.

*Pereonite* lateral margin 1–4 linear, 5–7 rounded. Pereonite 5 in dorsal view distinctly narrower than pereonites 4 and 6.

*Pleon* length 0.86 width in female. Pleotelson proximal margin length shorter than lateral margin length. *Pleonite 1* width 0.96 distance between uropods, length 0.2 width. *Pleotelson* anterior margin in dorsal view forming 60° angle with medial axis of pleon; lateral margins denticulate, with 9 and 10 denticles per side (♀, ♂), becoming larger posteriorly; posterior margin in female forming 110° angle.

*Antennula* with 5 articles, articles 1 and 2 combined shorter than eyestalk; article 1 subequal to 2, broader than 2, inflated; article 5 longer than articles 3 and 4 combined.

*Antenna* article 3 in ventral view distally expanded, lateral distal margin angular, width 2.00 length; article 5 distinctly longer than article 4; *flagellum* with 7 articles, proximal article 1.2 length of second article.

*Pereopod I* basis with crenate ridge on anterior margin, length 2.5 width; carpus (from Nordenstam 1933: fig. 55) distal width 1.25 posterior margin length, with 2 denticles proximal to robust setae (1 large, 1 small), with one denticle between robust setae; propodus narrowing distally to insertion of dactylus, with 2 robust setae. *Pereopods V–VII coxae* lateral margin elongate and projecting; 2 spines on coxa VII.

*Male pleopods I* lateral lobes distinctly projecting from midlateral margin, width 0.4 distance to midline; distal projection length 0.28 pleopod total length, approximately forming right angle, with pointed apices. *Female operculum* distal part tapering with concave distolateral margins, width 0.95 length.

*Uropods* on lateral margin of pleotelson.

*Size.* Largest female 1.20 mm, largest male 0.95 mm.

**Distribution.** Falkland Islands, South Atlantic, 22 m.

**Remarks.** For comparison with the only other species with 5 articles in the antennulae, see *Austronanus aucklandensis*, above. We place this species in *Austronanus* with hesitation, see Classification p. 24.

***Austronanus dubius* (Hale, 1937), comb. nov.**

(Fig. 9)

*Paramunna dubia* Hale, 1937: 40, fig. 16.

*Austrosignum dubia*.—Menzies, 1962: 44.

**Remarks on type material.** The anterior part of the body is somewhat flattened artificially, making it broader than the posterior pereonites.

**Material examined**

*Holotype.* ♀, 1.80 mm, Main Base, Commonwealth Bay, Adelie Land, Antarctica, 67°S 142°36'E, 25–30 fms [46–55 m], 3 September 1912, Hunter, SAMA C4346.

**Description.** *Body* width 0.47 length in female, widest at pereonite 2 or 3. *Head* length 0.63 width; length posterior to eyestalks 0.75 anterior length. *Frontal margin* lobe length 0.78 head length; apex bluntly angular in dorsal view, frontal margin adjacent to apex convex, not sinuous. *Eyestalks* lateral apex rounded, globular, shaft before apex slightly constricted with neck, long axis angling forward at approximately 40°, about as long as wide in dorsal view.

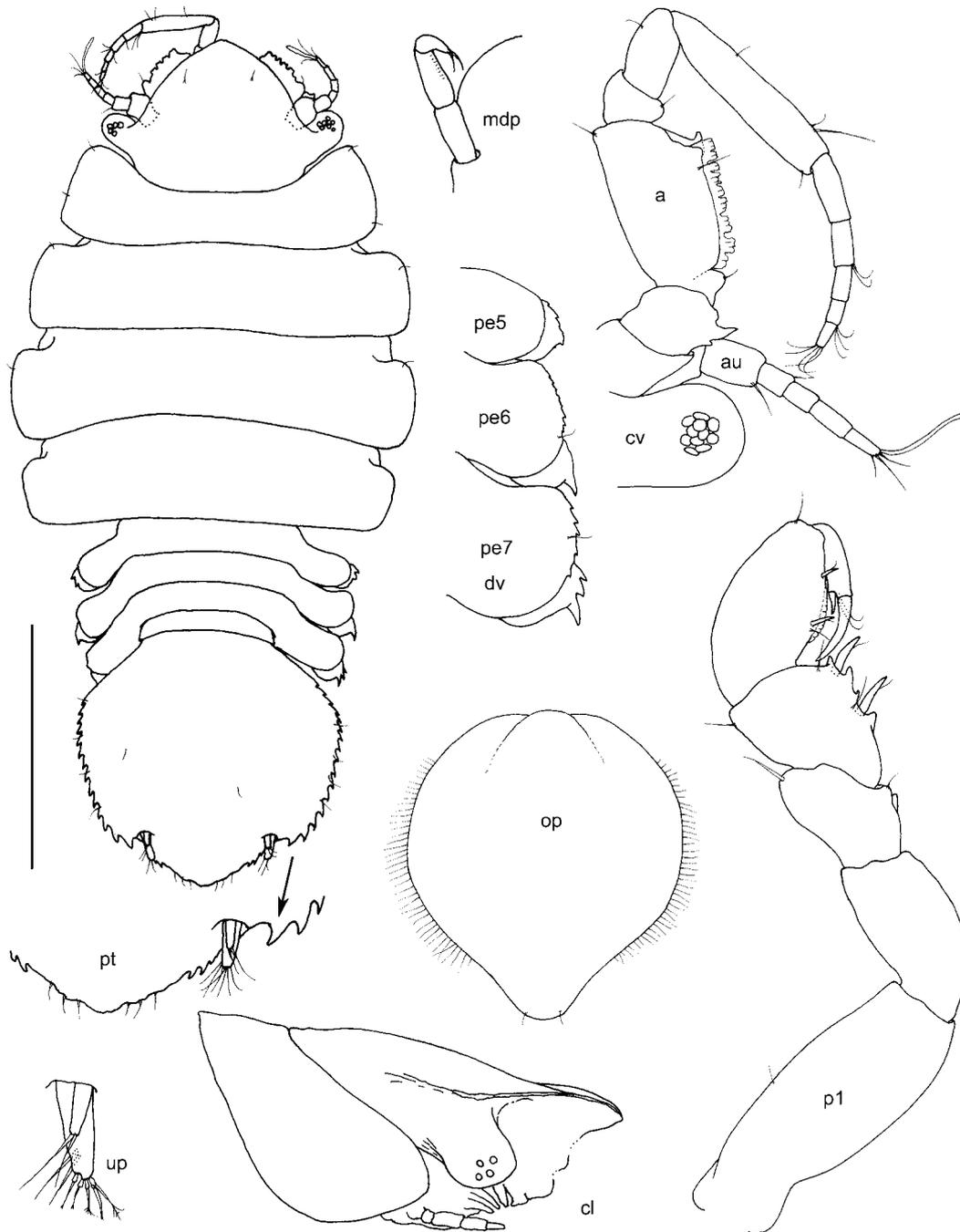
*Pereonite lateral margin* 1–4 linear, 5–7 rounded. Pereonite 5 in dorsal view distinctly narrower than pereonites 4 and 6. Pereonite lateral margins 6–7 finely denticulate.

*Pleon* length 0.95 width; pleotelson proximal margin length shorter than lateral margin length. *Pleonite 1* width 1.0 distance between uropods, length 0.14 width. *Pleotelson* proximal margins set at 45° angle with medial axis of pleon, merging into lateral margin without noticeable angle, lateral margins denticulate, with 14–16 denticles per side; posterior margin forming 125° angle, with 3 uniformly fine denticles laterally each side.

*Antennula* articles 1 and 2 combined reaching eyestalk apex; article 1 longer and broader than 2, inflated, 5–6 of subequal length, longer than articles 3–4.

*Antenna* article 2 lateral margin with two spines (proximal spine tiny); article 3 in ventral view distally expanded, distolateral margin angular, width 0.64 length, with crenate flange on lateral margin, flange coarse with rectangular subunits, with 1 distal

spine; article 5 only slightly longer than article 4; *flagellum* with 5 articles, proximal article 1.5 length of second article.



**FIGURE 9.** *Austronanus dubius*. Holotype, female. **a**, antenna; **au**, antennula; **cl**, lateral view of head; **cv**, ventral view of head; **dv**, dorsal view; **mdp**, mandible palp; **op**, operculum; **p1**, pereopod I; **pe5-7**, pereonites 5-7 with coxae; **pt**, pleotelson; **up**, uropod. Habitus scale bar: 0.5 mm.

