

AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Lowry, J. K., 1984. Systematics of the pachynid group of lysianassoid Amphipoda (Crustacea). *Records of the Australian Museum* 36(2): 51–105. [15 June 1984].

doi:10.3853/j.0067-1975.36.1984.325

ISSN 0067-1975

Published by the Australian Museum, Sydney

nature culture **discover**

Australian Museum science is freely accessible online at
www.australianmuseum.net.au/publications/
6 College Street, Sydney NSW 2010, Australia



Systematics of the Pachynid Group of Lysianassoid Amphipoda (Crustacea)

J. K. LOWRY

Australian Museum, P.O. Box A285, Sydney South, NSW 2000, Australia.

ABSTRACT. A monophyletic group of genera, the pachynid group, is established within the lysianassoid amphipods for genera with an extremely compressed carpus and enlarged propodus on gnathopod 1. Two subgroups within the pachynids are established for genera with smooth or with sculptured spine-teeth on maxilla 1. Four new genera—*Sheardella*, *Drummondia*, *Acheronia* and *Ekelofia*—and 10 new species—*Sheardella kapala*, *S. tangaroa*, *Drummondia corinellae*, *D. parviramus*, *Pachynus pugilator*, *P. denticulatum*, *Figorella tasmanica*, *Acheronia pegasus*, *Pachychelium schellenbergi* and *P. nicholli*—are described. A further 4 genera and 8 species are rediagnosed or redescribed. *Pachychelium mediterraneum* is transferred to *Prachynella* and *Ekelofia* is established for *Pachychelium oculatum*.

LOWRY, J.K., 1984. Systematics of the pachynid group of lysianassoid Amphipoda (Crustacea). Records of the Australian Museum 36(2): 51-105.

CONTENTS

Introduction	52
The Pachynid Group	52
Key to the Genera and Species of the Pachynid Group	53
The Sculptured-toothed Subgroup	54
<i>Sheardella</i> n.gen.	54
<i>Sheardella kapala</i> n.sp.	54
<i>Sheardella tangaroa</i> n.sp.	61
<i>Drummondia</i> n.gen.	61
<i>Drummondia corinellae</i> n.sp.	64
<i>Drummondia parviramus</i> n.sp.	65
<i>Prachynella</i> J.L. Barnard	72
<i>Prachynella lodo</i> J.L. Barnard	72
<i>Prachynella mediterranea</i> (Ruffo)	72
The Smooth-toothed Subgroup	72
<i>Pachynus</i> Bulycheva	72
<i>Pachynus pugilator</i> n.sp.	78
<i>Pachynus chelatum</i> Bulycheva	78
<i>Pachynus barnardi</i> Hurley	78
<i>Pachynus denticulatum</i> n.sp.	84
<i>Figorella</i> J.L. Barnard	86
<i>Figorella tasmanica</i> n.sp.	86
<i>Figorella tanidea</i> J.L. Barnard	92
<i>Acheronia</i> n.gen.	92
<i>Acheronia pegasus</i> n.sp.	93
<i>Ekelofia</i> n.gen.	97
<i>Ekelofia oculata</i> (Schellenberg)	97

<i>Pachychelium</i> Stephensen	99
<i>Pachychelium schellenbergi</i> n.sp.	102
<i>Pachychelium nichollsi</i> n.sp.	103
<i>Pachychelium antarcticum</i> Schellenberg	104
<i>Pachychelium davidis</i> Stephensen	104
Acknowledgements	105
References	105

Pachychelium was originally described by Stephensen (1925) from the Davis Strait west of Greenland. Thirty years later Bulycheva (1955) described *Pachynus* from the Sea of Japan. J. L. Barnard (1962), in his study of the deep-sea amphipods of the South Atlantic Ocean, described *Figorella* from the East Scotia Basin near South Georgia. Soon after, J.L. Barnard (1964) described *Prachynella* from the continental shelf off southern California.

The relationship between these genera has never been fully appreciated and at no time have they been considered as a monophyletic group. Bulycheva (1955) and Gurjanova (1962) both recognized the relationship of *Pachynus* to *Pachychelium*. J.L. Barnard (1962) mentioned some character-states which differentiated *Figorella* and *Pachychelium* and considered the relationship of *Figorella* to *Koroga* Holmes and *Pseudokogora* Schellenberg. Although J.L. Barnard (1964) compared *Prachynella* with *Pachychelium* and *Pachynus* he did not mention his recently described genus *Figorella*. In J.L. Barnard's (1969a) keys to the lysianassoid genera, all of the above-mentioned genera except *Pachychelium* fall out in the same key even though Barnard did not necessarily intend to indicate phylogenetic relationships.

These genera do in fact form a monophyletic group within the lysianassoid amphipods. The groups is characterized by the body form, mouthpart morphology and, most importantly, the peculiar condition of gnathopod 1 in which the carpus is extremely compressed and the propodus is greatly enlarged.

In the collections of the Australian Museum and the Museum of Victoria I have identified 6 species from Australia and New Zealand with gnathopod 1 in this condition, but I could not confidently place any of them in existing genera based on current diagnoses. Consequently I borrowed material of all known species for study. In this paper all known genera in the pachynid group are re-diagnosed on the basis of their type-species. Four new genera and 9 new species are described, and a key to all genera and species is provided.

Material is deposited in the Allan Hancock Foundation, Los Angeles (AHF); the Australian Museum, Sydney (AM); the American Museum of Natural History, New York (AMNH); Museo Civico di Storia Naturale, Verona (MCSN); Museum of Victoria, Melbourne (NMV); National Museum of New Zealand, Wellington (NMNZ); Swedish Museum of Natural History, Stockholm (SMNH); Zoologisches Museum,

East Berlin (ZMB); Zoologisk Museum, Copenhagen (ZMC).

The following abbreviations are used in the figures: A1, 2: antenna 1, 2; G1, 2: gnathopod 1, 2; l: left, r: right; MD: mandible; MX1, 2: maxilla 1, 2; MP: maxilliped; P3-7: pereopod 3-7; T: telson; U1-3: uropod 1-3; UR: urosome.

The Pachynid Group

The pachynid group of genera is a monophyletic group characterized by gnathopod 1, which has a peculiarly compressed carpus and enlarged propodus. The proximal articles of the flagellum of antenna 1 are usually fused and bear rows of aesthetascs; calceoli are never present on either antenna. On the mandible, the molar is always absent, the incisor has a smooth cutting edge, and the left lacinia mobilis and the accessory spines may or may not be present or a serrate blade (lamina dentata) may be present. The mandibular palp is always 3-articulate. On maxilla 1 the inner plate is usually small and may or may not have terminal setae, the outer plate has from 11 to 4 spine-teeth. The palp may be present or absent; if present it bears either terminal articulating spines or setae. The maxillipeds may or may not have inner plates, the outer plates are always at least moderately enlarged and the palp is usually 4-articulate, occasionally 3-articulate. Gnathopod 1 may be subchelate, parachelate or chelate and the palm may be defined by a simple spine, a complex spine, a projecting tooth or not at all, but the carpus is always compressed and the propodus is always enlarged. Gnathopod 2 is a typical lysianassoid mitten which is usually minutely subchelate, but occasionally the dactyl and palm are enlarged. Coxa 4 usually has a well developed posteroventral lobe but occasionally this lobe is absent or poorly developed. Article 4 of pereopods 5 and 6 is usually expanded posteriorly. Uropods 1 and 2 are biramous. Uropod 3 is usually biramous, occasionally uniramous, with the outer ramus always 2-articulate. The telson is small, entire, and slightly broader than long.

The group can be divided into two distinct subgroups: the sculptured-toothed pachynids, which are characterized by a long, thin, straight body with a shallow, horizontal, anthurid-like mouthpart bundle, sculptured spine-teeth on maxilla 1 and elongate, tapering plates

on maxilla 2; and the smooth-toothed pachynids, which are characterized by a stocky, comma-shaped body with a hypognathous, v-shaped mouthpart bundle, smooth spine-teeth on maxilla 1 and short, mainly subquadrate plates on maxilla 2.

As defined in this study the pachynid group is composed of 8 genera: *Sheardella* n.gen., *Drummondia* n.gen., *Prachynella* J.L. Barnard, *Pachynus* Bulycheva, *Figorella* J.L. Barnard, *Acheronia* n.gen., *Ekelofia* n.gen. and *Pachychelium* Stephensen.

Key to the Genera and Species of the Pachynid Group

1. Maxilla 1, outer plate with most spine-teeth sculptured;
maxilla 2 long, thin, tapering distally 2
— Maxilla 1, outer plate with spine-teeth smooth;
maxilla 2 short, plates usually subquadrate, occasionally tapering 7
2. Maxilla 1, palp 2- or 1-articulate with several terminal setae;
uropod 3 uniramous *Sheardella* ... 3
— Maxilla 1, palp absent or vestigial;
uropod 3 biramous, inner ramus may be vestigial 4
3. Maxilla 1, palp 2-articulate *S. kapala*
— Maxilla 1, palp small, 1-articulate *S. tangaroa*
4. Mandible, serrate blade present;
maxilliped, palp 4-articulate *Drummondia* ... 5
— Mandible, serrate blade absent;
maxilliped, palp 3-articulate *Prachynella* ... 6
5. Peraeopods 3 to 7, setae encased in sheaths *D. corinellae*
— Peraeopods 3 to 7, setae not encased in sheaths *D. parviramus*
6. Maxilla 1, outer plate with 10 spine-teeth in a 7/3 formula *P. lodo*
— Maxilla 1, outer plate with 8 spine-teeth in a 5/3 formula *P. mediterranea*
7. Gnathopod 1 with simple or complex spine defining palm 8
— Gnathopod 1 with produced tooth or nothing defining palm 14
8. Maxilla 1, palp present; maxilliped, inner plates present 9
— Maxilla 1, palp absent; maxilliped, inner plates absent *Ekelofia oculata*
9. Antenna 1, flagellum without fused proximal articles bearing aesthetascs
maxilla 1, outer plate with 10 spine-teeth, palp with terminal setae;
gnathopod 1, palm defined by simple spine *Figorella* ... 10
— Antenna 1, flagellum with fused proximal articles bearing aesthetascs; maxilla
1, outer plate with 7–8 spine-teeth, palp with terminal spines; gnathopod 1,
palm defined by complex spine *Pachynus* ... 11
10. Antenna 1, accessory flagellum 1-articulate; maxilla 1, outer plate spine-tooth
formula 6/4; uropod 3, inner ramus shorter than article 1 of outer
ramus *F. tanidea*
— Antenna 1, accessory flagellum 2-articulate; maxilla 1, outer plate spine-tooth
formula 5/5; uropod 3, inner ramus subequal in length to article 1 of
outer ramus *F. tasmanica*
11. Gnathopod 1 subchelate to chelate; peraeopod 7, article 2 about as long as
broad; uropods without denticles 12
— Gnathopod 1 extremely chelate; peraeopod 7, article 2 longer than broad;
uropods with denticles *Pachynus denticulatum*

12. Gnathopod 1 chelate 13
 — Gnathopod 1 subchelate *P. pugilator*
13. Gnathopod 2, article 6 more than twice as long as broad; peraeopod 5, article 4 with postero-proximal corner broadly rounded *P. chelatum*
 — Gnathopod 2, article 6 less than twice as long as broad; peraeopod 5, article 4 with postero-proximal corner narrowly rounded *P. barnardi*
14. Maxilla 1, palp absent; maxilliped, inner plates absent; coxa 4, postero-ventral lobe absent *Pachychelium* ... 15
 — Maxilla 1, palp present; maxilliped, inner plates present; coxa 4, postero-ventral lobe well developed *Acheronia pegasus*
15. Maxilliped, palp 3-articulate 16
 — Maxilliped, palp 4-articulate 17
16. Gnathopod 1, palm defined by well-developed tooth *P. antarcticum*
 — Gnathopod 1, palm without defining tooth *P. davidis*
17. Gnathopod 1, articles 2 and 3 greatly enlarged; peraeopod 7, article 2 with broadly rounded posteroventral corner *P. schellenbergi*
 — Gnathopod 1, articles 2 and 3 not greatly enlarged; peraeopod 7, article 2 with sharply rounded posteroventral corner *P. nicholli*

The Sculptured-toothed Subgroup

Sheardella n.gen.

Diagnosis. Antenna 1, flagellum with fused proximal articles bearing rows of aesthetascs only in reproductive male stage. Mandibles with lacinia mobilis absent, well-developed accessory spines present. Maxilla 1, inner plate subquadrate with several terminal setae; outer plate with 11 spine-teeth (8 sculptured, 3 smooth in a 7/4 formula); palp small, 2- or 1-articulate, with 2 small terminal setae. Maxilla 2 with long, thin, tapering plates; outer plate longer, with medial and terminal setae; inner plate with several terminal setae. Maxilliped, inner plates small, with several apical setae; outer plates large, reaching end of 4-articulate palp. Gnathopod 1 subchelate; palm defined by 2 simple spines. Coxa 4 with well-developed posteroventral lobe. Peraeopods 5 and 6, article 4 expanded posteriorly, with weak postero-proximal shoulder. Peraeonite 5 without posterodorsal tooth. Uropod 3 uniramous.

Type-species. *Sheardella kapala* n.sp.

Etymology. The genus is named after Dr Keith Sheard in recognition of his contribution to the systematics of Australian Amphipoda.

Remarks. *Sheardella* is similar to other sculptured-toothed pachynid genera, *Drummondia* and *Prachynella*, in body shape, the shape of the mouthpart bundle, the absence of the lacinia mobilis and the long slender second maxilla. It differs from them in having a palp on maxilla 1, accessory spines on the mandible and simple teeth defining the palm of gnathopod 1, and

in not having posterodorsal tooth on peraeonite 5 or inner ramus on uropod 3.

Sheardella contains 2 species, *S. kapala* and *S. tangaroa*, which live along the continental shelf and bays of south-eastern Australia.

Sheardella kapala n.sp.

Figs 1-3

Type-material. HOLOTYPE, female, 5.0 mm, AM P32390; 2 PARATYPES, AM P32391; east of Port Jackson, New South Wales, Australia, 33°52'S 151°23'E, epibenthic sled in shelly mud, 80 m, R.T. Springthorpe on FRV *Kapala*, 11 December 1980, Station K80-20-11.

Additional material examined. Two specimens, AM P22895, 2 km E of Long Bay, New South Wales, Australia, 33°58'S 151°17'E, 66 m, Australian Museum Shelf Benthic Survey, 30 July 1973, Station IV. One specimen, AM P24231, E of Malabar, New South Wales, Australia, 33°57'S 151°19'E, Shipek grab, sandy gravel, 92 m, Australian Museum Shelf Benthic Survey, 22 May 1972. Eight specimens, NMV J1702, Bass Strait, Australia, 40°13.8'S 148°39.6'E, epibenthic sled, muddy sand, 60 m, Victorian Institute of Marine Sciences, Cruise 81-T-1 on RV *Tangaroa*, 14 November 1981, BSS Station 165.

Diagnosis. Maxilla 1, palp well-developed, 2-articulate. Gnathopod 1, palm transverse. Gnathopod 2, article 5 about 3 times as long as broad, palm transverse. Peraeopods 5 and 6, article 4 longer than broad, slightly expanded posteriorly.

Description. Holotype female, 5.0 mm. *Antenna 1*: peduncular article 1 about 1.5 times as long as articles 2 and 3 combined, peduncle about 3 times as long as

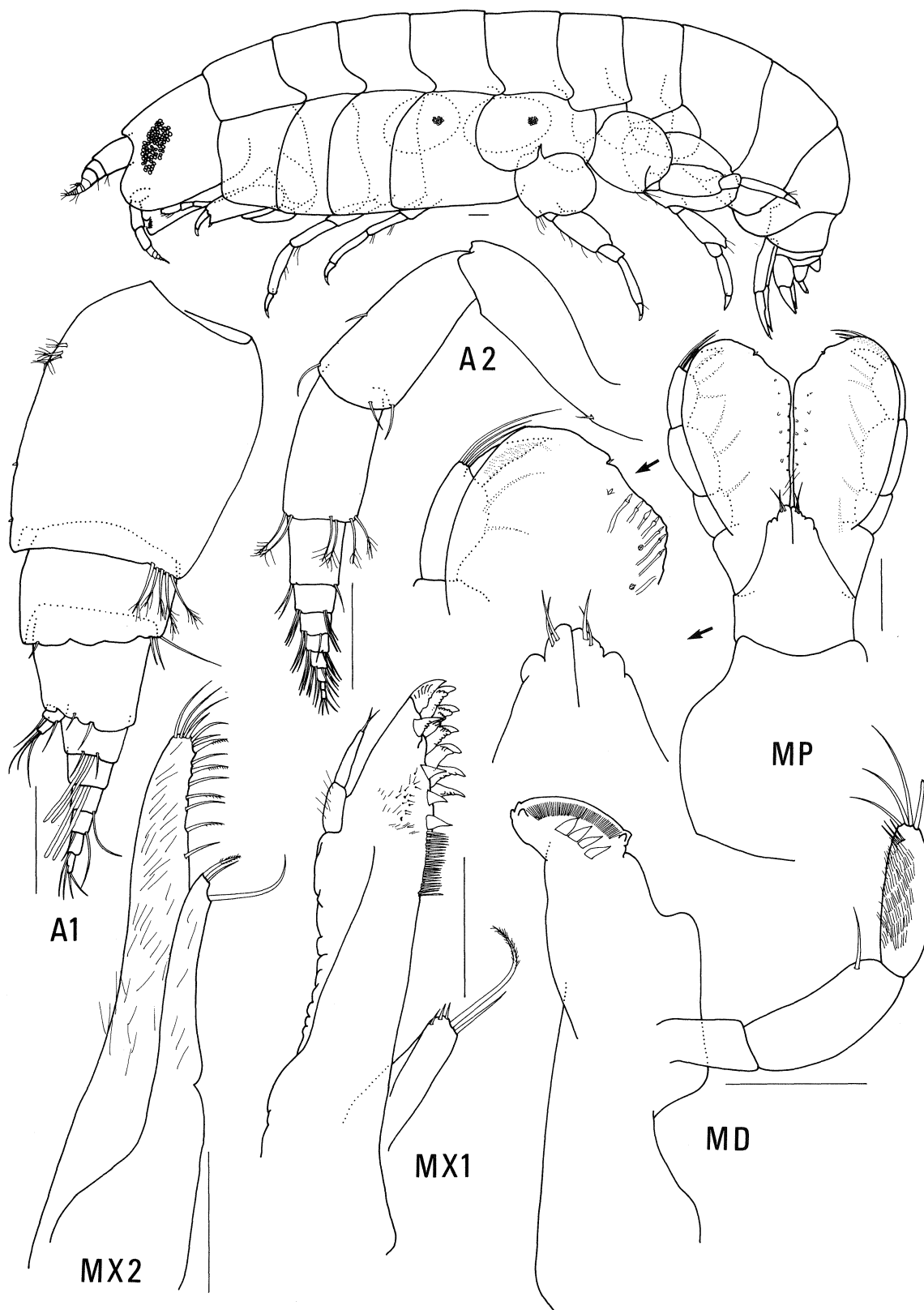


Fig. 1 *Sheardella kapala* n.gen. n.sp., holotype, female, 5.0 mm, E of Port Jackson, New South Wales, Australia. Scale represents 0.1 mm.

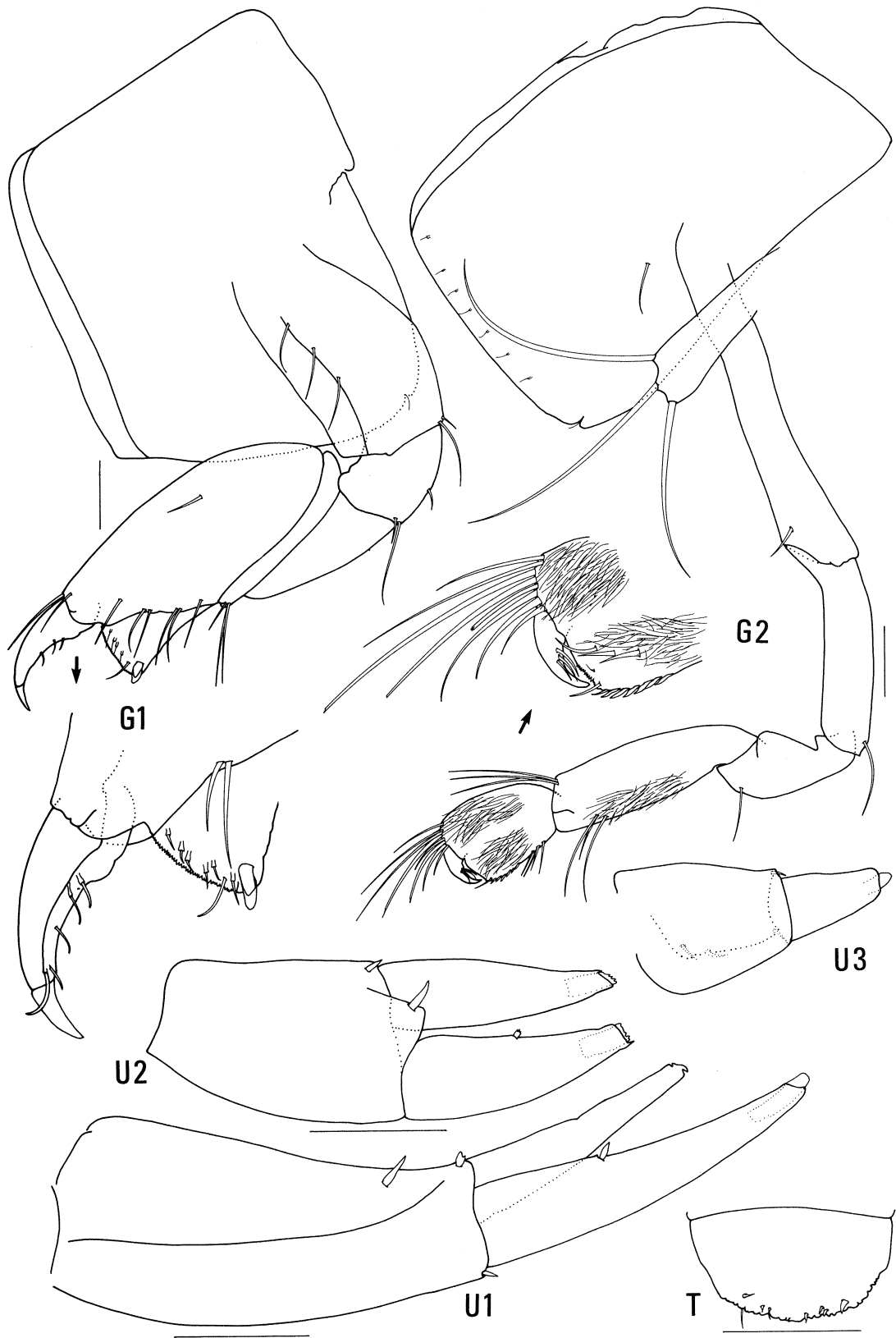


Fig. 2 *Sheardella kapala* n.gen. n.sp., holotype, female, 5.0 mm, E of Port Jackson, New South Wales, Australia. Scale represents 0.1 mm.

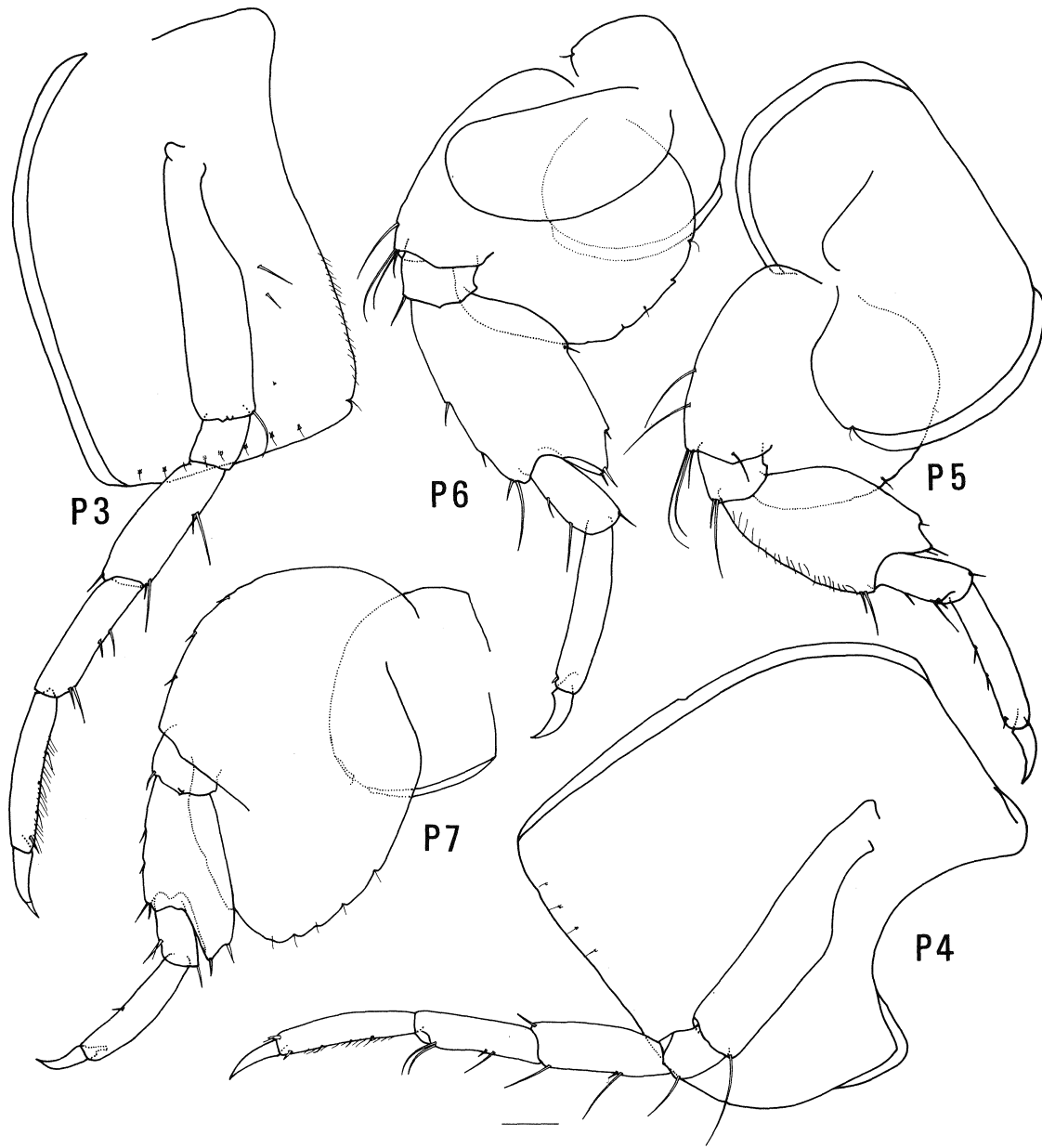


Fig. 3 *Sheardella kapala* n.gen. n.sp., holotype, female, 5.0 mm, E of Port Jackson, New South Wales, Australia. Scale represents 0.1 mm.

flagellum; flagellum 6-articulate; accessory flagellum 2-articulate. *Antenna 2* slightly longer than antenna 1; flagellum 8-articulate.

Mandible: incisor broad with a smooth cutting edge; lacinia mobilis absent; 4 broad accessory spines present; palp attached midway along dorsal margin, article 2 broad, slightly longer than article 3, with 1 mediobasal seta, article 3 with rows of minute hairs and 4 strong apical setae. **Maxilla 1:** inner plate small, narrow, subquadrate, with 1 large apical plumose seta, 1 small apical seta and 3 small subapical setae; outer plate with 11 spine-teeth in a 7/4 formula, and a strong row of short, stout setae; palp small, 2-articulate with 2 small terminal setae. **Maxilla 2** long, thin, tapering distally;

inner plate with 3 terminal setae; outer plate with 8 serrate setae along medial margin and 6 terminal setae. **Maxilliped:** inner plates reduced, each with 2 apical setae; outer plates subovate, large, reaching slightly beyond end of 4-articulate palp.

Gnathopod 1 subchelate, large; coxa subquadrate; article 6 large, nearly 2.5 times as long as broad, palm transverse, defined by 2 broad blunt spines, tip of dactyl slightly overreaching palm. **Gnathopod 2** subchelate; article 5 about 3 times as long as broad; article 6 with transverse palm and a row of about 7 serrate spines along posterodistal margin.

