Gammaridean Amphipoda of Australia, Part IV

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and
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SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 269

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SMITHSONIAN INSTITUTION PRESS
City of Washington
1979

ABSTRACT

Barnard, J. Laurens, and Margaret M. Drummond. Gammaridean Amphipoda of Australia, Part IV. *Smithsonian Contributions to Zoology*, number 269, 69 pages, 38 figures, 1979.—Five Australian species (four of them new) in four genera of the new family Platyischnopidae and seven Australian new species of *Urothoides*, a genus of Urothoidae, are described. Two non-Australian species formerly assigned to *Platyischnopus* (Platyischnopidae) are placed in a new genus, *Indischnopus*. Three of the four Australian genera of Platyischnopidae are new: *Tomituka, Yurrokus,* and *Tittakunara*. The Australian species of *Urothoides* appear to be more primitive than the type-species from Kerguelen Island.

OFFICIAL PUBLICATION DATE is handstamped in a limited number of initial copies and is recorded in the Institution's annual report, *Smithsonian Year*. SERIES COVER DESIGN: The coral *Montastrea cavernosa* (Linnaeus).

Library of Congress Cataloging in Publication Data
Barnard, Jerry Laurens, 1928–
Gammaridean Amphipoda of Australia.
(Smithsonian contributions to zoology ; no. 103, 139, 245, 269)
Pt. (4) by J. L. Barnard and M. M. Drummond.
1. Amphipoda—Australia. 2. Crustacea—Australia. I. Drummond, Margaret M. II. Title. III. Series: Smithsonian Institution. Smithsonian contributions to zoology, no. 103, [etc.]
QL1.S54 no. 103 591'.08s [595'371] 72–601600

Contents

Gammaridean Amphipoda of Australia, Part IV

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Introduction

Two groups of Australian Amphipoda are described: the Platyischnopidae, with four genera and five species, and seven species of the genus *Urothoides* Stebbing, 1891, in the family Urothoidae. These are fossorial amphipods found abundantly in Port Phillip Bay and Western Port, Victoria, Australia. The materials were largely collected in three surveys of those bays carried out by the Department of Fisheries and Wildlife, Victoria. See Barnard and Drummond (1978) for acknowledgments and a discussion of methods and materials. Four additional samples are cited in the appendix herein. The Ministry for Conservation in Victoria has listed this present monograph as Publication Number 00141 of their Environmental Studies Series.

Formerly, *Platyischnopus* Stebbing, 1888, was assigned to either Haustoriidae or Phoxocephalidae but is now to be considered as the type genus of a new family, Platyischnopidae. We establish in Platyischnopidae four genera in addition to the type genus, all of which have eastern hemisphere distribution (one is non-Australian). The type genus also has four species that are limited to the western hemisphere but allocation of these to new genera is contemplated by Bousfield (in litt.). The new genus *Indischnopus* is proposed herein to contain one Asiatic and one African species originally assigned to *Platyischnopus*.

The new species of *Urothoides* may be generically distinct and more primitive than the type-species from Kerguelen Island but confusion in the allied genus *Urothoe* Dana, 1853–1855, prevents nomenclatural distinction at this time.

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Figure Abbreviations

(used in specimen drawings)

A antenna	*S* maxilliped
B prebuccal from lateral	*T* telson
C head	*U* upper lip
D dactyl of pereopod	*V* palp
E coxa	*W* pleon (pleonites 1–3 bearing epimera; pleonites 4–6, also referred to as urosomites 1–3, comprising urosome; often shown with attached structures: telson and uropods 1–3)
F accessory flagellum	
G gnathopod	
H eye	
I inner plate or ramus	
J cephalic pit	
K spine	
L lower lip	
M mandible	
N molar	
O outer plate or ramus	*X* maxilla
P pereopod	*Y* see legend under illustration
Q cuticle	
R uropod	*Z* calceolus

Lowercase letters on the left side of labels denote specimens cited in the legends and voucher material in the text; lowercase letters on the right side

of labels (or affixed to the drawing as is often the case with "*e*" and "*s*") indicate the following:

a alternate view	*o* opposite
d dorsal	*r* oblique posterior
e broken	*s* setae removed
f flat	*t* right
h half	*u* part
i medial	*y* enlarged
n oblique	

For other lowercase letters see definition in legend. Where space does not allow a horizontal alinement of the label, the resulting vertical arrangement has the same order of elements top to bottom as found in the horizontal from left to right.

PLATYISCHNOPIDAE, new family

DIAGNOSIS.—Head elongate, produced into cylindric rostrum anterior to eyes, bearing ventral retrorse protrusion; article 1 of antenna 1 short, accessory flagellum multiarticulate; mandibular molar large, weakly triturative apically; lower lip with mandibular lobes; maxillipeds with dactyl; gnathopods weakly to strongly chelate; pereopods fossorial, posterior members elongate, bearing dactyls, pereopod 5 relatively large in relation to pereopods 3–4 but with enlarged articles 4–5 (compare Phoxocephalidae), article 2 usually different than article 2 of pereopod 4; outer ramus of uropod 3 elongate, 2-articulate, female inner ramus very short, male inner ramus variable in length; telson short, entire or cleft.

DESCRIPTION.—Body slender, occasionally anterior pereonites compressed forward; anterior coxae variable; coxal gills present on pereonites 2–7 or 3–7.

TYPE GENUS.—*Platyischnopus* Stebbing, 1888.

COMPOSITION.—*Tomituka,* new genus; *Yurrokus,* new genus; *Tittakunara,* new genus; *Indischnopus,* new genus; and new genera from American species of *Platyischnopus* projected by E. L. Bousfield (in litt.).

RELATIONSHIP.—This family differs from other haustorioids and especially from Phoxocephalidae in the structure of the rostrum, in the large and weakly triturative molar, and in the small article 2 and enlarged articles 4–5 of pereopod 5. The family has the general facies of the Urothoidae in terms of mandibles and pereopods, but the molars are definitely triturative and the rostrum is unique.

Western hemisphere platyischnopids are distinguished generally from eastern members by the much-shortened fifth articles of the gnathopods, although *Yurrokus,* from Australia, approaches that condition.

The apex of the rostrum in platyischnopids examined in this study apparently contains glandular tissue that shrinks on preservation and either creates or compresses a series of longitudinal striations in the cuticle to form a multicolumnar appearance that may be abnormal to living individuals. At the base of this striated projection the head carries an equatorial series of head pits, each bearing a stiff setule. These pits may be sensory and in addition may serve as egress for glandular products, if any, in the striated part of the rostrum.

References in diagnoses to the condition of the upper lip of the genera reflect observations that may be subject to various interpretations because the ventral margin of this mouthpart preserves poorly.

Reference to the dorsal position of spines on the telson applies in eastern hemisphere genera only to the situation in *Tittakunara,* where one or more spines are fully dorsal and situated in the middle of the lobe.

Key to the Eastern Hemisphere Genera of Platyischnopidae

1. Article 2 of antenna 1 elongate, coxa 3 tapering distally ..... ***Platyischnopus***
   Article 2 of antenna 1 short, coxa 3 expanded distally 2
2. Pleonite 3 with dorsal teeth, mandibular rakers absent, setae on mandibular palp article 2 vestigial or absent ..... ***Indischnopus,*** new genus
   Pleonite 3 lacking dorsal teeth, mandibular rakers present, setae on mandibular palp article 2 well developed 3
3. Article 2 of pereopod 7 with softly blunt posteroventral notch, telson with dorsofacial spines ..... ***Tittakunara,*** new genus

Article 2 of pereopod 7 with single sharp posteroventral cusp, telson lacking dorsofacial spines 4

4. Article 5 of gnathopods 1–2 much longer than article 6, hands strongly chelate, nail on dactyl of maxilliped strong and articulate ..... *Tomituka*, new genus

Article 5 of gnathopods 1–2 scarcely longer than article 6, hands poorly chelate, nail on dactyl of maxilliped absorbed ..... *Yurrokus*, new genus

Platyischnopus Stebbing

Platyischnopus Stebbing, 1888:830.

DIAGNOSIS.—Platyischnopidae with article 2 of antenna 1 elongate, bearing rows of spines ventrally and dorsomedially. Mandibular incisors elongate, simple; lacinia mobilis on right and left sides similar, linguiform; spines of raker row reduced to 1–2, possibly 3, humps or linguiform pieces. Five or more spines on outer plate of maxilla 1 arranged in geniculate group forming curved mop, or weakly so. Plates of maxilla 2 broadly conical, apices subpointed, setae mainly medial. Inner plate of maxilliped tapering distally, no facial setae, basal attachment very broad. Coxae 1–3 very small, of diverse shapes; coxa 3 tapering distally. Article 5 of gnathopods longer than article 6; hands strongly chelate. Article 2 of pereopod 3 expanded, of pereoped 5 with sharp cusp. Pleonite 3 dorsally smooth. Article 2 on outer ramus of uropod 3 thick, strongly spinose. Telson lacking dorsal spines.

DESCRIPTION.—Articles of accessory flagellum very thin and elongate. Inner plate of maxilla 1 naked or bearing one seta, small, not broadened basally; palp of maxilla 1 very slender. Truncate apex of maxillipedal palp article 4 bearing nail and setae.

TYPE-SPECIES.—*P. mirabilis* Stebbing, 1888 [monotypy].

COMPOSITION.—*P. mam*, new species.

Key to the Species of *Platyischnopus*

Epimeron 3 with small tooth posteroventrally ..... *P. mirabilis*

Epimeron 3 rounded posteroventrally ..... *P. mam*, new species

Platyischnopus mirabilis Stebbing

FIGURES 1–5

Platyischnopus mirabilis Stebbing, 1888:830–835, pl. 58; 1906:123; 1910:635.

Not *Platyischnopus mirabilis*.—Chilton, 1922:4–6, fig. 1 [= *P. mam*, new species].

NEW DESCRIPTION OF FEMALE.—Head about 20 percent of total body length, greatest width about 40 percent of length, rostrum apically constricted, narrow, elongate, bearing subapical downturned blunt process flush with ventral cephalic tangent. Eyes medium, mostly occluded with pigment, ommatidia distinct. Article 1 on peduncle of antenna 1 about 1.5 times as long as wide, about 1.5 times as wide as article 2, ventral margin with 3 setules, unproduced dorsal apex with 3 spinules, lateral face with brush of 3 setules; article 2 elongate, about 1.5 times as long as article 1, with 4 cycles of 5–6 anteromedial spines, ventral margin with 3 acclivities bearing 3–5 spines each, distoventral corner produced sharply, dorsodistal corner produced medially, apical face with row of 5 spines; article 3 about 0.8 times as long as article 1, ventral margin with one acclivity bearing 2 spinules, ventral apex with 2 similar spinules; primary flagellum 6-articulate, about 0.9 times as long as peduncle, article 1 of flagellum elongate, each article with medium aesthetasc; accessory flagellum about 0.55 times as long as primary flagellum, 3- or 4-articulate. Dorsal margin on article 4 of antenna 2 with 7 groups of 2–3 mixed setae and spinules, ventral margin with 3 acclivities bearing 2–4 spines and setae, ventral apex with 6 spines and setae; article 5 about 0.83 times as long as article 4, dorsal and ventral margins with 6–7 groups of 2–3 setae and spines; flagellum about 0.83 times as long as article 5 of peduncle, 5-articulate.