*Pereopod I* basis anterior margin smooth, length 2.5 width; merus with 1 spine on posterior margin (low and rounded); carpus distal width 1.0 posterior margin length; posterior margin with one denticle proximal to robust setae, 2 denticles between robust setae (smaller tooth proximally), one denticle distal to robust setae; propodus narrowing distally to insertion of dactylus, with 2 robust setae, with crenate ridge. *Pereopods V–VII* coxae lateral margin denticulate, coxa V with small denticles, coxae VI–VII with denticles grading to spines posteriorly.

*Female operculum* distal part tapering with concave distolateral margins, width 0.88 length.

*Uropods* dorsal and directly adjacent to lateral margin of pleotelson.

*Size.* Largest female 1.80 mm.

**Distribution.** Known only from the type locality.

**Remarks.** *Austronanus dubius* is the largest species in the genus. Article 3 of the antennae is similar to that in *A. glacialis*, but *A. dubius* differs from that species in the evenly convex lateral margins of the head, lack of anterodistal spines on merus of pereopod I, weak dentition on lateral margins of pereonites 5–7 and coxae 5 and 6, and a more ovoid female operculum. *Austronanus dubius* differs from the other two species in the genus with evenly convex lateral margins of the head, *A. dentatus* and *A. gelidus*, as follows: *A. dentatus* has only 5 articles in the antennulae and laterally elongate coxae V–VII; in *A. gelidus*, article 3 of the antennae is much narrower, lateral margins of pereonites 5 and 6 and coxae 5 and 6 are smooth, and pleotelson more angular between proximal and lateral margins.

### *Austronanus gelidus* sp. nov.

(Fig. 10)

**Etymology.** The species name is Latin for icy, referring to the Antarctic habitat of this species.

#### **Material examined**

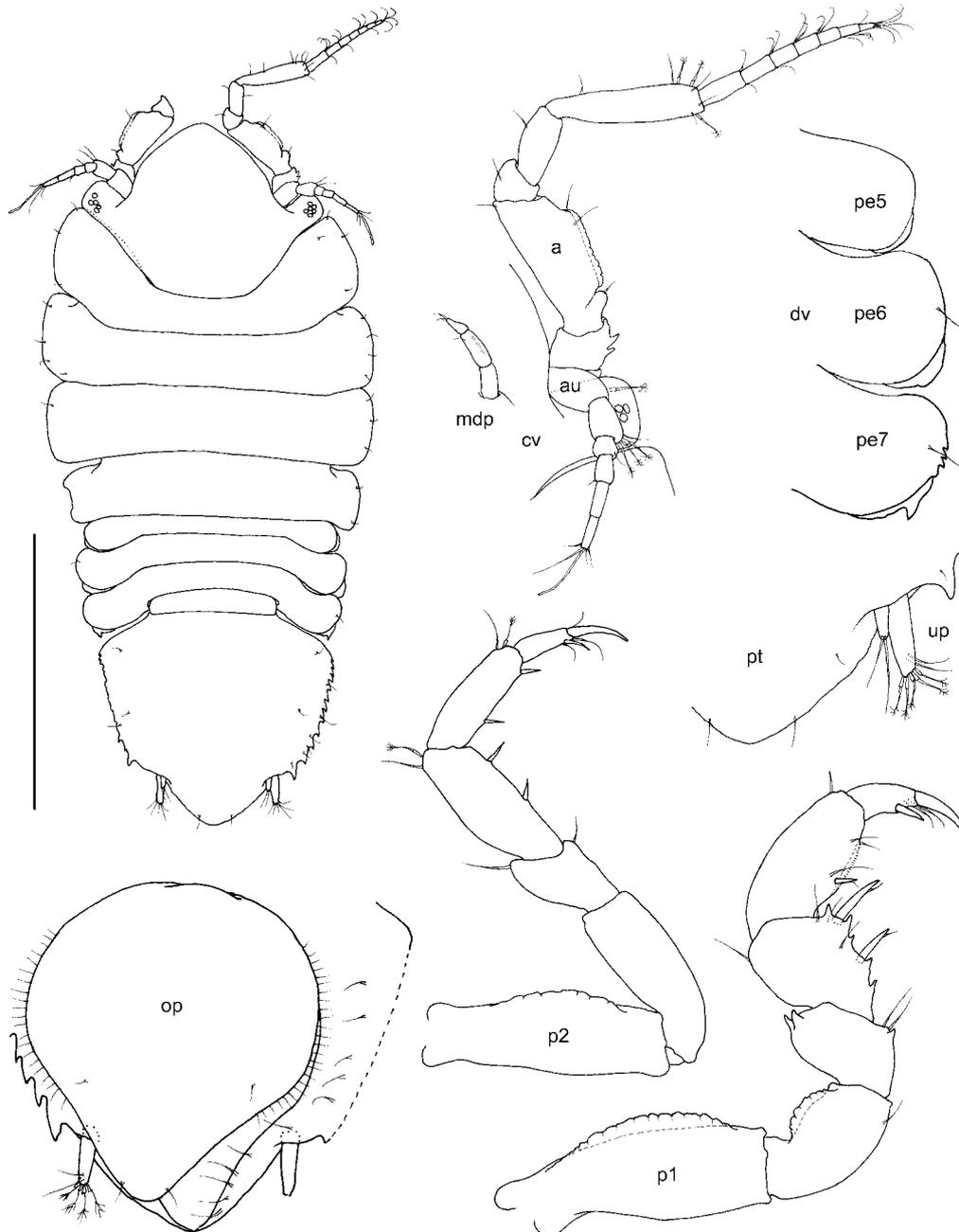
*Holotype.* ♀, 1.31 mm, Antarctica, Davis Station, 68°38'S 77°48'E, M. Tucker, 6 January 1982, NMV J4773.

**Description.** *Body* width 0.46 length in female, widest at pereonite 2 or 3. *Head* length 0.73 width; length posterior to eyestalks 1.0 anterior length. *Frontal margin* lobe length 0.37 head length; apex bluntly angular in dorsal view, margin adjacent to apex convex, not sinuous. *Eyestalks* lateral apex somewhat flattened, long axis angling forward at approximately 45°.

*Pereonite lateral margin* 1–4 linear, 5–7 rounded. *Pereonite* 5 in dorsal view distinctly narrower than pereonites 4 and 6. *Pereonite* lateral margin 7 finely denticulate.

*Pleon* length 1.0 width in female; pleotelson proximal margin length shorter than lateral margin length. *Pleonite* 1 width 1.0 distance between uropods, length 0.2 width.

*Pleotelson* laterally angular anteriorly, lateral margins straight sided; proximal margin forming 60° angle with medial axis of pleon; lateral margins denticulate, with 12 denticles (right side only, left side damaged in holotype), increasing in size posteriorly; posterior margin forming 100° angle.



**FIGURE 10.** *Austronanus gelidus*, sp. nov. Holotype, female. **a**, antenna; **au**, antennula; **cv**, ventral view of head; **dv**, dorsal view; **mdp**, mandible palp; **op**, operculum; **p1-2**, pereopod I and II; **pe5-7**, pereonites 5-7 with coxae; **pt**, pleotelson; **up**, uropod. Habitus scale bar: 0.5 mm.

*Antennula* articles 1 and 2 combined extending beyond eyestalk apex; article 1 length and width subequal to 2, tubular; 5 and 6 of subequal length, longer than articles 3 and 4.

*Antenna* article 2 lateral margin with two spines (proximal spine smaller); article 3 in ventral view tubular, width 0.41 length, broadening slightly on crenate lateral margin, crenate flange low and thin, lacking subdivisions; article 5 distinctly longer than article 4; flagellum with 7 articles, proximal article 1.4 length of second articles.

*Pereopod I* basis with crenate ridge on anterior margin, length 3.0 width; ischium anterodistal margin with crenate ridge; merus with 2 spines on anterior margin, 1 spine on posterior margin; carpus distal width 0.9 posterior margin length, with 2 denticles proximal to robust setae, 2 denticles between robust setae, one denticle distal to robust setae; propodus narrowing distally to insertion of dactylus, with 1 robust seta, with fine crenate ridge. *Pereopod II* basis with crenate ridge. *Pereopods V and VI coxae* lateral margin smooth, VII with single denticle.