Peraeopod 3: coxa longer than broad, subquadrate; dactyl short. **Peraeopod 4:** coxa as long as broad,

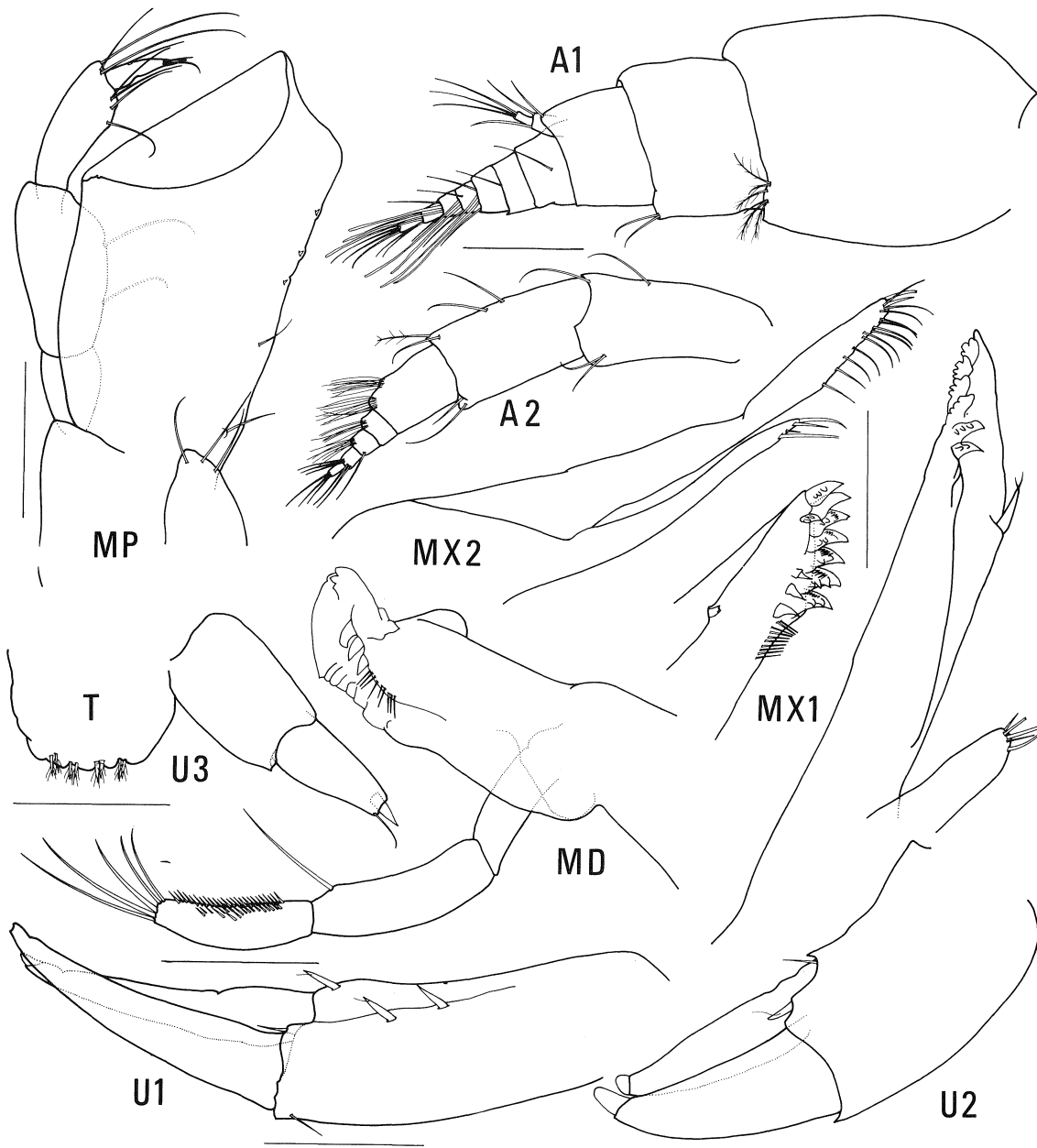


Fig. 4 *Sheardella tangaroa* n.gen. n.sp., holotype, female, 4.0 mm, E of Crib Point, Western Port, Victoria, Australia. Scale represents 0.1 mm.

strongly produced posteroventrally, otherwise similar to peraeopod 3. *Peraeopod 5*: article 2 with posterior margin rounded; article 4 large, slightly expanded posteriorly. *Peraeopod 6*: article 2 with posterior margin rounded; article 4 large, slightly expanded posteriorly. *Peraeopod 7*: article 2 larger than article 2 of peraeopods 5 and 6, subovate posteriorly with a slightly crenulate margin; article 4 narrow with 2 small posterodistal setae.

Uropod 1: peduncle slightly longer than rami; outer ramus longer than inner ramus, with a small mid-dorsal spine. *Uropod 2* shorter than uropod 1; rami subequal in length, outer ramus with small mid-dorsal spine.

Uropod 3 shorter than uropod 2, uniramous; peduncle longer than ramus. *Telson* entire, broader than long, slightly rounded distally with minute spines along minutely crenulate distal margin.

Etymology. The species takes its name from the research vessel of New South Wales State Fisheries, the FRV *Kapala*, which has provided important collections of amphipods from the east coast of Australia.

Remarks. *Sheardella kapala* is closely related to *S. tangaroa*. The most significant morphological difference appears to be the well developed 2-articulate maxillary

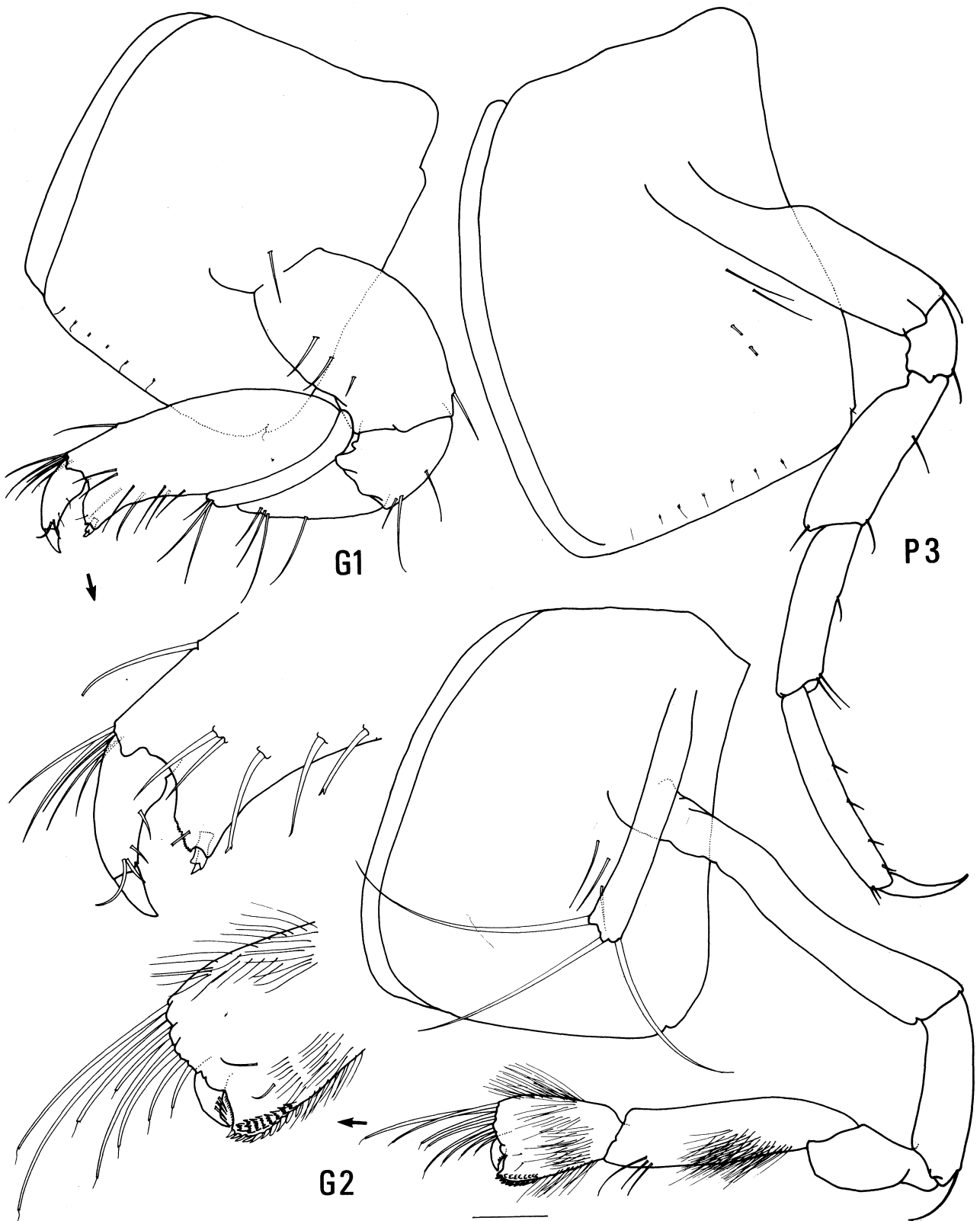


Fig. 5 *Sheardella tangaroa* n.gen. n.sp., holotype, female, 4.0 mm, E of Crib Point, Western Port, Victoria, Australia. Scale represents 0.1 mm.

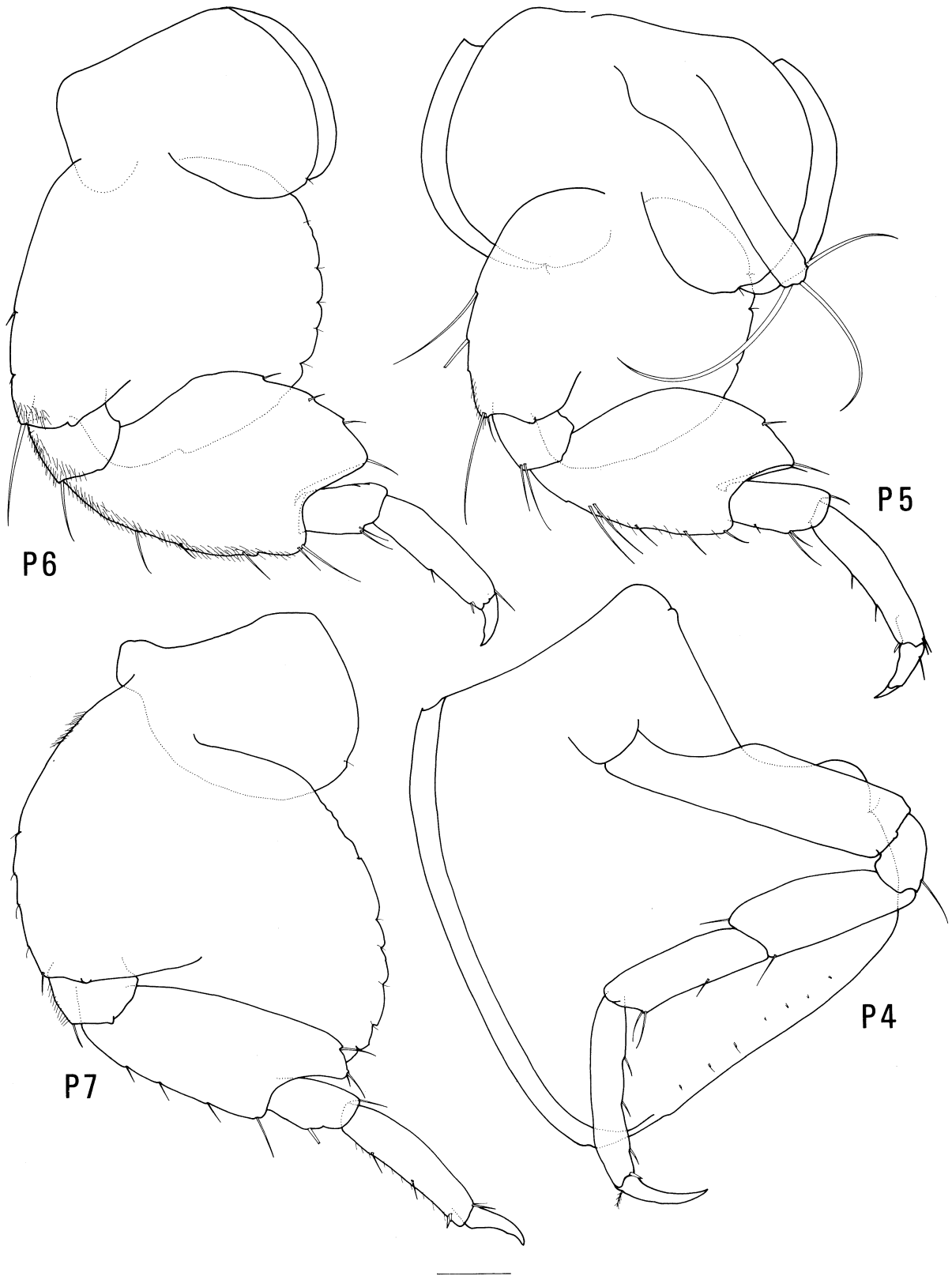


Fig. 6 *Sheardella tangaroa* n.gen. n.sp., holotype, female, 4.0 mm, E of Crib Point, Western Port, Victoria, Australia. Scale represents 0.1 mm.

palp of *S. kapala*. *Sheardella kapala* appears to be confined to the continental shelf whereas *S. tangaroa* inhabits shallow bays.

Distribution. *Sheardella kapala* is known from off Port Jackson, New South Wales, Australia, in 66 to 92 m depth and from Bass Strait in 60 m depth.

Sheardella tangaroa n.sp.

Figs 4–6

Type-material. HOLOTYPE, female, 4.0 mm, NMV J1694, Crib Point, Western Port, Victoria, Australia, 38°19.7'S 145°13.82'E, Smith-McIntyre grab, sand, 14 m, Marine Studies Group, Fisheries and Wildlife Department, Ministry for Conservation, Victoria, 22 March 1965, CPBS Station 33N. One PARATYPE, NMV J1691, as for holotype except: 38°22.00'S 145°13.38'E, shelly gravel, 3 m, 17 March 1965, CPBS Station 11S. Two PARATYPES, NMV J1692, as for holotype except: 38°21.33'S 145°13.64'E, fine sand/mud, 15 m, 8 April 1965, CPBS Station 31S. One PARATYPE, NMV J1699, as for holotype except: 38°20.94'S 145°13.62'E, fine sand/mud, 15 m, 29 March 1965, CPBS Station 31N. One PARATYPE, NMV J1698, as for J1692 except August 1967. One PARATYPE, NMV J1699, as for holotype except 38°20.83'S 145°13.49'E, sandy gravel, 13 m, 23 March 1965, CPBS Station 32N. One PARATYPE, AM P34113, as for holotype except: 38°20.94'S 145°14.08'E, muddy sand, 16 m, 30 March 1965, CPBS Station 51N. One PARATYPE, AM P34114, Western Port, Victoria, Australia, 38°25.80'S 145°21.52'E, Smith-McIntyre grab, sand, 10 m, Marine Studies Group, Ministry for Conservation, Victoria, 26 November 1973, WBES Station 1732.

Diagnosis. Maxilla 1, palp reduced, 1-articulate. Gnathopod 1, palm convexly transverse. Gnathopod 2, article 5 almost 4 times as long as broad, palm concavely transverse. Peraeopods 5 and 6, article 4 as long as broad, moderately expanded posteriorly.

Description. Holotype female, 4.0 mm. *Antenna 1*: peduncular article 1 about 1.5 times as long as articles 2 and 3 combined, peduncle about 2.5 times as long as flagellum; flagellum 7-articulate; accessory flagellum 2-articulate. *Antenna 2* subequal in length to antenna 1; flagellum 5-articulate.

Mandible: incisor broad with smooth cutting edge; 3 well-developed accessory spines and a row of setae; palp attached about midway along dorsal margin, articles 2 and 3 slender; article 2 slightly longer than article 3, with 1 mediobasal seta; article 3 covered in minute hairs, with 5 terminal setae. *Maxilla 1*: inner plate small, narrow, subquadrate, with 1 large plumose seta and several small setae terminally; outer plate with 11 spine-teeth in a 7/4 formula, and a row of short stout setae; palp small, 1-articulate. *Maxilla 2* slender; inner plate with 4 terminal setae; outer plate with about 15 mediobasal setae. *Maxilliped*: inner plates reduced, each with 3 apical setae; outer plates large, subovate, reaching beyond end of 4-articulate palp.

Gnathopod 1 subchelate, large, coxa subquadrate; article 6 large, about 2.3 times as long as broad, with a complex spine defining convex palm; dactyl overreaching palm. *Gnathopod 2* minutely subchelate;

article 5 almost 4 times as long as broad. Article 6 with concavely transverse palm and a row of about 8 serrate spines along posterodistal margin.

Peraeopods 3 and *4* similar except coxa 4 with well developed posteroventral lobe; article 4 shorter than article 6, anterodistal margin of article 4 not overlapping article 5. *Peraeopods 5* and *6*: article 2 about as broad as long with evenly rounded posterior margin; article 4 large, about as long as broad, moderately expanded posteriorly. *Peraeopod 7*: article 2 about as long as broad, posterior margin evenly rounded, crenulate; article 4 narrow, posterior margin oblique with 2 posterodistal setae.

Uropod 1: peduncle longer than rami and bearing 3 dorsal spines; outer ramus slightly longer than inner ramus, neither bearing spines. *Uropod 2* shorter than uropod 1; rami subequal in length, neither bearing spines. *Uropod 3* uniramous; peduncle subequal in length to 2-articulate ramus.

Etymology. This species takes its name from the research vessel of the New Zealand Oceanographic Institute, the RV *Tangaroa*, which has provided important collections of amphipods from the east coast of Australia.

Remarks. *Sheardella tangaroa* is related to *S. kapala*, the only other species in the genus, in the ways outlined under that species.

Distribution. *Sheardella tangaroa* is known only from Western Port, Victoria, Australia, where it has been collected on substrates ranging from sandy mud to shelly gravel in depths of 3 to 15 m.

Drummondia n.gen.

Diagnosis. Antenna 1, flagellum with fused proximal articles bearing rows of aesthetascs in adult male and female. Mandibles with incisor dorsodistal; lacinia mobilis absent; accessory spines absent; an elongate serrate blade (lamina dentata) present. Maxilla 1 slender, elongate; inner plate small, subquadrate with small terminal seta; outer plate with 11 short sculptured spine-teeth, (all sculptured); palp absent. Maxilla 2 with long, thin, tapering plates; outer plate longer, with medial and terminal setae; inner plate with several terminal setae. Maxilliped, inner plates small, with several apical setae; outer plates large, reaching beyond end of 4-articulate palp. Gnathopod 1 chelate or parachelate; palm defined by a complex spine. Coxa 4 with well-developed posteroventral lobe. Peraeopods 5 and 6, article 4 expanded posteriorly with moderately developed posteroproximal shoulder. Peraeonite 5 with small posterodorsal tooth. Uropod 3 biramous, inner ramus reduced.

Type-species. *Drummondia corinellae* n.sp.

Etymology. The genus *Drummondia* is named in honour of Mrs Margaret Drummond, now retired from the Marine Studies Group, Fisheries and Wildlife Department, Victoria, and the Museum of Victoria,

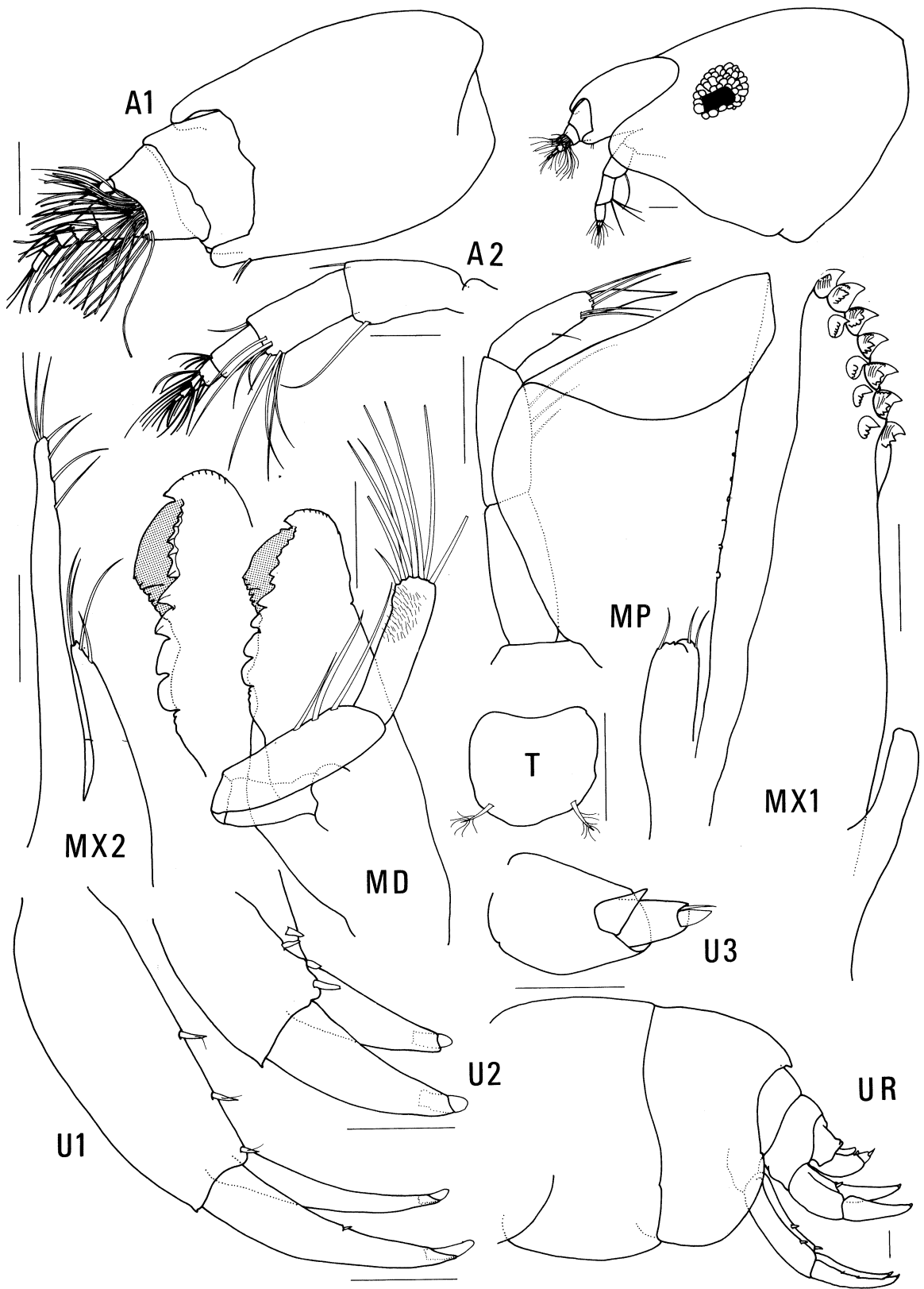


Fig. 7 *Drummondia corinellae* n.gen. n.sp., holotype, female, 6.3 mm, Crib Point, Western Port, Victoria, Australia. Scale represents 0.1 mm.



Fig. 8 *Drummondia corinellae* n.gen. n.sp., holotype, female, 6.3 mm, Crib Point, Western Port, Victoria, Australia.
Scale represents 0.1 mm.

Melbourne, in recognition of her great contribution to the systematics of Australian Amphipoda.

Remarks. *Drummondia* differs from other pachynid genera in the reduced inner ramus of uropod 3 and in having a serrate blade on the mandibles. A structure similar to this occurs in some anthuridean isopods and is known as a lamina dentata. According to Dr Brian Kensley (pers. comm.) the lamina dentata is formed by the fusion of the accessory spines. The

accessory spines of *Sheardella* are broad and their fusion could produce a structure such as the serrate blade found in *Drummondia*.

Drummondia is most closely related to *Prachynella*. Both genera have fused proximal articles bearing rows of aesthetascs on the flagellum of antenna 1 in adult males and females. Both genera have lost the lacinia mobilis and accessory spines on the mandible and the palp on maxilla 1 and both genera have a small dorsal tooth on pereonite 5.

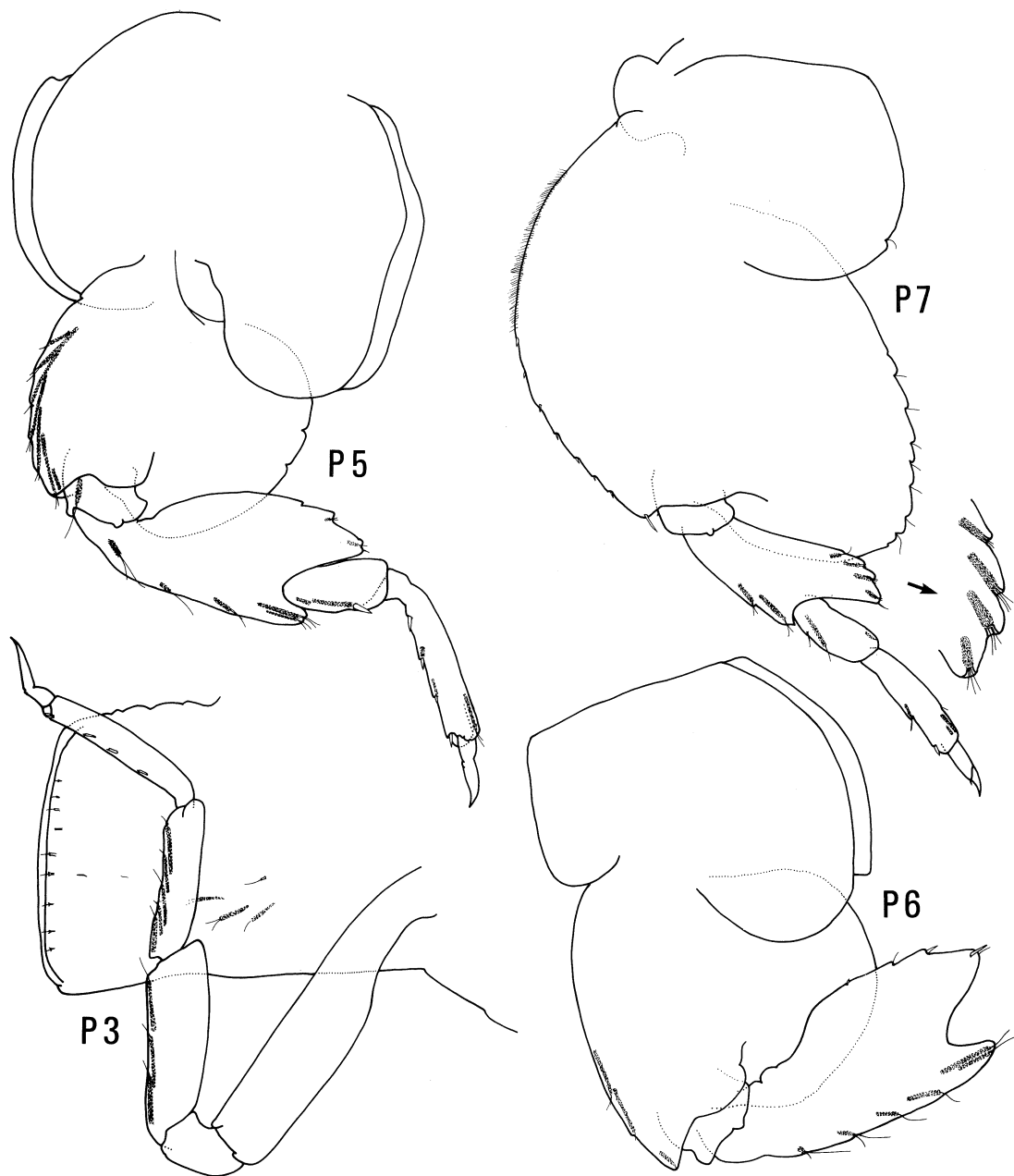


Fig. 9 *Drummondia corinellae* n.gen. n.sp., holotype, female, 6.3 mm, Crib Point, Western Port, Victoria, Australia. Scale represents 0.1 mm.

Drummondia contains 2 species, *D. corinellae* and *D. parviramus*, which inhabit the shallow bays of eastern Australia.

***Drummondia corinellae* n.sp.**

Figs 7-9

Type-material. HOLOTYPE, ovigerous female, 6.3 mm, NMV J1690, Crib Point, Western Port, Victoria, Australia, 38°21'S 145°14'E, Smith-McIntyre grab sample, 11 m, Marine Studies Group, Fisheries and Wildlife Department, Ministry for Conservation, Victoria, 12 October 1964, CPBS

Station B4. One PARATYPE, NMV J1693, as for holotype except: 38°20.83'S 145°13.49'E, sandy gravel, 13 m, 23 March 1965, CPBS Station 32N. Two PARATYPES, AM P34115, Western Port, Victoria, Australia, 38°26.64'S 145°18.79'E, Smith-McIntyre grab sample, sand, 14 m, Marine Studies Group, Ministry for Conservation, Victoria, 26 November 1973, WBES Station 1730.

Additional material examined. Two specimens, NMV J1695, as for holotype except: 38°21.48'S 145°13.85'E, coarse sand, 15 m, 24 March 1965, CPBS Station 41S. One specimen, NMV J1696, as for holotype except: 38°20.94'S 145°14.08'E, muddy sand, 16 m, 30 March 1965, CPBS Station 51N.

Diagnosis. Gnathopod 1 chelate, article 6, 2.75 times as long as broad, complex spine defining palm. Peraeopods 3 to 7 with setae encased in sheaths. Peraeopods 5 and 6, article 4 weakly expanded posteriorly, dactyls slender.

Description. Holotype, ovigerous female, 6.3 mm. Eyes present, lateral cephalic lobe subacute. *Antenna 1*: peduncular article 1 longer than rest of antenna, article 1 produced dorsally and ventrally about halfway along article 2; accessory flagellum 2-articulate and shorter than article 1 of flagellum; flagellum 5-articulate, article 1 about as broad as long and bearing a large group of aesthetascs, remaining articles setose. *Antenna 2* slender, about as long as antenna 1; articles 4 and 5 each twice as long as broad and subequal in length; flagellum 5-articulate.

Mandible: incisor dorsodistal; lacinia mobilis absent; left lamina dentata with about 9 serrations; palp article 2 slightly longer than article 3 with 3 large mediobasal setae; article 3 with a group of 8 large apical setae. *Maxilla 1*: inner plate small, subquadrate; outer plate with 11 small well-developed spine-teeth; palp absent. *Maxilla 2* slender, elongate; inner plate about half length of outer plate with 2 subapical and 2 apical setae; outer plate with 4 subapical and 3 apical setae. *Maxilliped*: inner plates small, each with a few apical setae; outer plates large, subovate, reaching beyond end of 4-articulate palp.

Gnathopod 1 chelate; coxa subquadrate; article 6 large, 2.75 times as long as broad, palm minutely rugose, defined by a complex spine (damaged), posterior margin with 5 strong setae; dactyl stout, reaching corner of palm. *Gnathopod 2* minutely subchelate; article 5 more than twice as long as article 6; article 6 subquadrate, nearly twice as long as broad, palm transverse, posterodistal margin with a row of 11 serrate spines.

Peraeopod 3: coxa longer than broad, subquadrate; articles 4 and 6 subequal in length and slightly longer than article 5; articles 4 and 5, posterior margin with small setae encased in elongate sheaths; article 6 with shorter but similar sheaths. *Peraeopod 4* similar to peraeopod 3 except coxa 4 with a well-developed posteroventral lobe. *Peraeopod 5*: article 2 with elongate sheaths along anterior margin, posterior margin evenly rounded; article 4 large, anterior margin with elongate sheaths encasing short setae, posterior margin convex, not strongly expanded, with several short sheaths posterodistally; article 6 slender, 5 times as long as broad, with short sheaths encasing setae along anterior margin and 2 elongate sheaths posterodistally. *Peraeopod 6*: article 2, anterior margin with 3 elongate sheaths, posterior margin strongly expanded and evenly rounded; article 4 large, expanded posteriorly, anterior margin with elongate sheaths. *Peraeopod 7*: article 2 larger than article 2 of peraeopods 5 and 6, subovate posteriorly with slightly crenulate margin; article 4 expanded posterodistally with 4 sheathed setae, anterior margin with 2 sheathed setae; article 6, 4 times as long as broad with 1 sheathed seta on anterior margin and 2 posterodistally.