Mandible with weak palpar hump on face opposite molar, incisor elongate, tapering, simple but with

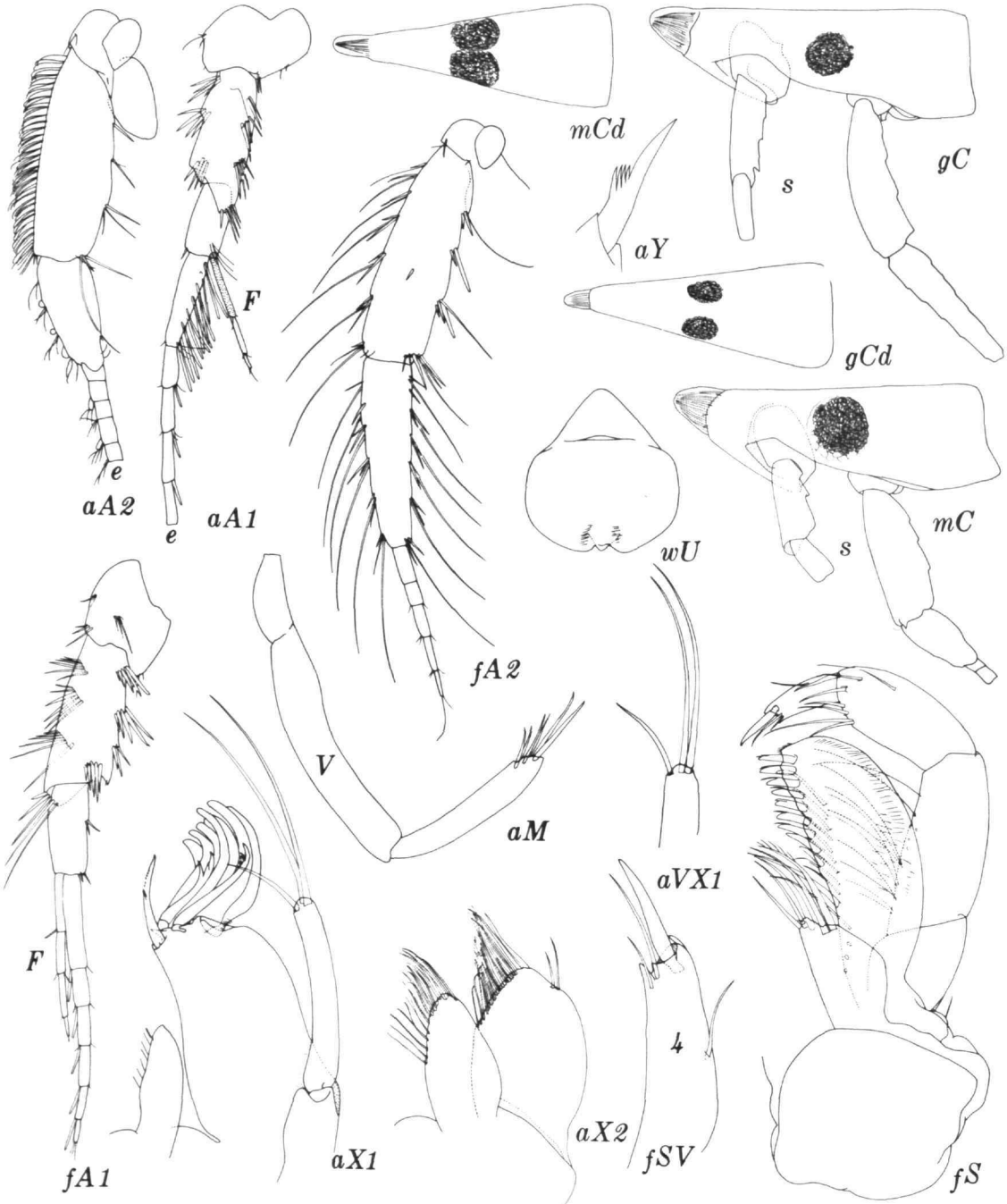

FIGURE 1.—*Platyischnopus mirabilis* Stebbing (*a* = male "a," 5.07 mm; *f* = female "f," 4.63 mm; *g* = female "g," 4.75 mm; *m* = male "m," 4.56 mm; *w* = female "w," 5.07 mm; *Y* = spine on outer plate of maxilla 1).

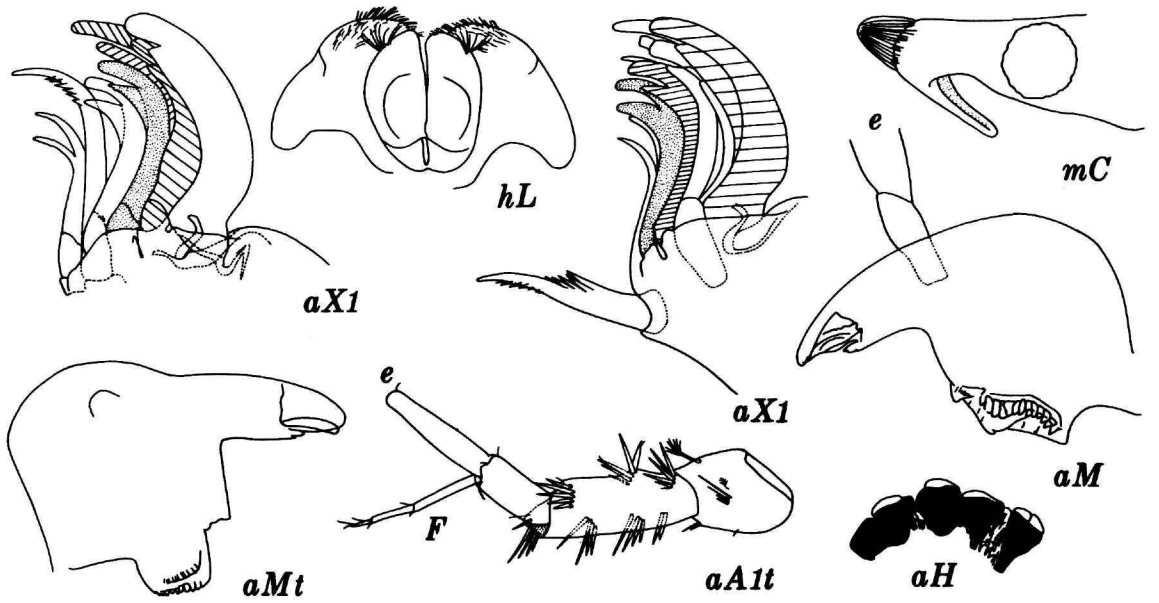

FIGURE 2.—*Platyischnopus mirabilis* Stebbing (*a* = male "a," 5.07 mm; *h* = female "h," 5.11 mm; *m* = male "m," 4.56 mm).

cornified side ridge, apically rounded; right and left sides with linguiform lacinia mobilis; right mandible with one linguiform spine, left with one similar spine on double basal hump; molar of medium size, forming face on medial surface of mandible, ventral apex weakly triturative, otherwise surface smooth or minutely carved into polygons, molars bearing accessory distal hump; article 1 of palp weakly elongate, article 2 naked, article 3 about 0.7 times as long as article 2, oblique apex with 5–6 short setal spines, palp generally elongate and thin. Inner plate of maxilla 1 small, slender, subpointed apically, naked; outer plate with 9 spines, medialmost spine normally pointed and sharp, next adjacent spine bifid, next spine with 3 medial denticles, all other spines broad and apically blunt, all but 2 of those weakly to strongly bifid, with medial branch slightly sharpened, whole spine group forming geniculate cluster aimed laterally but recurved medially, with appearance of mop; palp 1-articulate, reaching apex of outer plate, thin, bearing 3 long apical setae. Maxilla 2 forming weak baler, lobes subpointed, outer much broadened, bearing 2 subapicolateral setae, most remaining setae of both lobes on medial part of cone. Maxillipeds short and broad, very large basally; inner plate broad, trapezoidal but subconical apically, bearing 3–4 apical and apicomedial thick setae and 2–3 apicolateral larger setae; outer plate elongate, with about 9 blunt medial spines, ventral longitudinal row of setae; palp short relative to elongate outer plate, naked laterally, article 2 with medium density of medial setal groups, article 3 naked medially, with 2 apicolateral facial setae and several medioterminal setae, article 4 of medium length, apically truncate, oblique margin guarded by cusp on each end, bearing one stout medium spine and 2 accessory setae. Coxa 4 of normal dimensions, coxae 1–3 very small, overlapped weakly but not hidden by following coxae except for posterior half of their surfaces by each succeeding and overlapping coxa, when animal flexed anteriorly coxa 3 often mostly hidden by coxa 4; coxa 1 weakly quadrate, anteroventral corner extended forward, blunt, coxa 1 bearing one small anteroventral setule; coxa 2 weakly quadrate from full lateral view but when flattened bearing posteroventral adzlike extension, bearing one long ventral seta and 2 setules; coxa 3 stout-conical, ventral apex with one long seta and

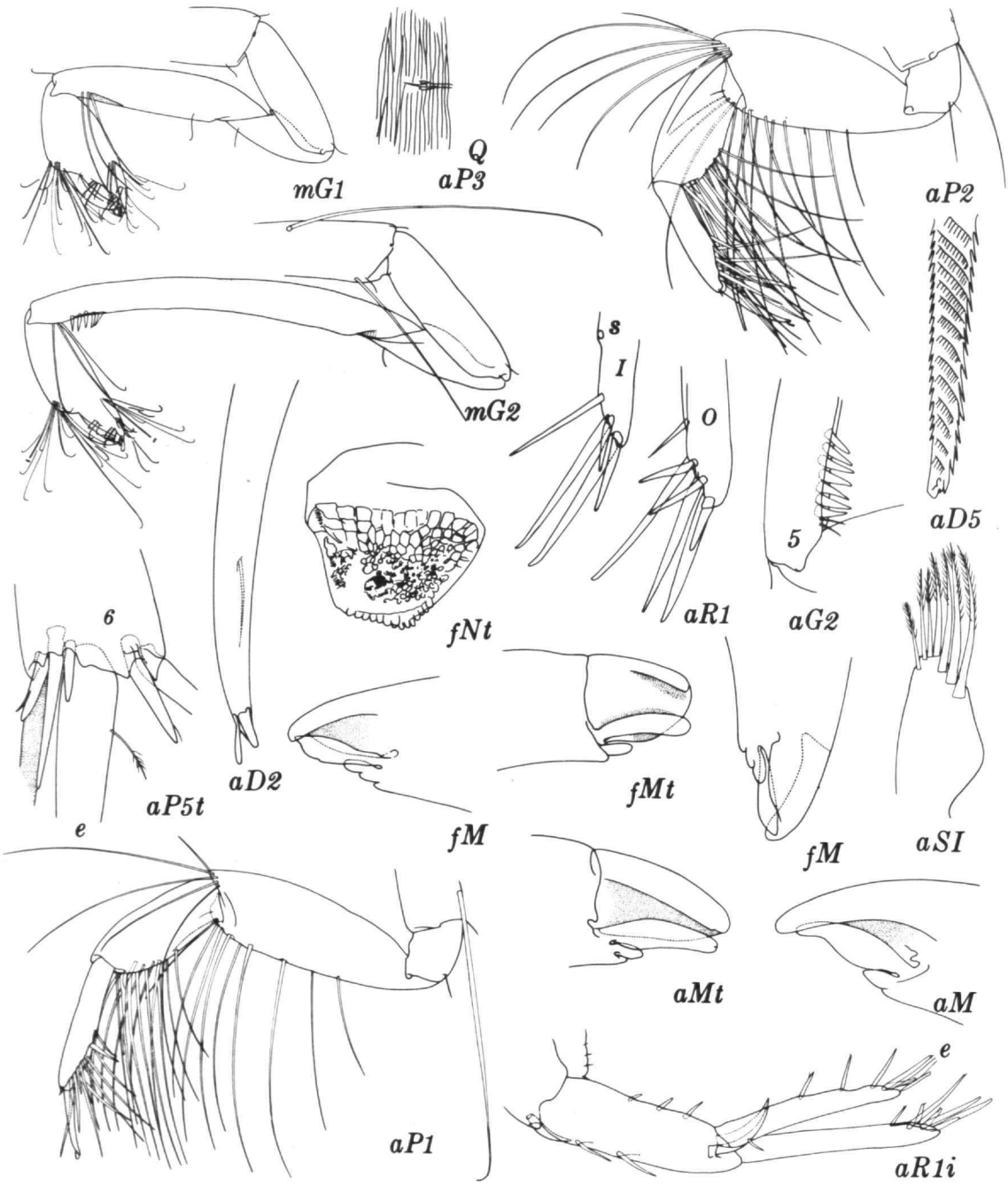

FIGURE 3.—*Platyischnopus mirabilis* Stebbing (*a* = male "a," 5.07 mm; *f* = female "f," 4.63 mm; *m* = male "m," 4.56 mm).