*Female operculum* distal part tapering with concave distolateral margins, width 0.90 length.

*Uropods* on lateral margin of pleotelson.

*Size.* Largest female 1.31 mm.

**Distribution.** Known only from the type locality.

**Remarks.** *Austronanus gelidus* sp. nov. differs from other species with evenly convex lateral margins of the head, as discussed above under *A. dubius*.

***Austronanus mawsoni* sp. nov.**

(Figs 11–12)

**Etymology.** The species is named after Sir Douglas Mawson, Australia's pre-eminent Antarctic explorer.

**Material examined**

*Holotype.* Adult ♀, 1.35 mm, Antarctica, Davis Station, 68°34.5'S, 77°53'E, Site C, 25 January 1982, M. Tucker, NMV J4774.

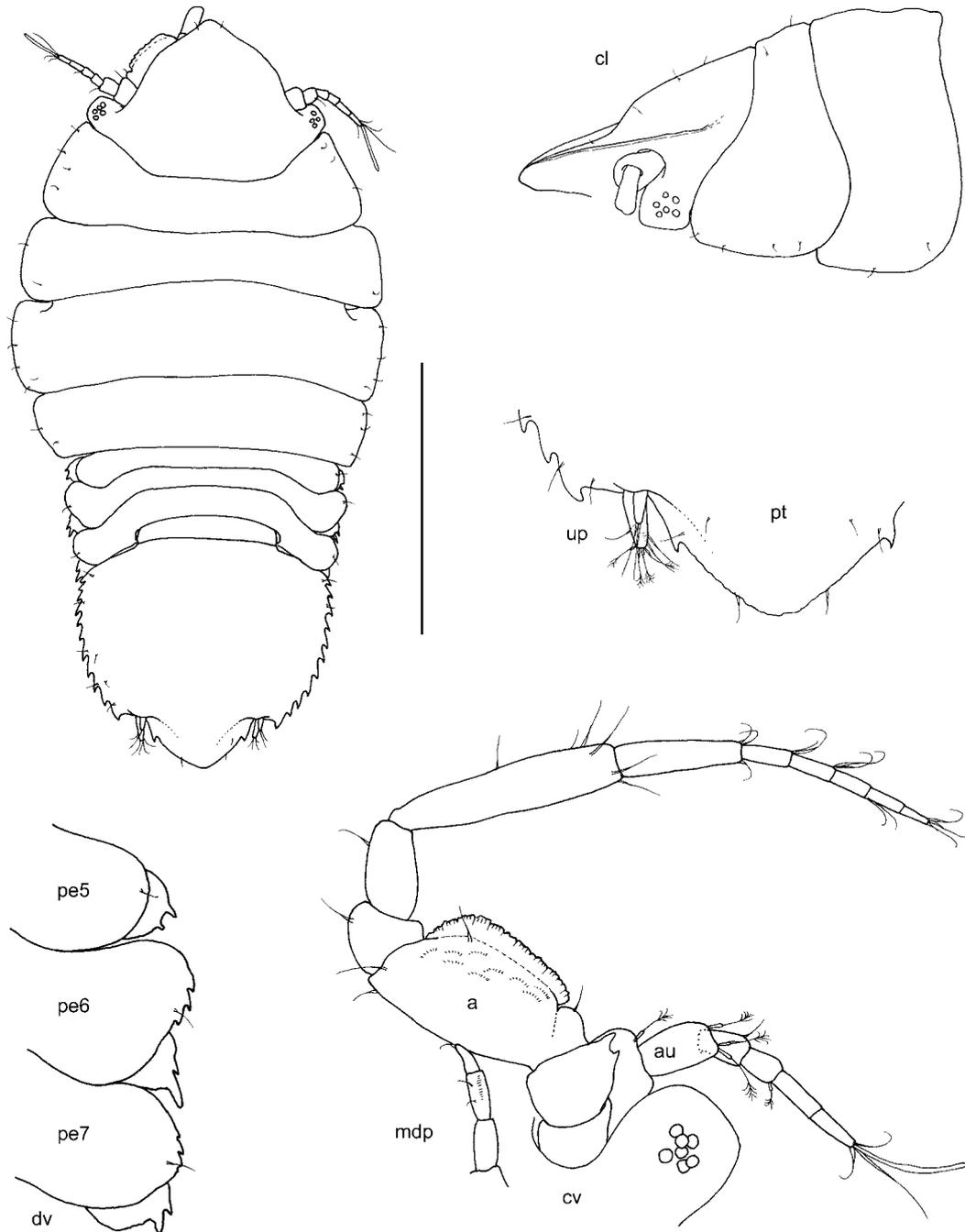
*Paratypes.* Same data as holotype, NMV J53233 (♀B).

**Description.** *Body* width 0.48 length in female, widest at pereonite 3. *Head* length 0.48 width; length posterior to eyestalks 0.65 anterior length. *Frontal margin* lobe length 0.40 head length; apex bluntly angular in dorsal view, margin adjacent to apex concave, sinuous. *Eyestalks* lateral apex somewhat flattened, long axis angling forward at approximately 40°.

*Pereonite* lateral margin 1–4 linear, 5–7 rounded. Pereonite 5 in dorsal view distinctly narrower than pereonites 4 and 6. Pereonite lateral margins 6–7 finely denticulate.

*Pleon* length 1.0 width. Pleonite 1 width 1.1 distance between uropods. Pleonite 1 length 0.2 width. *Pleotelson* proximal margin length shorter than lateral margin length forming 60° angle with medial axis of pleon; lateral margins denticulate, with 11 denticles

per side, length of denticles subequal except for small anterior and single large posterior ones; posterior margin in female forming  $100^\circ$  angle, with single denticle each side.

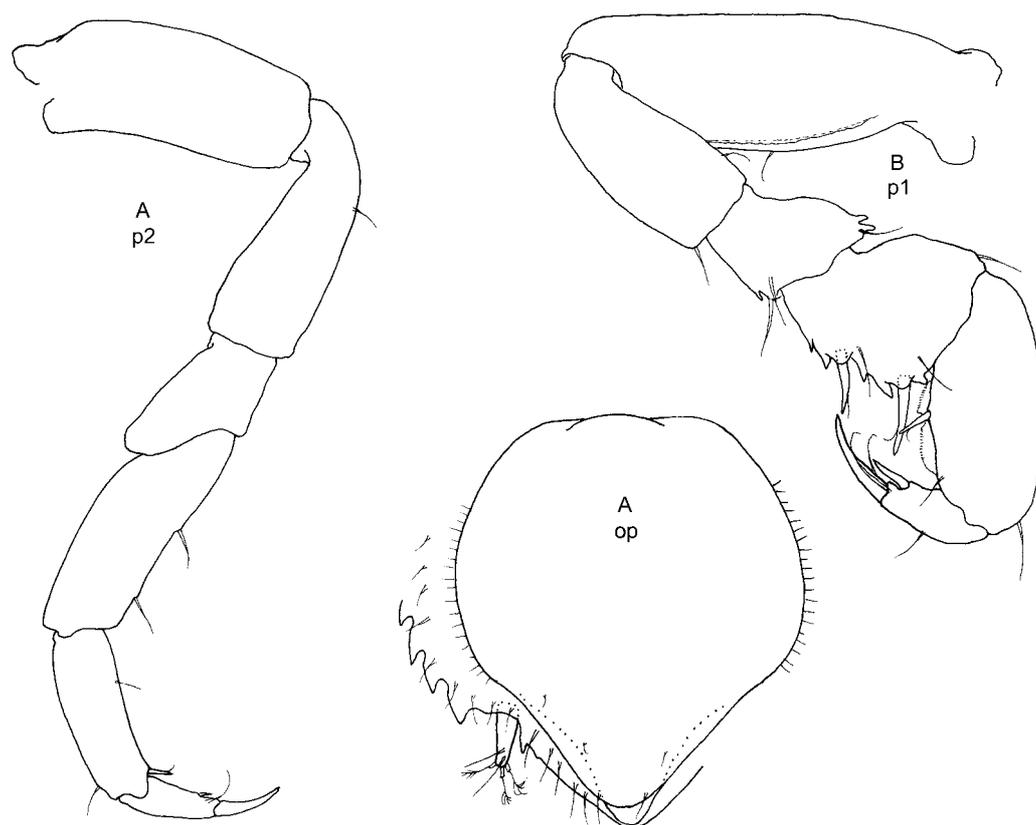


**FIGURE 11.** *Austronanus mawsoni*, sp. nov. Holotype, female. **a**, antenna; **au**, antennula; **cl**, lateral view of head; **cv**, ventral view of head; **dv**, dorsal view; **mdp**, mandible palp; **pe5-7**, pereonites 5-7 with coxae; **pt**, pleotelson; **up**, uropod. Habitus scale bar: 0.5 mm.