Uropod 1: peduncle longer than rami, with 3 dorsodistal spines; outer ramus slightly longer than inner ramus, with small mid-dorsal spine. *Uropod 2* shorter than uropod 1; outer ramus slightly longer than inner ramus. *Uropod 3* small; peduncle longer than rami; inner ramus about half length of outer ramus. *Telson* entire, slightly broader than long with 2 sensory setae on posterior margin.

Etymology. The species is named after the town of Corinella, the oldest permanent settlement on the shores of Western Port, Victoria.

Remarks. *Drummondia corinellae* is easily distinguished from the only other species in the genus, *D. parviramus*, by its larger size, the shorter dactyl of gnathopod 1 and the sheathed setae on the peraeopods.

Distribution. *Drummondia corinellae* is known from sandy gravel to muddy sand bottoms in 13–16 m depth in Western Port, Victoria, Australia.

Drummondia parviramus n.sp.

Figs 10–12

Type-material. HOLOTYPE, 4.8 mm, AM P33838; one PARATYPE, AM P33839; Halifax Bay, Queensland, Australia, 19°10'S 146°44'E, 5 m, January 1978, Station 78-1-G.

Diagnosis. Gnathopod 1 parachelate, article 6 about twice as long as broad, complex spine defining palm. Setae on peraeopods not encased in sheaths. Peraeopods 5 and 6, article 4 strongly expanded posteriorly, dactyls stocky.

Description. Holotype, 4.8 mm. Eyes present, lateral cephalic lobe broadly rounded. *Antenna 1*: peduncular article 1 longer than rest of antenna, produced dorsally and ventrally about halfway along article 2; accessory flagellum 2-articulate; flagellum 5-articulate, proximal articles fused, bearing rows of aesthetascs. *Antenna 2* slender, subequal in length to antenna 1; flagellum 4-articulate.

Mandible: left lamina dentata well developed, with 8 serrations, weakly developed on right side, with 2 serrations; palp with 2 mediobasal setae on article 2 and 6 terminal setae on article 3. *Maxilla 1*: inner plate small, tapering distally with 1 minute seta; outer plate with 11 short, sculptured spine-teeth in a 7/4 formula. *Maxilla 2*: inner plate short, about half length of outer plate with several apical setae; outer plate subquadrate with about 8 medial setae and 5 terminal setae. *Maxilliped*: inner plates small, each with an apical seta; outer plate large, subovate, reaching beyond end of 4-articulate palp.

Gnathopod 1 parachelate, article 6 about twice as long as broad, complex spine defining palm, dactyl overreaching palm. *Gnathopod 2* minutely subchelate; article 6 subquadrate, about 1.5 times as long as broad, palm convexly transverse, posterodistal margin with a row of about 10 serrate spines.

Peraeopods 3 and *4* similar except coxa 4 with well-developed posteroventral lobe with a sharply rounded posteroproximal corner; article 4 in both peraeopods slightly shorter than article 6 and not overlapping article

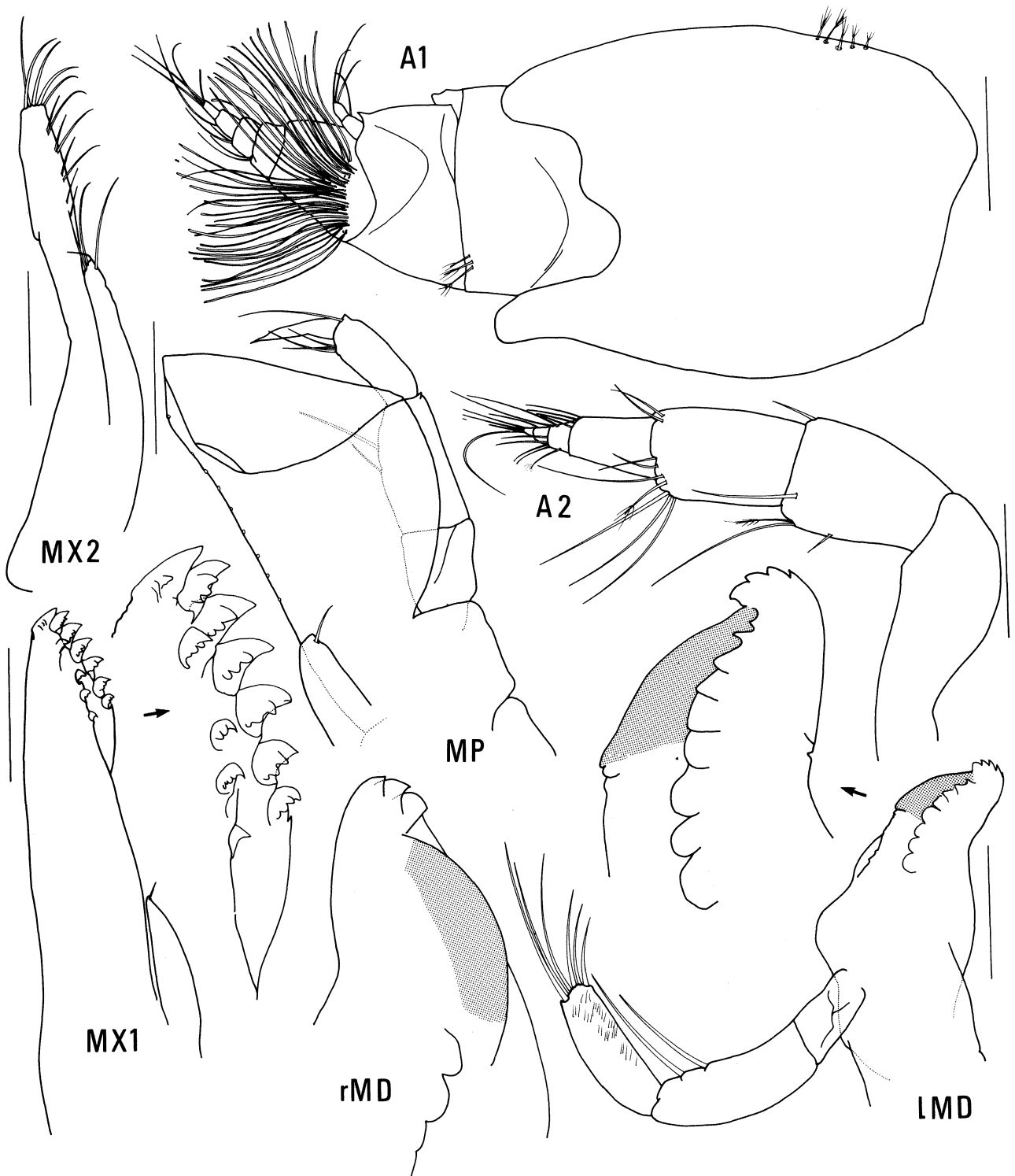


Fig. 10 *Drummondia parviramus* n.gen. n.sp., holotype, 4.8 mm; MX1 and MP, paratype; Halifax Bay, Queensland, Australia. Scales represent 0.1 mm.

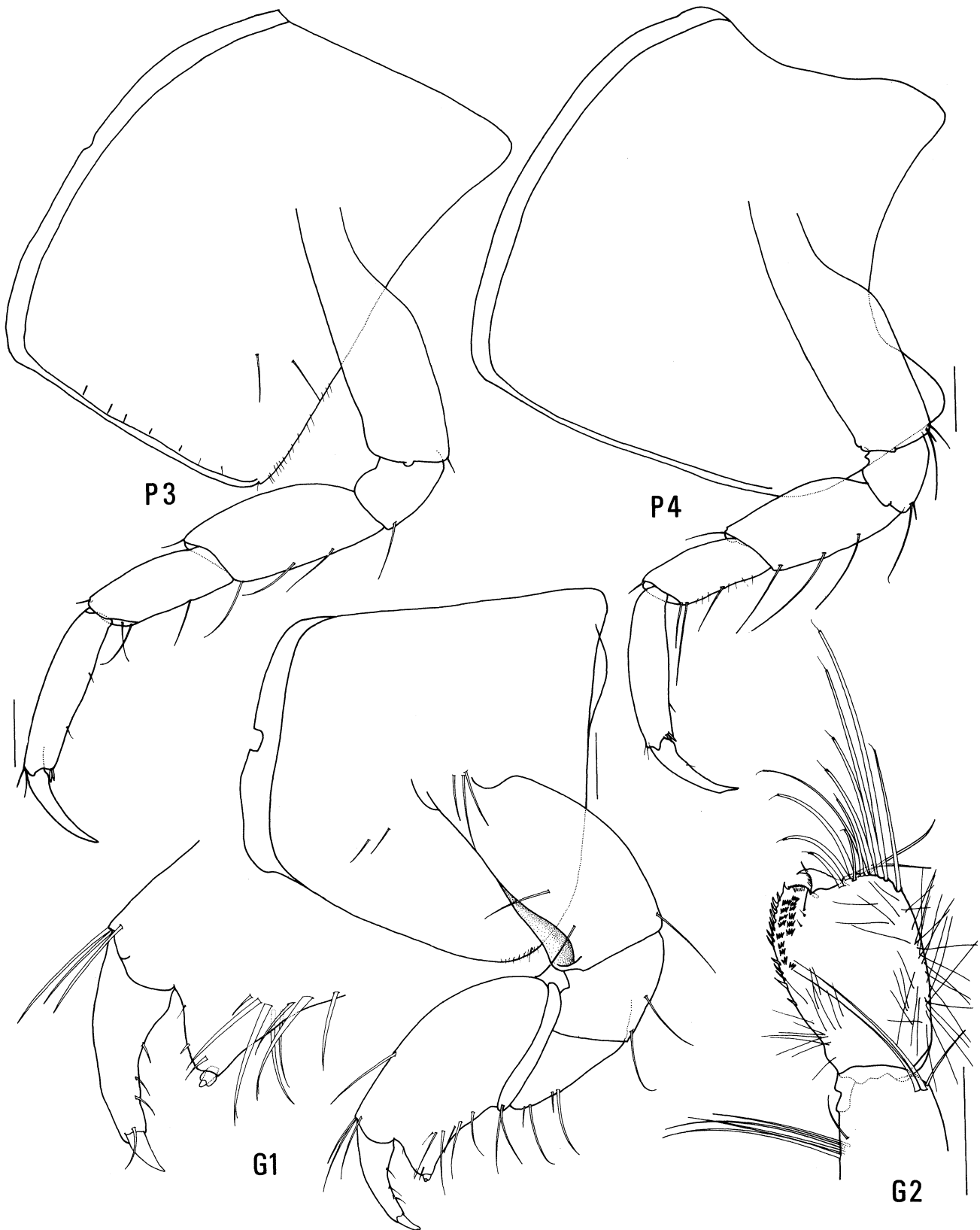


Fig. 11 *Drummondia parviramus* n.gen. n .sp., holotype, 4.8 mm, Halifax Bay, Queensland, Australia. Scales represent 0.1 mm.

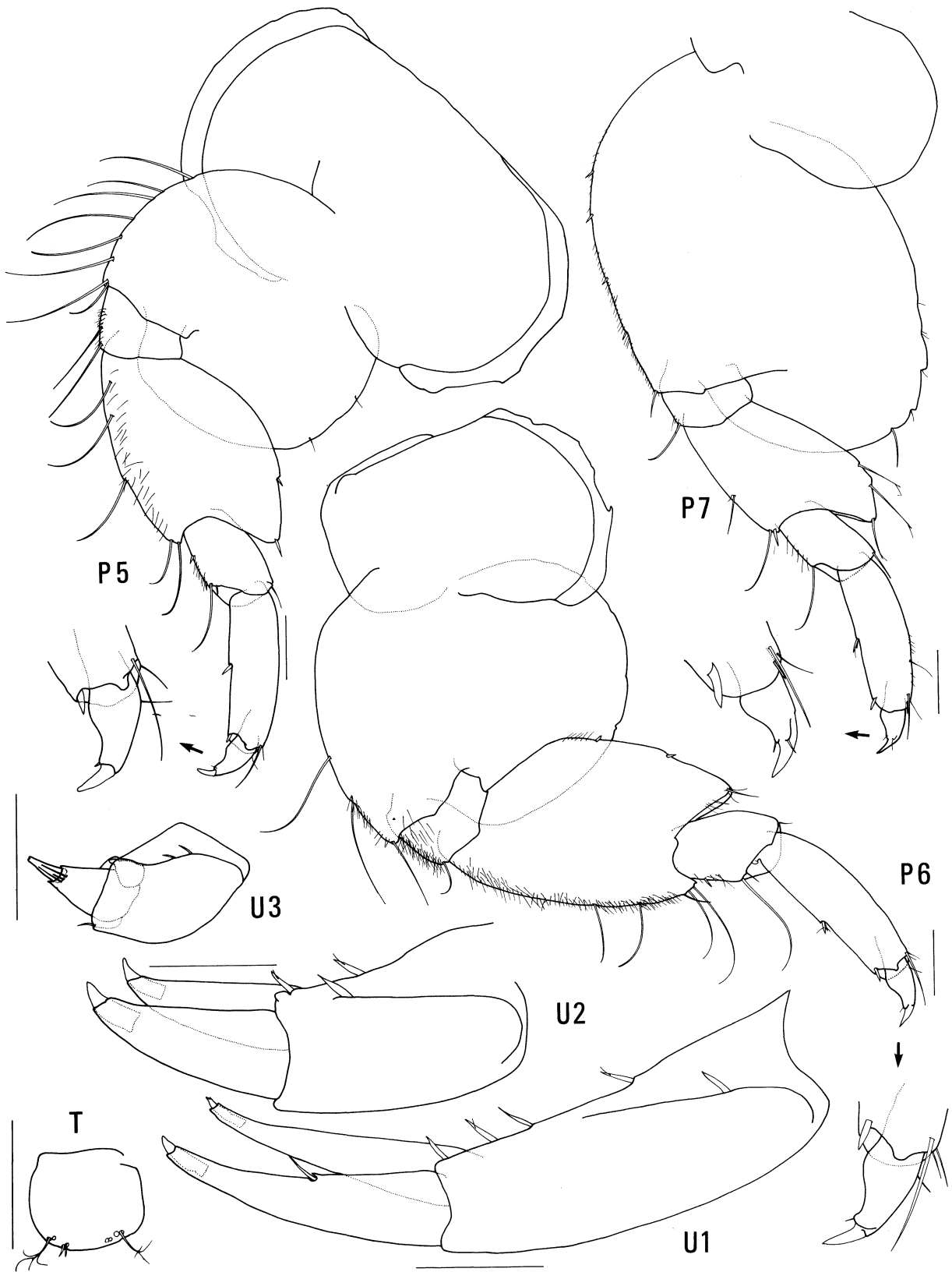


Fig. 12 *Drummondia parviramus* n.gen. n.sp., holotype, 4.8 mm, Halifax Bay, Queensland, Australia. Scales represent 0.1 mm.

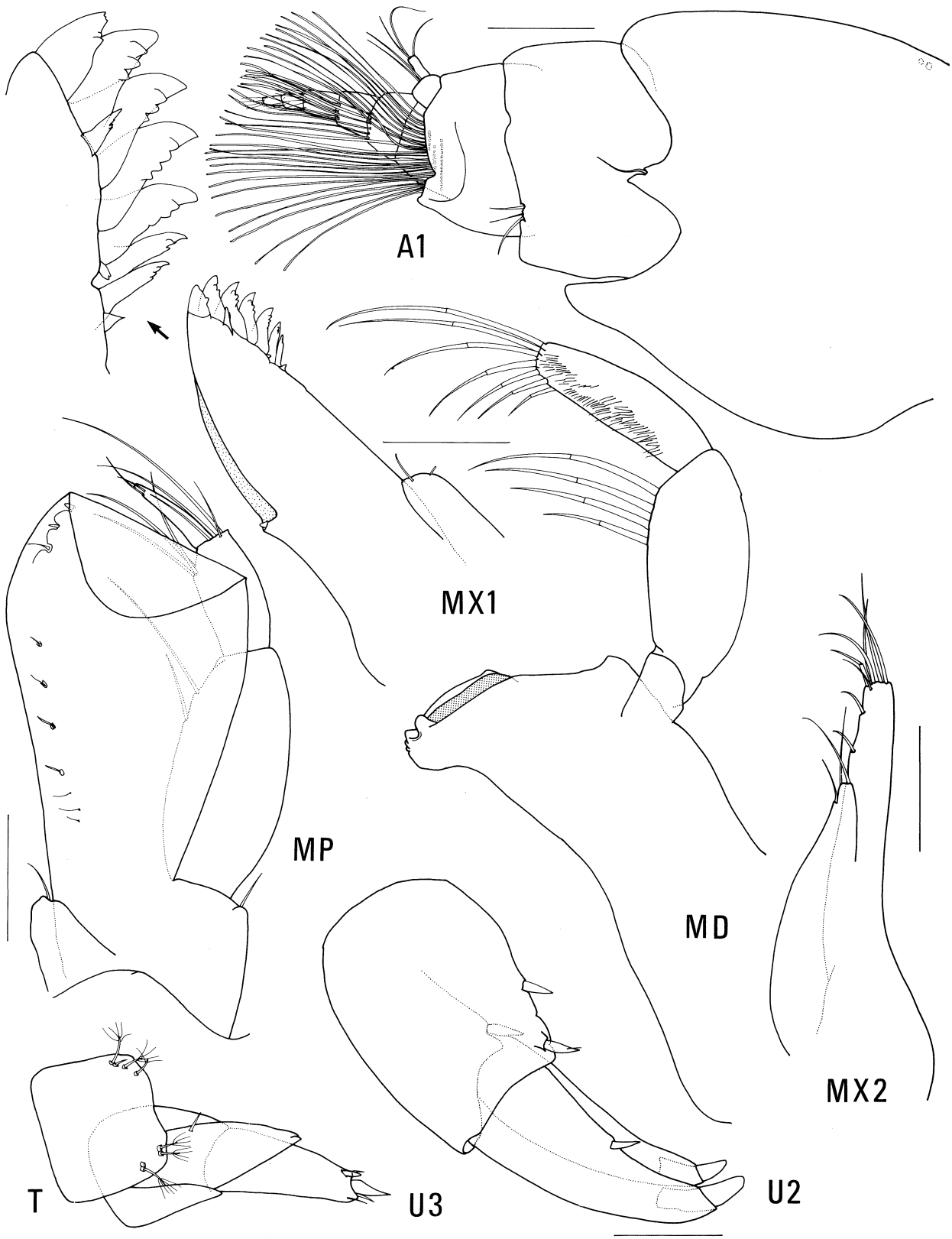


Fig. 13 *Prachynella lodo* J.L. Barnard, holotype, females 5.8 mm, San Mateo Point, California, USA. Scales represent 0.1 mm.

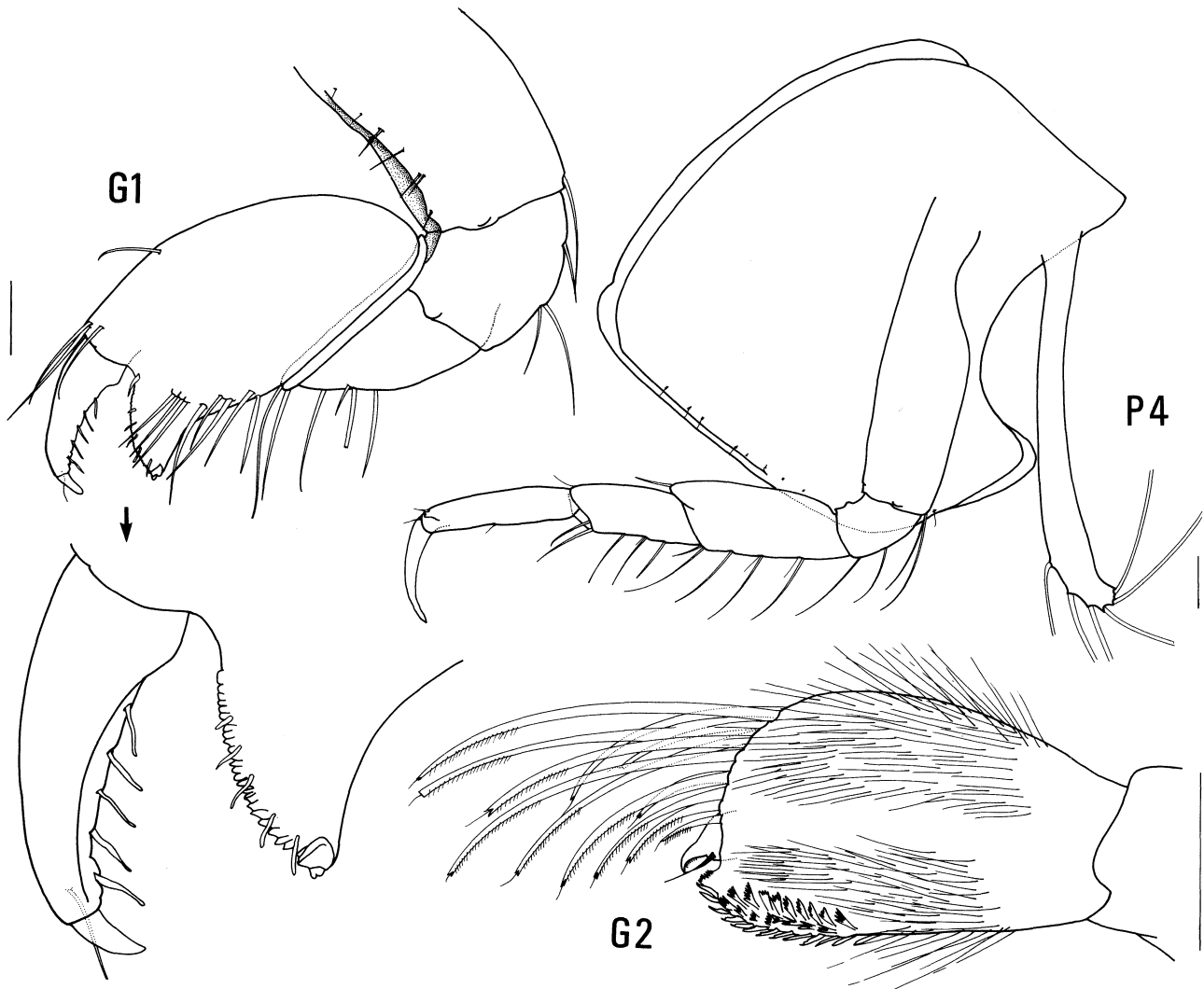


Fig. 14 *Prachynella lodo* J.L. Barnard, holotype, females 5.8 mm, San Mateo Point, California, USA. Scales represent 0.1 mm.

5 along anterodistal margin. *Peraeopod 5*: article 2 slightly broader than long, posterior margin evenly rounded, anterior margin with long setae; article 4 strongly expanded posteriorly with a broadly rounded posteroproximal shoulder; dactyl short, stocky. *Peraeopod 6*: article 2 slightly broader than long, posterior margin evenly rounded, anterior margin with several long distal setae; article 4 strongly expanded posteriorly with obtusely angled posteroproximal corner; dactyl short, stocky. *Peraeopod 7*: article 2 longer than broad, posterior margin straight with a broadly rounded posteroventral corner; article 4 with an oblique slightly convex posterior margin with 3 distal setae.

Uropod 1: peduncle longer than rami, with 5 dorsal spines; outer ramus slightly longer than inner ramus, with 1 mid-dorsal seta. *Uropod 2*: peduncle slightly longer than rami, with 3 dorsal spines; rami subequal

in length. *Uropod 3* small, peduncle longer than 2-articulate outer ramus; inner ramus reduced. *Telson* entire, broader than long with 8 sensory setae along posterior margin.

Etymology. The specific name refers to the small rami of uropod 3.

Remarks. *Drummondia parviramus* differs from *D. corinellae* in the ways listed under that species. In a collection made by K. Sheard in 1944 from Spencer Gulf, South Australia (AM P33831–P33832) there are 3 reproductive males of a *Drummondia* species which is very similar to *D. parviramus*. There are subtle differences in the shapes of gnathopod 1 and pereopods 5 to 7. But until females are available for study I am leaving it undescribed.

Distribution. *Drummondia parviramus* is known from two specimens from Halifax Bay, Queensland, Australia.

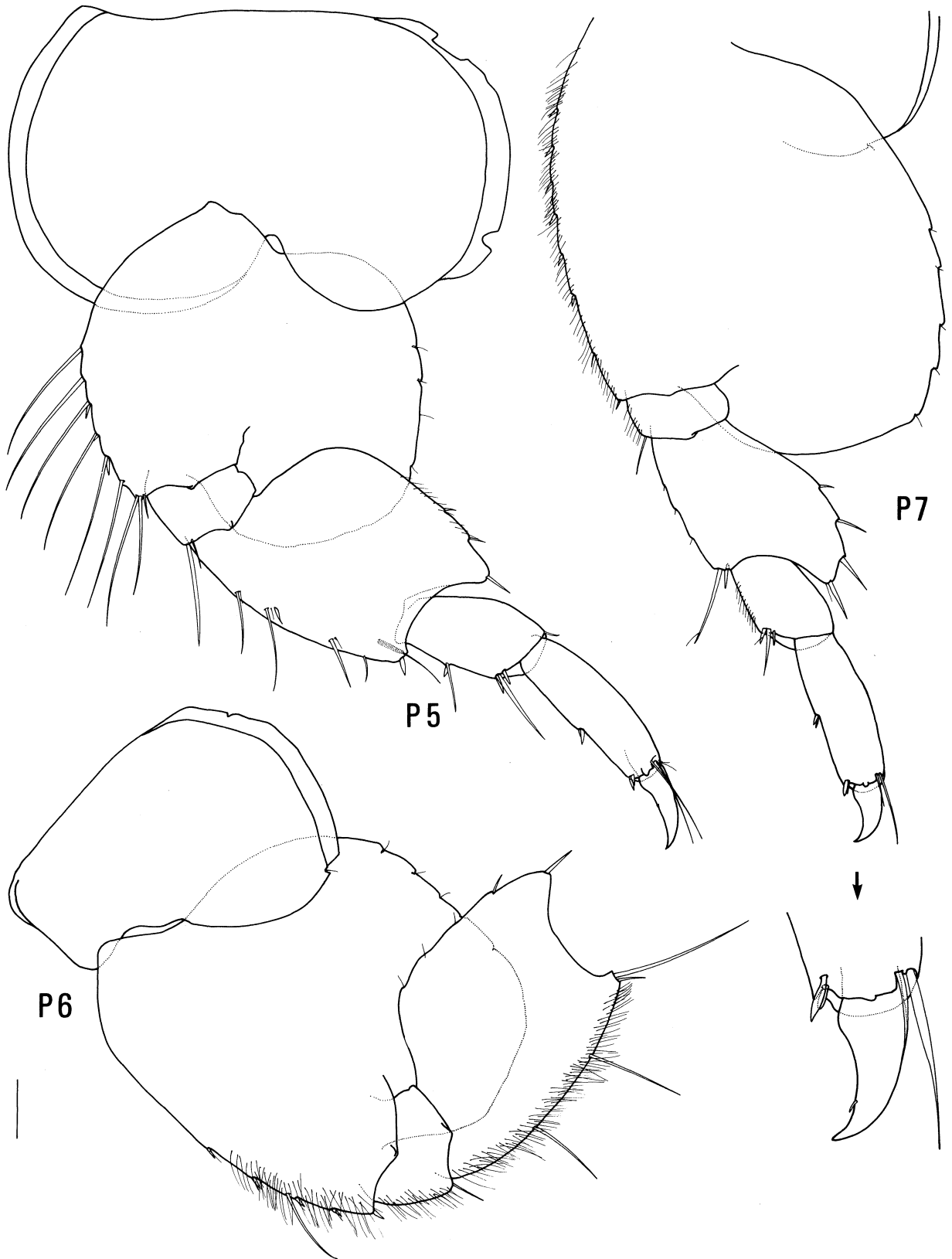


Fig. 15 *Prachynella lodo* J.L. Barnard, holotype, females 5.8 mm, San Mateo Point, California, USA. Scale represents 0.1 mm.

***Prachynella* J.L. Barnard**

Prachynella J.L. Barnard, 1964: 232.—1969a: 359.

Diagnosis. Antenna 1, flagellum with proximal articles fused and bearing rows of aesthetascs in male and female. Mandibles lacking lacinia mobilis and accessory spines. Maxilla 1, inner plate subquadrate with small terminal setae; outer plate with 8–10 sculptured spine-teeth; palp a minute article. Maxilla 2 with long, thin, tapering plates; outer plate with medial and terminal setae; inner plate with several terminal setae. Maxilliped, inner plates small, with an apical seta; outer plates large, reaching beyond end of 3-articulate palp. Gnathopod 1 chelate, palm defined by a complex spine. Coxa 4 with well-developed posteroventral lobe. Peraeopods 5 and 6, article 4 strongly expanded posteriorly with well-developed posteroproximal shoulder. Peraeonite 5 with small posterodorsal tooth. Uropod 3 biramous.

Type-species. *Prachynella lodo* J.L. Barnard, 1964 (original designation).

Remarks. *Prachynella* is most closely related to *Drummondia*, both genera having the characteristic small tooth on peraeonite 5. *Prachynella* differs from *Drummondia* in not having a lamina dentata on the mandible, in having fewer spine-teeth on maxilla 1 and in having a 3-articulate maxillipedal palp.

Prachynella contains two species, *P. lodo* known from southern California and *P. mediterranea* known from the Adriatic Sea. It is possible that the *Prachynella* specimens studied by J.L. Barnard (1964, 1967) represent several species.

***Prachynella lodo* J.L. Barnard, 1964**

Figs 13–15

Prachynella lodo J.L. Barnard, 1964: 233, fig. 7.—1966a: 70; 1966b: 26; 1967: 69, figs 29, 30.

In the original description of *Prachynella lodo*, Barnard (1964) designated a holotype (AHF 5735) from station 4868, south-east of San Mateo Point, California, but he described and illustrated a specimen from Station 5193, locality not mentioned. Barnard (1967) republished the original plates and illustrated two other specimens which differed from the original specimen. I borrowed the holotype, which is illustrated below. The holotype differs from the specimen illustrated in Barnard (1964) in that the palm of gnathopod 1 is not as strongly produced distally and is defined by a complex spine, and the dorsal flange of peduncular article 1 is not strongly produced over article 2. There is some confusion between the figures and the text in Barnard (1967) but it appears that the holotype differs from the anoculate deep-sea specimen illustrated by Barnard (1967, fig. 30a-g) in having eyes and a shallow posterodorsal tooth on peraeonite 5 and it appears to differ from the shallow-water oculate form (fig. 30h-k) in having a complex tooth defining the palm of gnathopod 1. From

the studies of Barnard (1964, 1967) it appears that several species of *Prachynella* occur along the Californian coast. The holotype of *P. lodo* is illustrated and diagnosed here. The large collection needs to be studied in detail to determine if there is more than one species in this material.