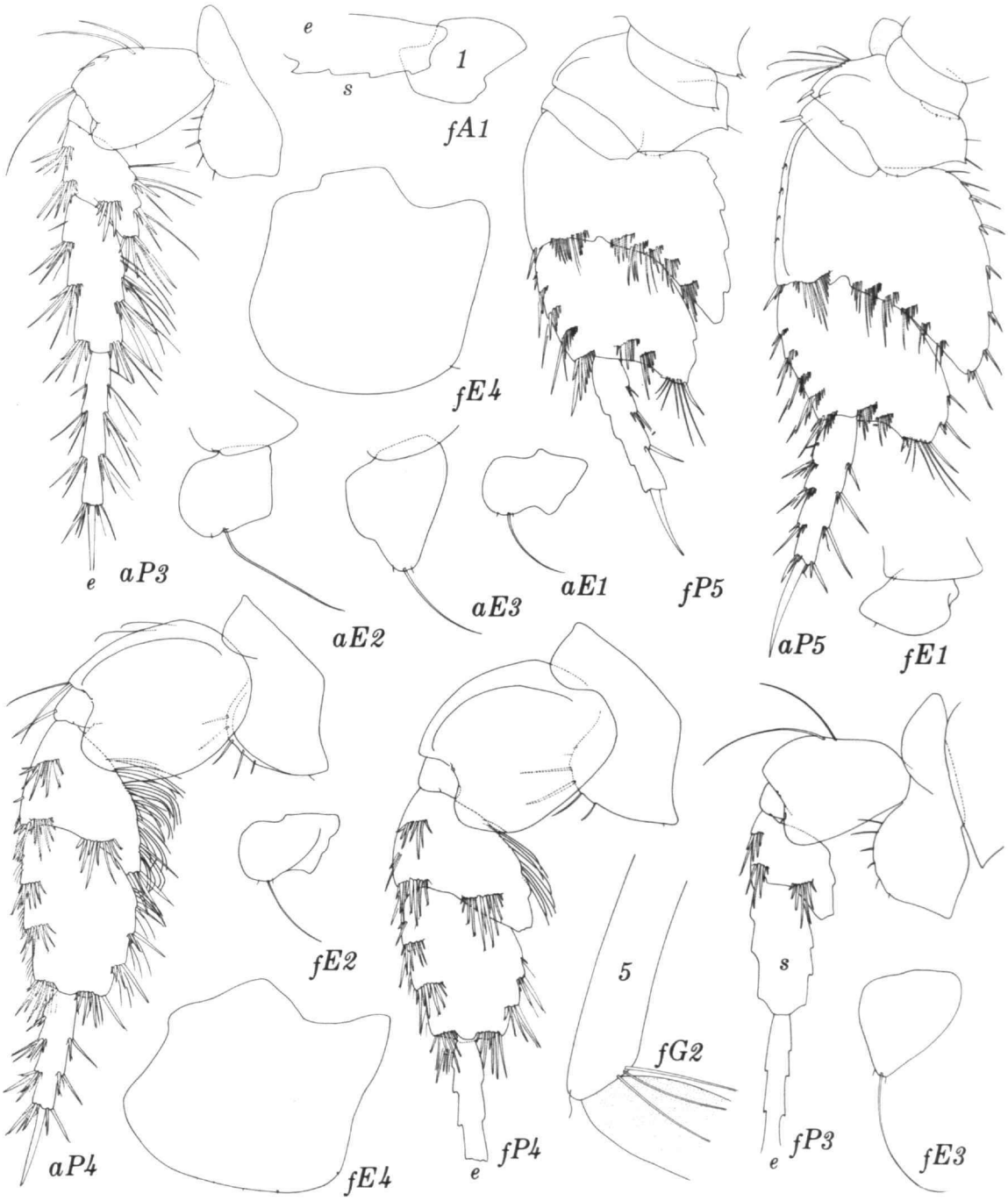

FIGURE 4.—*Platyischnopus mirabilis* Stebbing (*a* = male "a," 5.07 mm; *f* = female "f," 4.63 mm).

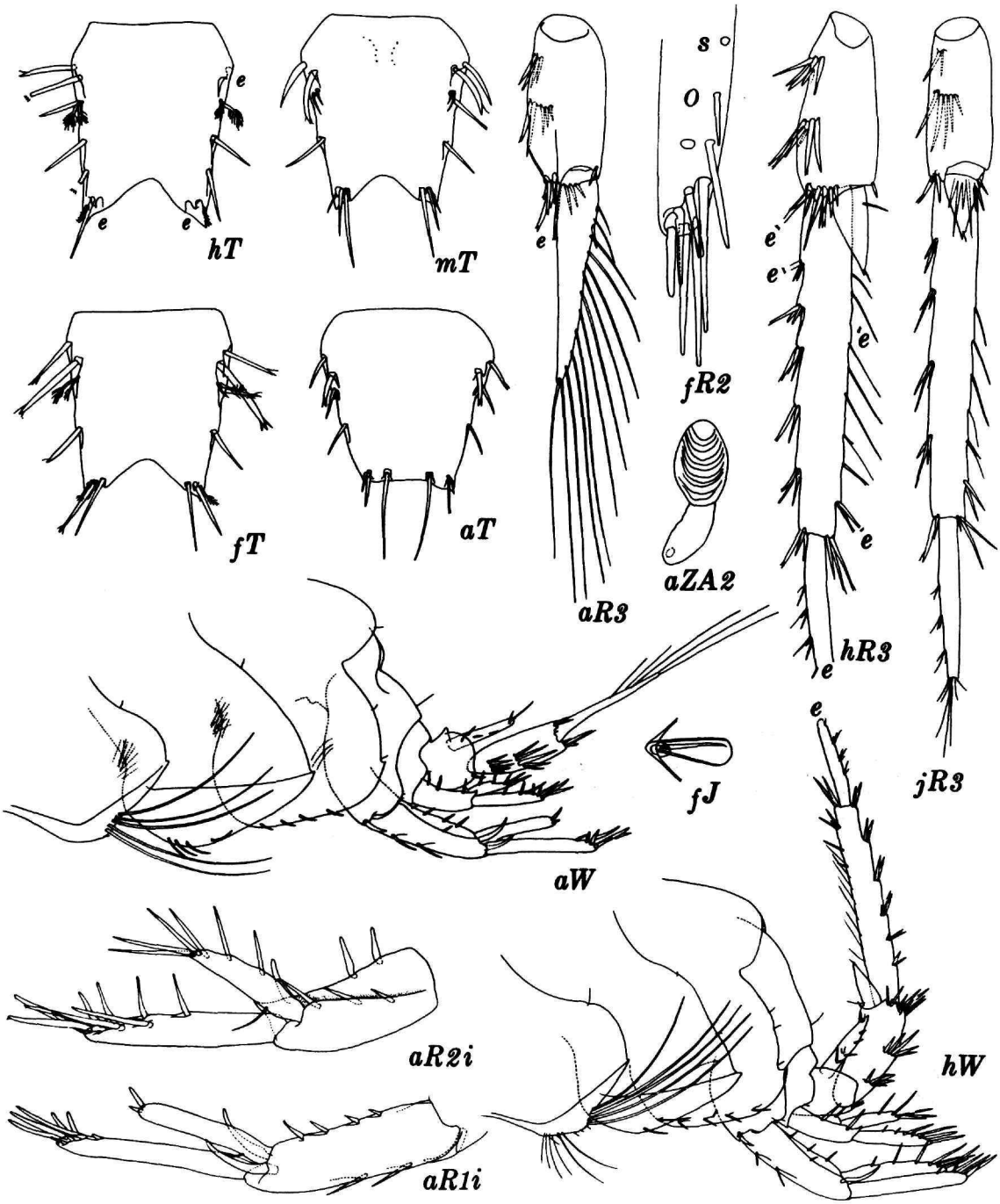

FIGURE 5.—*Platyischnopus mirabilis* Stebbing (*a* = male "a," 5.07 mm; *f* = female "f," 4.63 mm; *h* = female "h," 5.11 mm; *j* = female "j," 3.77 mm; *m* = male "m," 4.56 mm).

2 setules; coxa 4 of parallelogram form, anterior margin extended forward slightly, posterior margin oblique and subparallel to anterior, posterodorsal tooth rounded, posterodorsal margin long, V-shaped, width–length ratio of coxa 4 = 27:21. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 4–(5–6)–5–5, long anterior setae = (4–5)–(2–4, one distally)–0–0, short anteriors = 2–3–(0–2)–(1–2), no others. Gnathopods with elongate article 5, much longer than short article 6, far more elongate on gnathopod 2 than on gnathopod 1, sixth articles chelate, elongate-oval, anterior and posterior margins biconvex, width ratios of articles 5–6 on gnathopods 1–2 = 17:24 and 15:20, length ratios = 89:54 and 153:56, palmar humps sharp, article 3 elongate, apicolateral margin of article 5 produced, naked posteriorly except for 3 long apical setae. Pereopod 2 stouter than pereopod 1; main apical spine of article 5 scarcely distinguishable from other numerous longer spine-setae but extending to M. 60 on article 6, spine formula of article 6 on pereopods 1–2 = 5 + 5 + one middistal elongate spine; dactyls of pereopods 1–2 lacking inner acclivity, apex with mostly immersed scarcely visible nail bearing clavate scale, medial face with subdistal seta.

Articles 4–5 of pereopod 3 narrow, of pereopods 4–5 very broad, facial spine rows dense; facial ridge formulas on article 2 of pereopods 3–5 = 0–1–1; width ratios of articles 2, 4, 5, 6 of pereopod 3 = 40:32:23:9, of pereopod 4 = 59:52:44:12, of pereopod 5 = 64:76:51:13; length ratios of articles 2, 4, 5, 6 of pereopod 3 = 52:37:50:? (broken on all similar females), of pereoped 4 = 72:47:58:? (broken on all similar females), of pereopod 5 = 41:65:62:58; article 2 of pereopod 3 of medium breadth basally, widening slightly towards distal end, weakly pyriform, of pereopod 4 broadly ellipitic, of pereopod 5 with midposterior tooth, medial apex of article 6 smooth; dactyls of pereopods 3–5 long.

Posteroventral corner of epimeron 1 with small tooth, posterior margin convex, bearing one setule, anteroventral beveled margin with 6 long setae, several setules, anterior part of ventral margin slightly concave, bearing tightly packed row of 5–6 extremely long posteriorly projecting setae; posteroventral corner of epimeron 2 with small tooth, straight posterior margin with one setule, anteroventral margin with 2–3 spines; posteroventral corner of epimeron 3 with small tooth, convex posterior margin with 2 setules, ventral margin with 3–4 spines.

Urosomite 1, bearing scarcely evident dorsal saddle, with one dorsolateral seta on each side, one stout spine on side at base of uropod 1, one small midventral spine; urosomite 2 weakly protuberant dorsally. Peduncle of uropod 1 with one large apicolateral spine and one small spine in middle, 2 ventral spines, medial margin with 3 marginal spines, one large apicomedial spine; peduncle of uropod 2 with 2–3 dorsal spines, medially with 3 spines, lateral apex forming sharp cusp; rami of uropods 1–2 densely spinose apically, outer ramus of uropod 1 naked proximally, inner with 2–3 proximal spines, outer ramus of uropod 2 with 2 small proximal spines, inner with one large proximal spine, inner ramus much shorter than outer on uropod 2, slightly shorter on uropod 1. Uropod 3 with slightly elongate peduncle bearing 2 groups of lateral facial spines, basal group usually with one fewer spine than distal group, formula usually 5–6 but variable (e.g., 4–6, 4–5, 2–5), dorsolateral apex with 2 spines, medially with one, ventrally with 5–7 spines; rami feminine, inner very short, extending to M. 20–25 on article 1 of outer ramus, leaflike, bearing one mediobasal setule and one apicomedial smaller setule, outer ramus immensely elongate, lateral margin of article 1 with 4–5 acclivities bearing 3 spines each, medial margin with setae basally merging to spines distally, medial setal formula (example) = 1–1–1–1–1–0–0, spine formula = 0–0–0–0–1–2–3, article 2 elongate, bearing several lateral acclivities each bearing 2–3 setules, apex strongly setose. Telson ordinary, length–width ratio about 38:31, cleft about 23 percent of telsonic length, forming gape, each apex sharp, bearing 2 thin spines and apicolateral setule, lateral margins each with small pair of plusetules, below which one spine set on ventral side of telson, lateral margin between plusetules and apex with either one or two dorsolateral spines on each side, lateral margins basal to plusetules with subcontiguous pair of spines on each side.

Bulbar setules on cuticle very sparse, cuticle otherwise with dense fingerprint striations.

NEW DESCRIPTION OF MALE.—Eyes slightly larger than in female from lateral view, meeting each other on top of head. Articles 2–3 of antenna 1

shorter than on female, spines in spine groups fewer and shorter, ventral acclivities of article 2 shallower, ventrodistal cusp obsolescent, flagellum elongate, about 1.3 times as long as peduncle, 8-articulate, distal articles each with aesthetasc, elongate article 1 with about 7 pairs of aesthetascs. Article 4 of antenna 2 with apically curved bristles in numerous sets dorsomedially, ventral spines and setae generally shorter and fewer than on female, article 5 shortened, almost naked posteriorly, dorsal margin with 4 sets of male setae and 3 calceoli; flagellum highly elongate, as much as 79-articulate, flagellar formula = 79, 2, 4, 6 . . . 50.

Coxae 1–3 generally as in female (see "Observations"), coxa 3 with sharper constriction than in female, coxa 4 more regular than in female, anterior and posterior margins less oblique. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 4–(6–7)–7–5, long anteriors = 4–4(one distal)–0–0, short anteriors = 3–3–1–1; gnathopods like female but article 5 of gnathopod 2 with 7 stout and short apicoposterior spines; spine formula on article 6 of pereopods 1–2 = 6 + 7 +1 and 5 + 6 + 1; width ratios of articles 2, 4, 5, 6 of pereopod 3 = 37:28:22:9, of pereopod 4 = 57:45:44:12, of pereopod 5 = 65:83:58:16; length ratios of articles 2, 4, 5, 6 of pereopod 3 = 53:38:60:60, of pereopod 4 = 70:52:66:47, of pereopod 5 = 36:77:65:60.