*Antennula* articles 1–2 combined extending beyond eyestalk apex; article 1 length subequal to 2, broader than 2, inflated; article 2 with distoventral projection, distal articles inserting dorsally; 5–6 of subequal length, longer than articles 3–4.

*Antenna* article 2 lateral margin with two spines (proximal spine smaller); article 3 in ventral view inflated midlength, margins curved, width 0.50 length, with crenate flange on lateral margin, broad (width near length of small setae), with distinct scalloping; article 5 distinctly longer than article 4; *flagellum* with 6 articles, proximal article 2.7 length of second article.

*Pereopod I* basis with low crenate ridge on anterior margin, length 3.3 width; merus with 2 spines on anterior margin, 1 spine on posterior margin; carpus distal width 1.0 posterior margin length; posterior margin with 2 denticles proximal to robust setae, 2 denticles between robust setae, one denticle distal to robust setae; propodus narrowing distally to insertion of dactylus, with 1 robust setae (somewhat proximally), with crenate ridge (fine, divided at level of robust seta). *Pereopods V–VII coxae* lateral margin denticulate, each with 2 denticles of differing lengths.



**FIGURE 12.** *Austronanus mawsoni*, sp. nov. A, holotype, female; B, paratype, female B. **op**, operculum; **p1, 2**, pereopods I, II.

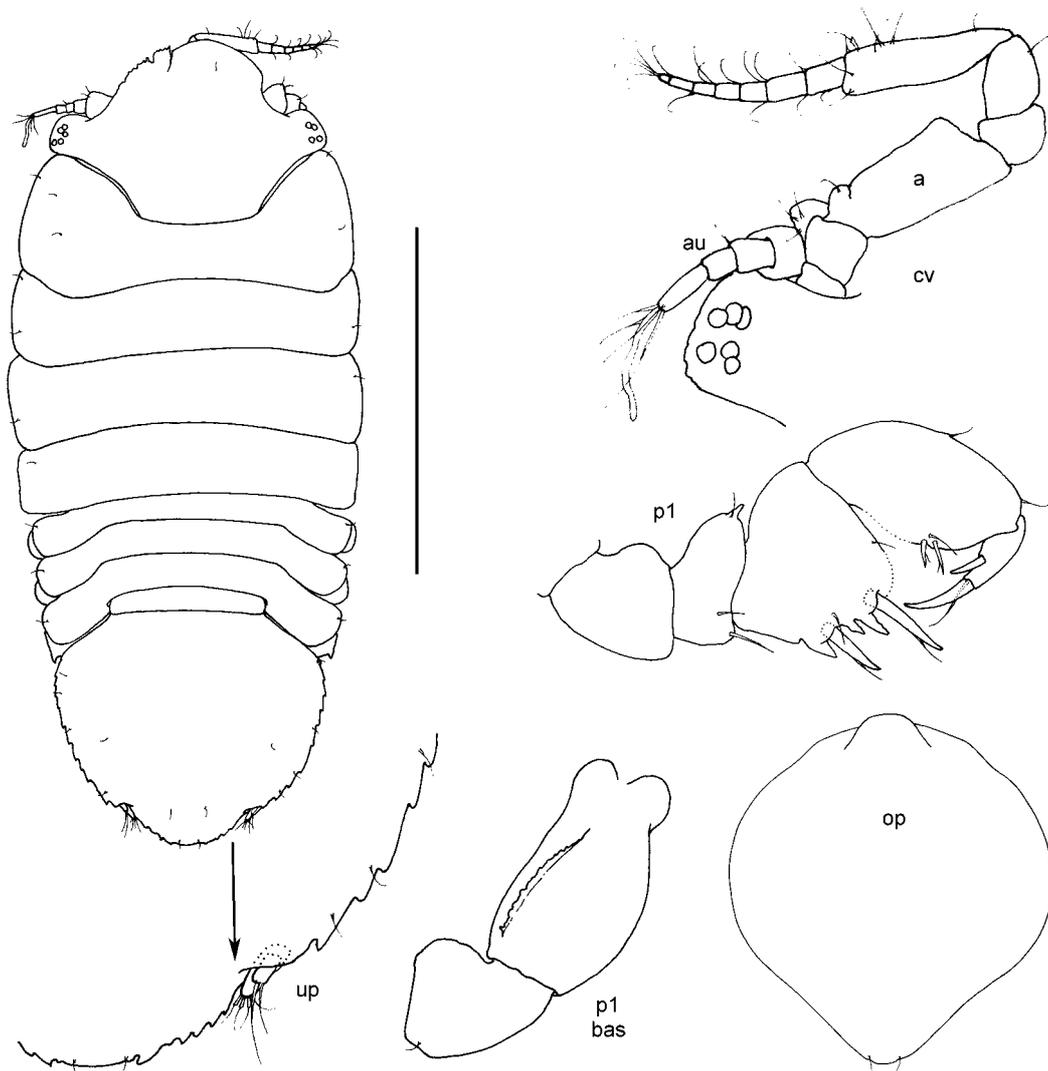
*Female operculum* distal part tapering with concave distolateral margins, width 0.87 length.

*Uropods* on lateral margin of pleotelson.

*Size.* Largest female 1.35 mm.

**Distribution.** Known only from the type locality.

**Remarks.** *Austronanus mawsoni* sp. nov. shares with *A. glacialis* and *A. aucklandensis* a rounded apex of the head and sinuous lateral margins. *Austronanus aucklandensis* has only 5 articles in the antennulae as opposed to 6 in *A. mawsoni*. Differences between *A. mawsoni* and *A. glacialis* are discussed under *A. glacialis*.



**FIGURE 13.** *Austronanus* specimen A. **cv**, ventral view of head; **bas**, basis; **op**, operculum; **p1**, pereopod I; **up**, uropod. Habitus scale bar: 0.5 mm.

***Austronanus* specimen A**

(Fig. 13)

**Material examined.** Ovigerous ♀, 1.20 mm, Campbell Island, New Zealand, off Boulder Beach, Smoothwater Bay, 52°32'S 169°12'E, sediment and terrestrial fibrous root detritus, 15 January 1980, P.C. Terrill, CA-172, AM P68206.

**Remarks.** The single specimen has a damaged head; parts of pereopod I, and all other pereopods are missing. It appears to be close to the new species *Austronanus aucklandensis* described above, including a 5-segmented antennula, but the shape of the frontal margin of the head differs, to judge from the undamaged parts, the body is slightly broader, the uropods are shorter, and the female operculum is more pointed.

By analogy with the presence of closely related paramunnid species on the various subantarctic islands documented by Just and Wilson (2004), *Austronanus* specimen A probably represents a separate, new species, but the specimen is not suitable for description.

***Xigonus* gen. nov.**

**Type species.** *Paramunna patagoniensis* Winkler, 1994, here designated.

**Species included.** *Xigonus patagoniensis* (Winkler, 1994) comb. nov.

**Etymology.** The genus name is a random selection of letters.

**Diagnosis.** *Body* slender ovate, greatest width less than 50% length. Protruding *frontal margin* of head angular with rounded mid point, dorsally upcurving anteriorly, without lateral corners but indented at antennular insertion, anterior rim dorsoventrally thin, pointed in lateral view. *Pereopod I* carpus triangular. *Coxa I* with triangular forward projection. *Coxae II–VII* simple rings without denticles. *Pereonites 5–7* lateral margins not projecting, coxae visible in dorsal view. *Pleotelson* tapering, proximal margin distinctly shorter than lateral margin, lateral margins smooth.

**Remarks.** For differences between *Xigonus*, *Austronanus* and *Stephenseniellus* see remarks under *Austronanus*.

***Xigonus patagoniensis* (Winkler, 1994), comb. nov.**

(Figs 14–15)

*Paramunna patagoniensis* Winkler, 1994: 268, figs 21–24.