Material examined. HOLOTYPE female, 5.8 mm, AHF 5735, south-east of San Mateo Point on the California Coast, 33°17'35"N 117°31'00"W, 24 m, 20 February 1957, Station 4868. 1 specimen, Monterey Bay, California, 54 m, station 6426; 1 specimen Monterey Bay, California, 139 m, station 6471; 1 specimen, Santa Cruz Canyon, southern California, 459 m, station 6804; 1 specimen, Cedros Trench, Baja California, 27°38'N 115°16'W, 791–842 m, 2 January 1961, station 7234.

Diagnosis. Eyes present. Antenna 1, peduncular article 1 produced dorsally and ventrally about halfway along article 2. Maxilla 1, outer plate with 10 spine-teeth in a 7/3 formula. Gnathopod 1 chelate with a convex palm, defined by a complex spine. Peraeopod 5 with long setae along anterior margin of articles 2 to 5.

Remarks. *Prachynella lodo* and *P. mediterranea* appear to be closely related species even though they are widely separated geographically. The most significant difference between them is the number of spine-teeth on maxilla 1. The deepwater specimen from 791 m off southern California which J.L. Barnard (1967) studied may represent a third species in the genus.

Distribution. *Prachynella lodo* is known from numerous sites in southern California and Baja California from 10–791 m depth.

***Prachynella mediterranea* (Ruffo, 1975) n.comb.**

Figs 16, 17

Pachychelium mediterraneum Ruffo, 1975: 440, figs 1–4.

Material examined. HOLOTYPE, 1.8 mm, MCSN slides 1341–1343, Central Adriatic Sea, 43°35'40"N 15°41'54"W, 160 m, 14 September 1972.

Diagnosis. Eyes absent. Antenna 1, article 1 of peduncle produced dorsally to end of peduncle and produced ventrally to end of article 2. Maxilla 1, outer plate with 8 spine-teeth in a 5/3 formula. Gnathopod 1 chelate with a straight palm defined by a complex spine. Peraeopod 5 without long setae along anterior margin of articles 2 to 5.

Remarks. *Prachynella mediterranea* is known from only one specimen in the Adriatic Sea but this record of a sculptured-toothed pachynid outside the Pacific Ocean suggests that more species await discovery in the deep-sea North and South Atlantic.

The Smooth-toothed Subgroup***Pachynus* Bulycheva, 1955**

Pachynus Bulycheva, 1955: 193.—Hurley, 1963: 30; J.L. Barnard, 1969a: 354.

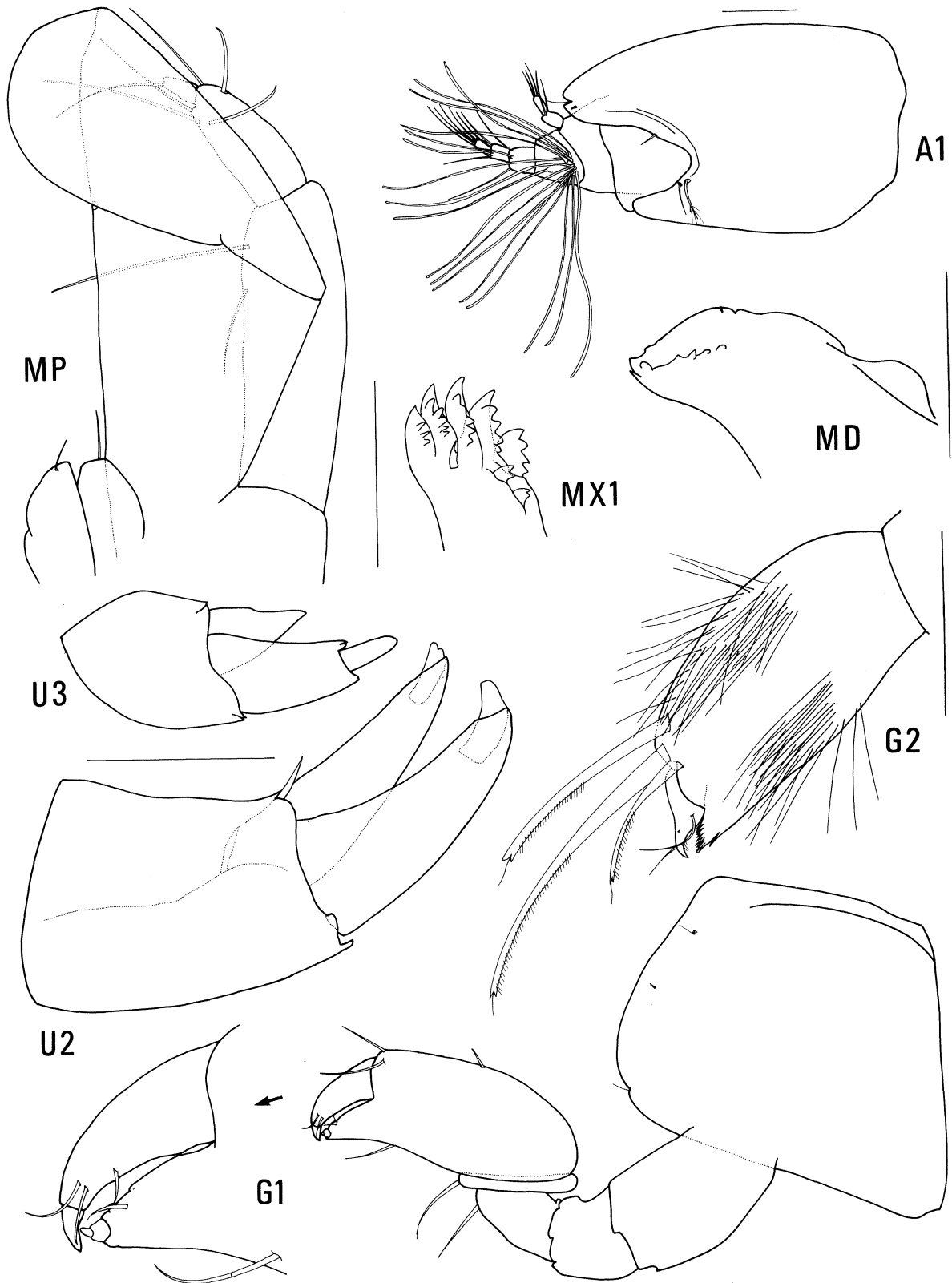


Fig. 16 *Prachynella mediterranea* (Ruffo), holotype, 1.8 mm, Central Adriatic Sea. Scales represent 0.5 mm.

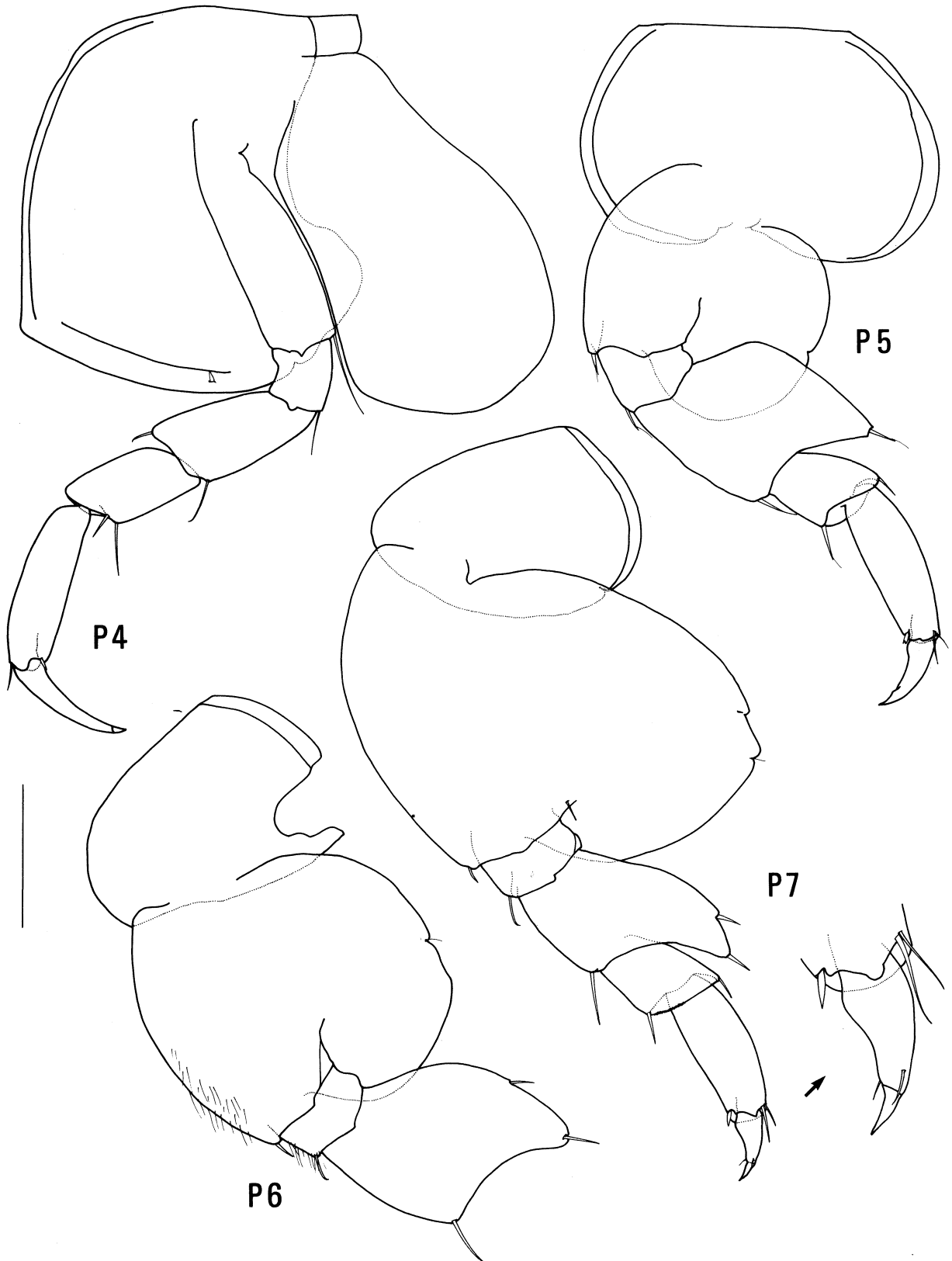


Fig. 17 *Prachynella mediterrane* (Ruffo), holotype, 1.8 mm, Central Adriatic Sea. Scale represents 0.1 mm.

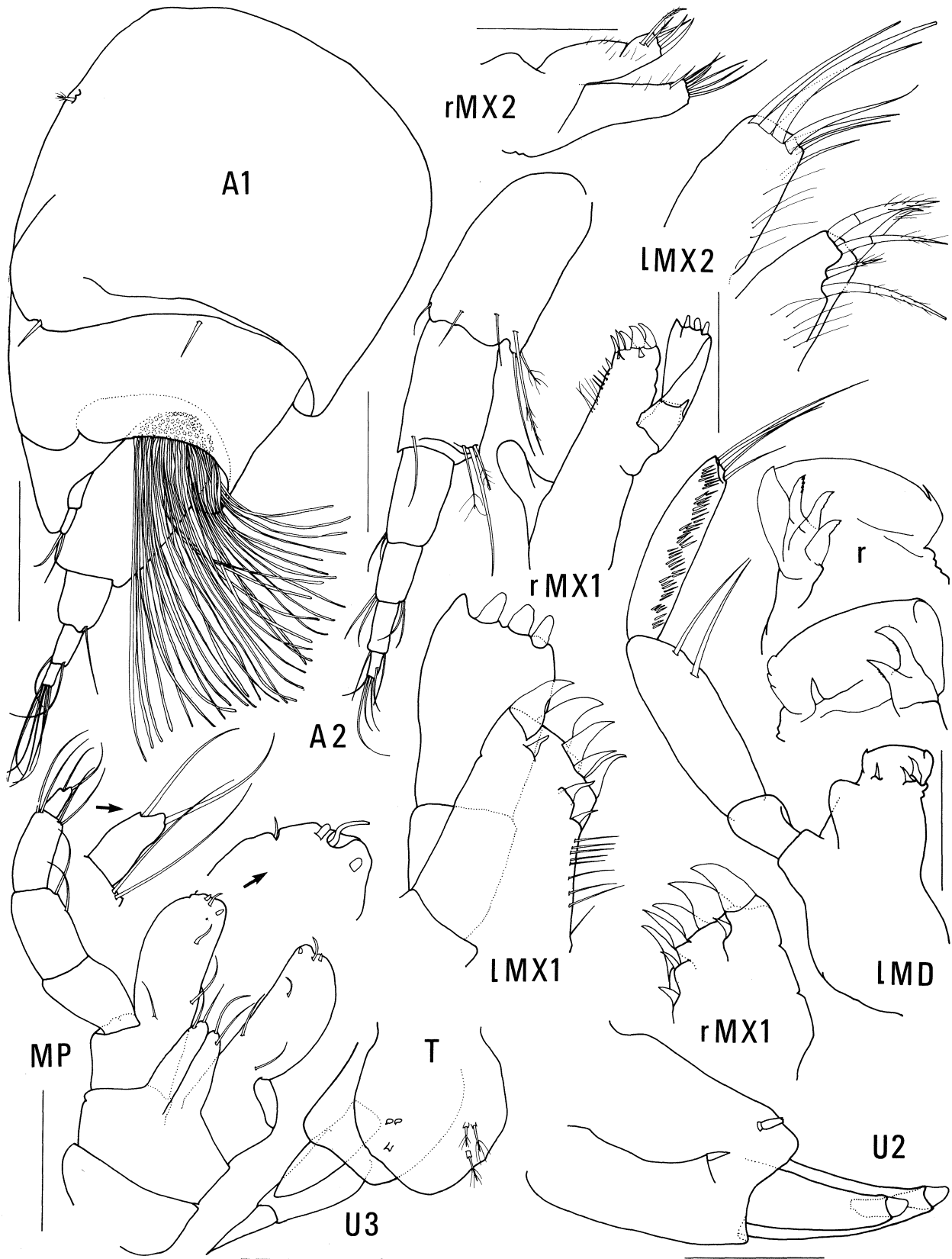


Fig. 18 *Pachynus pugilator* n.sp., holotype, 3.3 mm, Bass Strait, Australia. Scales represent 0.1 mm.

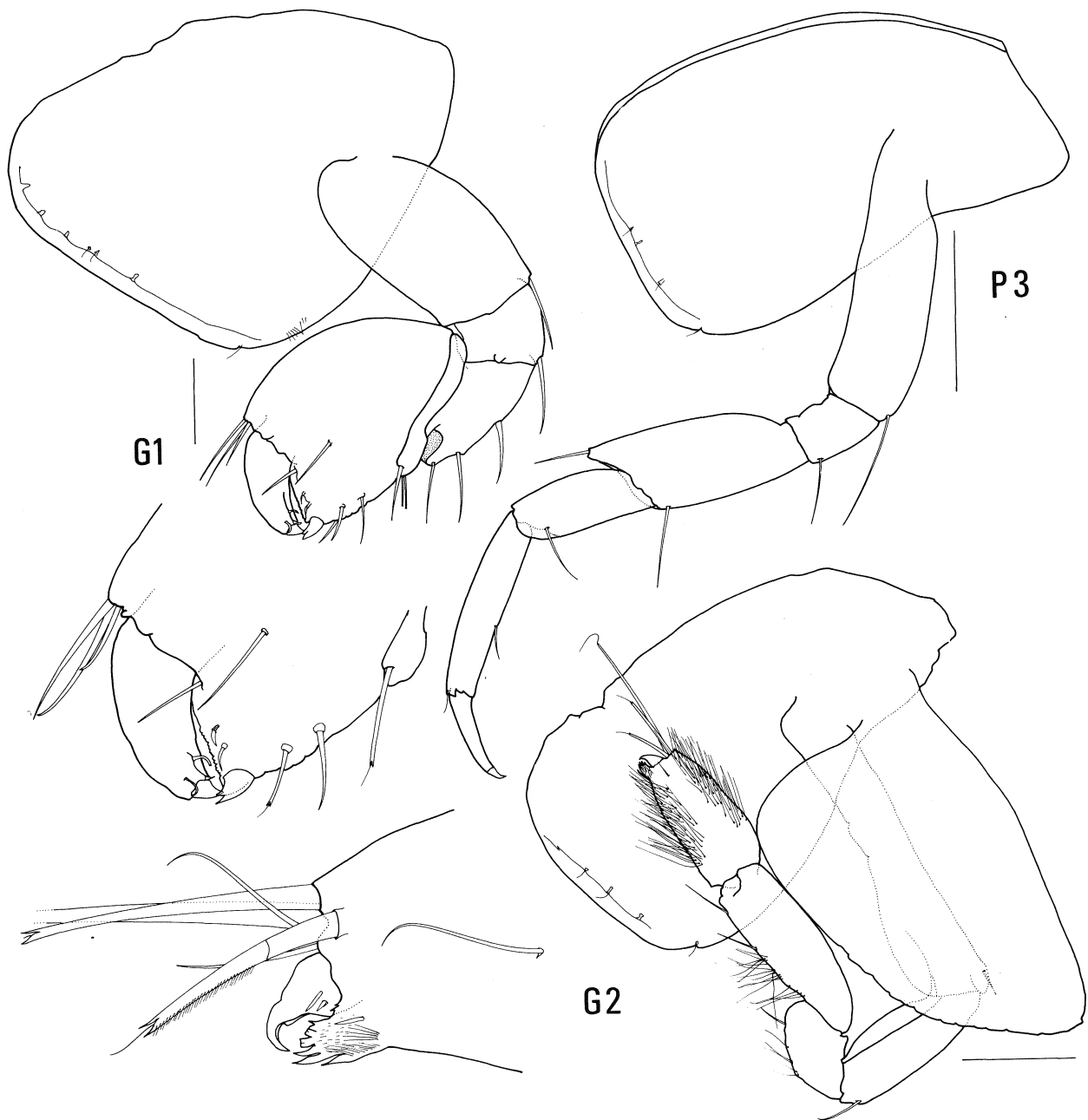


Fig. 19 *Pachynus pugilator* n.sp., holotype, 3.3 mm, Bass Strait, Australia. Scales represent 0.1 mm.

Diagnosis. Antenna 1, flagellum with fused proximal articles bearing rows of aesthetascs in male and female. Mandibles, left lacinia mobilis present; accessory spines on both mandibles. Maxilla 1, inner plate small, terminal setae absent; outer plate with 8 smooth spine-teeth in a 5/3 formula; palp 2-articulate with several terminal articulating spines. Maxilla 2 with short subquadrate plates bearing terminal setae. Maxillipeds, inner plates small to well-developed with several apical setae; outer plates not large, reaching end of second article of palp; palp 4-articulate, article 4 small. Gnathopod 1 subchelate to chelate, palm defined by a

complex spine with a concave inner surface to receive tip of dactyl. Gnathopod 2, dactyl and palm minute. Coxa 4 with well-developed posteroventral lobe. Pereopods 5 and 6, article 4 expanded posteriorly with well-developed posteroproximal shoulder. Pereopods 5 to 7, article 5 with minute denticles along distal margin. Uropod 3 biramous.

Type-species. *Pachynus chelatum* Bulycheva, 1955 (original designation).

Remarks. Aside from the smooth spine-teeth the genus *Pachynus* shows little relationship to other

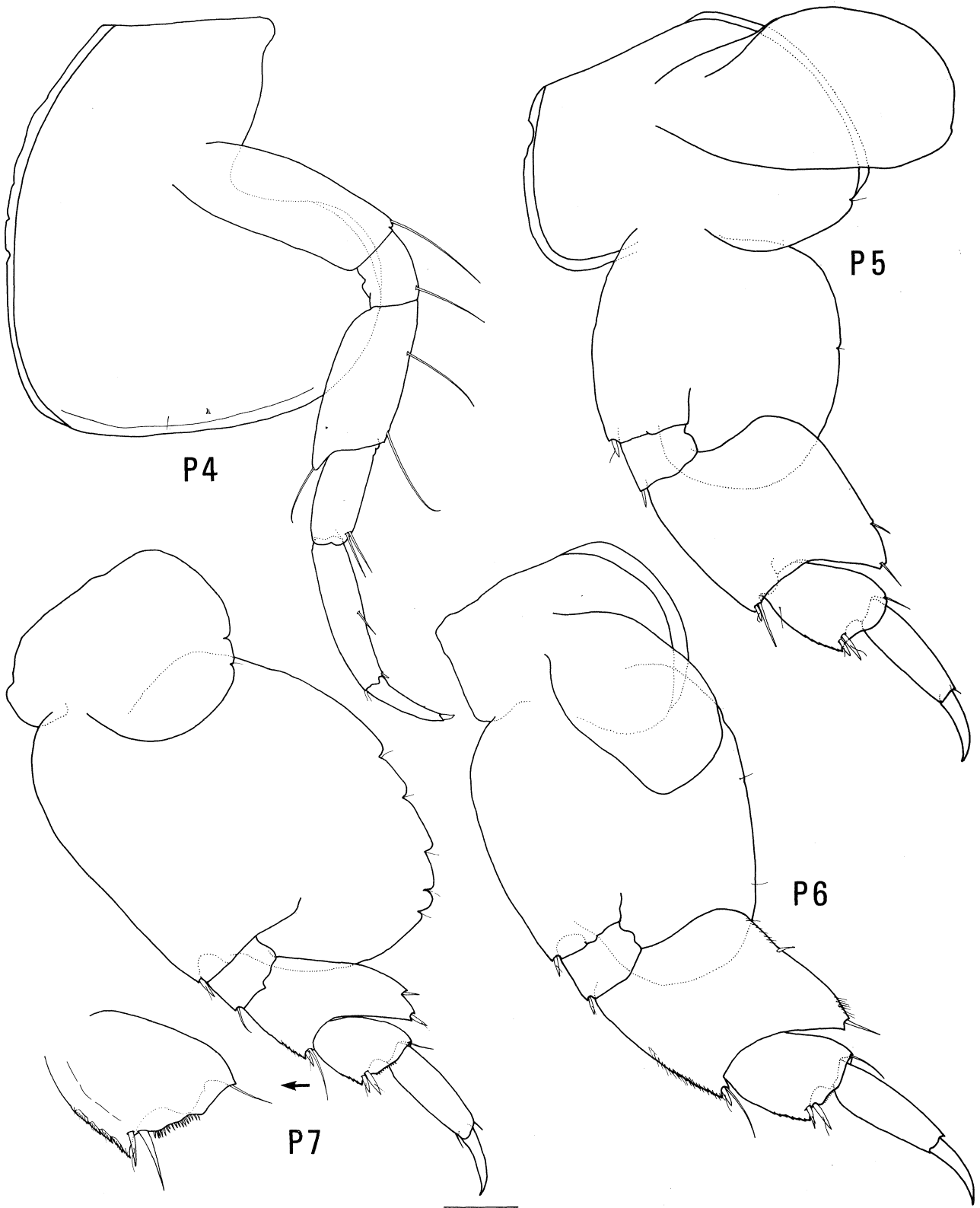


Fig. 20 *Pachynus pugilator* n.sp., holotype, 3.3 mm, Bass Strait, Australia. Scale represents 0.1 mm.

smooth-toothed genera. It differs from them in having fused proximal articles bearing rows of aesthetascs on the flagellum of antenna 1 in adult males and females, and in having terminal spines on the palp of maxilla 1 and a 5/3 spine-tooth formula on the outer plate. It also differs in having small outer plates and relatively large inner plates on the maxilliped, a peculiar character within the pachynids. *Pachynus* and *Figorella* both have a lacinia mobilis and accessory spines on the mandibles.

Pachynus is now known from the North and South Pacific Ocean. It contains four species: *P. chelatum* (Sea of Japan) and *P. barnardi* (continental shelf off southern California) from the North Pacific Ocean and *P. pugilator* and *P. denticulatum* (continental shelf off eastern Australia) from the South Pacific Ocean.

Pachynus pugilator n.sp.

Figs 18–20

Type-material. HOLOTYPE, 3.3 mm, NMV J3773, Bass Strait, Australia, 38°38.2'S 142°35.0'E, epibenthic sled, 59 m, Victorian Institute of Marine Sciences, Cruise 81-T-1 on RV *Tangaroa*, 20 November 1981, BSS Station 188.

Diagnosis. Antenna 1, accessory flagellum 2-articulate. Maxilla 1, outer plate with a 5/3 spine-tooth formula; palp with 3 terminal articulating spines. Gnathopod 1 subchelate; article 6 slightly produced posterodistally. Peraeopod 7, article 2 slightly longer than broad, posterior margin slightly convex, posteroventral corner subquadrate. Uropods not covered in minute denticles. Uropod 3, inner ramus shorter than article 1 of outer ramus.

Description.—Holotype, 3.3 mm. *Antenna 1*: peduncle massive, nearly twice as long as flagellum; flagellum 4-articulate, proximal articles fused, bearing rows of aesthetascs; accessory flagellum 2-articulate. *Antenna 2* slender, subequal in length to antenna 1; flagellum 4-articulate.

Mandible: left side with lacinia mobilis and 2 accessory spines, right side with 3 accessory spines; palp slender, articles 2 and 3 subequal in length, article 2 with 2 mediobasal setae, article 3 with 4 terminal setae. *Maxilla 1*: inner plate small, subquadrate, setae absent; outer plate with 8 spine-teeth in a 5/3 formula; palp broad, with 3 terminal spines. *Maxilla 2* short with subquadrate plates bearing terminal setae. *Maxilliped*: inner plates well developed, each with 2 apical setae; outer plates not well developed, reaching to distal end of palp article 2; palp 4-articulate, article 4 reduced.

Gnathopod 1 large, subchelate; coxa expanded distally; article 6 slightly longer than broad, slightly produced posterodistally; palm transverse, defined by complex spine hollowed to receive tip of dactyl. *Gnathopod 2* minutely chelate; article 5 longer than article 6; article 6 slightly more than twice as long as broad.

Peraeopod 4: coxa with broadly rounded posteroventral lobe; article 4 subequal in length to article 6 with anterior margin slightly produced along article 5. *Peraeopod 5*: article 2 about as long as broad, posterior

margin broadly rounded; article 4 large, postero-proximal corner sharply rounded; *Peraeopod 6*: article 2 longer than broad, posterior margin straight; article 4 large, posteroproximal corner sharply rounded. *Peraeopod 7*: article 2 slightly longer than broad, posterior margin slightly convex, crenulate, posteroventral corner subquadrate; article 4, posterior margin oblique, slightly convex with 2 small posterodistal spines.

Uropod 2: peduncle slightly longer than rami; rami without marginal spines; inner ramus slightly shorter than outer ramus. *Uropod 3*: peduncle slightly shorter than 2-articulate outer ramus; inner ramus nearly as long as article 1 of outer ramus; rami without marginal spines. *Telson* entire, about as long as broad, rounded distally.

Etymology. The name *pugilator* alludes to the fist-like character of gnathopod 1.

Remarks. *Pachynus pugilator* appears to be the most plesiomorphic species in the genus, on the basis of the morphology of the maxilliped. It differs from other *Pachynus* species in the subchelate gnathopod 1. *Pachynus pugilator* shows a strong similarity to *P. chelatum* and *P. barnardi* in the morphology of the spine-teeth of maxilla 1.

Distribution. *Pachynus pugilator* is known at present from one specimen collected from 59 m depth in Bass Strait, Australia.

Pachynus chelatum Bulycheva, 1955

Figs 21–23

Pachynus chelatum Bulycheva, 1955: 194, fig. 1.—Hurley, 1963: 34; J.L. Barnard, 1969a: 354.

Material examined. One specimen, AM P33775, Sea of Japan, 88 m, N.I. Tarasov, 8 September 1932, Station xi-261, from the Zoological Institute, Academy of Sciences, USSR, catalogue number 5/2676.

Diagnosis. Antenna 1, accessory flagellum 2-articulate. Maxilla 1, outer plate with a 5/3 spine-tooth formula; palp with 3 terminal articulating spines. Gnathopod 1 chelate; article 6 moderately produced posterodistally. Peraeopod 7, article 2 about as long as broad, posterior margin and posteroventral corner gently rounded. Uropods not covered in minute denticles. Uropod 3, inner ramus slightly longer than article 1 of outer ramus.

Remarks. *Pachynus chelatum* is most closely related to *P. barnardi* from which it differs principally in the structure of articles 2 and 4 of peraeopods 5 to 7.

Distribution. *Pachynus chelatum* is known from the Sea of Japan in 88 to 125 m depth.

Pachynus barnardi Hurley, 1963

Fig. 24

Pachynus barnardi Hurley, 1963: 31, figs 6, 7.—J.L. Barnard, 1966a: 70; 1966b: 26; 1969b: 218, figs 25a-c; 1971: 44. *Pachynus* sp. J.L. Barnard, 1964: 232.