Pereopods 3–4 somewhat thinner, pereopod 5 somewhat broader in relation to female at same magnification.

Epimeron 1 lacking setae on anteroventral bevel; epimeron 2 with 3–4 ventral spines; epimeron 3 with 3–5 ventral spines. Urosomite 1 with strong dorsal saddle, dorsomedial margin of urosomite 3 erect. On uropods 1–2 spines very slightly shortened; inner ramus of uropod 3 much longer than on female but probably reaching only one-half to two-thirds along article 1 of outer ramus, latter missing on all similar specimens, medial margin of inner ramus setose, lateral margin naked. Telson of early males like female but basal spines shorter and more curved, dorsobasal face with two longitudinal rows of denticles, terminal males with basal spines even shorter and cleft obsolescent, apex nearly transversely truncate, medial spine of each apex migrant medially and much more elongate than lateral spine on each apex.

OBSERVATIONS.—Head with several pits basal to striated part of rostrum, emergent setule analogized as wiper oscillating in elongate pit, basal part of setule covered by hood, setule emerging from deep capsule in deeper part of pit (Figure 1). Ommatidia of eyes forming clear apical lens, highly flattened, thus forming button pointing outward, remainder of each ommatidium enveloped in dark purple pigment, tailing off within ocular interior. Calceoli resembling lilies, with thick basal trunk and flat, ovate, slightly dish-shaped, striate reflector. Prebuccal mass flat anteriorly, flush with mandibular outlines. Upper lip partially fused to epistome, marked by weak articulation line, ventral margin of upper lip with notch masked by posterior hump extending downward (hump in illustration behind plane of notch). Inner lobes of lower lip elongate, separated for much of length. Mandibular lobes of medium extension, outer lobes lacking cones.

The proportion of males in the samples is unusually high; out of a total of 849 specimens, 76 are adult males and 67 are subadult males.

VARIATIONS.—Aberrant left coxa 1 of male "a" simulating coxa 2 as shown heavily flattened for female. Pereopods 3–5 with prickly dactyls (Figures 3, 4). Male "a" left uropod 1 aberrant, inner ramus regenerant (Figure 5).

Somewhat larger females from PPBES 945/1 have more robust articles 4 and 5 of pereopods 3–5, for example, female "y" 5.28 mm, has the following formula: widths of articles 2, 4, 5, 6 on pereopod 3 = 40:36:25:10, on pereopod 4 = 59:56:50:13, on pereopod 5 = 67:85:66:16; lengths on pereopod 3 = 62:40:57:62, on pereopod 4 = 75:55:68:45, on pereopod 5 = 37:80:61:52.

ILLUSTRATIONS.—Head of female "g" with antennal outlines based on twisted, unflattened appendages; view of male "a" antenna 1 with article 1 flattened and reversed; views of pereopods 1–2 not fully flattened; note aberrant uropod 1 of male "a" in two illustrations; outer ramus of uropod 3 missing on male "a"; view of telson of male "a" with denticles missing (damaged); pleon of female "h" with uropod 2 added from another female; elongate setae of epimeron 1 of female "h" added from another female.

VOUCHER MATERIAL.—PPBES 981/5: female "f," 4.63 mm (illus.); female "g," 4.75 mm (illus.); female "h," 5.11 mm (illus.) female "w," 5.07 mm (illus.); male "a," 5.07 mm (illus.); male "b," 4.35 mm; male

"c," 4.12 mm; male "d," 4.50 mm; male "m," 4.56 mm (illus.). PPBES 920/5: female "j," 3.77 mm (illus.) and one other broken specimen. PPBES 945/1: female "y," 5.28 mm.

MATERIAL.—PPBES, 46 samples from 22 stations (849); CPBS, 2 samples from 2 stations (4).

DISTRIBUTION.—Victoria: Port Phillip Bay and Western Port, 4–31 m, sand, silty sand, sandy silt. New South Wales: Port Jackson, 4–18 m.

Platyischnopus mam, new species

FIGURES 6–8

?Platyischnopus mirabilis.—Chilton, 1922:4–6, fig. 1 [not Stebbing, 1888].

DESCRIPTION OF YOUNG MALE.—Head about 18 percent of total body length, greatest width about half of length, rostrum apically constricted, narrow, elongate, bearing subapical downturned subsharp process flush with cephalic tangent. Eyes medium, clear of pigment, ommatidia distinct. Article 1 on peduncle of antenna 1 about 1.2 times as long as wide, about 1.25 times as wide as article 2, ventral margin with 3 setules, unproduced dorsal apex with 3 spinules, lateral face with brush of 5 setules; article 2 elongate, about 1.8 times as long as article 1, with 4 cycles of 5–6 anteromedial spines, ventral margin with 3 acclivities bearing 4–5 spines each, distoventral corner scarcely produced, dorsodistal corner strongly produced medially, apical face with row of 6 spines and setae; article 3 as long as article 1, ventral margin with one acclivity bearing one spinule, ventral apex with one spine and 2 smaller armaments; primary flagellum 7-articulate, about 0.95 times as long as peduncle, article 1 of flagellum elongate, only penultimate article with medium aesthetasc; accessory flagellum about 0.45 times as long as primary flagellum, 3-articulate. Dorsal margin of article 4 on antenna 2 with 6 groups of 2–3 long to short setae, ventral margin with 4 acclivities bearing 1–3 spines and setae, ventral apex with 3 spines and setae; article 5 about 0.6 times as long as article 4, dorsal and ventral margins with 4–5 groups of 2–5 setae and spines; flagellum commencing elongation at time of death, base proliferate.

Mandibles with weak palpar hump on face opposite molar; incisors elongate, tapering, simple, truncate; right and left sides with linguiform lacinia mobilis, apex on right side simple, toothed on left side; right mandible with one conical spine-cusp, left with one trifid spine-cusp; molars of medium size, forming face on medial surface of mandible, ventral apices weakly triturative, otherwise surfaces fuzzy or mostly marked off into polygons, molar lacking accessory distal hump; palp generally elongate and thin, article 1 weakly elongate, article 2 naked, article 3 equal to article 2 in length, oblique apex with 6 short setal spines. Inner plate of maxilla 1 small, of medium width, rounded apically, bearing one medium seta; outer plate with 9 spines (medialmost spine normally pointed and sharp, next adjacent spine bifid, next spine denticulate medially, next spine bifid, next subsharp apically and bearing small inner tooth, next with broadened apex and large medial tooth, remaining 3 broad and apically blunt, 5 lateralmost spines forming very weakly geniculate cluster aimed laterally but recurved medially, weakly with appearance of mop); palp appearing 1-articulate but with weak articulation forming second article, palp slightly exceeding apex of outer plate, thin, bearing 4 long apical setae. Maxilla 2 forming very weak baler, lobes subconical, outer much broadened, bearing 2 apicolateral setae, most remaining setae of both lobes on medial part of cone. Maxillipeds short and broad, very large basally; inner plate broad, trapezoidal but subconical apically, bearing 6 apical and 2 medial setae (lateral 4 larger); outer plate elongate, with 9 blunt medial spines, ventral longitudinal row of setae; palp short relative to elongate outer plate, naked laterally, article 2 with medium density of medial setal groups, article 3 naked medially, with 2 apicolateral facial setae and several medioterminal setae, article 4 of medium length, apically truncate, guarded by cusp on each end, bearing one stout medium spine and 2 accessory setae.

Coxa 4 of normal dimensions, coxae 1–3 much smaller and coxae 1–2 very small but not fully hidden by following coxae; coxa 1 boot-shaped, anterior extended forward, subsharp, with weak posteroventral lobe, bearing two ventral setules; coxa 2 (when flattened) bilobed ventrally, rounded anteriorly, anterior lobe with one long ventral seta and 2 setules; coxa 3 stout–conical, ventral apex with one long seta and 2 setules; coxa 4 broadly subquadrate, anterior margin concave, then apically extended forward weakly, posterior margin weakly oblique and parallel to anterior margin, posterodorsal corner rounded, posterodorsal margin of me-

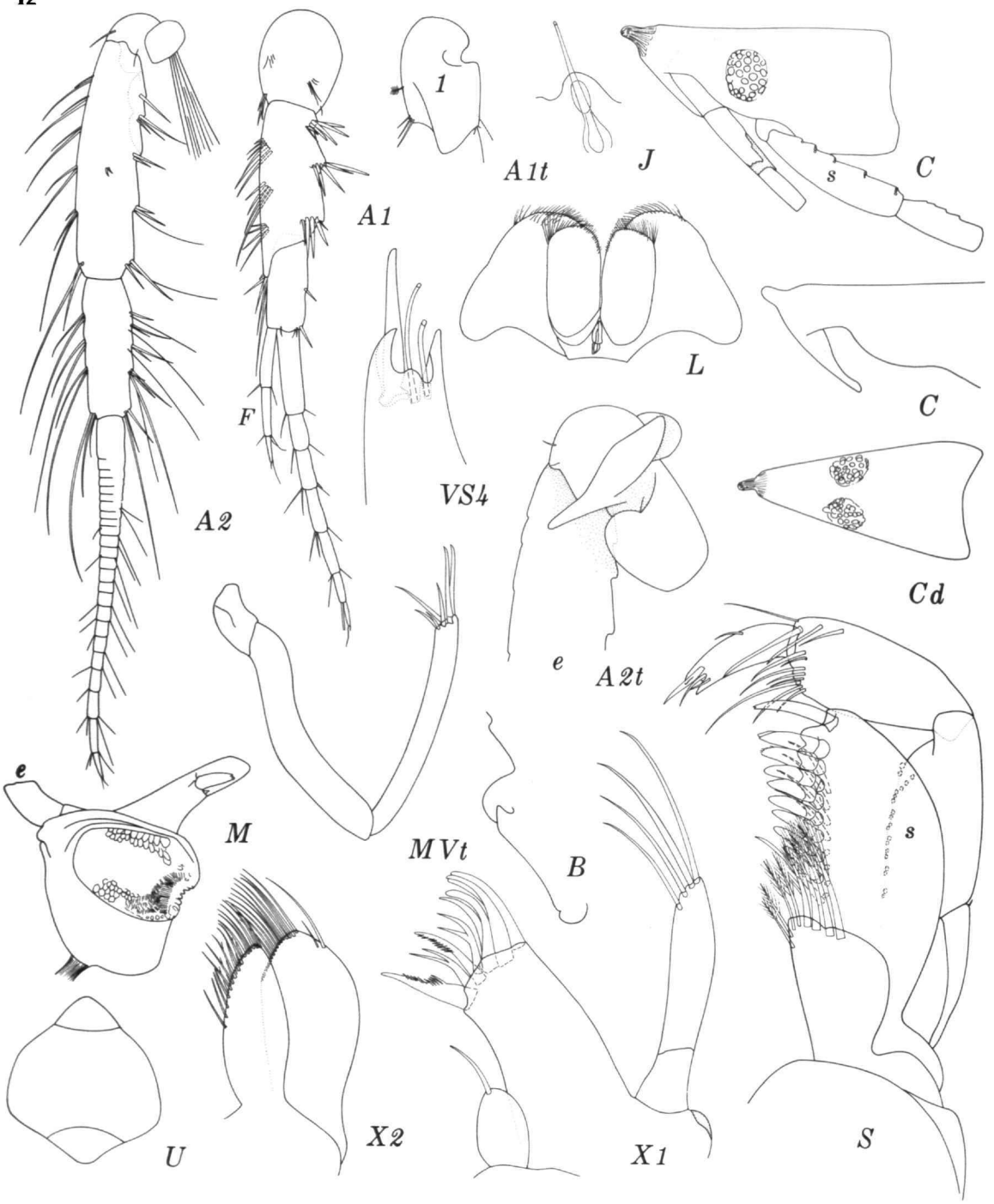

FIGURE 6.—*Platyischnopus mam*, new species, holotype, young male "a," 6.10 mm.