**Remarks on type material.** The holotype is a heavily dissected female without head. ZMB 4189 and 4190 also listed by Winkler may refer to slides of the holotype that we have not seen. Winkler (1994) listed as paratypes 'Males and females from stations HA,

HZ and HDD, ZMB 4191-4197, and 26931'. In addition, he listed 49 specimens from a variety of stations as additional material. We have examined the holotype (stn HZ), a male labelled paratype without further data, and 18 specimens from stns HZ and HDD. All specimens examined were under a common label marked 'Type material'. We consider the male and the 18 specimens to be paratypes. We have not examined the specimens listed by Winkler as additional material.

#### Material examined

*Holotype.* ♀, 1.07 mm (measurement according to Winkler 1994: 268), Chile, Magellan Strait, 51°32.2'S 69°00.7'W, 12 m, grey fine sand, April 1976, V.A. Gallardo, stn HZ, ZMB 26931.

*Paratypes.* All ZMB 26931. Same data as holotype, stn HZ2.0.25.F, 1 fully developed ♀, 12 specimens mostly small juveniles). Chile, Magellan Strait, 52°20.8'S 68°49.0'W, 17–21 m, (sediment not known), April 1976, V.A. Gallardo, stn HDD.0.25.F, (♀A, 1.06 mm, one ♀, 3 juveniles). Chile, Magellan Strait (no further data, but possibly from stn HA), (1 ♂B, 0.76 mm).

**Description.** *Body* width 0.38 length in female, 0.36 length in male, widest at pereonite 2 or 3. *Head* significantly elongate in male, length 0.88 width, 0.80 in female; length posterior to eyestalks 0.76 anterior length in female, 0.92 in male. *Frontal margin* lobe length 0.25 and 0.33 head length (♂, ♀); apex bluntly angular in dorsal view, margin adjacent to apex linear, not sinuous. *Eyestalks* lateral apex rounded, globular, long axis angling forward at approximately 30° in female, 20° in male.

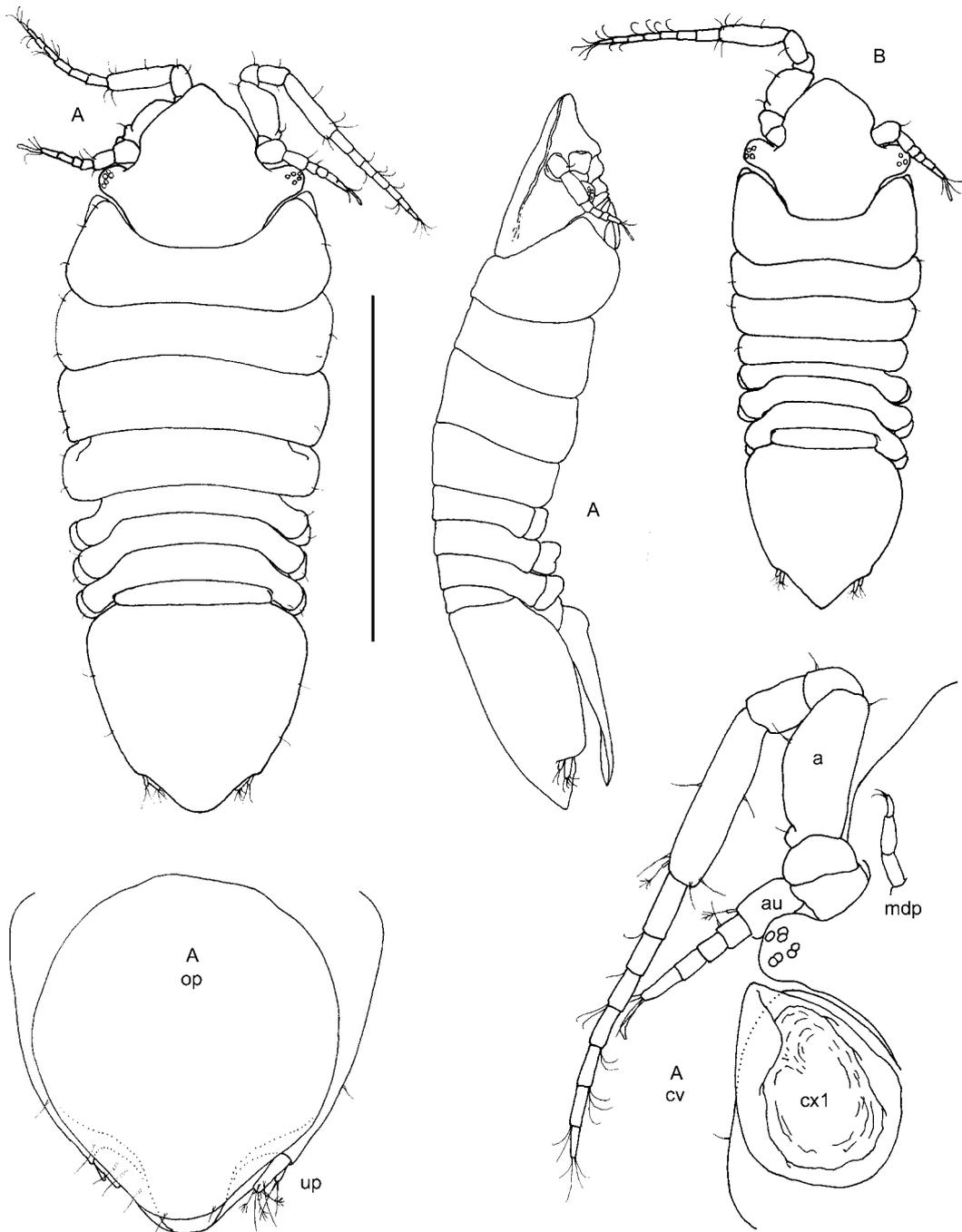
*Pereonite lateral margin* 1 linear, 2–7 rounded.

*Pleon* length 0.95 width in female, 0.88 width in male. *Pleonite 1* width 1.3 and 1.5 distance between uropods (♂, ♀); length 0.16 and 0.21 width (♂, ♀). *Pleotelson* proximal margin length shorter than lateral margin length. Pleotelson rounded anteriorly, tapering posteriorly; proximal margin in dorsal view forming 55° angle with medial axis of pleon; lateral margins smooth; posterior margin in female forming 100° angle, in male 90° angle (distinctly pointed in male).

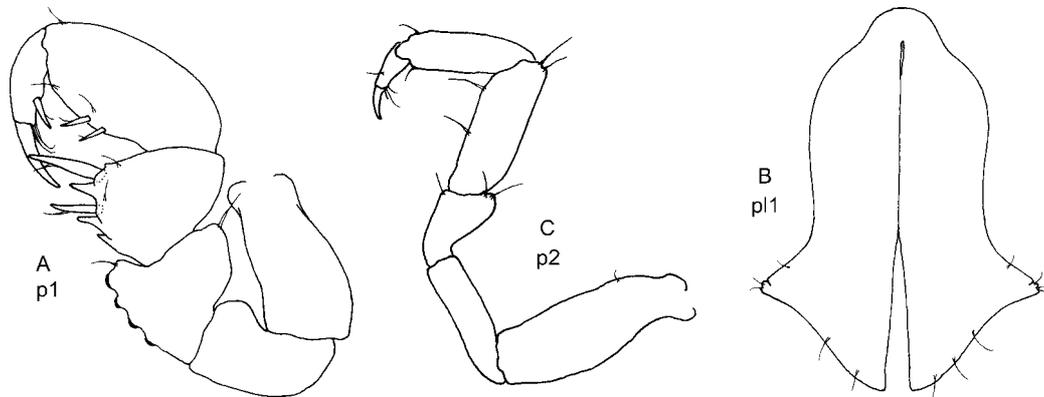
*Antennula* articles 1–2 combined extending beyond eyestalk apex; article 1 length subequal to 2, inflated, broader than 2; 5–6 of subequal length, longer than articles 3–4.

*Antenna* article 3 in ventral view lateral margin curved, medial margin straight, width 0.45 length; article 5 only slightly longer than article 4; *flagellum* with 7 articles, proximal article 1.5 length of second article.