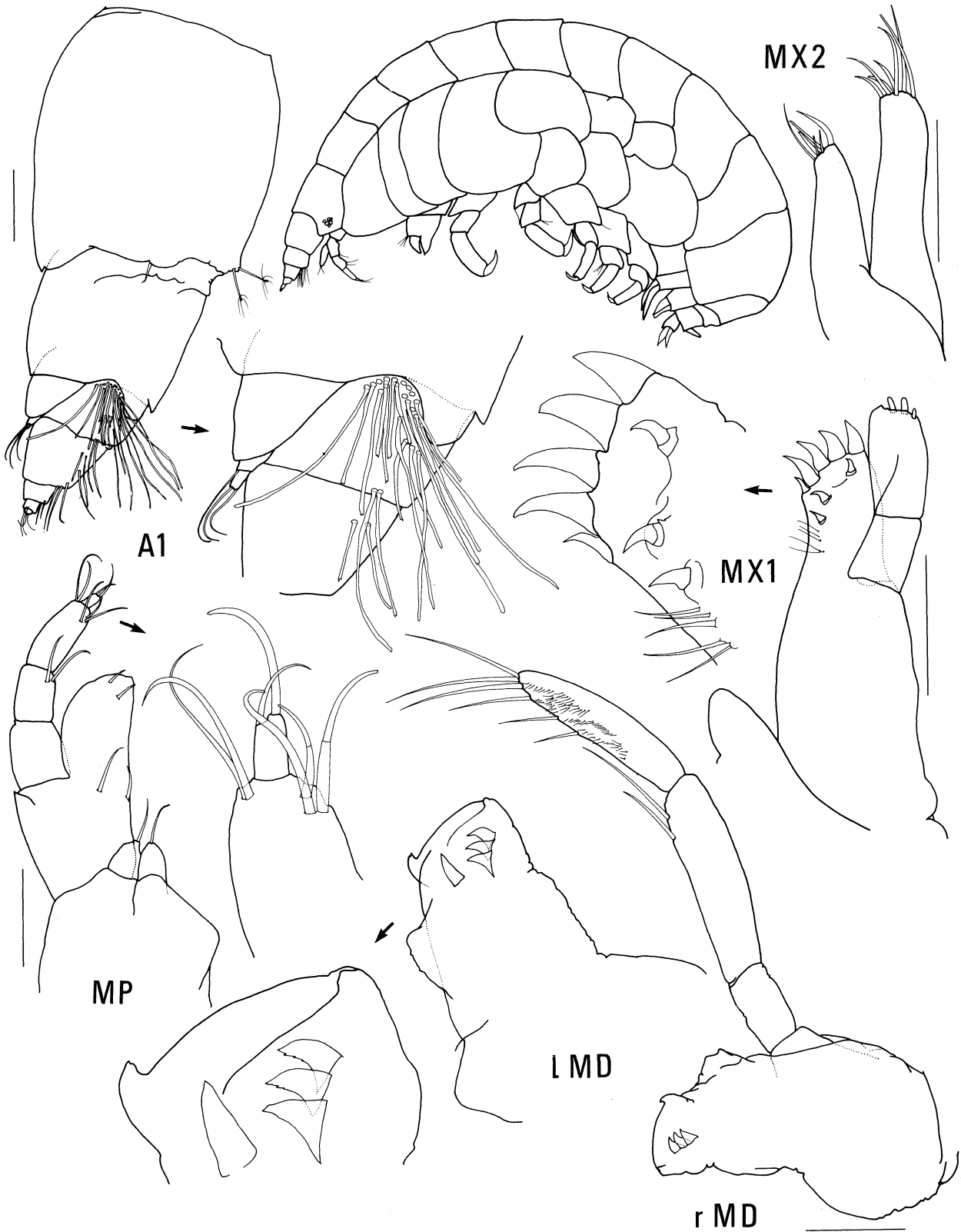


Fig. 21 *Pachynus chelatum* Bulycheva, Sea of Japan. Scales represent 0.1 mm.

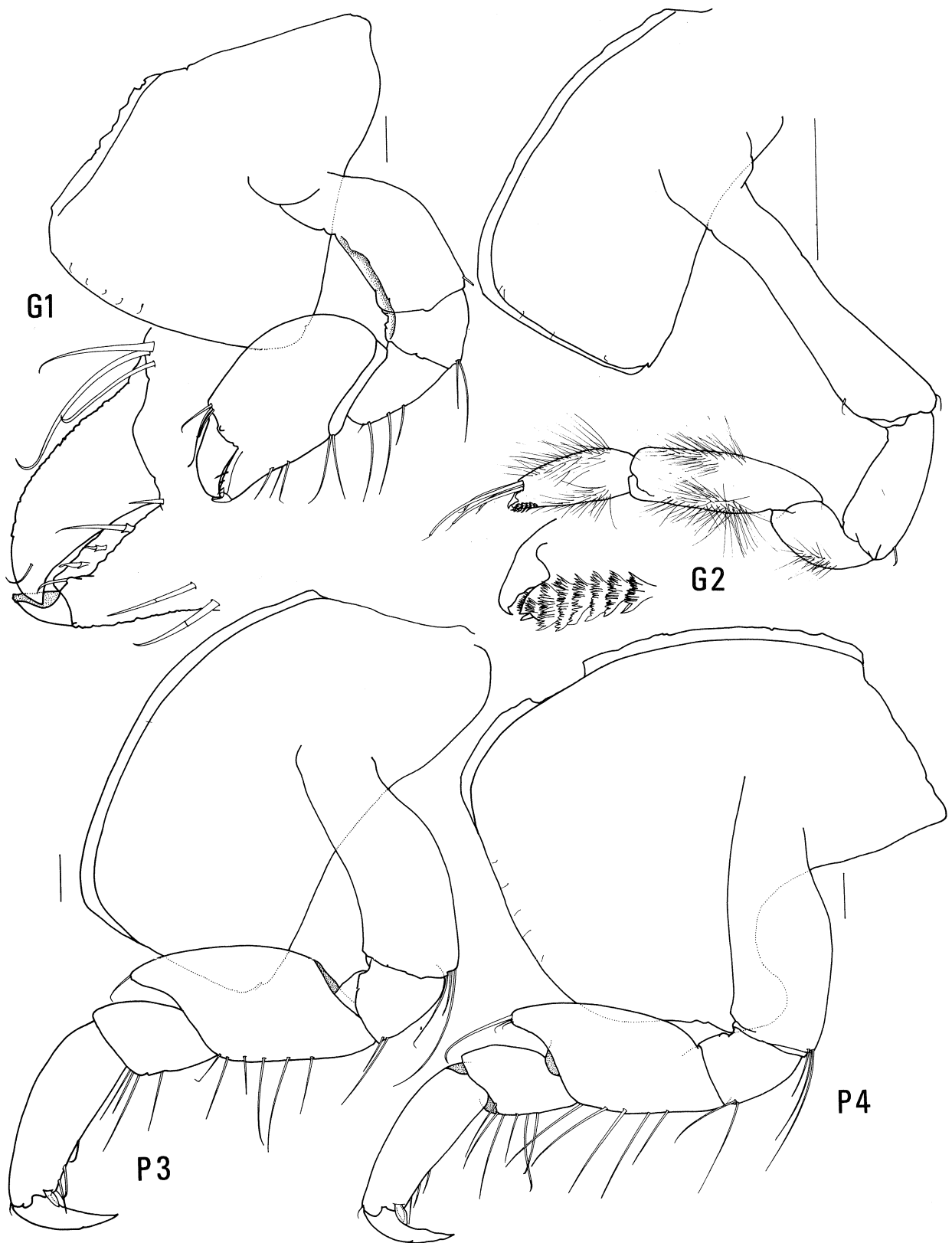


Fig. 22 *Pachynus chelatum* Bulycheva, Sea of Japan. Scales represent 0.1 mm.

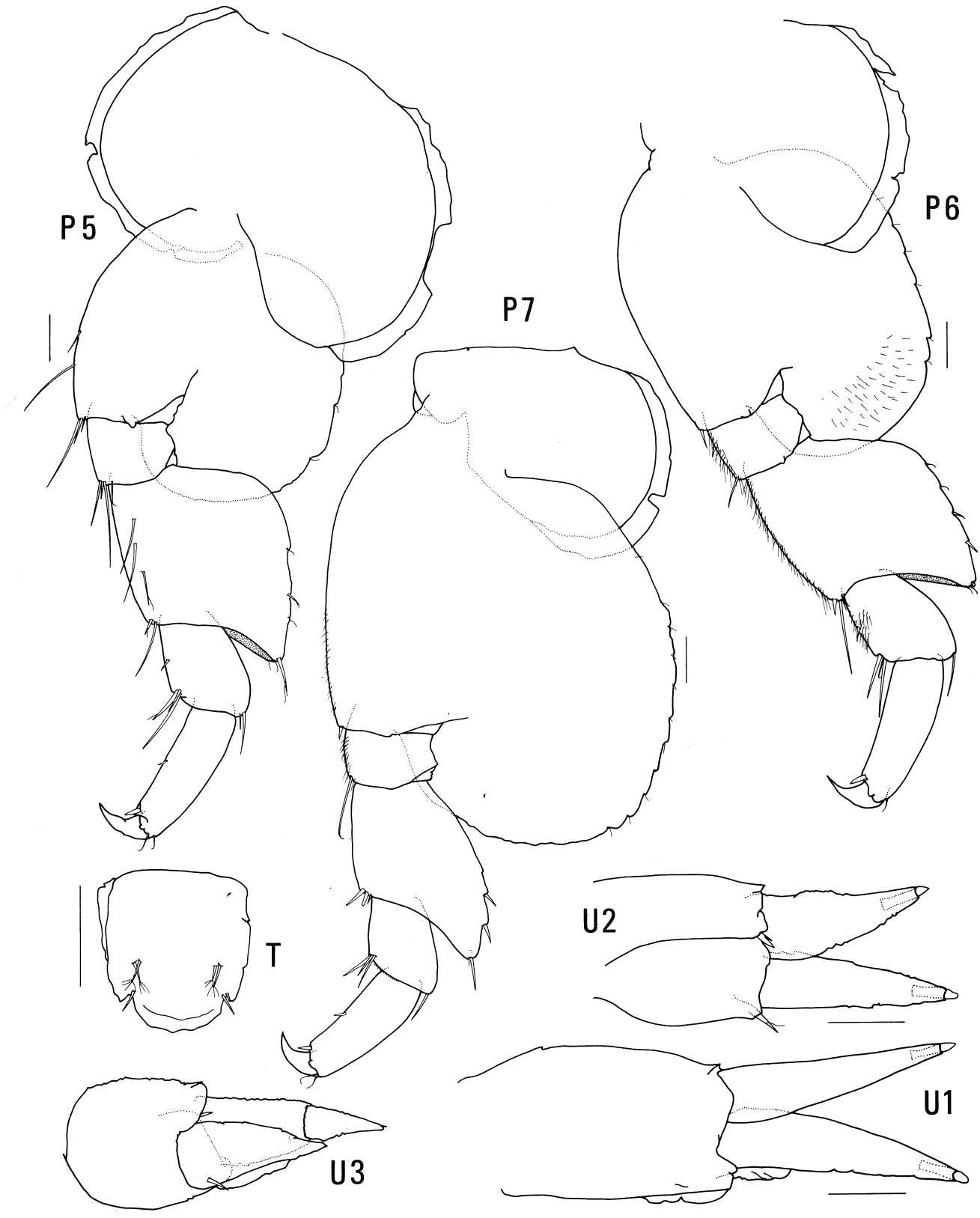


Fig. 23 *Pachynus chelatum* Bulycheva, Sea of Japan. Scales represent 0.1 mm.

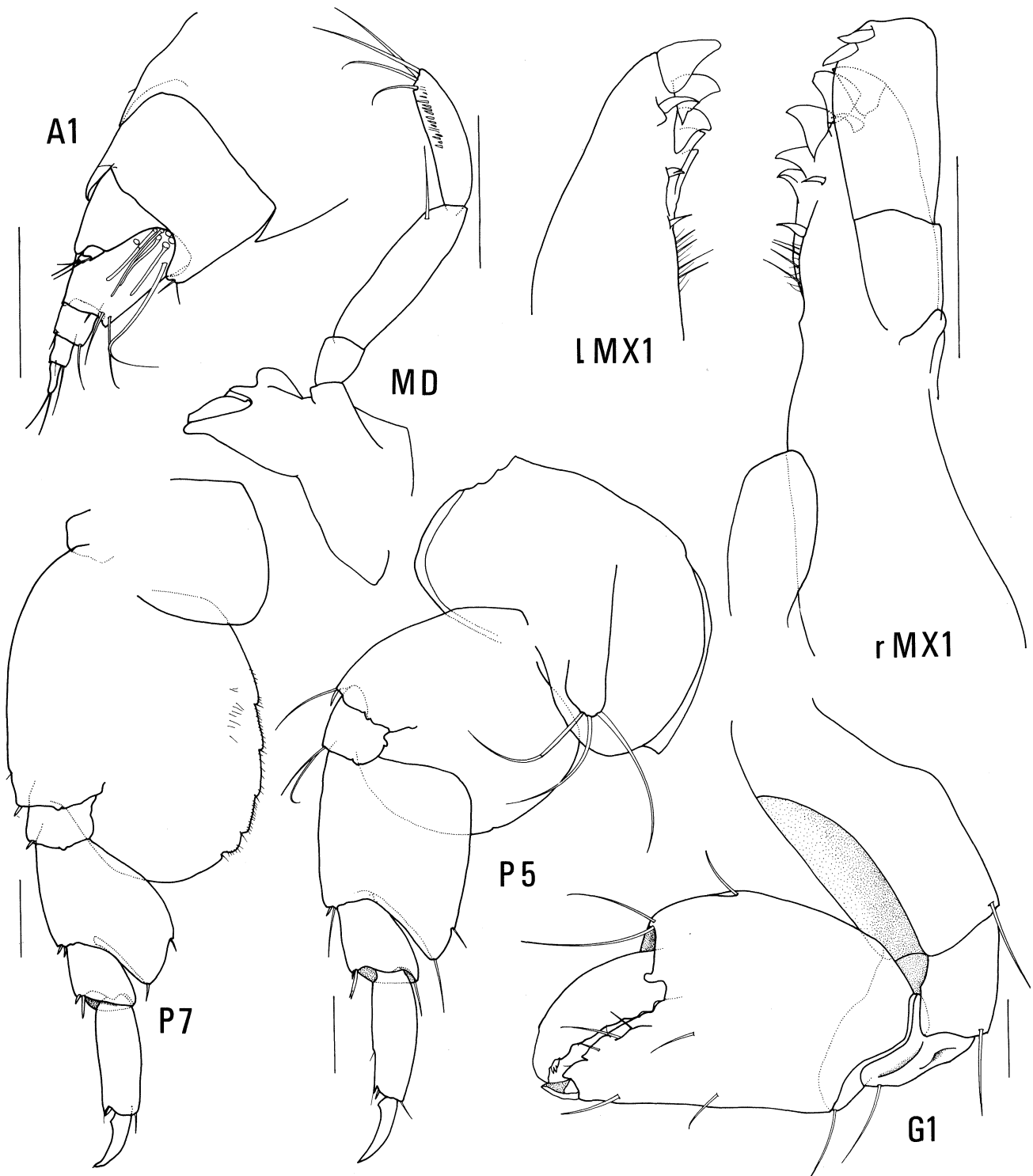


Fig. 24 *Pachynus barnardi* Hurley, holotype, W of Manhattan Beach, Los Angeles County, California, USA. MX scale represents 0.05 mm, other scales represent 0.1 mm.

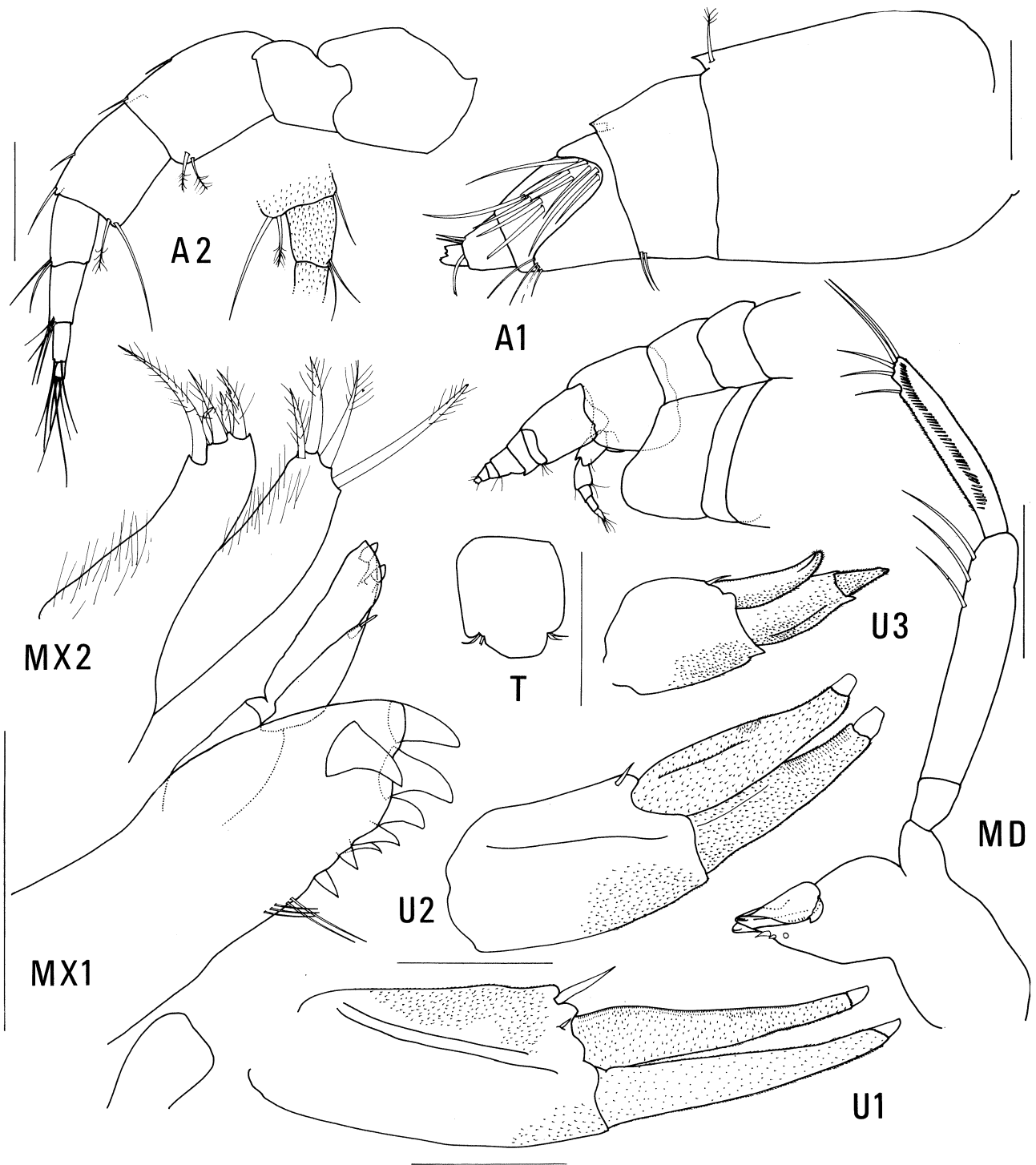


Fig. 25 *Pachynus denticulatum* n.sp., holotype, 3.4 mm, E of Malabar, Sydney, New South Wales, Australia. Scales represent 0.1 mm.

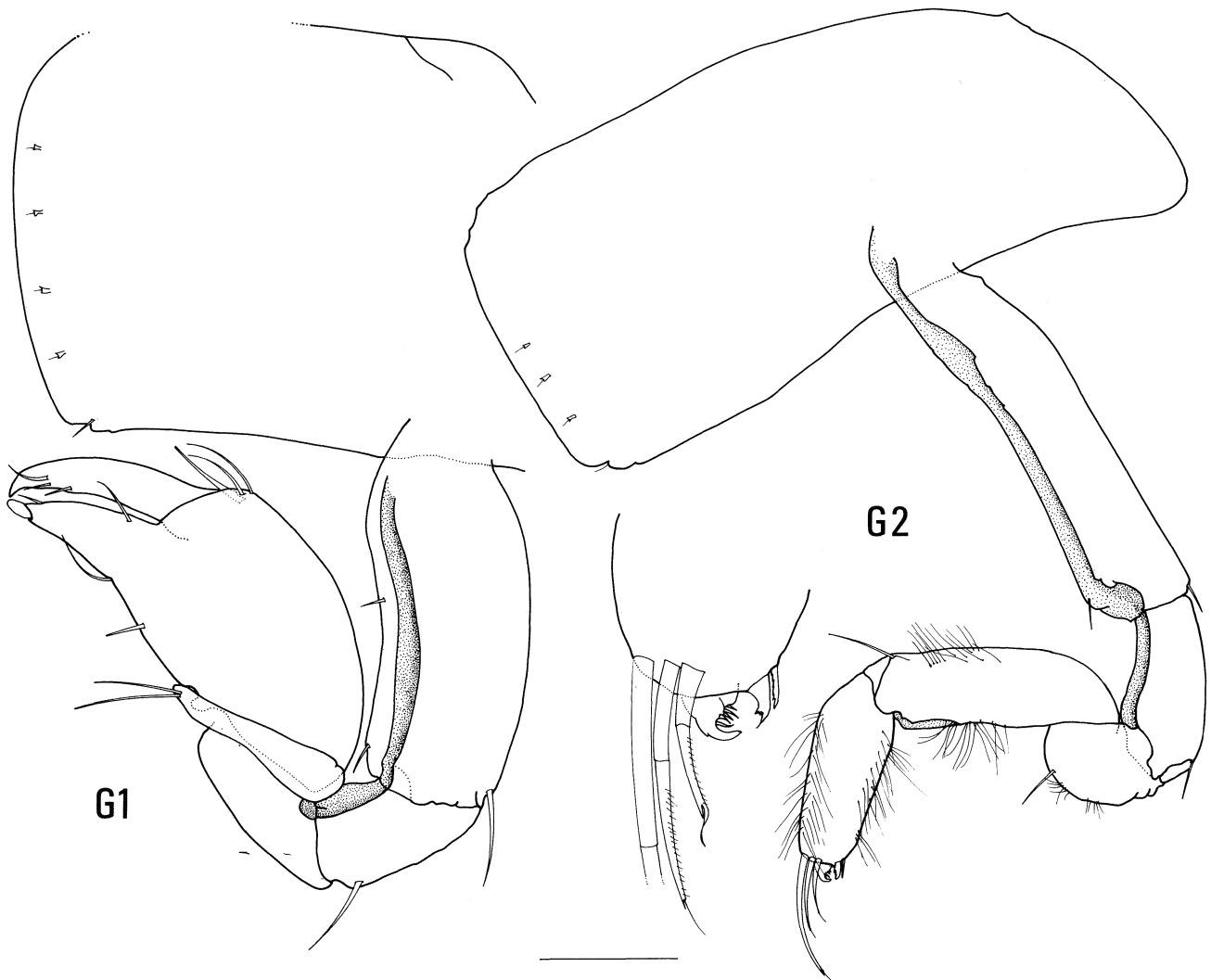


Fig. 26 *Pachynus denticulatum* n.sp., holotype, 3.4 mm, E of Malabar, Sydney, New South Wales, Australia. Scale represents 0.1 mm.

Material examined. HOLOTYPE, 1 slide, AHF 5510, slide L.7, 1.7 miles W of end of pier, Manhattan Beach, Los Angeles County, California, 33°52'43"N 118°26'53"W, 40 m, Hayward grab, black mud, 5 February 1955, Station 2991-55. Additional AHF material: 1 specimen, Monterey Bay, California, 82 m, Station 6458; 1 specimen, Mugu Canyon, California, 171 m, Station 4851; 1 specimen, Newport Canyon, California, 97 m, Station 5367.

Diagnosis. Antenna 1, accessory flagellum 2-articulate. Maxilla 1, outer plate with a 5/3 spine-tooth formula; palp with 2 terminal articulating spines. Gnathopod 1 chelate; article 6 moderately produced posterodistally. Peraeopod 7, article 2 slightly longer than broad, posterior margin and posteroventral corner gently rounded. Uropods not covered in minute denticles. Uropod 3, inner ramus subequal in length to article 1 of outer ramus.

Remarks. *Pachynus barnardi* is closely related to *P. chelatum*, as discussed under that species.

Distribution. *Pachynus barnardi* is known from several sites off the coast of southern California and Mexico in depths between 12 and 800 m.

Pachynus denticulatum n.sp.

Figs 25-27

Type-material. HOLOTYPE, 3.4 mm, AM P24232, E of Malabar, Sydney, Australia, 151°19'E 33°57'S, Shipek grab, medium sand, 69 m, Australian Museum Shelf Benthic Survey, 17 May 1972.

Additional material examined. One specimen, AM P33837, Halifax Bay, Queensland, Australia, 19°07'S, 146°33'E, 2 m, January 1978, Station 78-1-A.

Diagnosis. Antenna 1 with accessory flagellum absent. Maxilla 1, outer plate with a 5/3 spine-tooth formula, tooth 1 on inner row enlarged; palp with 2 terminal articulating spines. Gnathopod 1 chelate, article 6 strongly produced posterodistally. Peraeopod

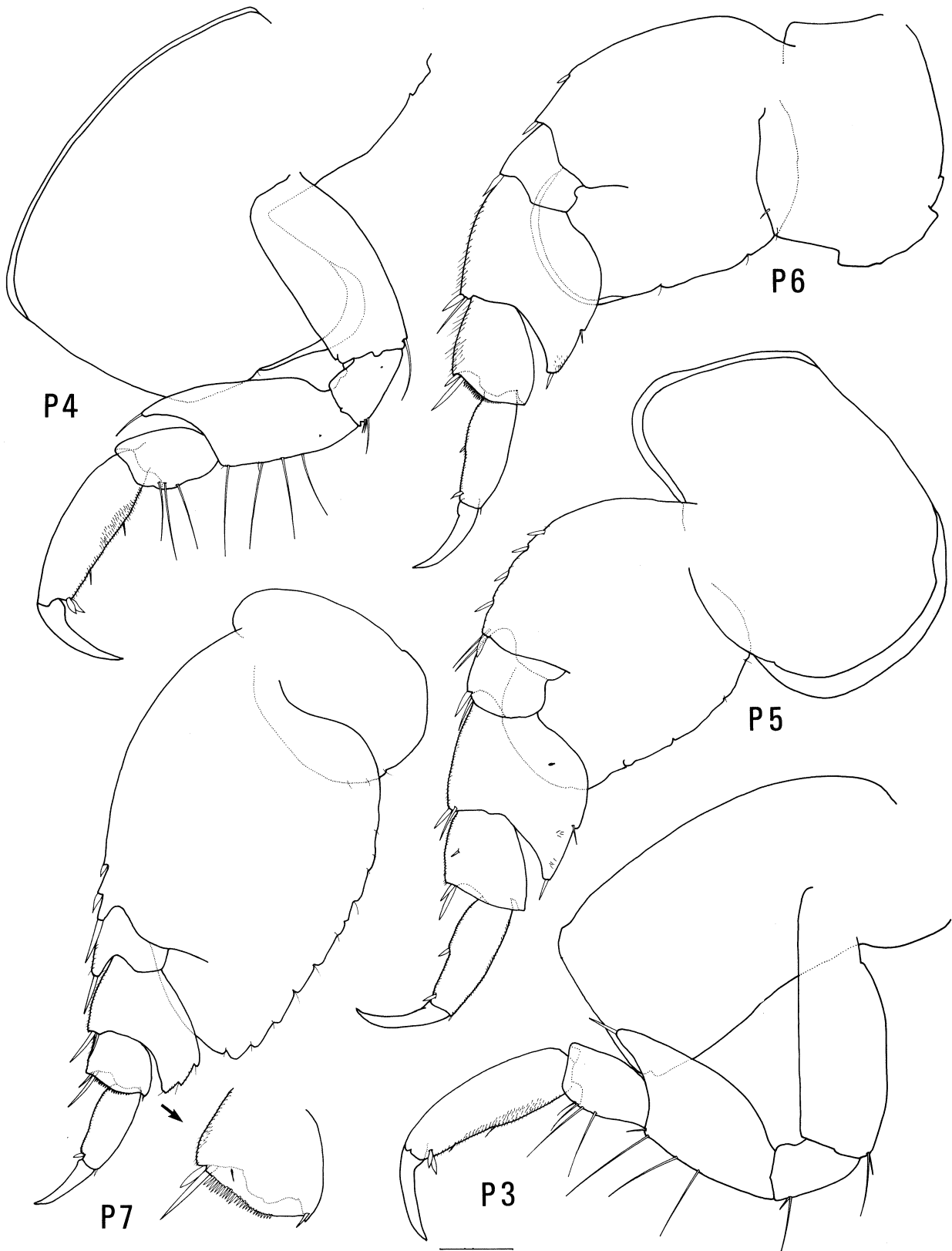


Fig. 27 *Pachynus denticulatum* n.sp., holotype, 3.4 mm, E of Malabar, Sydney, New South Wales, Australia. Scale represents 0.1 mm.

7, article 2 longer than broad, posterior margin straight, posteroventral corner subacute. Uropods covered in minute denticles. Uropod 3, inner ramus subequal in length to article 1 of outer ramus.

Description. Holotype, 3.4 mm. *Antenna 1*: peduncle large, more than twice as long as flagellum; flagellum damaged, at least 3-articulate, proximal articles fused, bearing rows of aesthetascs; accessory flagellum absent. *Antenna 2* slender, shorter than antenna 1; flagellum 5-articulate.

Mandible: left side not known, right side with 3 accessory spines; palp slender, article 2 longer than article 3, with 3 mediodistal setae; article 3 with 5 terminal setae. *Maxilla 1*: inner plate small, subquadrate, without setae; outer plate with 8 spine-teeth in a 5/3 formula, tooth 1 on inner row enlarged; palp with 2 terminal spines. *Maxilla 2*: short with subquadrate plates, each bearing 4 stout terminal setae. *Maxilliped* unknown.

Gnathopod 1 large, chelate; coxa subquadrate; article 6 longer than broad, strongly produced posterodistally, palm defined by a concave spine. *Gnathopod 2* minutely chelate, article 5 longer than article 6; article 6 more than twice as long as broad.

Peraeopod 4: coxa with projecting posteroproximal corner on posteroventral lobe; article 4 shorter than article 6 with anterior margin produced halfway along article 5; article 6 with minute denticles along posterior margin. *Peraeopod 5*: article 2 longer than broad, posterior margin straight, anterior margin with 5 short spines; article 4 large, posteroproximal corner broadly rounded. *Peraeopod 6*: article 2 longer than broad, posterior margin straight, anterior margin with 2 short spines; article 4 large, posteroproximal corner broadly rounded. *Peraeopod 7*: article 2 longer than broad, posterior margin straight, crenulate, posteroventral corner sharply rounded; article 4, posterior margin oblique, slightly convex with 3 minute posterodistal setae.

Uropod 1: peduncle subequal in length to outer ramus; inner ramus slightly shorter than outer ramus; both covered in minute denticles. *Uropod 2*: peduncle as long as rami; rami subequal in length, stockier than rami of uropod 1 and covered in minute denticles. *Uropod 3*: peduncle about as long as outer ramus; inner ramus as long as article 1 of outer ramus; rami covered in minute denticles. *Telson* slightly longer than broad, entire, with 2 pairs of short terminal setae.

Etymology. The name *denticulatum* refers to the minute denticles on the uropods.