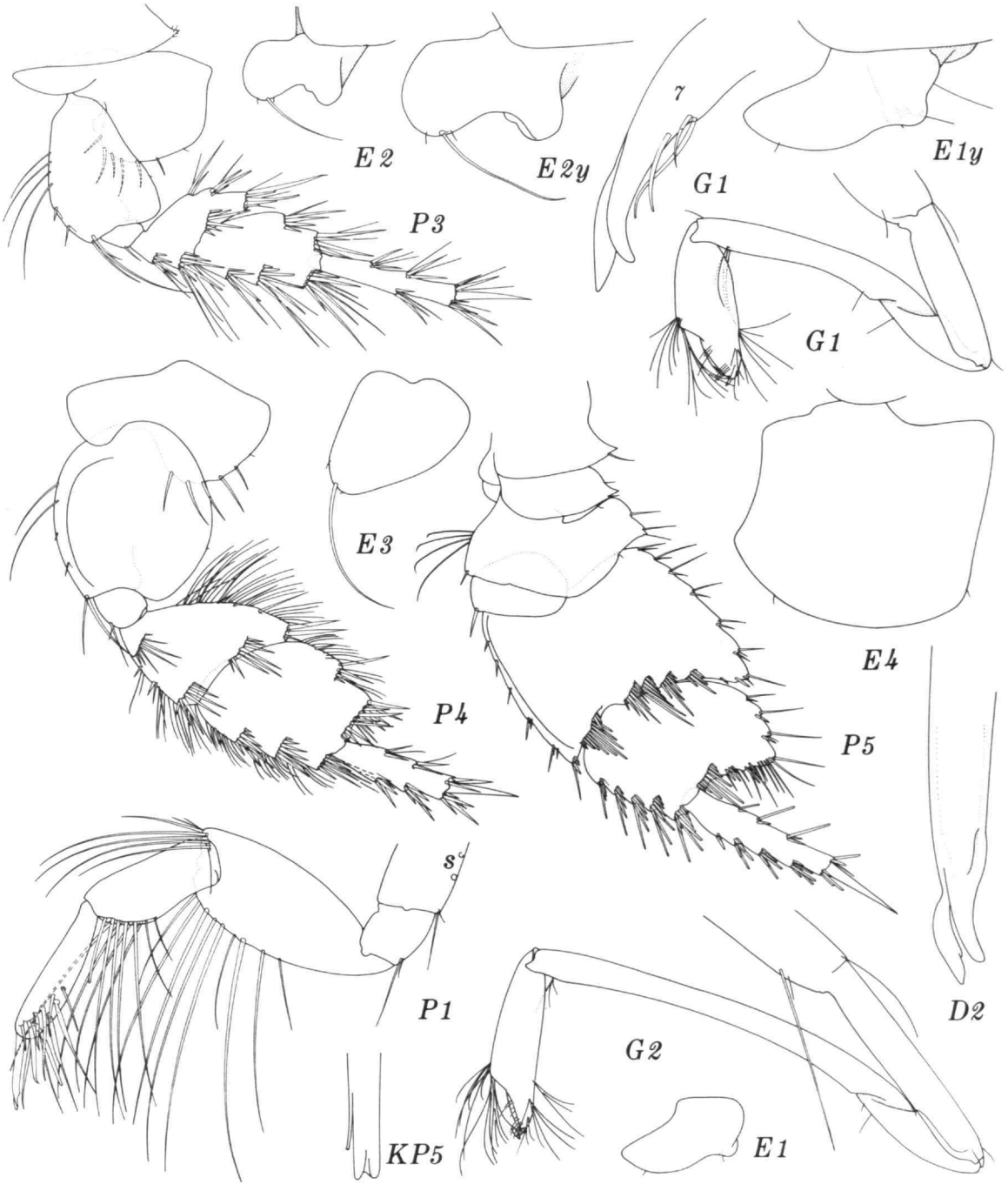

FIGURE 7.—*Platyischnopus mam*, new species, holotype, young male "a," 6.10 mm.

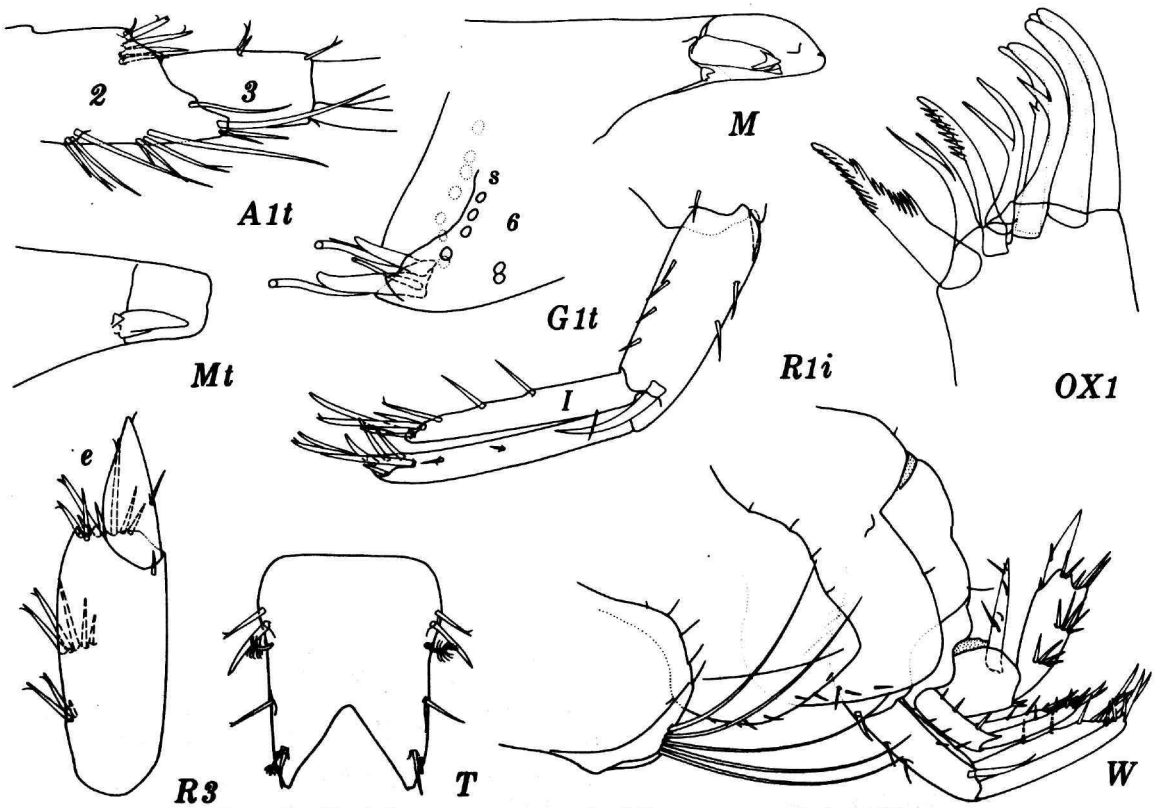

FIGURE 8.—*Platyischnopus mam*, new species, holotype, young male "a," 6.10 mm.

dium length, V-shaped, width–length ratio of coxa 4 = 18:17. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 4–2–6–5, long anterior setae = 5–4–0–0, short anteriors = 3–3–4–2, no others. Gnathopods with elongate article 5, much longer than short article 6, far more elongate on gnathopod 2 than on gnathopod 1; sixth articles chelate, elongate-oval, anterior and posterior margins weakly biconvex; width ratios of articles 5–6 on gnathopods 1–2 = 12:23 and 11:18, length ratios = 98:60 and 160:65; palmar humps sharp, article 3 elongate, apicolateral margin of article 5 produced, naked posteriorly except for 3–4 apical setae and one basal seta on gnathopod 1. Pereopods 1–2 similar, main apical spine extending to M. 50 on article 6, spine formula of article 6 on pereopod 1 = 5 + 5 plus one middistal spine, on pereopod 2 = 6 + 5 + 1; dactyls of pereopods 1–2 lacking inner acclivity, apex with fully fused nail bearing clavate scale, medial face with subproximal seta; articles 4–5 of pereopod 3 of medium breadth, of pereopods 4–5 very broad, facial spine rows dense. Facial ridge formula on article 2 of pereopods 3–5 = 0–1–0; width ratios of articles 2, 4, 5, 6 of pereopod 3 = 39:35:30:9, of pereopod 4 = 61:48:46:13, of pereopod 5 = 70:81:67:14; length ratios of articles 2, 4, 5, 6 of pereopod 3 = 55:37:47:56, of pereopod 4 = 70:49:56:45, of pereopod 5 = 40:68:58:60; article 2 of pereopod 3 of medium breadth basally, widening slightly towards distal end, weakly pyriform, of pereopod 4 broadly elliptic, of pereopod 5 with small posterior tooth; medial apex of article 6 smooth; dactyls of pereopods 3–5 medium to short.

Posteroventral corner of epimeron 1 with small setal notch, posterior margin convex, bearing 4 setae and setule, anteroventral sinuous margin naked, anterior part of ventral margin bearing tightly packed row of 5 extremely long posteriorly projecting setae; posteroventral corner of epimeron 2 rounded but

weakly extended, posterior margin concave with 4 setules, ventral margin with 3 spines; posteroventral corner of epimeron 3 rounded, weakly convex, posterior margin with one setule, ventral margin with 4 spines.

Urosomite 1 bearing weak dorsal saddle, with one dorsolateral seta on each side, one stout spine at base of uropod 1, two small midventral spines; urosomite 2 not protuberant dorsally. Rami of uropods 1–2 densely spinose apically, outer ramus of uropod 1 naked dorsally but with 2 small mediodorsal spines, inner with 2–3 proximal spines, outer ramus of uropod 2 with 2 proximal spines, inner with 2; peduncle of uropod 1 with one large apicolateral spine and one small spine in middle, 2 ventral spines, medial margin with 4 spines, one large apicomedial spine, peduncle of uropod 2 with 3 dorsal spines, lateral apex forming sharp cusp, medial margin with 2 spines (one of these apical); inner ramus much shorter than outer on uropod 2, slightly shorter on uropod 1. Uropod 3 with slightly elongate but stout peduncle bearing 2 groups of lateral facial spines, basal group with 3, distal with 5, dorsolateral apex with 2 spines, medially with one, ventrally with 6 spines; inner ramus feminine (outer missing), short, subconical, bearing one medial spinule. Telson ordinary, length–width ratio about 5:4, cleft about 37 percent of telsonic length, forming gape, each apex sharp, bearing one thin spine and apicolateral setule, lateral margins each with small pairs of plusetules and 3 spines in tandem near M. 22, 27, and 60, basalmost spine ventral.

Bulbar setules of cuticle absent, cuticle otherwise with dense but weak fingerprint striations.

Observations.—Head with several setules attached to knobs, not pits as in *P. mirabilis* (perhaps preservation forced pit outward into nodule, note probable shrinkage of anterior part of rostrum). Ommatidia distinct. Article 1 of antenna 1 with medial extension as illustrated. Urosomite 1 with spine also basomedial to attachment of uropod 1, fully hidden from lateral view. Prebuccal mass flat anteriorly (margin actually highly oblique), flush with mandibular outlines. Upper lip strongly distinct from epistome by articulation line, also bearing anterior crescentic ridge, ventral margin ventrally protuberant (perhaps posterior lobe having been rotated ventrally during preservation, upper lip thus unlike that of *P. mirabilis* but perhaps aberrant). Pereopods 3–5 with prickly dactyls like *P. mirabilis* but weaker. Outer rami of uropods 1–2 with 7 apical spines plus beak, inner rami with 6 and 5 apical spines. The unique holotype male is youthful and has not developed calceoli.

Illustrations.—Maxillipedal palp article 2 not flattened; pleonites 3–4 slightly disarticulate; outer ramus of uropod 3 missing.

Holotype.—WAM, young male "a," 6.10 mm. Unique.

Type-Locality.—WAM Trawl sta 6, 24 Jul 1943, Jibbon Point, off Cronulla, New South Wales, Australia, 34°05′S, 151°13′E, 40 m, bottom unknown.

Relationship.—This species differs from *P. mirabilis* Stebbing in the stronger dorsodistal medial tooth on article 2 of antenna 1, the equal length of articles 2–3 on the mandibular palp, the presence of a seta on the inner plate of maxilla 1, the poorly mopped condition of the spines on the outer plate of maxilla 1, the shape of coxa 4, the more numerous posterior setae on epimeron 1, the rounded posteroventral margin on epimeron 3 and the presence of only one apical spine on each lobe of the telson. Many other differences occur in proportions and shapes of various appendages, including small details of raker spines, right and left laciniae mobiles, and palp apex of maxilla 1.

Remarks.—Chilton's (1922) identification of one specimen, about 6 mm long, from Cape Jaubert, NW Australia, 70 ft (ca. 21 m), appears to belong to this species. The crucial clue to this suggestion lies in the rounded epimera 2–3. Chilton's views of pereopod 5 and telson also conform fairly closely to those of *P. mam.*

Material.—WAM, one sample (1).

Distribution.—New South Wales, off Jibbon point, 40 m, bottom unknown.

The *Tomituka* Complex

Tomituka, Yurrokus, and *Tittakunara* form a complex of monotypic genera that may simply be members of a single genus. A strong difference in shape, size, and armament of article 2 on the outer ramus of uropod 3 suggests generic distinction between *Tomituka and Tittakunara.* Article 2 of uropod 3 is unknown in *Yurrokus* and until it can be found, three full genera are described and differentiated from each other on the bases of pereopod

5, coxa 1, gnathopods, maxillipedal dactyl, epimeron 3, and telsonic size and armaments. These elements are used variously in the following key and in "Key to Eastern Hemisphere Genera of Platyischnopidae."