*Pereopod I* coxa with anterolateral lobe visible in dorsal view; basis anterior margin smooth, length 2.0 width; ischium anterodistal margin with robust bulge; merus with row of low rounded tubercles on posterior margin (4 in female A, Fig.15); carpus short and broad, near same size as merus, distal width 1.2 posterior margin length, posterior margin with 2 denticles proximal to robust setae, 1 denticle between robust setae; propodus narrowing distally to insertion of dactylus, with 2 robust setae at approximately midlength.



**FIGURE 14.** *Xigonus patagoniensis*. A, paratype, female A; B, paratype male B. **a**, antenna; **au**, antennula; **cv**, ventral view of head; **cx1**, coxa I; **mdp**, mandible palp; **op**, operculum; **up**, uropod. Habitus scale bar for all three: 0.5 mm.



**FIGURE 15.** *Xigonus patagoniensis*. A, paratype, female A; B, paratype male B; C, paratype, ovigerous female. **p1, 2**, pereopod I, II; **pl1**, pleopod I.

*Male pleopods I* lateral lobes distinctly projecting from midlateral margin, width 0.4 distance to midline; distal projection length 0.36 pleopod total length, forming approximately 110° angle, with rounded apices. *Female operculum* ovoid, width 0.90 length.

*Uropods* ventral to lateral margin of pleotelson, but visible in dorsal view.

*Size.* Largest female 1.07 mm, largest male 0.76 mm.

**Distribution.** Magellan Strait, Chile, 12–21 m.

**Remarks.** Our rendition of this species differs from Winkler's (1994, figs 21–24) in some details. Winkler (fig. 21) showed pointed anterior corners of pereonite 1, but did not discriminate between that segment and the protruding coxa of pereopod I; he showed pereonites 5–7 without dorsally visible coxae; and the first pleonite is shown much narrower than in our Fig. 14A and B.

### ***Stephensiellus* gen. nov.**

**Type species.** *Stephensiellus palliolatipes* sp. nov., here designated.

**Species included.** *Stephensiellus palliolatipes* sp. nov., *S. serraticornis* sp. nov.

**Etymology.** The genus is named in honour of renowned Danish carcinologist Dr K. Stephensen.

**Diagnosis.** *Body* broadly ovate, greatest width 50% length or more. Protruding *frontal margin of head* evenly convex, dorsally upcurving anteriorly, without lateral corners but indented at antennular insertion, anterior rim dorsoventrally thin, pointed in lateral view. *Antennula* with 5 articles. *Pereopod I* carpus triangular. *Pereonites 5–7* lateral margins angular, not projecting over coxae, with several robust setae on margin. *Coxa* pereopod I

with rounded lateral projection; coxae pereopods V–VII visible in dorsal view, angular and projecting (weakly developed in male of *S. palliolatipes*), without lateral denticles, with single apical robust seta. *Pleotelson* proximal margin of subequal length to lateral margin, with denticles mainly on mid lateral curvature.

**Remarks.** *Stephensiellus* differs from *Austronanus* and from *Xigonus* in having the front margin of the head evenly convex without an angled midpoint, laterally projecting coxae 1 and 5–7 (but note similar coxae V–VII in *A. dentatus*), and a pentagonal pleotelson with denticles on the midlateral bulges only.

***Stephensiellus palliolatipes* sp. nov.**

(Figs 16–18)

**Etymology.** The epithet is derived from the Latin *palliolatus* (with a hood) and *pes* (foot), alluding to the pleotelson hoods covering part of the uropods.

**Material examined**

*Holotype.* ♂, 1.27 mm, Handspike Point, Macquarie Island, 54°30'S 158°53'E, holdfasts of *Durvillea antarctica*, intertidal zone, D.S. Horning and J.K. Lowry, 21 December 1977, stn MA-135, NMV J52115.

*Paratypes.* same data as holotype: NMV J52098 (♀B, 1.42 mm), J53234 (1 ♂), AM P60884 (♀C, 1 ♀).

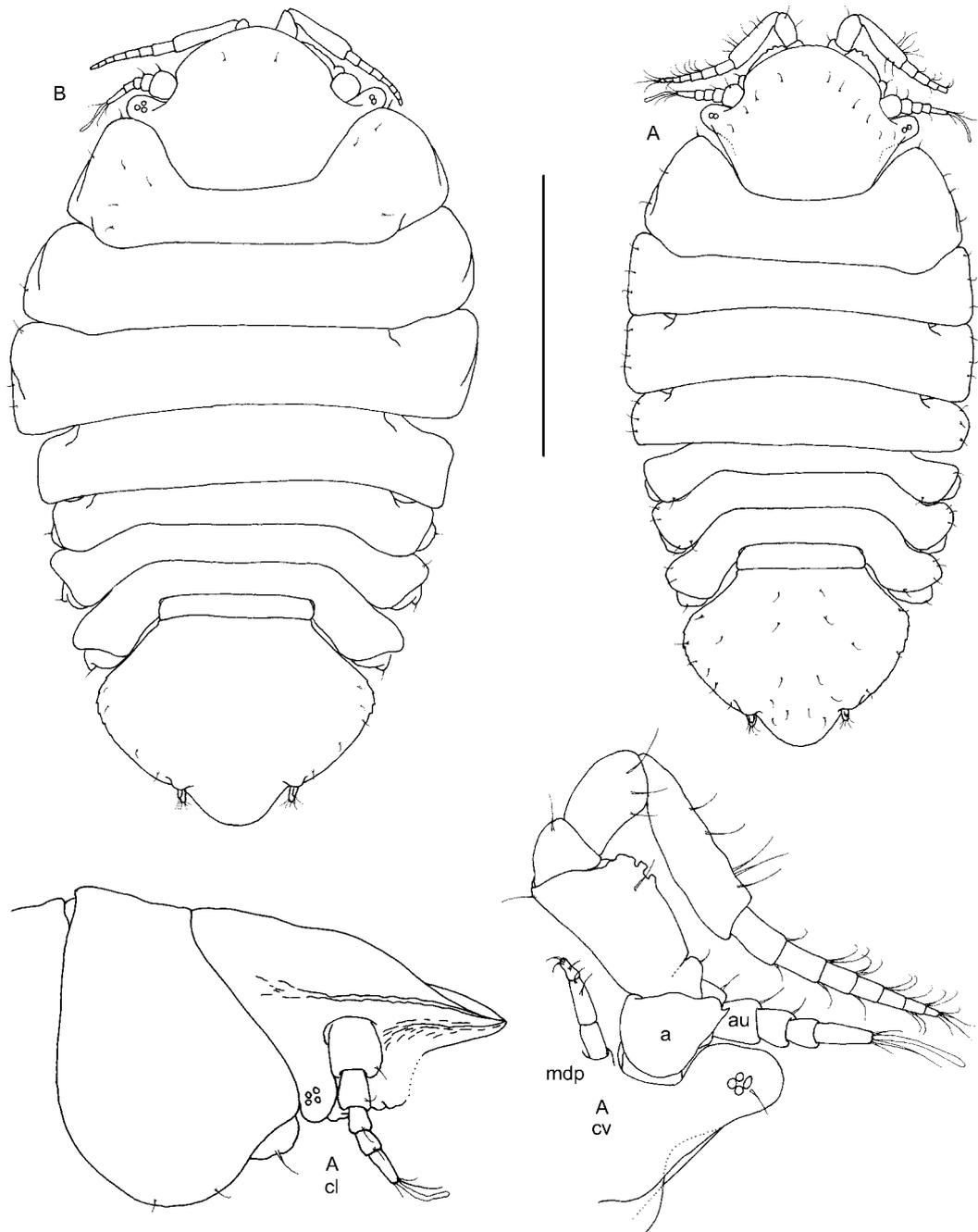
**Description.** *Body* width 0.57 length in female, 0.50 length in male, widest in female at pereonite 3, in male at pereonite 2 or 3. *Head* length 0.63 and 0.72 width (♀, ♂); length posterior to eyestalks 1.0 anterior length in female and male. *Frontal margin* lobe length 0.30 head length (♂, ♀); apex broadly rounded in dorsal view. *Eyestalks* lateral apex broadly rounded, long axis angling forward at approximately 30° in female, 20° in male, posterolateral margin of eyestalk indented under dorsal surface of head in male.

*Pereonite* lateral margin 1–3 linear, 4 rounded (linear in female), 5–7 angular and projecting in female, more rounded in male.