Remarks. *Pachynus denticulatum* appears to be the most apomorphic species in the genus. It differs significantly from other *Pachynus* species in the morphology of the spine-teeth on maxilla 1, the enlarged article 2 of peraeopod 7 and the presence of minute denticles on the uropods.

Distribution. *Pachynus denticulatum* is known along the coast of eastern Australia from one specimen collected off Port Jackson, New South Wales in 69 m

depth and one specimen collected in Halifax Bay, Queensland in 2 m depth.

Figorella J.L. Barnard, 1962

Figorella J.L. Barnard, 1962: 24.—1969a: 343.

Diagnosis. Antenna 1, proximal articles of flagellum not fused in male or female, male reproductive stage not known. Left mandible with lacinia mobilis, small accessory spines on both mandibles. Maxilla 1, inner plate subquadrate with several terminal setae; outer plate with 10 smooth spine-teeth; palp 2-articulate with small terminal setae. Maxilla 2 with short subquadrate plates bearing terminal and subterminal setae. Maxilliped, inner plates small with several apical setae; outer plates large, reaching to the end of palp article 3; palp 4-articulate. Gnathopod 1 subchelate, palm defined by simple spine. Gnathopod 2, dactyl large, palm slightly oblique. Coxa 4 with well-developed posteroventral lobe. Peraeopods 5 and 6, article 4 expanded posteriorly with weakly-developed posteroproximal shoulder. Peraeopods 5 to 7, article 5 without minute denticles along distal margin. Uropod 3 biramous.

Type-species. *Figorella tanidea* J.L. Barnard, 1962 (original designation).

Remarks. *Figorella* differs from *Pachynus* in the number of spine-teeth on maxilla 1, in not having fused proximal articles on the flagellum of antenna 1 in adult males and female, and in having terminal setae on the palp of maxilla 1. *Figorella* shows some relationship to *Acheronia* in that neither genus has fused proximal articles on the flagellum of antenna 1 and both have terminal setae on the palp of maxilla 1. Both *Ekelofia* and *Figorella* have a simple spine defining the palm of gnathopod 1.

Figorella contains two species, *F. tanidea* known from the East Scotia Basin off South Georgia and *F. tasmanica* known from the Tasman Sea off south-eastern Australia.

Figorella tasmanica n.sp.

Figs 28-30

Type-material. HOLOTYPE, female, 3.7 mm, AM P31998; 22 PARATYPES, 2.6 to 5.9 mm, AM P 25477; E of Port Kembla, New South Wales, Australia, 34°27'S 151°27'E, from Globigerina ooze, 1200 m, J.K. Lowry on FRV *Kapala*, 13 December 1976, K76-23-02.

Additional material examined. One specimen, AM P33632, off Sydney, New South Wales, Australia, 33°37'S, 152°04'E to 33°39'S 152°02'E, dredged, 914 m, R. Springthorpe and P. Colman on FRV *Kapala*, 10 December 1980, K80-20-08. One specimen, AM P33633, NE of Port Jackson, New South Wales, Australia, 33°41'S 152°01'E, epibenthic sled, 615 m, Australian Museum party on FRV *Kapala*, 11 December 1978, K78-27-03.

Diagnosis. Mandible with 4 accessory spines. Maxilla 1, outer plate with a 5/5 spine-tooth formula.

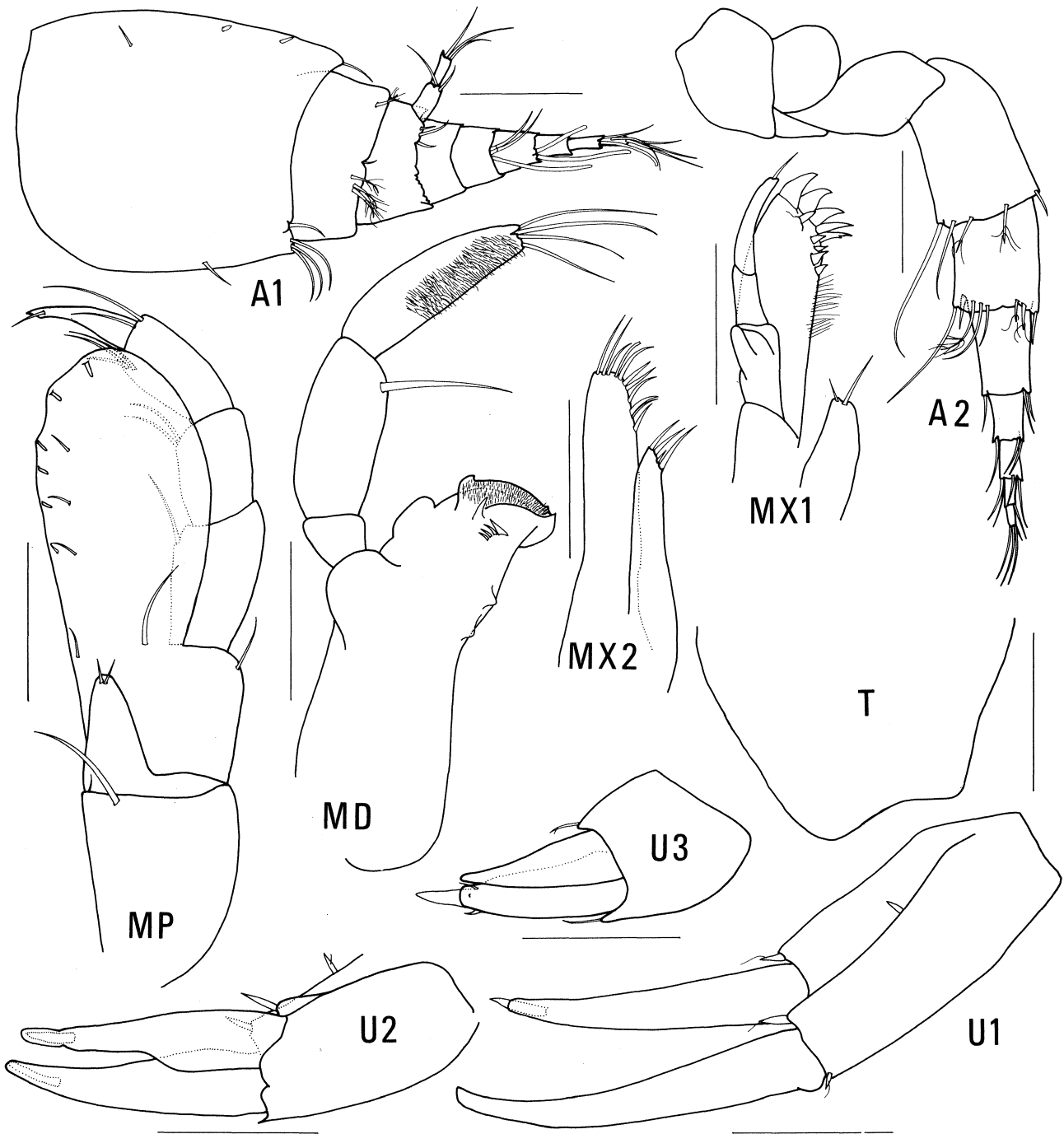


Fig. 28 *Figorella tasmanica* n.sp., holotype, female, 3.7 mm, E of Port Kembla, New South Wales, Australia. Scales represent 0.1 mm.

Gnathopod 2 with slightly oblique palm. Peraeopods 5 and 6 with article 4 strongly expanded posteriorly. Peraeopod 7, article 2 with slightly emarginate posteroventral corner. Uropod 3, inner ramus subequal in length to outer ramus.

Description. Holotype female, 3.7 mm. *Antenna 1*:

2 and 3 combined, peduncle twice as long as 6-articulate flagellum; accessory flagellum 2-articulate. *Antenna 2* subequal to antenna 1; flagellum 5-articulate.

Mandible: left lacinia mobilis present; 4 accessory spines present; 3-articulate palp attached midway along dorsal edge, article 2 broad, shorter than article 3 with one large distal seta, article 3 covered in minute hairs,

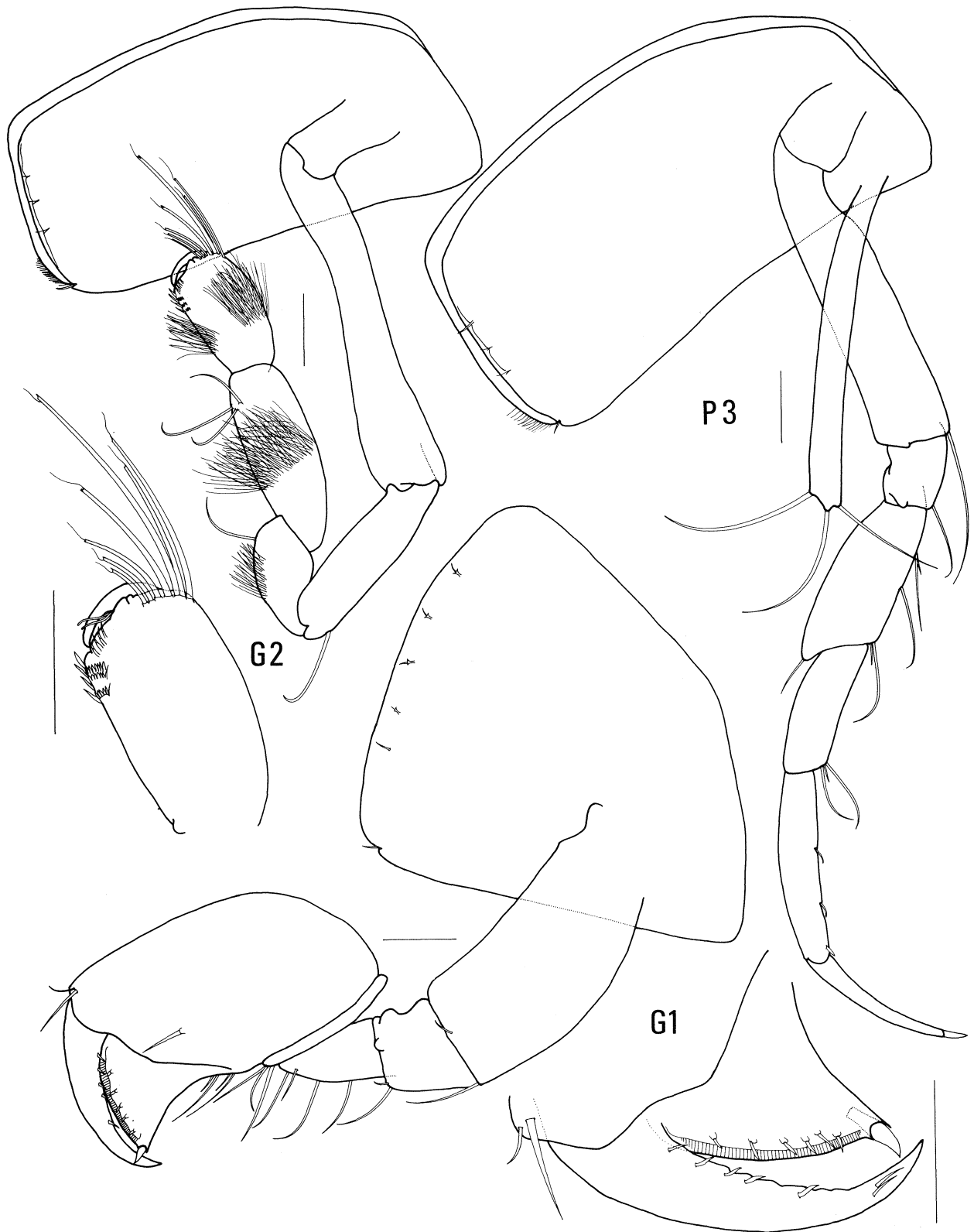


Fig. 29 *Figorella tasmanica* n.sp., holotype, female, 3.7 mm, E of Port Kembla, New South Wales, Australia. Scales represent 0.1 mm.

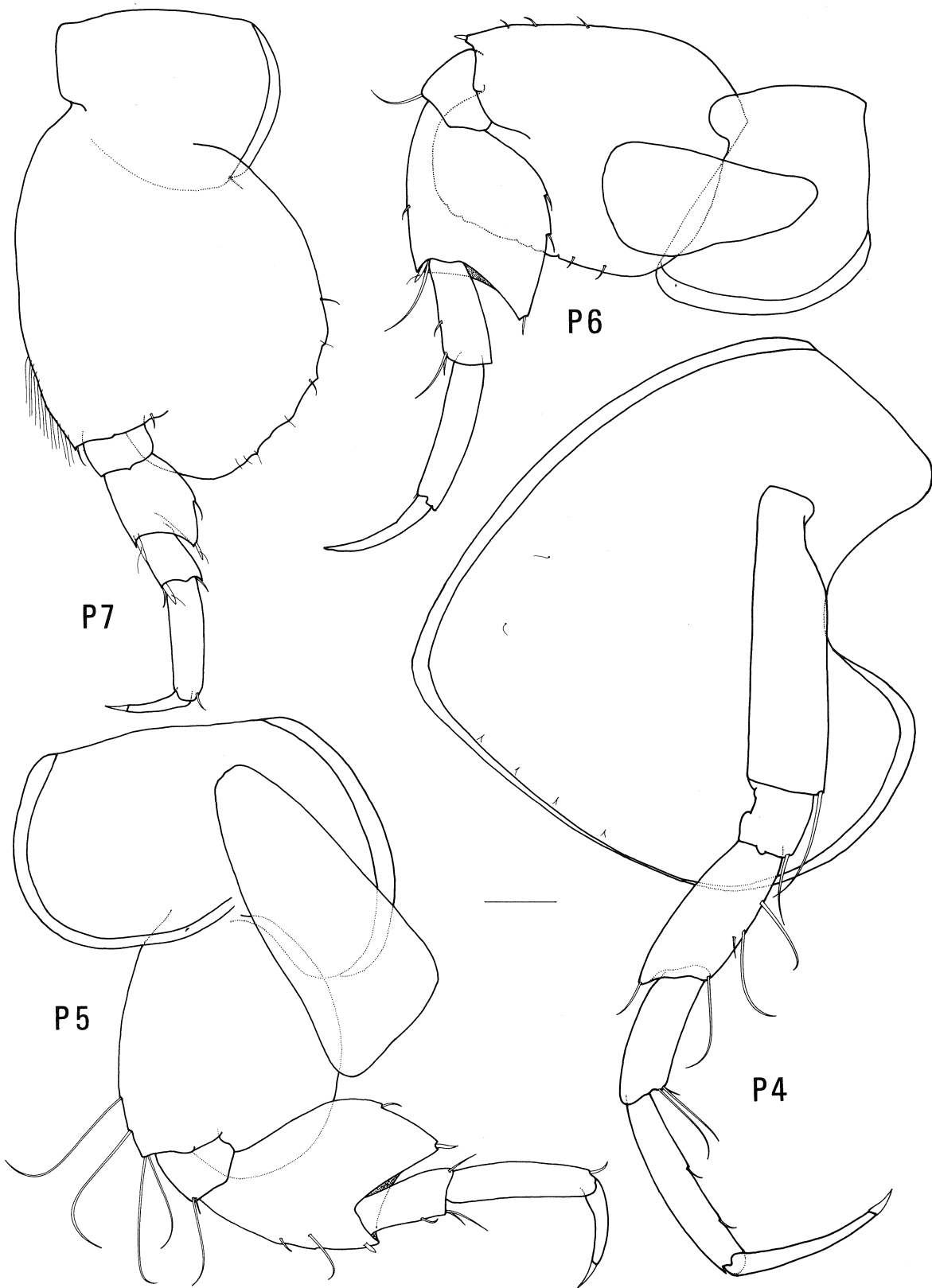


Fig. 30 *Figorella tasmanica* n.sp., holotype, female, 3.7 mm, E of Port Kembla, New South Wales, Australia. Scale represents 0.1 mm.

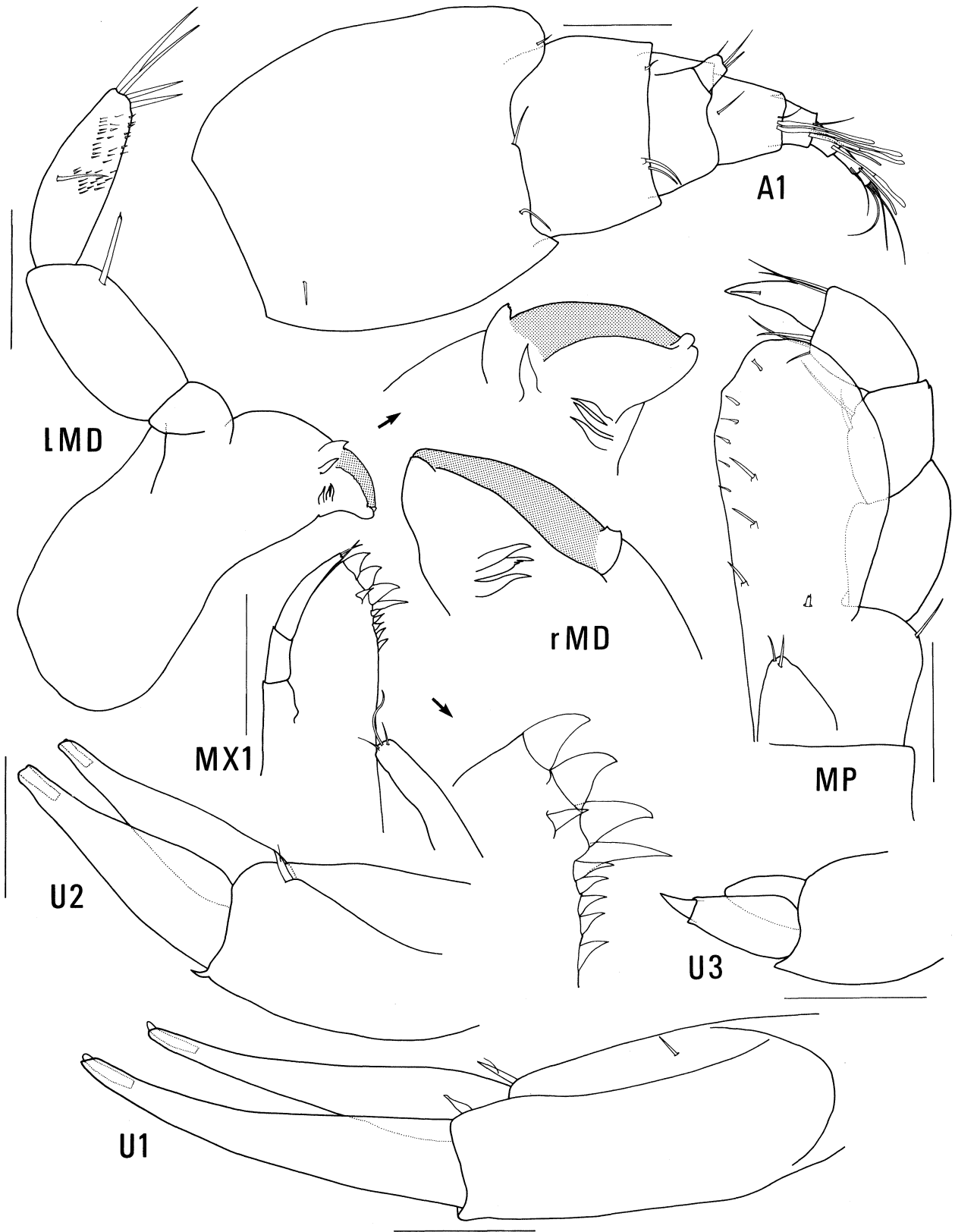


Fig. 31 *Figorella tanidea* J.L. Barnard, holotype, East Scotia Basin, South Atlantic Ocean. Scales represent 0.1 mm.

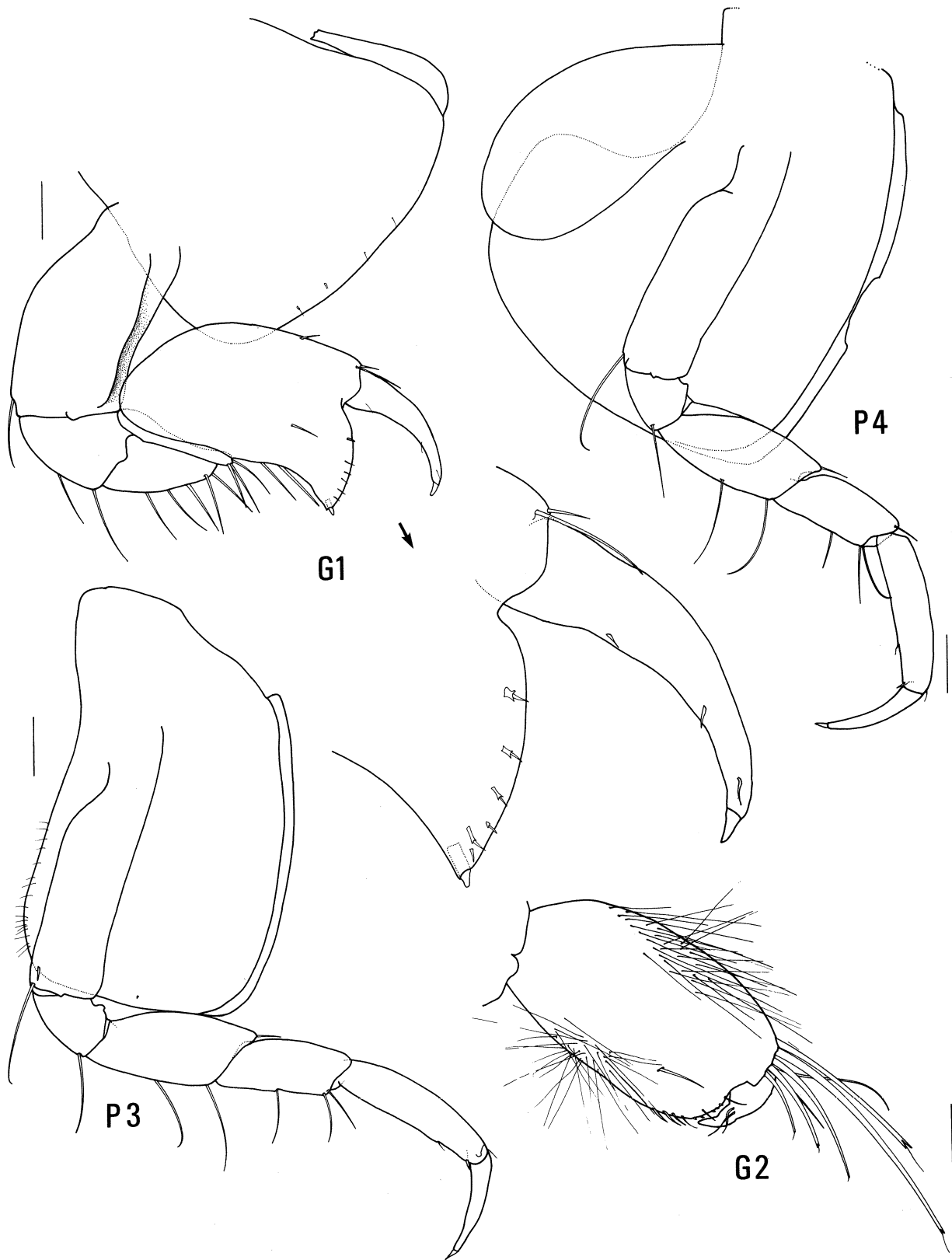


Fig. 32 *Figorella tanidea* J.L. Barnard, holotype, East Scotia Basin, South Atlantic Ocean. Scales represent 0.1 mm.

with 4 large terminal setae. *Maxilla 1*: inner plate reduced, narrow, subquadrate with 2 terminal setae; outer plate with 10 spine-teeth in a 5/5 formula; palp 2-articulate with 1 terminal seta. *Maxilla 2* reduced; inner plate with 4 terminal setae; outer plate with about 11 terminal setae. *Maxilliped*: inner plates present but reduced; outer plates large, subovate, reaching to distal end of palp article 3; palp slender, 4-articulate.

Gnathopod 1 large, subchelate; coxa expanded distally; article 6 large, longer than broad, palm convex, defined by a large simple spine; dactyl closing along entire palmar margin. *Gnathopod 2* subchelate; article 5 longer than article 6; article 6 with slightly oblique palm, about 3 serrate spines posterodistally.

Peraeopod 3: coxa twice as long as broad, subquadrate; dactyl long and thin. *Peraeopod 4*: coxa as long as broad, strongly produced posteroventrally; otherwise similar to peraeopod 3. *Peraeopod 5*: article 2 with an evenly rounded posterior margin; article 4 large, strongly expanded posteriorly. *Peraeopod 6* similar to peraeopod 5; article 2 with posterior margin straight. *Peraeopod 7*: article 2 larger than article 2 of peraeopods 5 and 6, rounded posteriorly; article 4 smaller than article 4 of peraeopods 5 and 6, not expanded posteriorly.

Uropod 1: peduncle slightly shorter than rami; outer ramus longer than inner ramus. *Uropod 2* shorter than uropod 1; peduncle shorter than rami; rami subequal in length. *Uropod 3* shorter than uropod 2; peduncle shorter than rami; inner ramus nearly as long as outer ramus. *Telson* emarginate, as broad as long, tapering distally.

Etymology. The specific name refers to the Tasman Sea.

Remarks. *Figorella tasmanica* is related to *F. tanidea* as outlined under that species.

Distribution. *Figorella tasmanica* is known from several collections made in 615 to 1200 m depth off the east coast of New South Wales, Australia. The species appears to be relatively common in this area.

Figorella tanidea J.L. Barnard, 1962

Figs 31-33

Figorella tanidea J.L. Barnard, 1962: 25, figs 7, 8.—Lowry and Bullock, 1976: 90.

Material examined. HOLOTYPE, AMNH 11905, East Scotia Basin, South Atlantic Ocean, 55°29'S 37°57'W, 3770 m, 6 March 1958, *Vema* Station 47.

Diagnosis. Mandible with 3 accessory spines. Maxilla 1, outer plate with a 4/6 spine-tooth formula. Gnathopod 2 with almost transverse palm. Peraeopods 5 and 6 with article 4 moderately expanded posteriorly. Peraeopod 7, article 2 with rounded posteroventral corner. Uropod 3, inner ramus shorter than article 1 of outer ramus.

Remarks. Although *F. tanidea* and *F. tasmanica* appear to be separated by a great distance they are very closely related. The most important morphological

differences occur in the mouthparts, but the most obvious differences are seen in peraeopod 7 and uropod 3. Until further collections of these interesting deep-sea pachynids become available for study little more can be said.

Distribution. *Figorella tanidea* is known from one specimen collected off South Georgia in the East Scotia Basin in 3770 m depth.

Acheronia n.gen.

Diagnosis. Antenna 1, proximal articles of flagellum not fused in adult female, male reproductive stage not known. Mandible with lacinia mobilis absent, small accessory spines present. Maxilla 1, inner plate subquadrate with 2 terminal setae; outer plate with 6 smooth spine-teeth in a 3/3 formula; palp 2-articulate with several apical setae. Maxilla 2 with short plates, inner plate tapering distally with apical setae; outer plate subquadrate with medial and terminal setae. Maxilliped, inner plates small; outer plates large, reaching end of palp article 3; palp 4-articulate. Gnathopod 1 subchelate, palm defined by projecting tooth. Gnathopod 2, dactyl large, palm extremely oblique. Coxa 4 with well-developed posteroventral lobe. Peraeopods 5 and 6, article 4 expanded posteriorly, with well-developed posteroproximal shoulder. Peraeopods 5 to 7, article 5 without minute denticles along distal margin. Uropod 3 biramous.

Type-species. *Acheronia pegasus* n.sp.

Etymology. The generic name refers to the *Acheron*, the support ship which carried supplies and personnel for expeditions to the New Zealand subantarctic islands during the 1970's.

Remarks. *Acheronia* is a remarkable genus known from one species, *A. pegasus*, living on the Campbell Plateau south of New Zealand. The only derived characters which separate *Acheronia* from other pachynids are the large dactyl and extremely oblique palm of gnathopod 2. The structure of the palm and dactyl is most similar to the large dactyl and slightly oblique palm of gnathopod 2 in *Figorella*. *Acheronia* and *Figorella* also share terminal setae on the palp of maxilla 1, but *Acheronia* has lost the lacinia mobilis on the mandible, has a greatly reduced spine-tooth formula on maxilla 1 and does not have a simple spine defining the palm of gnathopod 1.

Acheronia has the same spine-tooth formula as *Pachychelium* and both genera have a tooth defining the palm of gnathopod 1. *Acheronia* differs from *Pachychelium* in having accessory spines on the mandible, a 2-articulate palp on maxilla 1, a well-developed posteroventral lobe on coxa 4 and well-developed posteroproximal shoulders on the expanded fourth article of peraeopods 5 and 6.

Acheronia may show some relationship to *Ekelofia* in the number of accessory spines and the loss of the lacinia mobilis on the mandible.