Key to the Species of *Tomituka, Yurrokus,* and *Tittakunara*

1. Epimeron 3 with posteroventral tooth, anteroventral corner of coxa 4 extended forward ..... ***Tomituka doowi,*** new species
   Epimeron 3 with rounded posteroventral corner, anteroventral corner of coxa 4 rounded 2
2. Telson with at least one fully dorsal spine on each lobe, article 2 of pereopod 5 with rounded posteroventral corner ..... ***Tittakunara katoa,*** new species
   Telson lacking dorsal spines, article 2 of pereopod 5 with sharp posteroventral corner ..... ***Yurrokus cooroo,*** new species

Tomituka, new genus

ETYMOLOGY.—An aboriginal god; as Latinized, name to be considered feminine.

DIAGNOSIS.—Platyischnopidae with article 2 of antenna 1 not elongate, not spinose dorsally and ventrally, bearing setae distally. Mandibular incisors not elongate, ordinary, broad, lacinia mobilis different on right and left sides, definite sharp spines occurring in raker row. Spines on outer plate of maxilla 1 sharp, group of blunt spines arranged in mop not present. Plates of maxilla 2 ordinary, with rounded and setose apical margins. Inner plate of maxilliped not tapering apically, normal, bearing facial setae, basal attachment narrow and ordinary, dactyl with distinct nail. Coxae 1–3 large or coxa 1 slightly reduced in size; coxa 1 of shape distinct from coxa 3, shoe-shaped; coxa 3 apically expanded; anteroventral corners of coxae 2–4 sharply protuberant. Article 5 of gnathopod 1 slightly, of gnathopod 2 much longer than article 6, hands strongly chelate. Article 2 of pereopod 3 expanded, of pereopod 5 bearing sharp cusp. Pleonite 3 dorsally smooth. Article 2 on outer ramus of uropod 3 thin, short, poorly spinose. Telson elongate, lacking dorsal spines.

DESCRIPTION.—Articles of accessory flagellum thick and short. Inner plate of maxilla 1 broadened basally, setose, palp strong.

TYPE-SPECIES.—*Tomituka doowi,* new species.

COMPOSITION.—Unique.

RELATIONSHIP.—*Tomituka* lacks the usual features found in *Platyischnopus* on antenna 1, upper lip, mandibles, maxilla 1, maxilla 2, and maxilliped. In *Tomituka* these appendages are therefore of ordinary form, which might be considered primitive in Platyischnopidae.

Tomituka doowi, new species

FIGURES 9–12

DESCRIPTION OF FEMALE.—Head about 21 percent of total body length, greatest width about 48 percent of length, rostrum apically constricted, narrow, elongate, bearing subapical downturned blunt process flush with ventral cephalic tangent. Eyes medium, mostly occluded with pigment, ommatidia absent. Article 1 of peduncle of antenna 1 about 0.7 times as long as wide, about twice as wide as article 2, ventral margin with 5 setules, weakly produced dorsal apex with 2 setules, lateral face with brush of 7 setae; article 2 short, about as long as article 1, with 2 apical rows of 5 and 12 setae, ventral margin naked, distoventral corner unproduced, dorsodistal corner unproduced medially; article 3 about 0.6 times as long as article 1, ventral margin naked, ventral apex with one setule; primary flagellum 11- or 12-articulate, about 1.7 times as long as peduncle, article 1 of flagellum not elongate, each later article with medium aesthetasc; accessory flagellum about 0.6 times as long as primary flagellum, 8-articulate. Dorsal margin of article 4 on antenna 2 with 4 groups of 3–4 medium setae, ventral margin with 7 acclivities bearing dense setae, ventral apex with 5 thin spines and setae; article 5 about 0.63 times as long as article 4, dorsal and ventral margins with 2–3 groups of 2–3 setae; flagellum about 1.12 times as long as articles 4–5 of peduncle combined, 10- or 11-articulate. Mandibles with strong palpar hump on margin above molar; incisors short, weakly denticulate, simple but with cornified side ridge; right lacinia mobilis simple, weakly flabellate and denticulate, left lacinia mobilis with 4 teeth; flabellate right mandible with 3 rakers, left with 3; molars of medium size, forming face on medial sur-

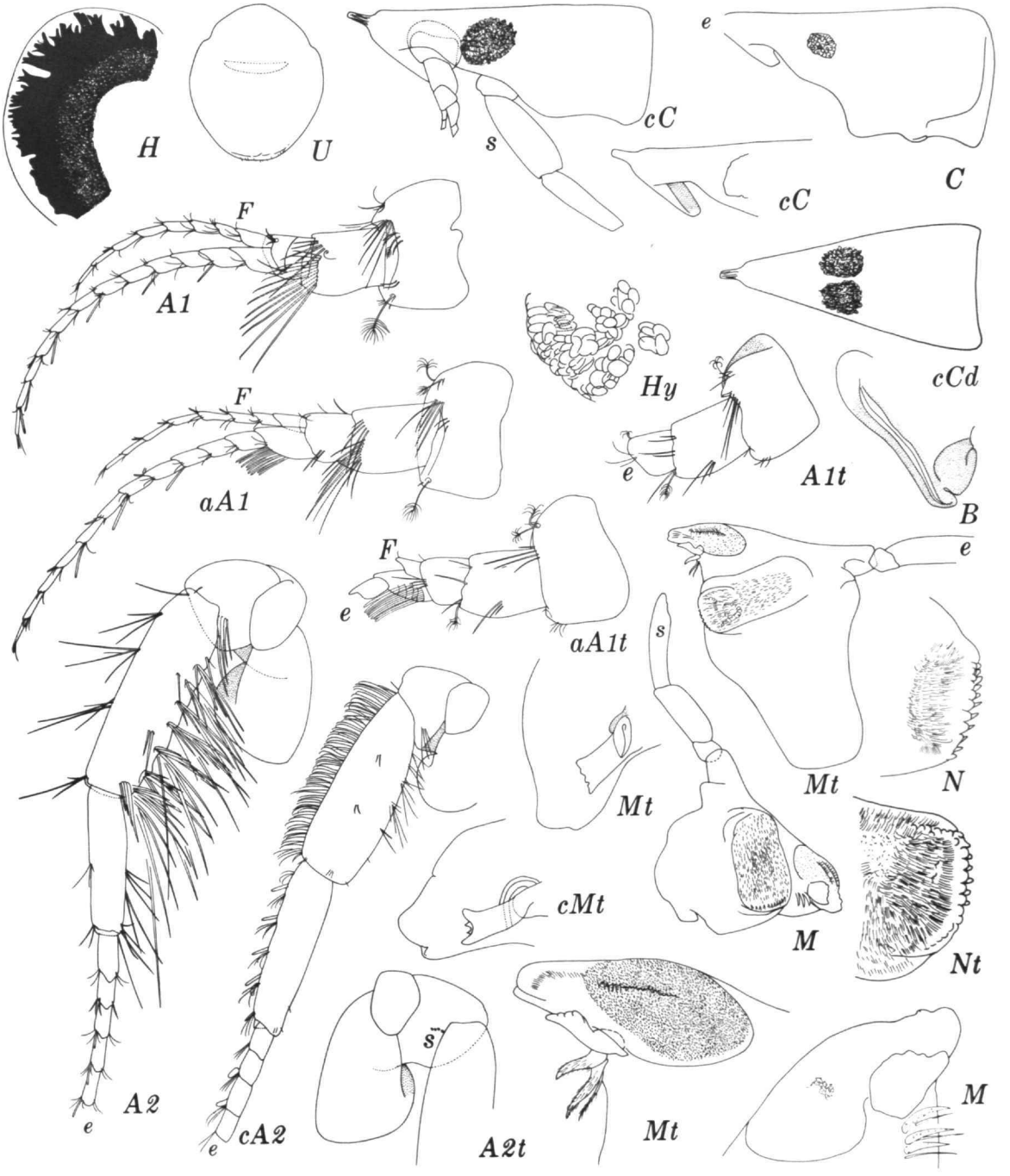

FIGURE 9.—*Tomituka doowi*, new species, holotype, female "f," 8.41 mm (*a* = male "a," 8.43 mm; *c* = male "c," 8.00 mm).

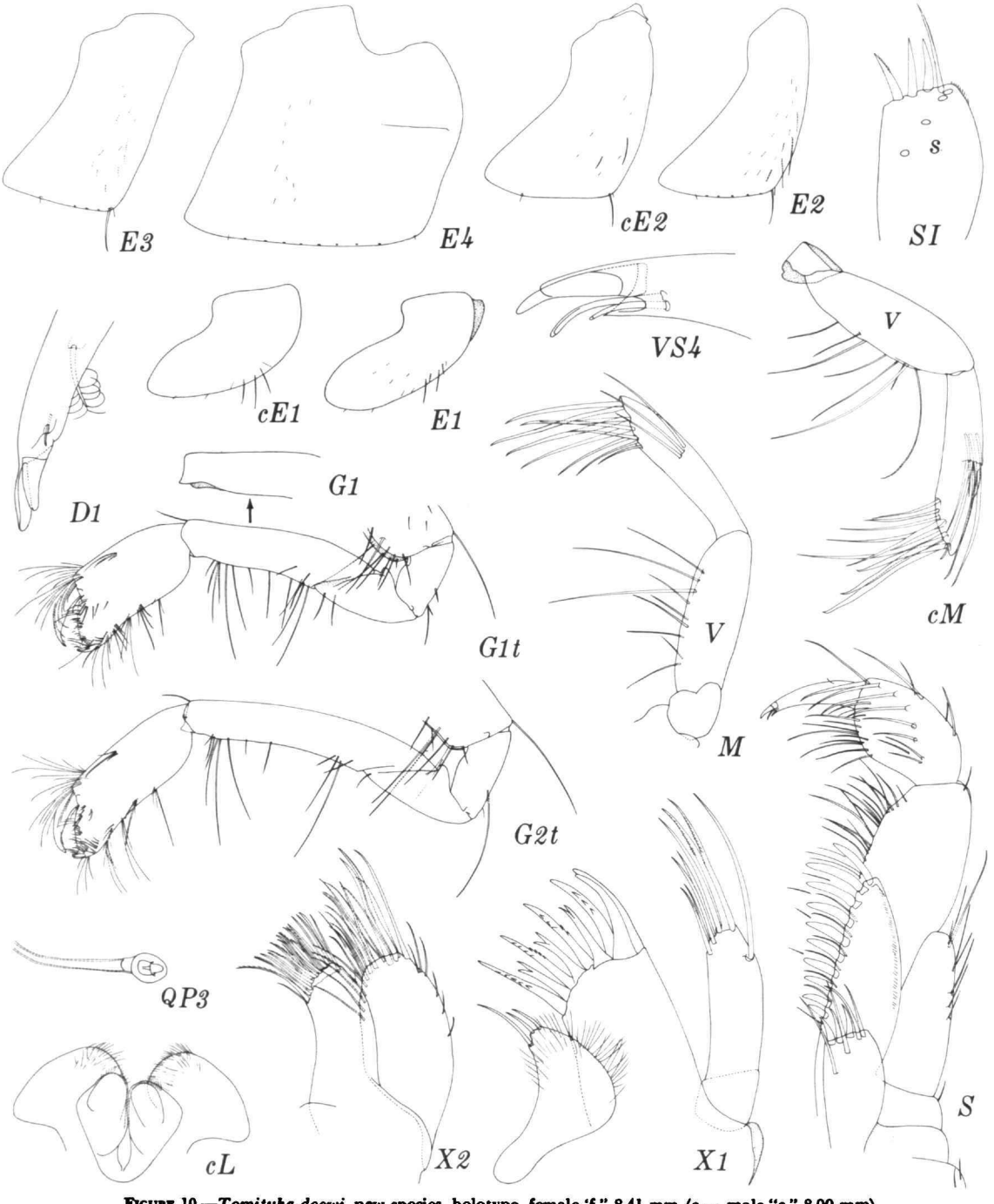

FIGURE 10.—*Tomituka doowi*, new species, holotype, female 'f," 8.41 mm (*c* = male "c," 8.00 mm).