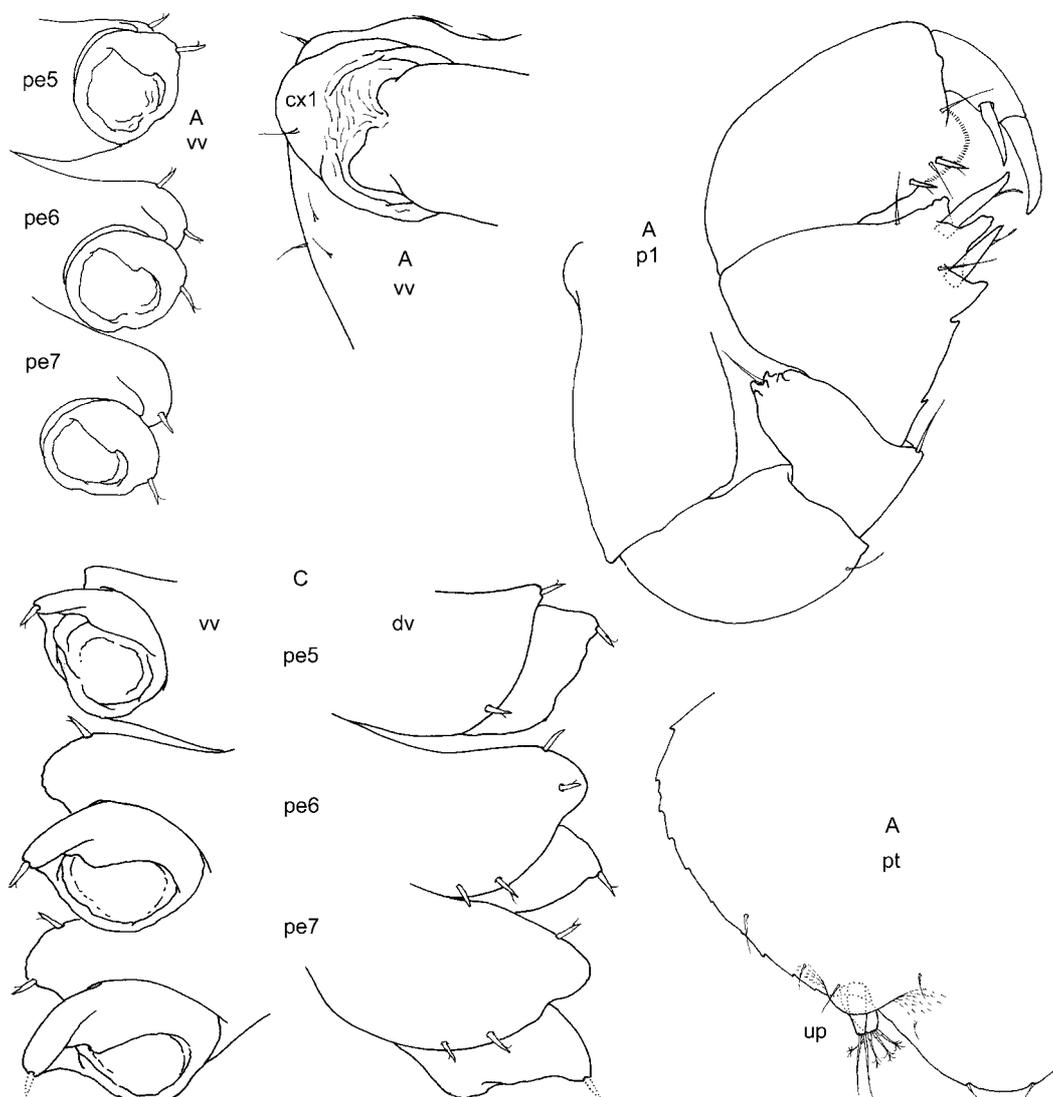
*Pleon* length 0.84 width in female, 0.90 in male. *Pleonite 1* width 1.2 distance between uropods, length 0.15 width. *Pleotelson* proximal margin length subequal to lateral margin length. Pleotelson laterally produced, inflection near middle of lateral margin; proximal margin in dorsal view forming 45° angle with medial axis of pleon; lateral margins denticulate, with 4–8 denticles per side, low, elongate, angled posteriorly, best expressed on lateral corners; posterior margin forming 105° angle.

*Antennula* articles 1 and 2 combined shorter than eyestalk; article 1 longer and broader than 2, inflated; distal article 5 length subequal to articles 3 and 4 combined.

*Antenna* article 2 lateral margin with single spine; article 3 in ventral view inflated midlength, lateral margin curved, medial margin straight, width 0.57 length, with coarse crenate flange only on distolateral margin, article 5 only slightly longer than article 4; *flagellum* with 7 articles, proximal article subequal to more distal articles.



**FIGURE 16.** *Stephenseniellus palliolatipes*, gen. nov., sp. nov. A, holotype, male; B, paratype, female B; C, paratype, female C. **a**, antenna; **au**, antennula; **cl**, lateral view of head; **cv**, ventral view of head; **mdp**, mandible palp. Habitus scale bar for both: 0.5 mm.

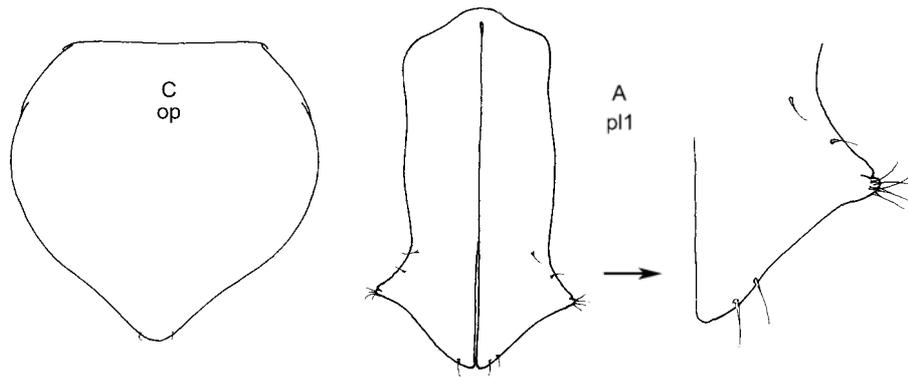


**FIGURE 17.** *Stephensiellus palliolatipes*, sp. nov. A, holotype, male; C, paratype, female C. **cx1**, coxa I; **dv**, dorsal view; **p1**, pereopod I; **pe5-7**, pereonites 5-7 with coxae; **pt**, pleotelson; **up**, uropod; **vv**, ventral view.

*Pereopod I* coxa with short lateral lobe; basis anterior margin smooth, length 1.8 width; merus with several spines on anterior margin (5 low denticles in holotype); carpus distal width 1.0 posterior margin length, with 3 denticles proximal to robust setae (proximal 2 spines low, angled distally), one massive denticle between robust setae, one denticle distal to robust setae; propodus distally broad and tapering steeply to insertion of dactylus, with 2 robust setae, with crenate ridge (with fine margin, placed distally).

*Pereopod V–VII* coxae lateral margins angular and projecting (projecting more in female than male), with single apical robust seta.

*Male pleopods I* lateral lobes distinctly projecting from midlateral margin, width 0.34 distance to midline; distal projection length 0.20 pleopod total length, approximately forming right angle, with pointed apices. *Female operculum* distal part tapering with concave distolateral margins, width 1.00 length.



**FIGURE 18.** *Stephenseniellus palliolatipes*, sp. nov. A, holotype, male; C, paratype, female C. **op**, operculum; **pl1**, pleopod I.

*Uropods* on lateral margin of pleotelson, covered by small dorsal cuticular hood.

*Size* Largest female 1.42 mm, largest male 1.27 mm.

**Distribution.** Macquarie Island, Australia, intertidal.

**Remarks.** *Stephenseniellus palliolatipes* sp. nov. differs from *S. serraticornis* sp. nov. (see below) primarily in possessing a cuticular hood over the uropods (*S. serraticornis*, simple insertion), in having a rudimentary lateral flange on article 3 of the antennae (strongly serrate), and in its shorter, straight eyestalks (elongate, curved).