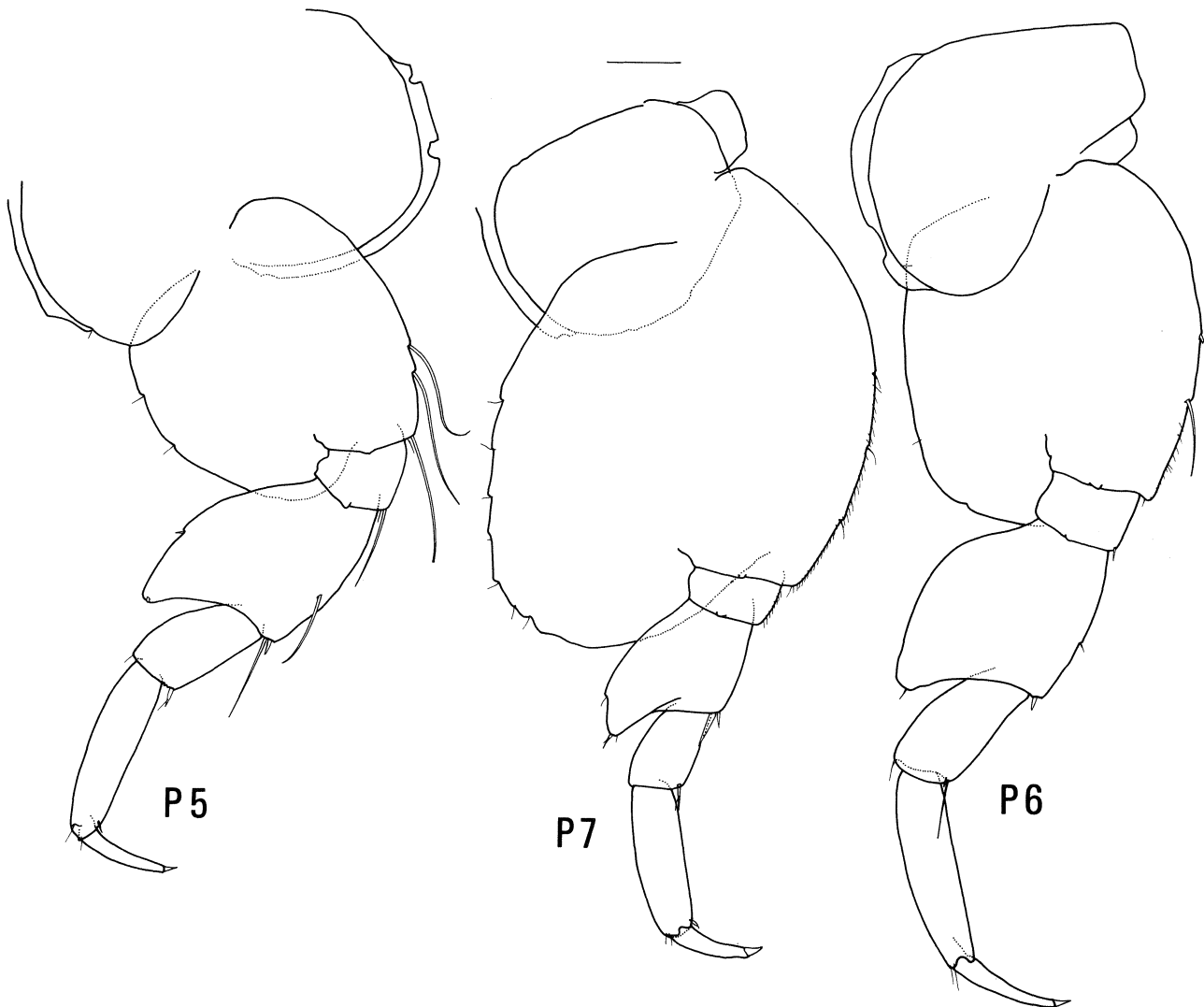


Fig. 33 *Figorella tanidea* J.L. Barnard, holotype, East Scotia Basin, South Atlantic Ocean. Scale represents 0.1 mm.

Acheronia pegasus n.sp.

Figs 34-36

Type-material. HOLOTYPE, 4.3 mm, NMNZ CR2534; 1 PARATYPE, NMNZ CR2535; 1 PARATYPE, AM P31999; North Arm, Port Pegasus, Stewart Island, New Zealand, 47°10'S 167°41'E, sandy-silt bottom, 42 m, J.K. Lowry on the *Acheron*, 23 March 1972.

Diagnosis. As for genus.

Description. Holotype, 4.3 mm. *Antenna 1* short, stocky; peduncle twice as long as 6-articulate flagellum; accessory flagellum 2-articulate. *Antenna 2* subequal to antenna 1; flagellum 5-articulate.

Mandible: lacinia mobilis absent; 2 accessory spines present; palp attached midway along dorsal margin, article 2 slightly longer than article 3 with at least 2 long distal setae, article 3 sparsely covered with minute hairs and bearing 3 subterminal and 3 terminal setae. *Maxilla 1:* inner plate reduced, narrow, subquadrate with 2

terminal setae; outer plate with 6 spine-teeth in a 3/3 formula; palp lost from holotype, 2-articulate in paratype. *Maxilla 2:* inner plate reduced with 3 terminal setae; outer plate reduced with 2 terminal and 4 subterminal setae. *Maxilliped:* inner plate vestigial, outer plate large, subovate, reaching midway along palp article 3 with small spines along medial margin; palp slender, 4-articulate.

Gnathopod 1 large, subchelate; coxa about as broad as long with produced and rounded anteroventral corner; article 6 large, longer than broad, palm transverse, posterior corner with large tooth; dactyl closing along entire palmar margin. *Gnathopod 2* subchelate; coxa longer than broad; article 5 slightly longer than article 6; article 6 with serrate spines on posterior margin, palm extremely oblique; dactyl large.

Peraeopods 3 and 4: coxa 3 similar to coxa 2; coxa 4 as long as coxa 3 but strongly produced posteroventrally; in other respects very similar.

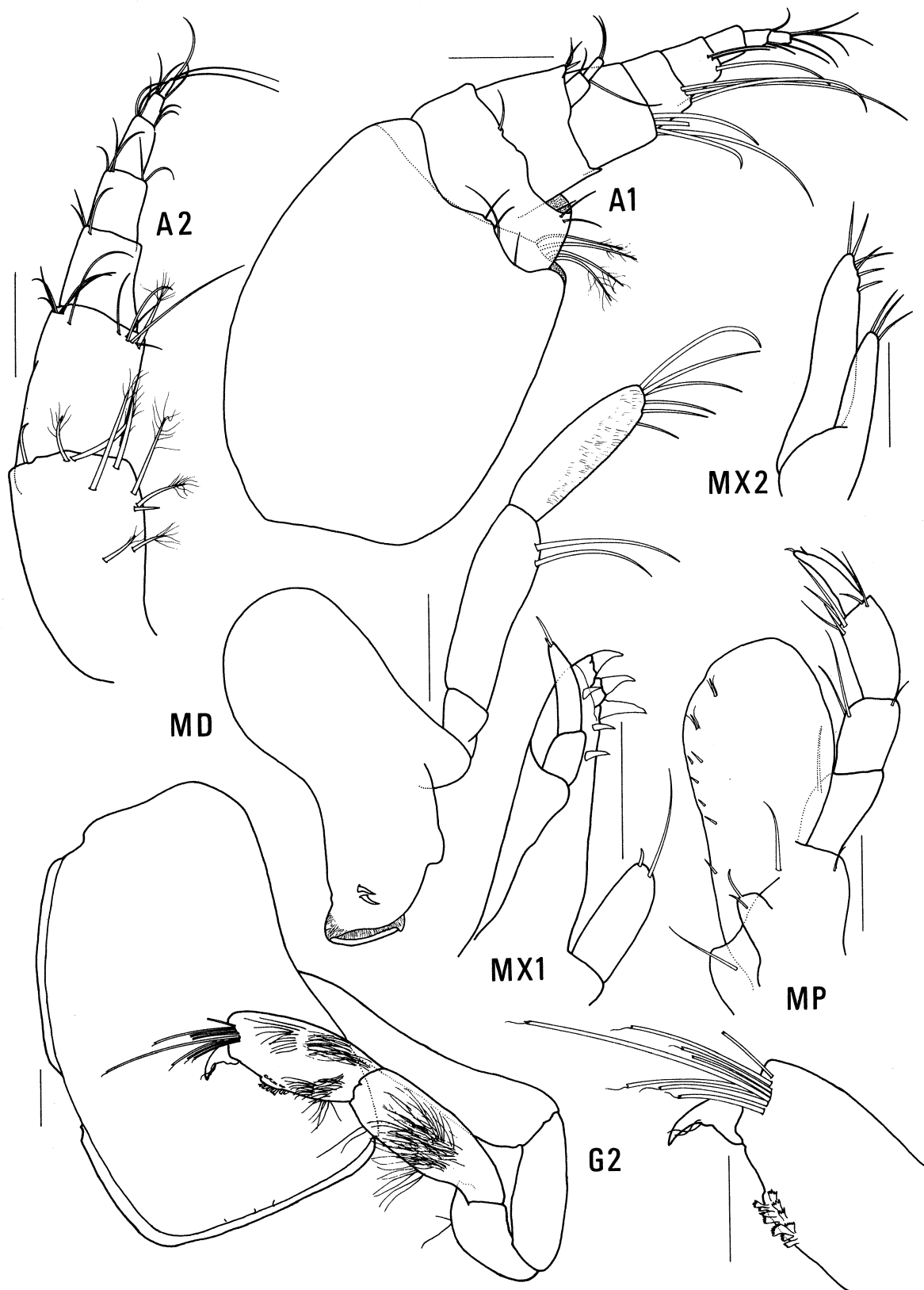


Fig. 34 *Acheronia pegasus* n.gen. n.sp., holotype, 4.3 mm; MXI, paratype; North Arm, Port Pegasus, Stewart Island, New Zealand. Scales represent 0.1 mm.

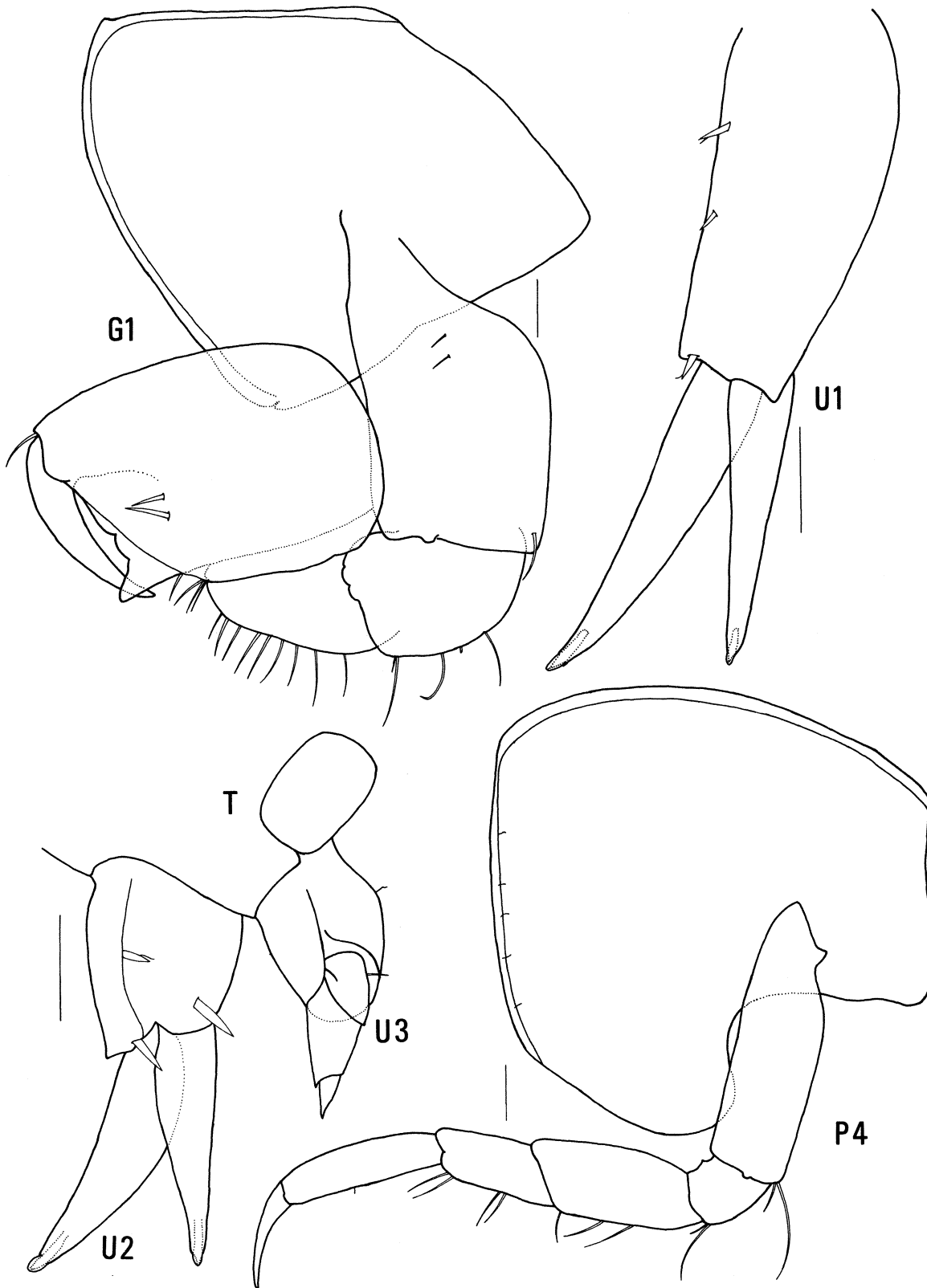


Fig. 35 *Acheronia pegasus* n.gen. n.sp., holotype, 4.3 mm; North Arm, Port Pegasus, Stewart Island, New Zealand. Scales represent 0.1 mm.

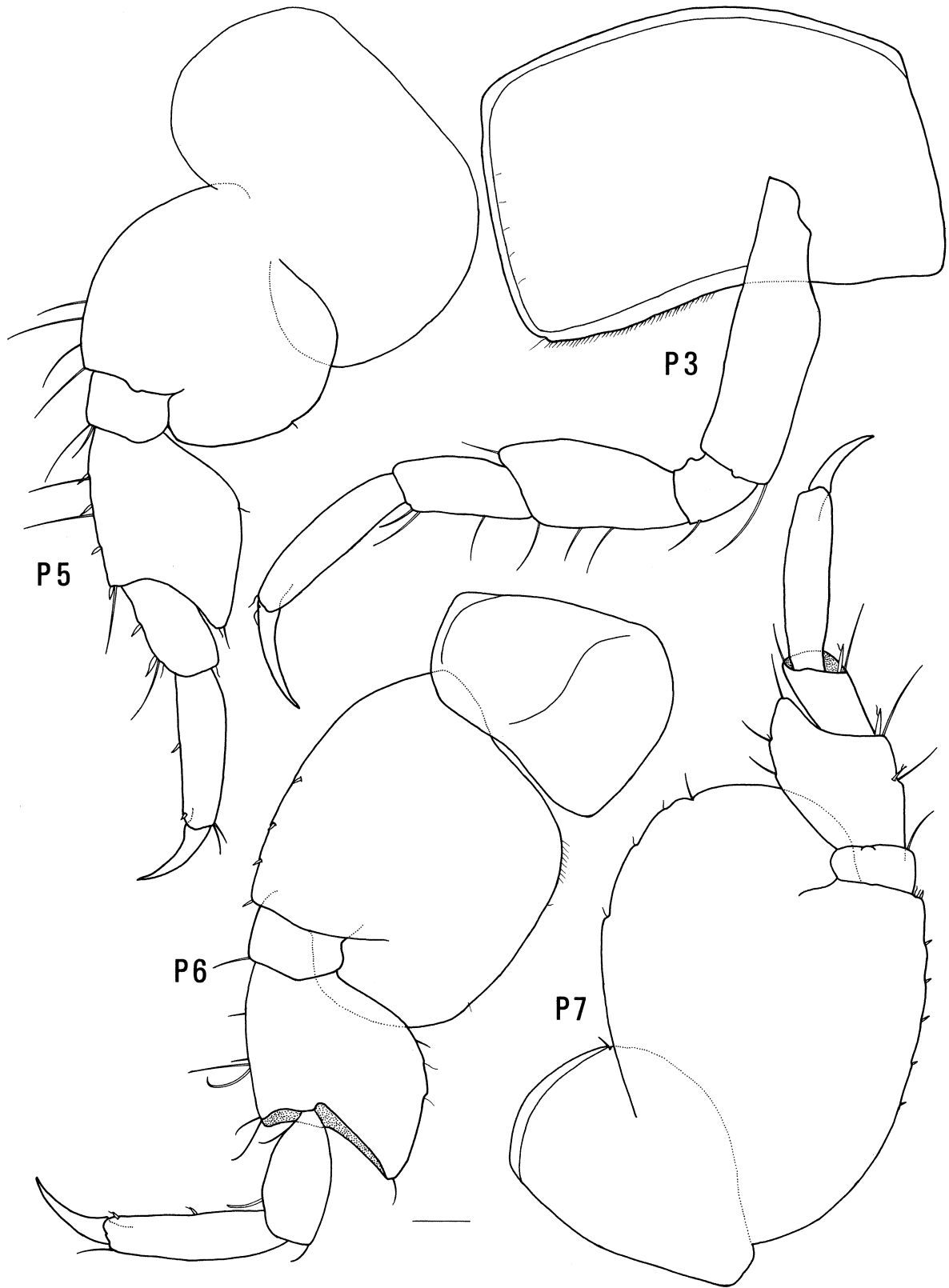


Fig. 36 *Acheronia pegasus* n.gen. n.sp., holotype, 4.3 mm; North Arm, Port Pegasus, Stewart Island, New Zealand. Scales represent 0.1 mm.

Peraeopod 5: article 2 slightly broader than long, ovate, article 4 expanded posteriorly, posterior margin straight and extending halfway along posterior margin of article 5. *Peraeopod 6*: article 2 slightly longer than broad; article 4 strongly expanded posteriorly, posterior margin slightly rounded. *Peraeopod 7*: article 2 about 1.5 times as long as broad with a rounded, slightly crenulate posterior margin; article 4 narrow with an evenly rounded posterior margin extending midway along article 5.

Uropod 1: peduncle slightly longer than rami; outer ramus slightly longer than inner ramus. *Uropod 2*: peduncle shorter than rami, with 3 stout spines; outer ramus slightly longer than inner ramus, both without marginal spines or setae. *Uropod 3*: peduncle subequal in length to outer ramus; inner ramus reduced, $\frac{1}{4}$ length of outer ramus. *Telson* broader than long, subrectangular, entire.

Etymology. The specific name refers to Port Pegasus, the type-locality.

Distribution. *Acheronia pegasus* is known from three specimens collected in Port Pegasus, Stewart Island, New Zealand in 42 m depth.

Ekelofia n.gen.

Diagnosis. Antenna 1, flagellum with fused proximal articles bearing aesthetascs. Mandible with lacinia mobilis absent, small accessory spines present. Maxilla 1, inner plate not known; outer plate with 6 smooth spine-teeth in a 4/2 formula; palp absent. Maxilla 2 with short plates; inner plate tapering distally with an apical seta; outer plate subquadrate with medial and terminal setae. Maxilliped lacking inner plates; outer plates large, reaching to end of palp article 4. Gnathopod 1 chelate, palm defined by a simple spine. Gnathopod 2, dactyl and palm minute. Coxa 4 with well-developed posteroventral lobe. Peraeopods 5 and 6, article 4 expanded posteriorly, with posteroproximal shoulder. Peraeopods 5 to 7, article 5 without minute denticles along distal margin. Uropod 3 biramous.

Type-species. *Pachychelium oculatum* Schellenberg, 1931.

Etymology. The genus is named in honour of Dr Eric Ekelöf, leader of the Swedish South Polar Expedition, 1902-03.

Remarks. *Ekelofia* differs from other pachynids in having a 4/2 spine-tooth formula. The spine defining the palm of gnathopod 1 is very similar to that structure in *Figorella*, but *Ekelofia* differs from *Figorella* in many other ways. *Ekelofia* appears to be most closely related to *Pachychelium* through the loss of the lacinia mobilis from the left mandible, the palp on maxilla 1, and the inner plates on the maxilliped, but *Ekelofia* has accessory spines on the mandibles, an articulating spine on the palm of gnathopod 1, a well-developed posteroventral lobe on coxa 4 and an expanded fourth article on peraeopods 5 and 6.

Ekelofia contains only one species, *E. oculata*, reported from South Georgia in the Southern Ocean.

Ekelofia oculata (Schellenberg, 1931) n. comb.

Figs 37, 38

Pachychelium oculatum Schellenberg, 1931: 20, fig. 9.—
Lowry and Bullock, 1976: 102.

Material examined. HOLOTYPE, 3.9 mm, SMNH type number 722, Svenska Sydpolarexp. 1901-03. N:o 25.21/5 1902. 24-52 m. Grauer Thon, eunige Algen. 54°22'S 36°27'W. Süd-Georgien. Ausserhalb der Kochtopfbucht [now officially King Edward Cove].

Diagnosis. As for genus.

Description. Holotype, 3.9 mm. Eyes present. *Antenna 1*: peduncular article 1 longer than rest of antenna, produced dorsally halfway along article 2 and ventrally completely along article 2; accessory flagellum 2-articulate, shorter than article 1 of flagellum; flagellum at least 3-articulate, article 1 about as broad as long, all articles bearing aesthetascs.

Mandible: lacinia mobilis absent; 2 small accessory spines present; palp 3-articulate, attached just distal to midpoint of dorsal margin, article 2 broad, subequal in length to article 3, with a large mediobasal spine, article 3 with rows of minute hairs and 3 large apical setae. *Maxilla 1*: inner plate missing from specimen; outer plate with 6 spine-teeth in a 4/2 formula; palp absent. *Maxilliped* lacking inner plates; outer plates large, reaching nearly to end of 4-articulate palp.

Gnathopod 1 large, chelate; coxa subquadrate with rounded ventral corners; article 6 large, about 1.75 times as long as broad, palm convex, defined by a large simple spine; posterior margin of article 6 with 4 large long spines; dactyl overreaching palm. *Gnathopod 2* minutely subchelate; article 5 nearly twice as long as article 6; article 6 with about 5 serrate spines along posterodistal margin.

Peraeopod 3: coxa about 1.5 times as long as broad, anterior margin convex; article 4 slightly produced anteriorly and subequal in length to article 6; dactyl short. *Peraeopod 4* similar to peraeopod 3 except coxa produced posteroventrally. *Peraeopod 5*: posterior lobe of article 2 subquadrate; article 4 expanded posteriorly with 2 setae on posterior margin; article 6 subequal in length to article 4, with a mid-distal spine and an apical spine on anterior margin. *Peraeopod 6* similar to peraeopod 5, coxa smaller, remainder of peraeopod larger. *Peraeopod 7*: article 2 larger than article 2 of peraeopods 5 and 6, posterior margin slightly convex with 3 distinct crenulations towards subquadrate posterodistal corner; article 4 with convex posterior margin and 2 posterodistal setae.

Uropod 3 small, peduncle about as long as outer ramus; inner ramus slightly longer than article 1 of outer ramus. *Telson* broader than long, entire, with 4 sensory setae on distal margin.

Distribution. *Ekelofia oculata* is known from one specimen collected near South Georgia in 24-52 m depth.

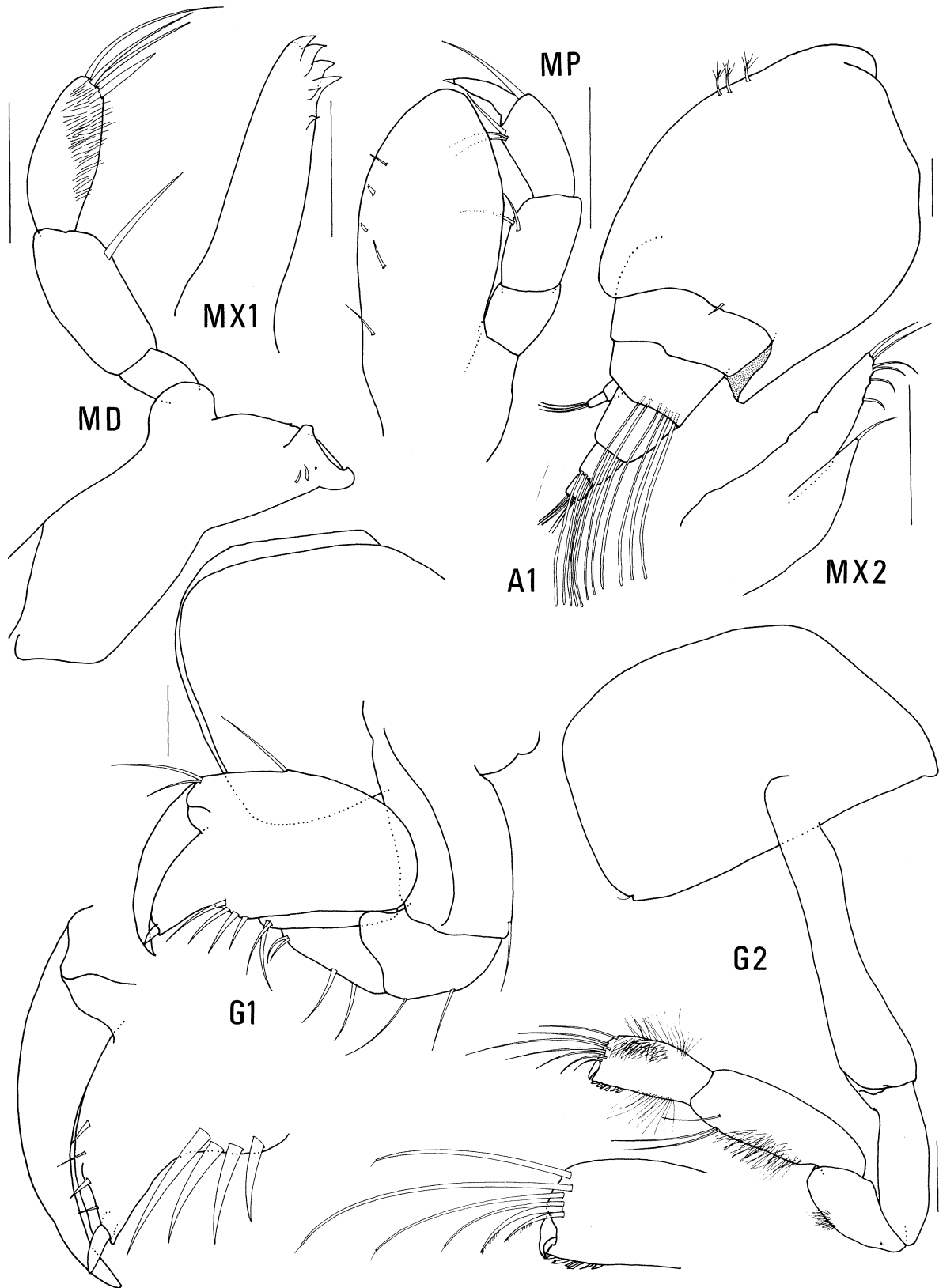


Fig. 37 *Ekelofia oculata* (Schellenberg), holotype, 3.9 mm, South Georgia. Scales represent 0.1 mm.

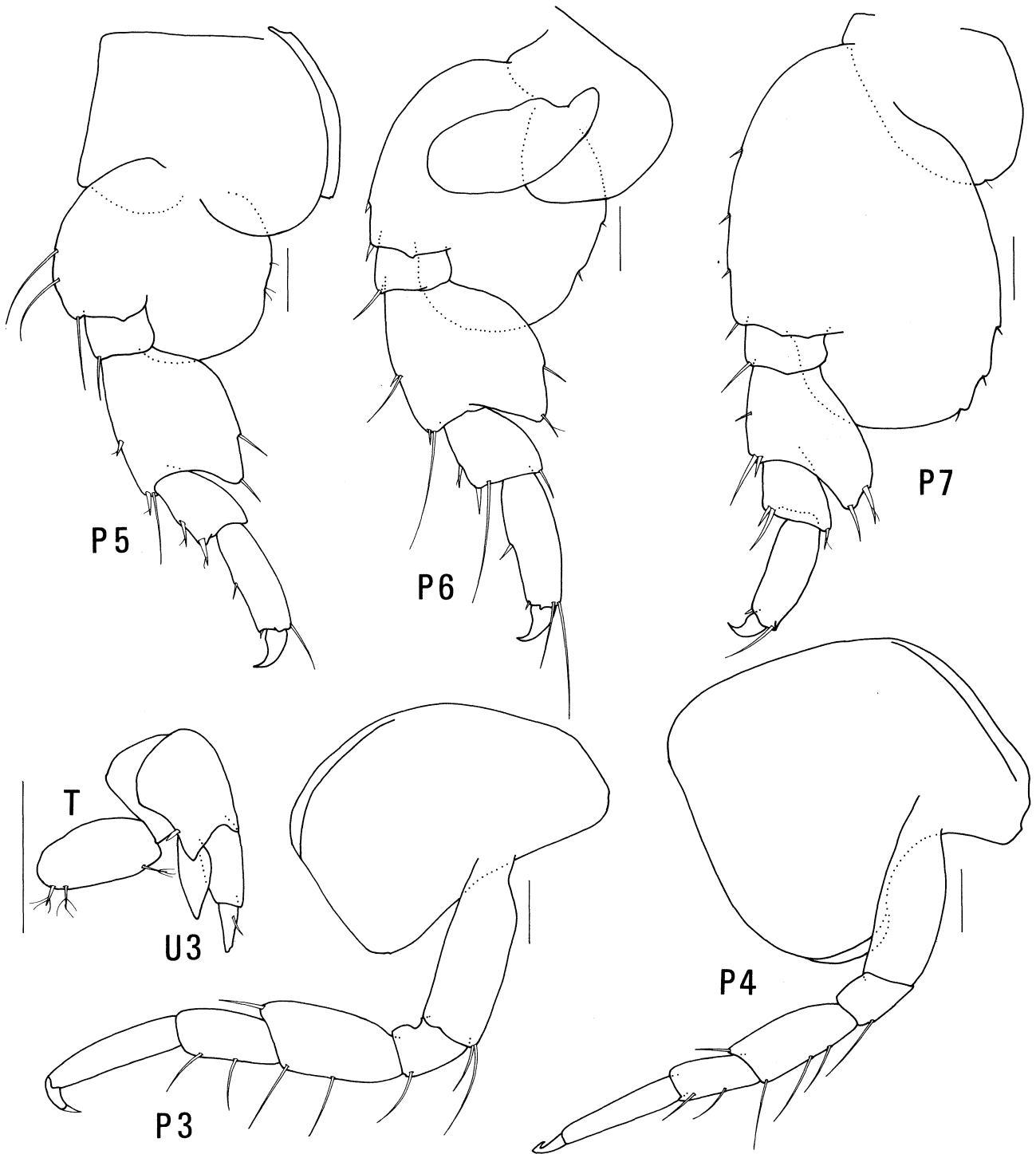


Fig. 38 *Ekelofia oculata* (Schellenberg), holotype, 3.9 mm, South Georgia. Scales represent 0.1 mm.

***Pachychelium* Stephensen, 1925**

Pachychelium Stephensen, 1925: 121.—K.H. Barnard, 1932:75; J.L. Barnard, 1969a: 354.

Diagnosis. Antenna 1, flagellum with proximal articles fused, with or without rows of aesthetascs.