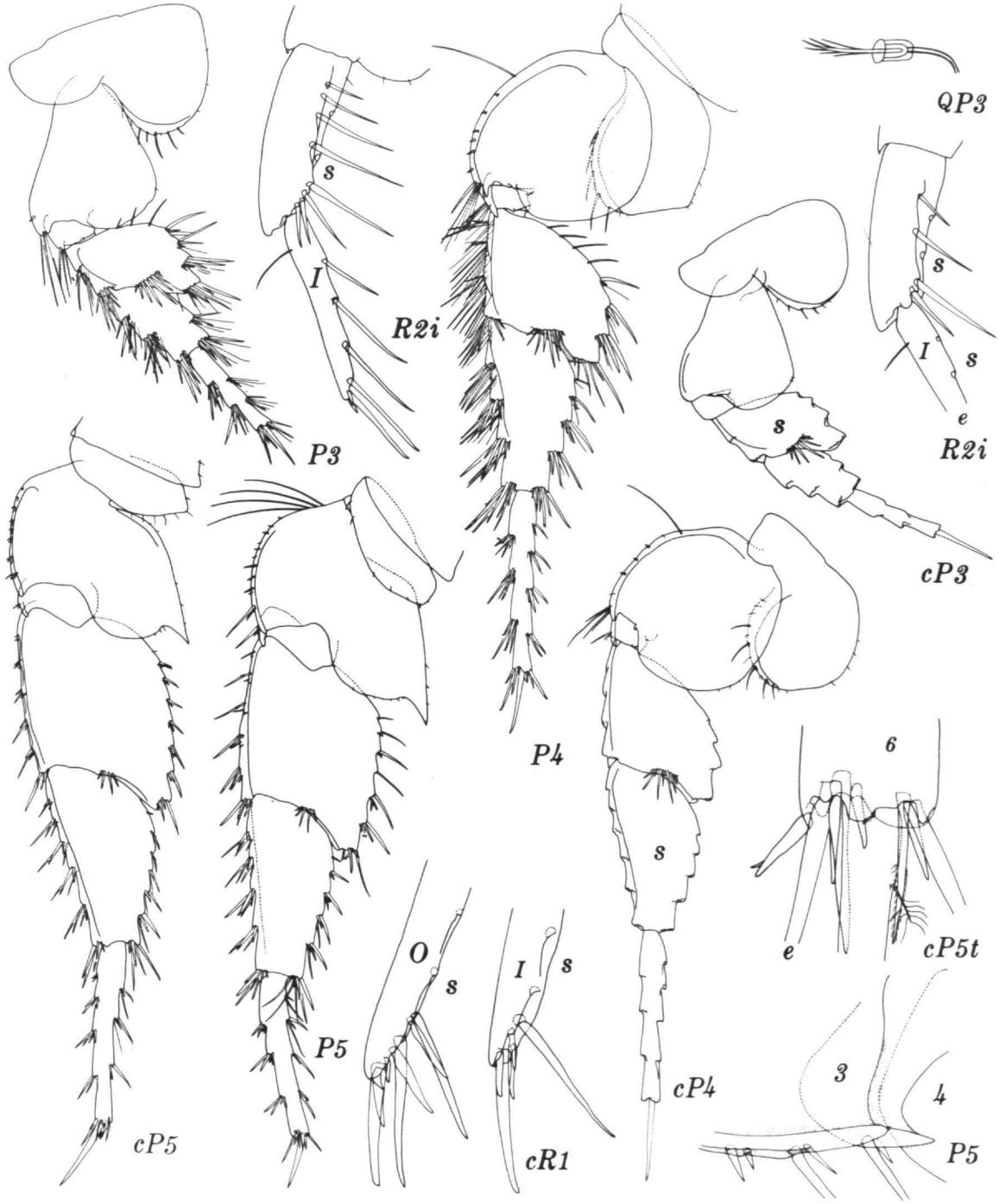

FIGURE 11.—*Tomituka doowi*, new species, holotype, female "f," 8.41 mm (*c* = male "c," 8.00 mm).

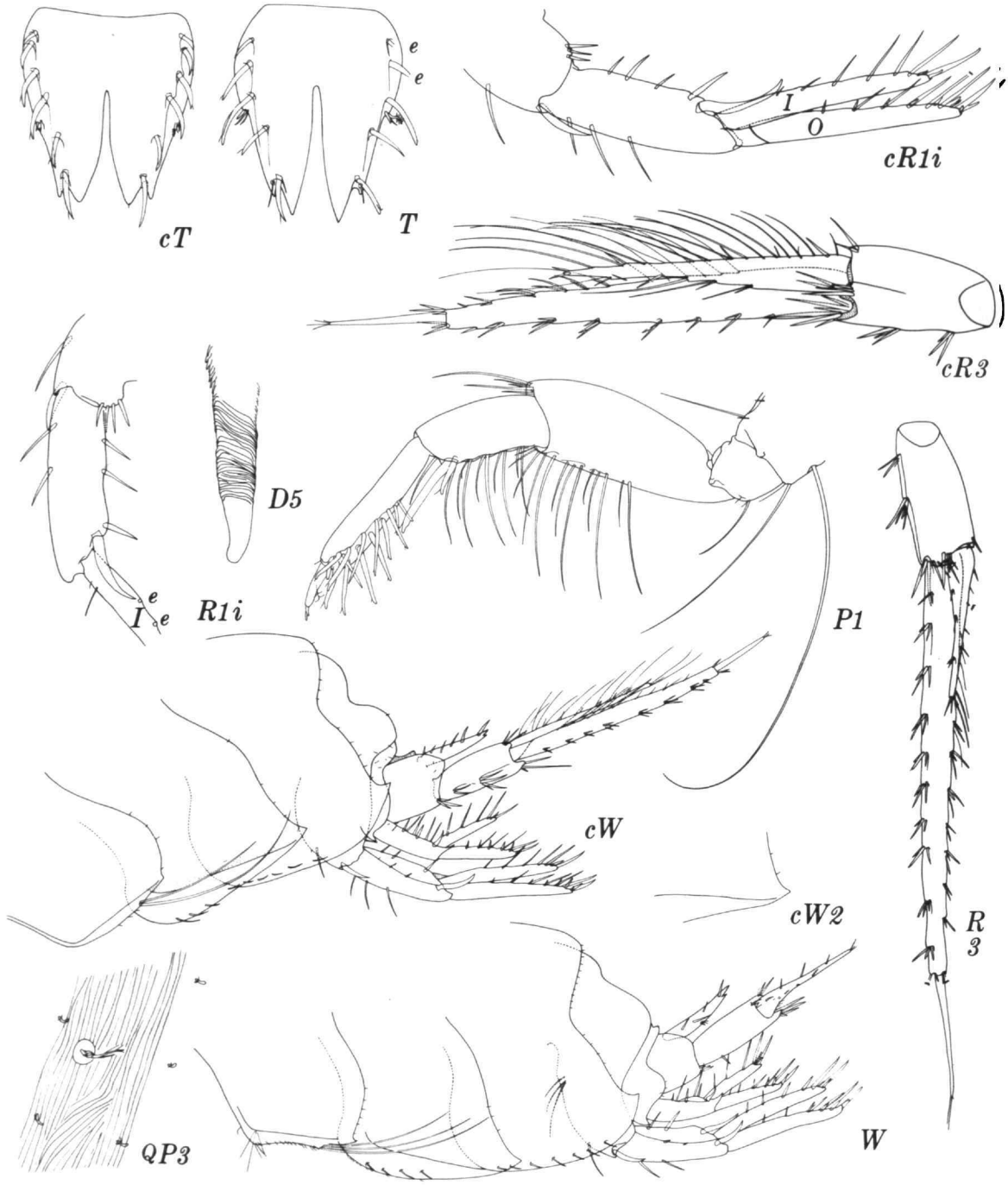

FIGURE 12.—*Tomituka doowi*, new species, holotype, female "f," 8.41 mm (*c* = male "c," 8.00 mm).

face of mandible, ventral apices weakly triturative, otherwise surface fuzzy, molars lacking accessory distal humps; palp generally stout, article 1 short, article 2 with 8 long to medium inner setae, article 3 about 1.05 times as long as article 2, oblique apex with 10 setal spines, basofacial formula = 0–3. Inner plate of maxilla 1 ordinary to large, subpointed, bearing 2 small apical and one larger apicomedial setae; outer plate with 9 normal spines; palp weakly 2-articulate, reaching apex of outer plate, thin, bearing 3 long apical setae, one lateral, 2 pairs of apicomedial setae. Maxilla 2 normal, lobes extending equally, outer slightly broadened, bearing 6 apicolateral setae, inner naked medially. Maxilliped normal, not large basally; inner plate broad and truncate apically, bearing 3 apical spines, 3 apicolateral larger setae and 2 or 3 facial setae; outer plate elongate, with about 10 blunt medial spines, ventral longitudinal row of setae; palp of ordinary size, article 1 setose laterally, article 2 with medium density of medial setal groups and one apicolateral seta, article 3 naked medially, with 2 sets of 2 apicolateral setae, 6–8 facial setae, article 4 of medium extension, apically truncate, oblique margin guarded by cusp on each end, bearing one stout medium spine and 2 accessory setules.

Coxa 1 shoe-shaped, strongly extended forward, coxae 2–3 larger and weakly boot-shaped, coxae 1–3 not reduced, not hidden by following coxae except for posterior thirds of their surfaces by each succeeding and overlapping coxa, when animal flexed anterior coxa 3 partially hidden by coxa 4; coxa 4 very broad, anteroventral corner protuberant, anterior and posterior margins nearly parallel, posterodorsal corner rounded, posterodorsal margin L-shaped, width length ratio = 1:1; ventral setal formula of coxae 1–4 = 7–2–2–0, coxa 2 with 3 posterior setae, setae of coxa 1 small, posteriormost ventral seta of coxae 2–3 very short. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 3–3–6–(6–9), long anterior setae = (20–21)–(15–16)–3–1, short anteriors = 3–(3–8)–8–9, no others. Gnathopods with elongate article 5, much longer than short article 6, far more elongate on gnathopod 2 than on gnathopod 1; sixth articles chelate, elongate-ellipsoid, anterior and posterior margins almost straight; width ratios of articles 5–6 on gnathopods 1–2 = 19:28 and 15:28, length ratios = 78:58 and 102:69; palmar humps sharp; article 3 scarcely elongate on gnathopod 2; apicolateral margin of article 5 produced posteriorly, setose sparsely. Pereopods 1–2 similar; main apical spine of article 5 extending to M. 50 on article 6; spine formula on article 6 of pereopods 1 and 2 = 7 + 6 or 7 + 7 plus one middistal elongate spine; dactyls of pereopods 1–2 with weak inner acclivity, emergent setule short, apex with nail bearing clavate scale, medial face with ordinary plusetule. Articles 4–5 of pereopod 3 of medium breadth, of pereopods 4–5 very broad; facial spine rows dense, facial ridge formula on article 2 of pereopods 3–5 = 0–1–1, width ratios of articles 2, 4, 5, 6 of pereopod 3 = 48:38:20:09, of pereopod 4 = 66:47:34:10, of pereopod 5 = 84:54:32:11, length ratios of articles 2, 4, 5, 6 of pereopod 3 = 60:40:38:40, of pereopod 4 = 75:58:65:70, of pereopod 5 = 58:70:66:63; article 2 of pereopod 3 narrow basally, widening strongly towards distal end, pyriform, of pereopod 4 broadly orbicular, of pereopod 5 with posterodistal tooth, medial apex of article 6 undulant, dactyls of pereopods 3–5 short, article 4 of pereopod 3 extended posterodistally.

Posteroventral corner of epimeron 1 with small tooth, posterior margin convex, bearing setules, anteroventral margin rounded, with 5 short to medium setae, anterior part of ventral margin slightly concave, setulate, posteriorly bearing tightly packed row of 2–3 extremely long posteriorly projecting setae; posteroventral corner of epimeron 2 with medium tooth, sinuous posterior margin with 3 setules, anteroventral margin with 4–5 spines; posteroventral corner of epimeron 3 with medium tooth, weakly convex posterior margin setulate, ventral margin with 7 spines.

Urosomite 1 with scarcely evident dorsal saddle, bearing stout spine on side at base of uropod 1, and one midventral seta; urosomite 2 weakly and sharply protuberant dorsally. Rami of uropods 1–2 densely spinose apically, outer ramus of uropod 1 with 2 dorsal spines, inner with 3 dorsal spines, outer ramus of uropod 2 with 6 paired and unpaired dorsal spines, inner with 3 larger spines, peduncle of uropod 1 with one large apicolateral spine and 2 small spines in middle, 2–3 ventral spines, medial margin with 3 spines and large apicomedial spine, peduncle of uropod 2 with 3 dorsal spines, medially with 2 spines and apical pair, lateral apex forming sharp cusp; inner ramus scarcely shorter than outer on uropods 1–2. Uropod 3 with slightly elongate peduncle bearing 2 groups of 3 and 4 lateral facial

spines, dorsolateral apex with 3 spines, medially with one, ventrally with 7–8 spines; rami feminine, inner very short, extending to M. 35 on article 1 of outer ramus, bearing one mediobasal setule and lateral and medial smaller spinules; outer ramus immensely elongate, lateral margin of article 1 with 10 acclivities bearing 2–3 spines each, medial margin with 13–14 acclivities bearing 1–3 short setae and spinules each, article 2 elongate, apex with 2 setules. Telson elongate, length–width ratio = 17:13, cleft about 67 percent of telsonic length, forming gape, each apex sharp, bearing deep lateral acclivity armed with spine and setule, lateral margins each with small pair of plusetules below which one spine set on ventral side of telson, lateral margin with 4 dorsolateral spines on each side.