***Stephenseniellus serraticornis* sp. nov.**

(Fig. 19)

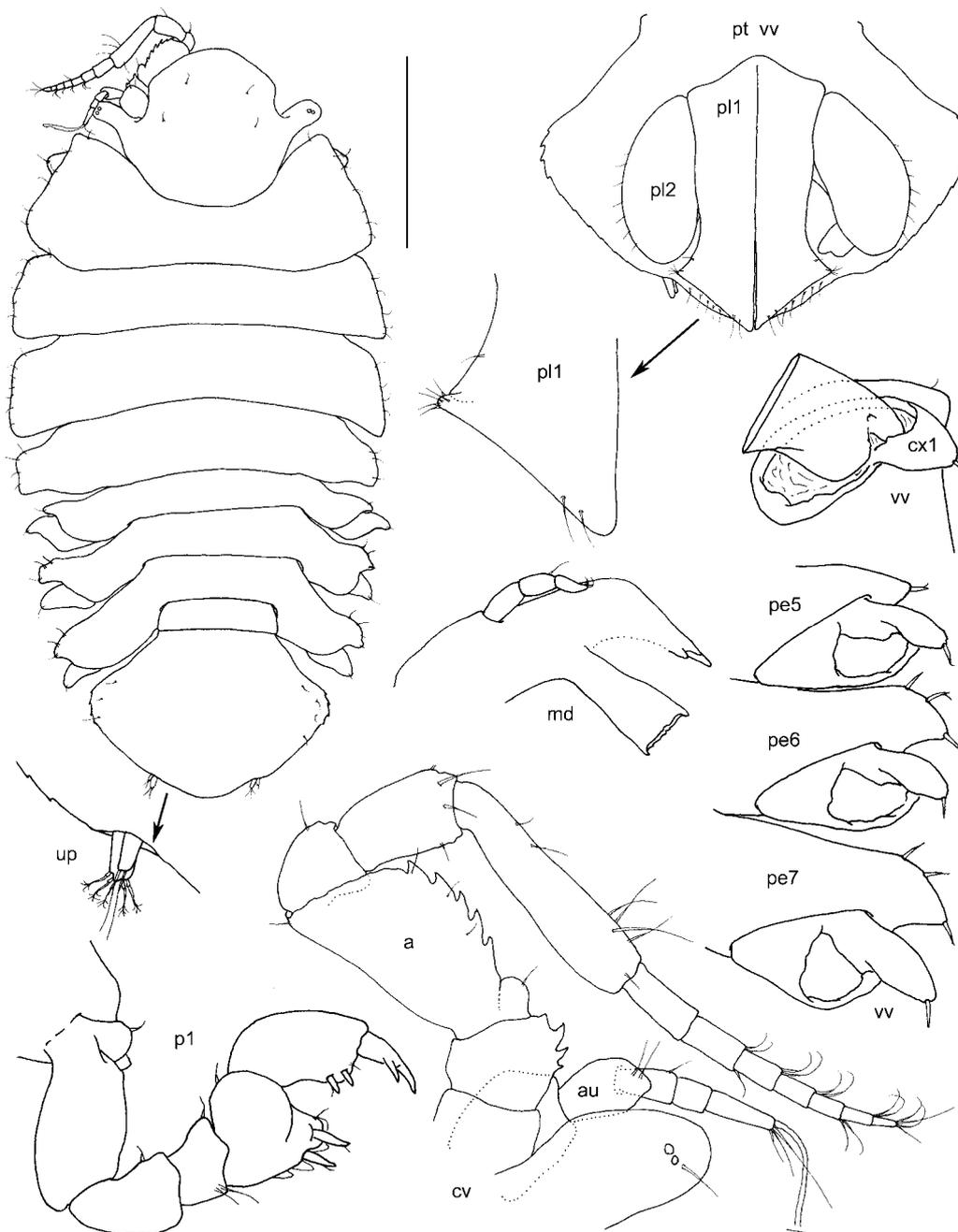
*Paramunna (serrata* (Richardson) ?).– Stephensen, 1927: 359, fig. 25.

**Etymology.** The species name is derived from the Latin *serratus* (with teeth) and *cornu* (horn, traditionally used for the antennae) alluding to the row of strong denticles on the lateral margin of article 3 of the antennae.

**Remarks on type material.** The holotype lacks all pereopods. Stephensen (1927, fig. 25P1) illustrated pereopod I; we have redrawn his illustration in our Fig. 19 pl1.

**Material examined**

*Holotype*. ♂, 1.9 mm, Carnley Harbour, Auckland Island, New Zealand, on the shore under stones at low tide, 29 November 1914, ZMUC-CRU-4920.



**FIGURE 19.** *Stephensiellus serraticornis*, sp. nov. Holotype, male. **a**, antenna; **au**, antennula; **cv**, ventral view of head; **cx1**, coxa I; **md**, mandible; **pe5-7**, pereonites 5-7 with coxae; **p1**, pereopod I (redrawn from Stephensen, 1927: 360, fig. 25), **pl1-2**, pleopods I, II; **pt**, pleotelson; **up**, uropod; **vv**, ventral view. Habitus scale bar: 0.5 mm.

**Description.** *Body* widest in male at pereonite 2 or 3. *Head* length 0.70 width; length posterior to eyestalks 1.3 anterior length. *Frontal margin* lobe length 0.30 head length; apex broadly rounded in dorsal view. *Eyestalks* lateral apex broadly rounded, shaft curving posteriorly, long axis angling forward 35° in male.

*Pereonite* lateral margin 1–4 linear, 5–7 angular, not projecting over coxae, with posterior concavity. Pereonite 5 in dorsal view distinctly narrower than pereonites 4 and 6. Pereonite 5–7 lateral margins with robust setae.

*Pleon* length 0.84 width in male. *Pleonite 1* width 1.1 distance between uropods, length 0.3 width. *Pleotelson* proximal margin length subequal to lateral margin length; laterally produced, inflection near middle of lateral margin; proximal margin in dorsal view forming 45° angle with medial axis of pleon; lateral margins denticulate, denticles largest at rounded corners, low denticles more posteriorly, with 4 denticles per side, several additional fine denticles more posteriorly; posterior margin in male forming 135° angle, set apart from lateral margins by slight concavity at level of uropods.

*Antennula* with 5 articles; articles 1 and 2 combined shorter than eyestalk; article 1 longer and broader than 2, inflated; article 2 with distoventral projection, distal articles inserting dorsally; distal article 5 shorter than articles 3 and 4 combined.

*Antenna* article 2 lateral margin with 4 denticles, 2 larger plus 2 smaller; article 3 in ventral view inflated midlength, lateral margin curved, medial margin straight, width 0.67 length, lateral margin with 5 coarse denticles; article 5 only slightly longer than article 4; *flagellum* with 7 articles, proximal article 1.4 length of second article.

*Pereopod I* coxa with lateral lobe visible in dorsal view; basis anterior margin smooth, length 1.85 width; carpus distal width 1.0 posterior margin length, posterior margin with 2 denticles proximal to robust setae, one denticle between robust setae, one denticle distal to robust setae (broad flange-like); propodus distally broad and tapering steeply to insertion of dactylus, with 2 robust setae. *Pereopods V–VII coxae* lateral margins angular and projecting, with posterior concavity, with single apical robust seta.

*Male pleopods I* lateral lobes distinctly projecting from midlateral margin, width 0.3 distance to midline; distal projection length 0.22 pleopod total length, forming approximately 100° angle, with pointed apices.

*Uropods* on lateral margin of pleotelson.

*Size.* Largest male 1.90 mm.

**Distribution.** Auckland Island, New Zealand, intertidal.

**Remarks.** See Remarks above under *Stephensiellus palliolatipes* sp. nov. for comparison with that species.

## CONCLUSIONS

Species in the *Austronanus* complex appear to be confined to Southern Hemisphere Antarctic and subantarctic waters, thus supporting the conclusion by Wilson (1980) and

Just and Wilson (2004: 459) that the Paramunnidae is overwhelmingly comprised of Southern Hemisphere temperate to cold-water species. If our view on the species composition of *Austronanus* is correct, this complex exhibits the same pattern found in the *Paramunna* complex (Just & Wilson 2004), namely clusters of closely related species with discrete and narrow distributions. Having been reported from the Magellanic region of South America, the Falkland Islands and the Subantarctic and Antarctica south of Australia and New Zealand, we expect that the *Austronanus* complex is circum-Antarctic.

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