Mandible without lacinia mobilis and accessory spines. Maxilla 1, inner plate present, without setae; outer plate with 4-6 smooth spine-teeth; palp absent. Maxilla 2 not known. Maxilliped inner plates small or absent; outer plates large, reaching nearly to end of palp article 3; palp 3- or 4-articulate. Gnathopod 1 subchelate, palm

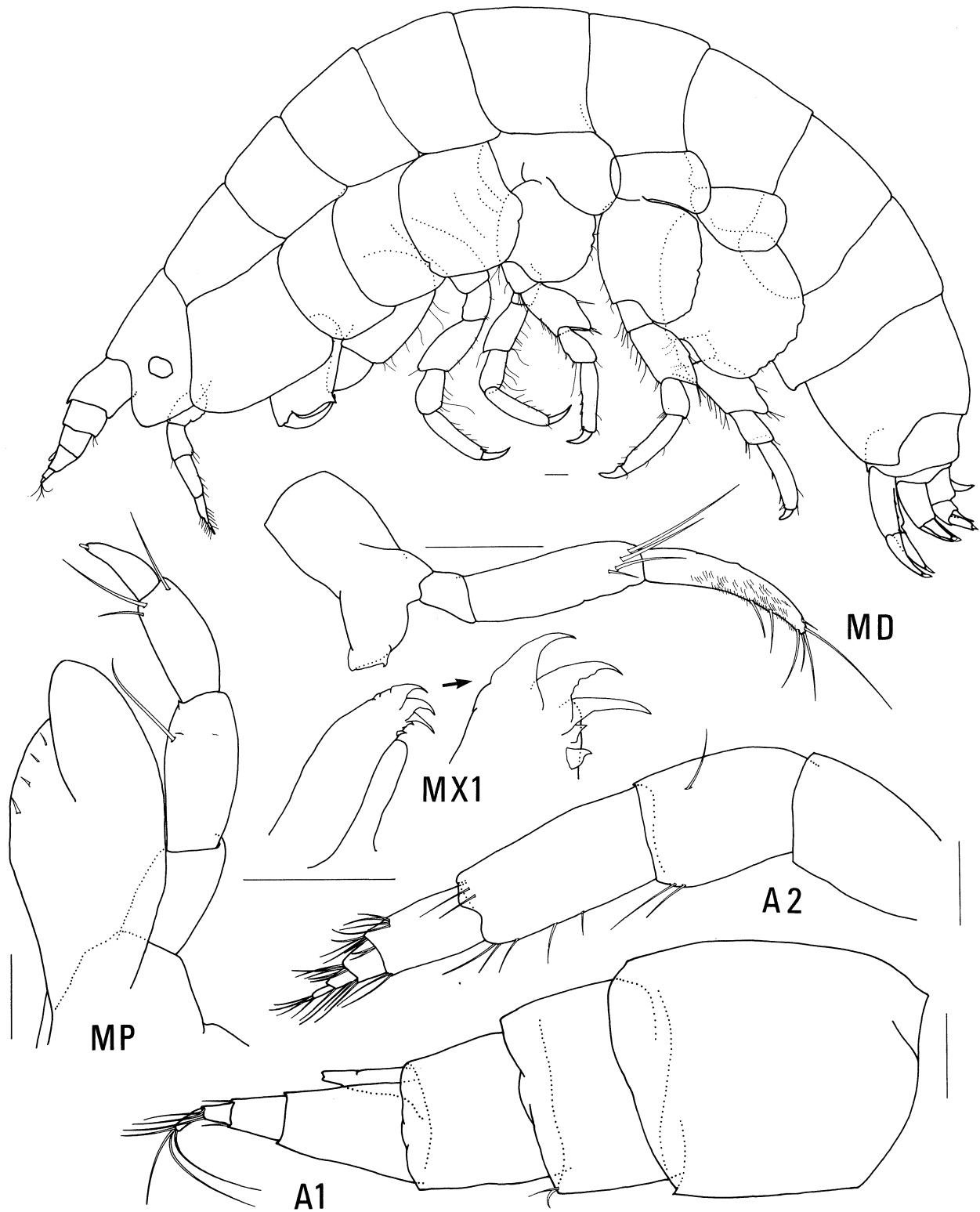


Fig. 39 *Pachychelium schellenbergi* n.sp., holotype, 6.3 mm, Ultima Esperanza, Chile. Scales represent 0.1 mm.

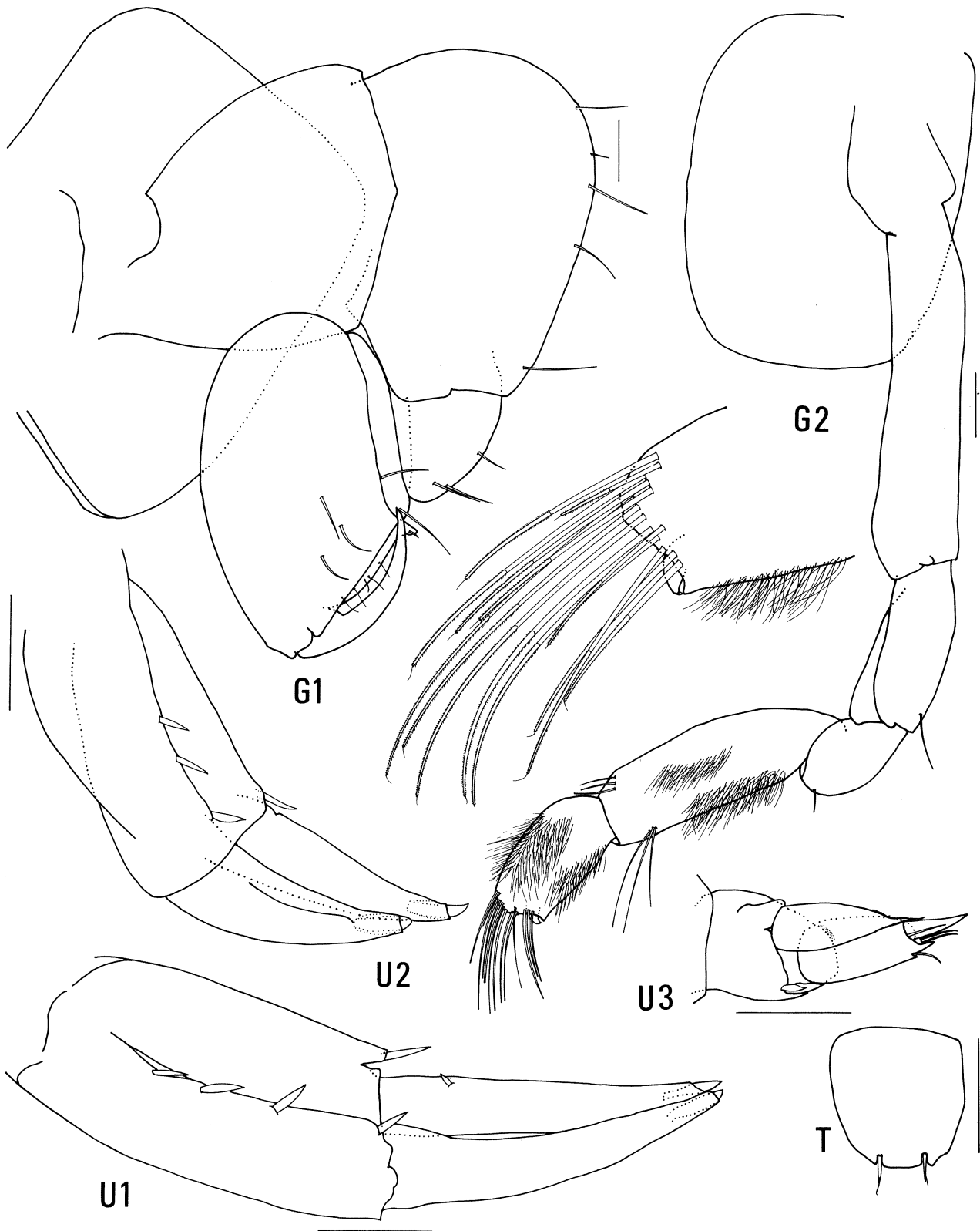


Fig. 40 *Pachychelium schellenbergi* n.sp., holotype, 6.3 mm, Ultima Esperanza, Chile. Scales represent 0.1 mm.

defined by a projecting tooth or not at all. Gnathopod 2, dactyl and palm minute. Coxa 4, posteroventral lobe poorly developed or absent. Peraeopods 5 and 6, article 4 not expanded posteriorly. Peraeopods 5 to 7, article 5 without minute denticles along distal margin. Uropod 3 biramous.

Type-species. *Pachychelium davidis* Stephensen, 1925 (original designation).

Remarks. *Pachychelium* is a bipolar genus. Unfortunately the type-species, *P. davidis*, from the Davis Strait, is known from only one specimen. This has made detailed study difficult and some characters are poorly known. More collecting may show that two genera exist. *Pachychelium* exhibits the greatest reduction in morphology of any of the pachynid genera. Species in the genus have lost the lacinia mobilis and the accessory spines on the mandible. They have lost the palp on maxilla 1 and have a greatly reduced number of spine-teeth on the outer plate. They have lost the inner plates on the maxillipeds and some species have lost the fourth article of the maxillipedal palp. The posteroventral lobe of coxa 4 is lost or poorly developed and article 4 of peraeopods 5 and 6 is not expanded posteriorly.

Pachychelium appears to be most closely related to *Ekelofia* with which it shares loss of left lacinia mobilis and accessory spines in the mandibles, loss of maxilla 1 palp and loss of maxillipedal plates. It also appears related to *Acheronia* with which it shares the same spine-tooth formula on maxilla 1 and the projecting tooth defining the palm of gnathopod 1, except for *P. davidis*.

Pachychelium currently contains four species: *P. davidis* from the Davis Strait, *P. schellenbergi* from Tierra del Fuego, and *P. antarctica* and *P. nichollsi* from the Davis Sea in the Southern Ocean.

Pachychelium schellenbergi n.sp.

Figs 39-41

Pachychelium antarcticum.—Schellenberg, 1931: 19, fig. 8.
? *Pachychelium davidis*.—K.H. Barnard, 1932: 75, fig. 32.

Type-material. HOLOTYPE, 6.3 mm, and one PARATYPE (only some parts remaining), ZMB 22721; one PARATYPE, SMNH 2797; Ultima Esperanza, Chile, 51°34'S 72°45'W, algae, mud and stones, 13-15 m, 5 April 1896, Swedish Expedition to Magellan Land, 1895-1897. One PARATYPE, 2.5 mm, SMNH 3808; Berkeley Sound, Falkland Islands, 51°34'S 57°55'W, gravel with mussels and algae, 16 m, 19 August 1902, Swedish Southpolar Expedition, 1901-1903.

Diagnosis. Eyes present. Maxilla 1, outer plate with a 3/2 spine-tooth formula. Maxilliped with 4-articulate palp. Gnathopod 1 subchelate, posterior corner of palm square, defined by a projecting tooth. Gnathopod 2 minutely chelate. Peraeopod 7, posterior margin of article 2 crenulate, evenly rounded. Epimeron 3, posteroventral corner acute, slightly produced.

Description. Holotype ?female, 6.3 mm. *Antenna 1*: peduncular article 1 about as long as articles 2 and

3 combined, peduncle about twice as long as flagellum; flagellum 4-articulate, article 1 nearly 1.5 times as long as broad, slightly longer than remainder of flagellum; accessory flagellum at least 1-articulate (damaged), reaching 3/4 of the way along article 1 of flagellum. *Antenna 2* about as long as antenna 1; flagellum 5-articulate.

Mandible: lacinia mobilis and accessory spines absent; palp 3-articulate, attached just distal to midpoint of dorsal margin, article 2 narrow, subequal in length to article 3 with 4 mediodistal setae, article 3 with rows of minute hairs and at least 6 setae along medial and apical margin. *Maxilla 1*: inner plate long, narrow, no apparent apical setae; outer plate with 5 spine-teeth in a 3/2 formula; palp absent. *Maxilliped*: inner plates absent; outer plates large, reaching to end of article 3 of 4-articulate palp.

Gnathopod 1 subchelate, large; coxa subquadrate, broader than long article 2 as broad as long; article 3 greatly enlarged; article 6 large, about 1.5 times as long as broad, palm transverse, defined by an acutely projecting tooth. *Gnathopod 2* minutely subchelate; article 5 about 1.75 times as long as article 6; article 6 with posterodistal margin naked.

Peraeopod 3: coxa slightly deeper than broad, subquadrate; articles 3 to 6 with sparse setae along posterior margin; article 4 slightly produced anteriorly and subequal in length to article 6; dactyl short. *Peraeopod 4*: coxa about as broad as long, posteroventral lobe weakly produced; in other ways similar to peraeopod 3 except setae along posterior margin of articles 3 to 6 are longer. *Peraeopod 5*: article 2 with posterior margin evenly rounded, crenulate; article 4 slightly expanded posteriorly with several setae along posterior margin. *Peraeopod 6* similar to peraeopod 5 except posterior margin of article 2 straight and broadly rounded distally. *Peraeopod 7*: article 2 larger than article 2 of peraeopods 5 and 6, posterior margin evenly rounded proximally, slightly cut away distally, crenulate; article 4 similar to article 4 of peraeopods 5 and 6.

Uropod 1: peduncle slightly longer than rami, with 3 dorsolateral spines and a pair of apical spines; rami without marginal spines; subequal in length. *Uropod 2* shorter than uropod 1; peduncle longer than rami, with 2 dorsolateral spines and a pair of apical spines; rami without marginal spines; inner ramus slightly longer than outer ramus. *Uropod 3* shorter than uropod 2; peduncle as long as outer ramus; outer ramus 2-articulate, slightly longer than inner ramus. *Telson* slightly longer than broad, entire, slightly rounded distally, with 2 apical setae.

Remarks. *Pachychelium schellenbergi* is very closely related to *P. nichollsi*. They differ in the shape of article 2 on peraeopods 5 to 7.

Distribution. *Pachychelium schellenbergi* is known from Ultima Esperanza, Punta Arenas and Picton Banner Cove in southern South America, 1 to 18 m depth, the Falkland Islands, 1 to 16 m depth, and possibly from South Georgia in 179 to 235 m depth.

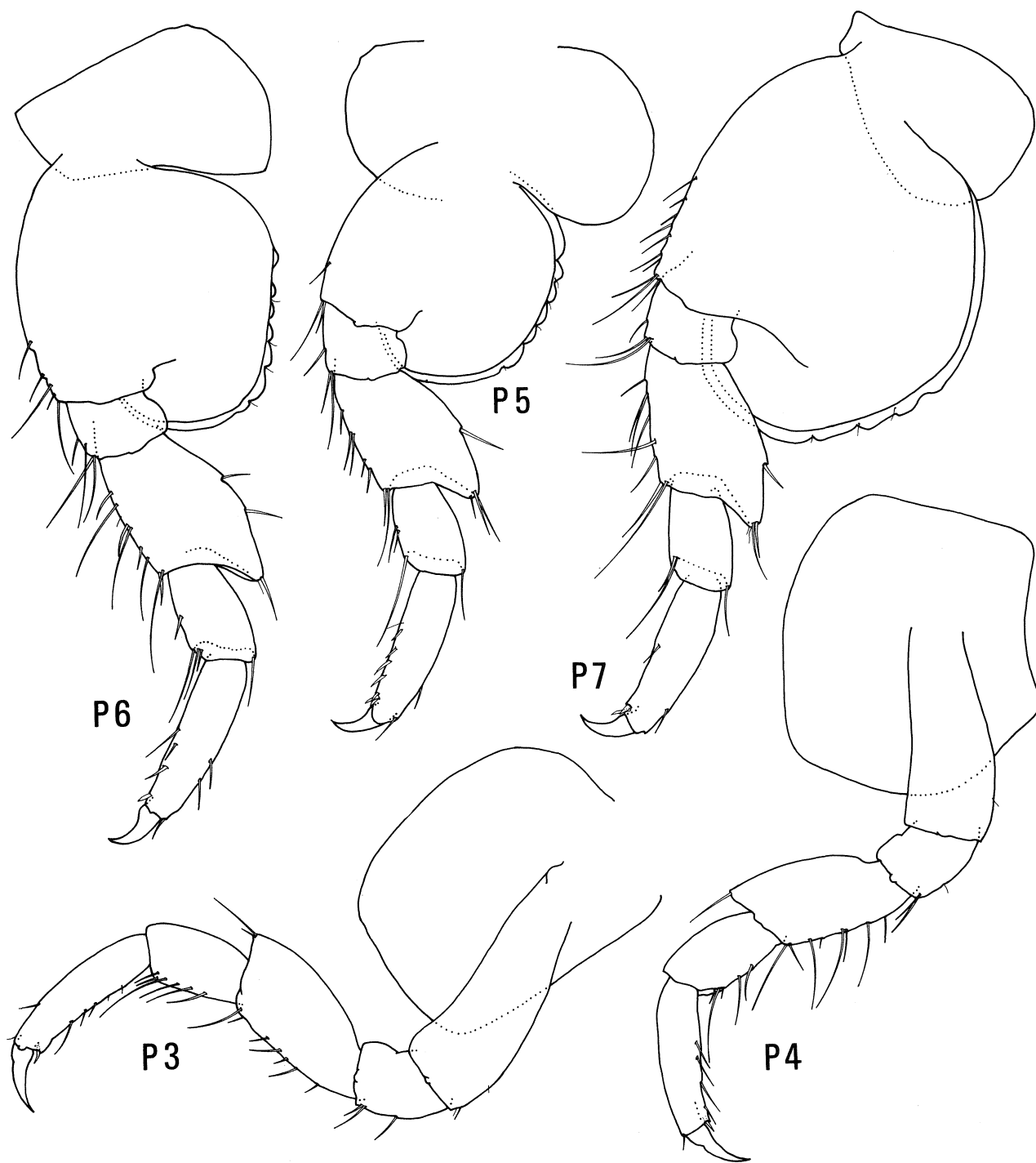


Fig. 41 *Pachychelium schellenbergi* n.sp., holotype, 6.3 mm, Ultima Esperanza, Chile. Scale represents 0.1 mm.

***Pachychelium nichollsi* n.sp.**

Pachychelium antarcticum.—Nicholls, 1938: 14, fig. 3; Bellan-Santini, 1972: 215, pl. 28.

All material of *Pachychelium* from the east Antarctic has been referred to *P. antarcticum*. However the

material so well illustrated by Nicholls (1938) and Bellan-Santini (1972) is a distinct new species which I am naming after Dr G.E. Nicholls. Because Nicholl's original material is now lost (Lowry, 1982) the specimen figured by Bellan-Santini (1972) is designated as the holotype. This specimen is in Dr Bellan-Santini's personal collection.

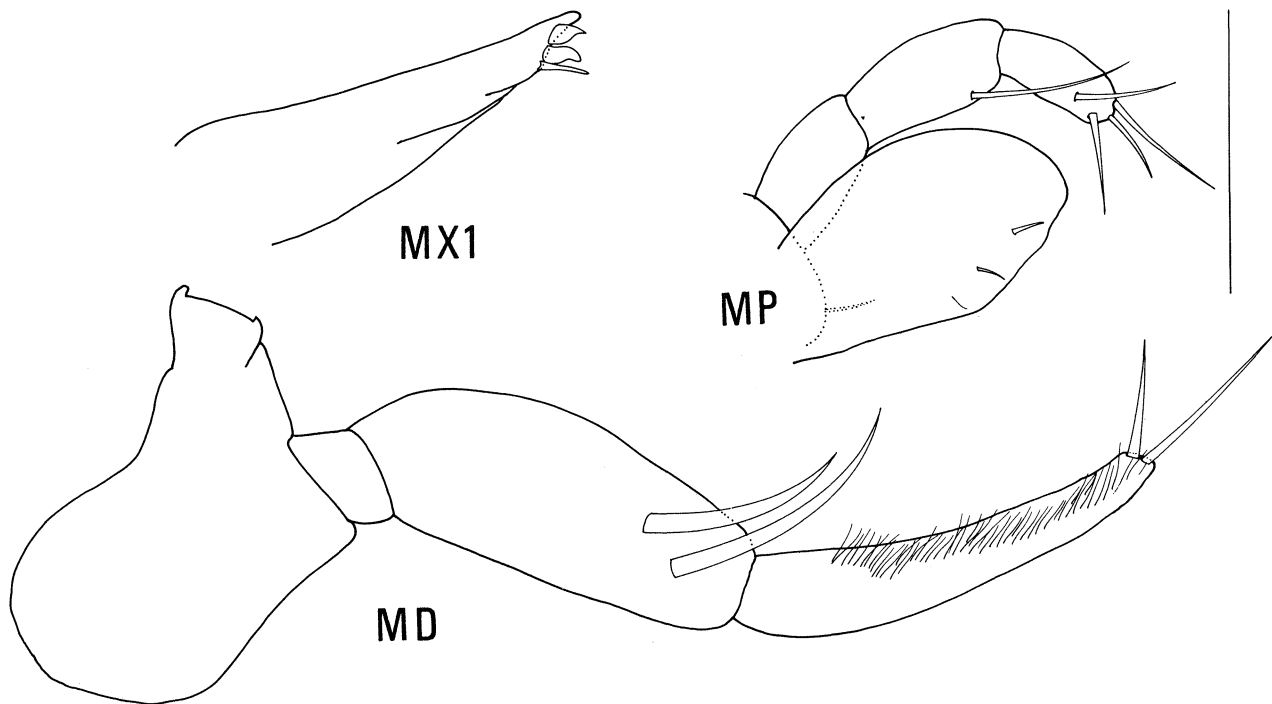


Fig. 42 *Pachychelium davidis* Stephensen, holotype, 3.5 mm, W of Greenland. Scale represents 0.1 mm.

Type-material. HOLOTYPE, Cape Geodesie, Adelle Coast, Antarctica, 66°40'S 139°51'E, pebble and mud bottom on the west side of the hole, 220-240 m, P.M. Arnaud, 26 December 1964, TA-D101 (illustrated in Bellan-Santini, 1972).

Diagnosis. Eyes absent. Maxilla 1, outer plate with a 3/3 spine-tooth formula. Maxilliped with 4-articulate palp. Gnathopod 1 subchelate, palm defined by an acutely projecting tooth. Gnathopod 2 minutely chelate. Peraeopod 7, posterior margin of article 2 straight, crenulate, posteroventral corner sharply rounded. Epimeron 3, posteroventral corner acute, slightly produced.

Remarks. *Pachychelium nicholli* is very closely related to *P. schellenbergi*. They differ in the shape of article 2 on peraeopods 5 to 7.

Distribution. *Pachychelium nicholli* is known from Commonwealth Bay, Antarctica, in depths from 45 to 720 m and from Cape Geodesie, Antarctica, in depths from 220 to 240 m.

Pachychelium antarcticum Schellenberg, 1926

Pachychelium antarcticum Schellenberg 1926: 296, fig. 30.—Lowry and Bullock, 1976: 101 (in part).
not *Pachychelium antarcticum*.—Schellenberg, 1931: 19, fig. 8 (= *P. schellenbergi*); Nicholls, 1938: 14, fig. 3 (= *P. nicholli*); Bellan-Santini, 1972: 215, pl. 28 (= *P. nicholli*).

Schellenberg's original description of *P. antarcticum* described the maxilliped as having 3-articulate palps and inner plates. Article 2 of peraeopod 7 was illustrated with a rounded posteroventral corner. Schellenberg (1931) had new material from southern South America

and the Falkland Islands which had a 4-articulate palp on the maxilliped and no inner plates. Schellenberg indicated that his original description was incorrect in this detail and called all the material *P. antarcticum*. I accept Schellenberg's original description and rediagnose the species.

Diagnosis. Eyes absent. Maxilla 1 unknown. Maxilliped with 3-articulate palp and small inner plates. Gnathopod 1 subchelate. Gnathopod 2 minutely chelate. Peraeopod 7 with article 2 small, less than half length of articles 3 to 7, posterior margin evenly rounded. Epimeron 3, posteroventral corner subacute.

Remarks. *Pachychelium antarcticum* is a poorly known species, but as it is described at present it appears to be most closely related to *P. davidis*. The two species differ in that *P. antarcticum* has small inner plates on the maxilliped. *Pachychelium antarcticum* differs from *P. nicholli* in the 3-articulate maxillipedal palp and in the size and shape of article 2 on peraeopod 7.

Distribution. *Pachychelium antarcticum* is known from one specimen collected in 385 m depth at Gauss Station, Davis Sea, Antarctica, 66°02'S 89°38'E.

Pachychelium davidis Stephensen, 1925

Fig. 42

Pachychelium davidis Stephensen, 1925: 121, fig. 35.
not *Pachychelium davidis*.—K.H. Barnard 1932: 75, fig. 32 (? = *P. schellenbergi*).

When Stephensen (1925) described *P. davidis* from the Davis Strait off Greenland he did not describe the

mouthparts. This became an increasing problem as more species became known. I was able to borrow Dr Stephensen's unique specimen and describe the mouthparts. The microscope slides of the body appendages are no longer in good condition but Dr Stephensen's drawings of these appendages are excellent.

Material examined. HOLOTYPE, 3.5 mm, ZMC, Danish Ingolf Expedition Station 27, west of Greenland, 64°54'N 55°10'W, 740 m, bottom temperature 3.8°C.

Diagnosis. Eyes absent. Maxilla 1, outer plate with 3/1 spine-tooth formula. Maxilliped with 3-articulate palp. Gnathopod 1 subchelate, posterior margin of palm rounded. Gnathopod 2 minutely subchelate. Peraeopod 7, posterior margin of article 2 evenly rounded. Epimeron 3, posteroventral corner evenly rounded.

Remarks. *Pachychelium davidis* appears to be most closely related to *P. antarcticum* from which it differs in not having inner plates on the maxilliped, and to *P. nichollsi* from which it differs in having a 3-articulate maxillipedal palp.

Distribution. Known from one specimen collected from 740 m depth in the Davis Strait off Greenland.

ACKNOWLEDGEMENTS. I thank Dr D.J. G. Griffin, Director, and Dr H.G. Cogger, Deputy Director, The Australian Museum, for their continued support of our lysianassoid studies. I thank Ms H.E. Stoddart and Mr R.T. Springthorpe for their assistance, intellectual and technical, in producing this paper.

I am grateful to Mr K. Graham, New South Wales State Fisheries, for arranging collecting trips aboard the FRV *Kapala* and to Mr A. Black, master of the *Acheron*, for his help in making the New Zealand collections.

I would like to thank Dr N.L. Tzvetkova, Zoological Institute, Leningrad, Dr G.C.B. Poore, Museum of Victoria, Melbourne, and Dr Judel, of Judel and Platt Pty Ltd., Sydney, for donating important material for this study.

The following curators have made generous loans of material for which I am most grateful: Dr. O. Anderson, Swedish Museum of Natural History, Stockholm; Dr R.C. Brusca, Alan Hancock Foundation, Los Angeles, California; Dr H.E. Gruner, Zoologisches Museum, East Berlin; Dr J. Just, Zoologisk Museum, Copenhagen; Dr E. Kirsteuer, American Museum of Natural History, New York; Dr G.C.B. Poore, Museum of Victoria, Melbourne; and Dr S. Ruffo, Museo Civico di Storia Naturale, Verona.

Dr R.J. Lincoln and Dr J.L. Barnard made useful comments on the manuscript, for which I am most grateful.

References

- Barnard, J.L., 1962. South Atlantic abyssal amphipods collected by R.V. *Vema*. *Vema Research Series* 1: 1-78.
- 1964. Los anfipodos bentonicos marinos de la costa occidental de Baja California. *Revista de la Sociedad Mexicana de Historia Natural* 24: 205-274.
- 1966a. Submarine canyons of southern California, Part V, Systematics: Amphipoda. *Allan Hancock Pacific Expeditions* 27(5): 1-166.
- 1966b. Benthic Amphipoda of Monterey Bay, California. *Proceedings of the United States National Museum* 119(3541): 1-41.
- 1967. Bathyal and abyssal gammaridean Amphipoda of Cedros Trench, Baja California. *United States National Museum Bulletin* 260: 1-205.
- 1969a. The families and genera of marine gammaridean Amphipoda. *United States National Museum Bulletin* 271: 1-535.
- 1969b. A biological survey of Bahia de los Angeles, Gulf of California, Mexico, IV. Benthic Amphipoda (Crustacea). *Transactions of the San Diego Society of Natural History* 15(13): 175-228.
- 1971. Gammaridean Amphipoda from a deep-sea transect off Oregon. *Smithsonian Contributions to Zoology* 61: 1-86.
- Barnard, K.H., 1932. Amphipoda. *Discovery Report* 5: 1-326.
- Bellan-Santini, D., 1972. Invertébrés marins des XIIème et XVème Expéditions Antarctiques Françaises en Terre Adélie. 10. Amphipods Gammariens. *Tethys, supplement* 4: 157-238.
- Bulycheva, A.I., 1955. Novye vidy bokoplavov (Amphipoda, Gammaridea) iz Yaponskogo Morya. II. *Trudy Zoologicheskogo Instituta. Akademiya Nauk SSSR* 21: 193-207.
- Gurjanova, E., 1962. Bokoplavy severnoi chasti Tixoga Okeana (Amphipoda-Gammaridea) chasti'1. *Akademiya Nauk SSSR, Opredeliteli po Faune SSSR* 74: 1-440.
- Hurley, D.E., 1963. Amphipoda of the family Lysianassidae from the west coast of North and Central America. *Allan Hancock Foundation Publications, Occasional Paper* 25: 1-160.
- Lowry, J.K., 1982. The status of the gammaridean Amphipoda collected by the Australasian Antarctic Expedition, 1911-14. *Crustaceana* 42 (3): 319-320.
- Lowry, J.K. & S. Bullock, 1976. Catalogue of the marine gammaridean Amphipoda of the Southern Ocean. *Bulletin of the Royal Society of New Zealand* 16: 1-187.
- Nicholls, G.E., 1938. Amphipoda Gammaridea. Australasian Antarctic Expedition, 1911-14, Scientific Reports, series C-Zoology and Botany 2(4): 1-145.
- Ruffo, S., 1975. Studi sui Crostacei Anfipodi, LXXVIII. Nuovi Lisianassidi e Stegocefalidi del Mediterraneo (Crustacea, Amphipoda). *Bolletino del Museo Civico di Storia Naturale, Verona* 1: 439-453.
- Schellenberg, A., 1926. Die Gammariden der Deutschen Südpolar-Expedition 1901-1903. *Deutsche Südpolar-Expedition, Zoology* 10, 18: 233-414.
- 1931. Gammaridean und Caprelliden des Magellangebietes, Sudgeorgiens und der Westantarktis. *Further Zoological Results of the Swedish Antarctic Expedition 1901-1903*, 2: 1-290.
- Stephensen, K., 1925. Crustacea Malacostraca. VI. (Amphipoda. II). *The Danish Ingolf-Expedition* 3(9): 101-178.