Cuticle with bulbar setules of varying sizes mixed with pipes and rudimentary setules, surrounded by clear space in midst of fine striations in form of linear fingerprint pattern, emergent setules branched or plumose.

Description. of Male.—Head as in female. Eyes pigmented or clear but not reduced in size as in certain females. Setae on antenna 1 smaller and shorter than in female; article 1 of primary flagellum slightly enlarged and bearing about 5 rows of aesthetascs. Peduncle of antenna 2 not broadened but article 5 longer than in female, almost 0.9 times as long as article 4, latter bearing dense dorsomedial fuzz, ventral setal groups reduced to 5 with few and short elements, article 5 almost naked ventrally, bearing 5 dorsal sets of calceoli and attendant male setae, flagellum immensely elongate, flagellar formula = 65, 2, 3, 5, 7 . . . 33 or 35. Right lacinia mobilis with enlarged teeth, outside teeth forming enlarged cusps embracing 2 smaller middle teeth; mandibular palp article 3 with facial setal formula of 3–3. Outer plate of maxilla 2 with 4 lateral setae. Palp article 3 of maxilliped with 5 facial setae, lateral margin with 3 long and one short setae. Coxae 1–2 broader than in female (Figure 10: *cE1 cE2*), coxae 3–4 scarcely wider than in female. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 2–4–5–6, long anteriors = (14–13)–8–1–1, short anteriors = 3–(5–9)–7–7, no others. Article 6 of gnathopod 1 relatively slightly smaller than in female, article 5 of gnathopod 2 relatively slightly longer than in female. Article 2 of pereopod 5 relatively much smaller in relation to articles 4–6 than in female (in Figure 11 pereopod 5 adjusted to same size as in female, note male pereopods 3–4 thus depicted smaller than those of female) but overall appendage much larger in male. Posteroventral tooth of epimeron 1 smaller than in female, anteroventral margin naked. Dorsal margin of urosomite 1 with deep saddle. Spine counts of peduncles on uropods 1–2 different from those in female (see illustrations). Inner ramus of uropod 3 elongate, reaching M. 70 on article 1 of outer ramus, medial margins of both rami with setae in addition to small spines, lateral margin of outer ramus with 8 acclivities, apex of article 2 with 5 short setae (4 shown in illustration). Telson with medial limb apices shorter, less sharp than in female, with 5 lateral–dorsal spines on each side.

Description of Juvenile.—Juvenile "h," 5.45 mm: Eyes pigmentless. Setal sets on article 2 of antenna 1 = 7 and 6; primary flagellum 10-articulate; accessory flagellum 7-articulate. Article 4 of antenna 2 with 6 posterior sets of setae; article 5 with 2 posterior sets including distalmost; flagellum 9-articulate. Ventral spines on epimera 2–3 = 4 and 3; epimeron 1 with one ventral seta. Peduncle of uropod 1 with 2 ventral spines. Peduncle of uropod 3 with 2 sets of lateral spines.

Juvenile "i," 5.48 mm: Dactyls of pereopods 3–4 elongate, about 50 percent longer than in other specimens but otherwise fitting general context of *Tomituka doowi* with following observations: eyes almost fully occluded with purple pigment; primary flagellum of antenna 1 with 9 articles, accessory flagellum with 6 articles; article 4 of antenna 2 with only 5 sets of posterior setae; article 6 of pereopods 1–2 with spine formulas of 5 + 4 + 1 or on one member of pereopod 1 = 5 + 3 + 1; dactyl of pereopod 5 missing; epimeron 1 with only one small anteroventral seta; epimeron 3 with only 3 ventral spines; uropod 3 missing; mouthparts not examined.

Observations.—Apices of rami on uropods 1–2 similar, thus apex of outer ramus on uropod 1 like apex of outer ramus on uropod 2 (Figure 11: *cR1O*, small differences on inner rami (Figure 11: *cR1I*) reflected on both uropods; posterior setal sets on article 4 of male antenna 2 becoming more and more reduced in number and size and length in terminal males with distalmost sets being lost first.

Specimens, both male and female, with heavily pigmented eyes have eosin-colored fimbriae projecting outside the pigmented mass; in specimens with colorless eyes these fimbriae are reduced or absent

and the dominant ocular feature is a series of morulae radiating outwards from the center of the eye; in the few specimens at hand, presence or absence of pigment is about 1 to 1, but shriveling or reduction in size of eyes is rare, occurring only in the holotype and one other specimen (female "f" is nevertheless selected as the holotype because it is otherwise in the best condition); articles 2 and 3 of pereopods 4–5 bearing hook-like anteroventral extension furnished with ridge; note facial ridges on articles 4–5 of certain pereopods 3–5.

A high proportion of males occurs in the benthic samples; in the CPBS samples, with 144 specimens, 11 are adult males and 11 are subadult males; in the PPBES samples, with 105 specimens, 24 are adult males and 15 are subadult males.

ILLUSTRATIONS.—Dorsalmost long seta on epimeron 1 of female "f" missing but added in illustration, true length unknown; pleonal illustration of female "f" bearing right uropod 3, thus showing medial surface of peduncle, outer ramus missing, left uropod 3 detached during sorting process but saved and illustrated in detached aspect; male "c" urosomite 1 on pleonal illustration with basoproximal setal bundle removed for clarity, similar to but denser than in female.

HOLOTYPE.—NMV, female "f," 8.41 mm.

TYPE-LOCALITY.—CPBS 34S/5, 1 Mar 1965, Western Port, Victoria, Australia, 12.8 m, sand.

VOUCHER MATERIAL.—Type-locality: juvenile "h," 5.45 mm. CPBS 35S/5: male "a," 8.43 mm (illus.); male "b," 7.94 mm. PPBES 975/2: female "d," 7.33 mm; male "c," 8.00 mm (illus.), male "e," 7.93 mm. CPBS 600/2: juvenile "i," 5.48 mm.

RELATIONSHIP.—See *Yurrokus cooroo,* new species.

MATERIAL.—CPBS, 60 samples from 24 stations (144); WPBES, 10 samples from 6 stations (14); PPBES, 26 samples from 8 stations (105).

DISTRIBUTION.—Victoria: Western Port and Port Phillip Bay, 4–18 m, sand, sand and gravel, sand and mud, seagrass.

Yurrokus, new genus

ETYMOLOGY.—Aboriginal name for sun; masculine.

DIAGNOSIS.—Platyischnopidae with article 2 of antenna 1 not elongate, not spinose dorsally and ventrally, bearing setae distally. Mandibular incisors not elongate, ordinary, broad, lacinia mobilis different on right and left sides; definite sharp spines occurring in raker row. Spines on outer plate of maxilla 1 sharp, group of blunt spines arranged in mop not present. Plates of maxilla 2 ordinary, with rounded and setose apical margins. Inner plate of maxilliped not tapering apically, normal, bearing facial setae, basal attachment narrow and ordinary; dactyl with apical nail fully fused to member. Coxa 1 very small, shoe-shaped, coxae 2–4 large, only anteroventral corner of coxa 2 sharply protuberant, coxa 3 expanded distally. Article 5 of gnathopods scarcely longer than article 6, hands weakly chelate. Article 2 of pereopod 3 expanded, of pereopod 5 with sharp cusp. Pleonite 3 dorsally smooth. [Outer ramus of uropod 3 unknown.] Telson elongate, lacking dorsal spines.

DESCRIPTION.—Articles of accessory flagellum thick and short. Inner plate of maxilla 1 broadened basally, setose, palp strong.

TYPE-SPECIES.—*Yurrokus cooroo,* new species.

COMPOSITION.—Unique.

RELATIONSHIP.—This genus differs from *Tomituka* in the smaller coxa 1, much shortened wrists on the gnathopods, poorly chelate hands of the gnathopods and the fusion of the apical nail on the dactyl of the maxilliped. A key to the species of *Tomituka, Yurrokus,* and *Tittakunara* precedes the description of *Tomituka.*

Yurrokus differs from *Indischnopus* in the absence of dorsal teeth on pleonite 3, the presence of raker spines on the mandible, absence of a nail on the dactyl of the maxilliped, and the large and multisetose palp of maxilla 1.

Yurrokus bears shortened wrists on the gnathopods and therefore resembles western hemisphere genera of Platyischnopidae.

Yurrokus cooroo, new species

FIGURES 13–15

DESCRIPTION OF FEMALE.—Head about 19 percent of total body length, greatest width about 45 percent of length; rostrum apically constricted, narrow, elongate, bearing subapical downturned blunt process flush with ventral cephalic tangent. Eyes medium, with dense to sparse ommatidia composed of stained morulae. Article 1 of peduncle on antenna 1 about 0.5 times long as wide, about 1.7 times as wide as article 2, ventral margin with 3

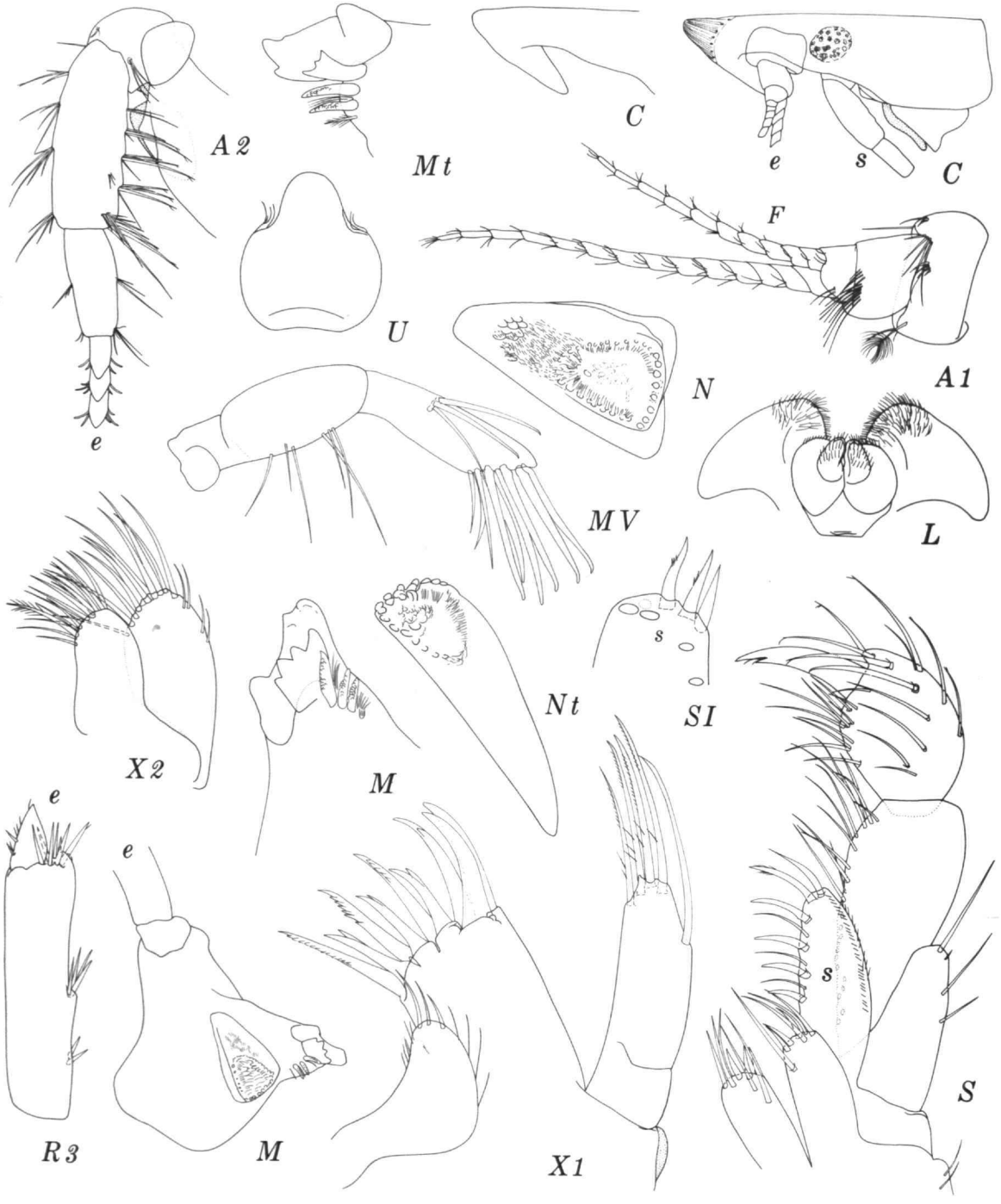

FIGURE 13.—*Yurrokus cooroo*, new species, holotype, female "b," 6.96 mm.

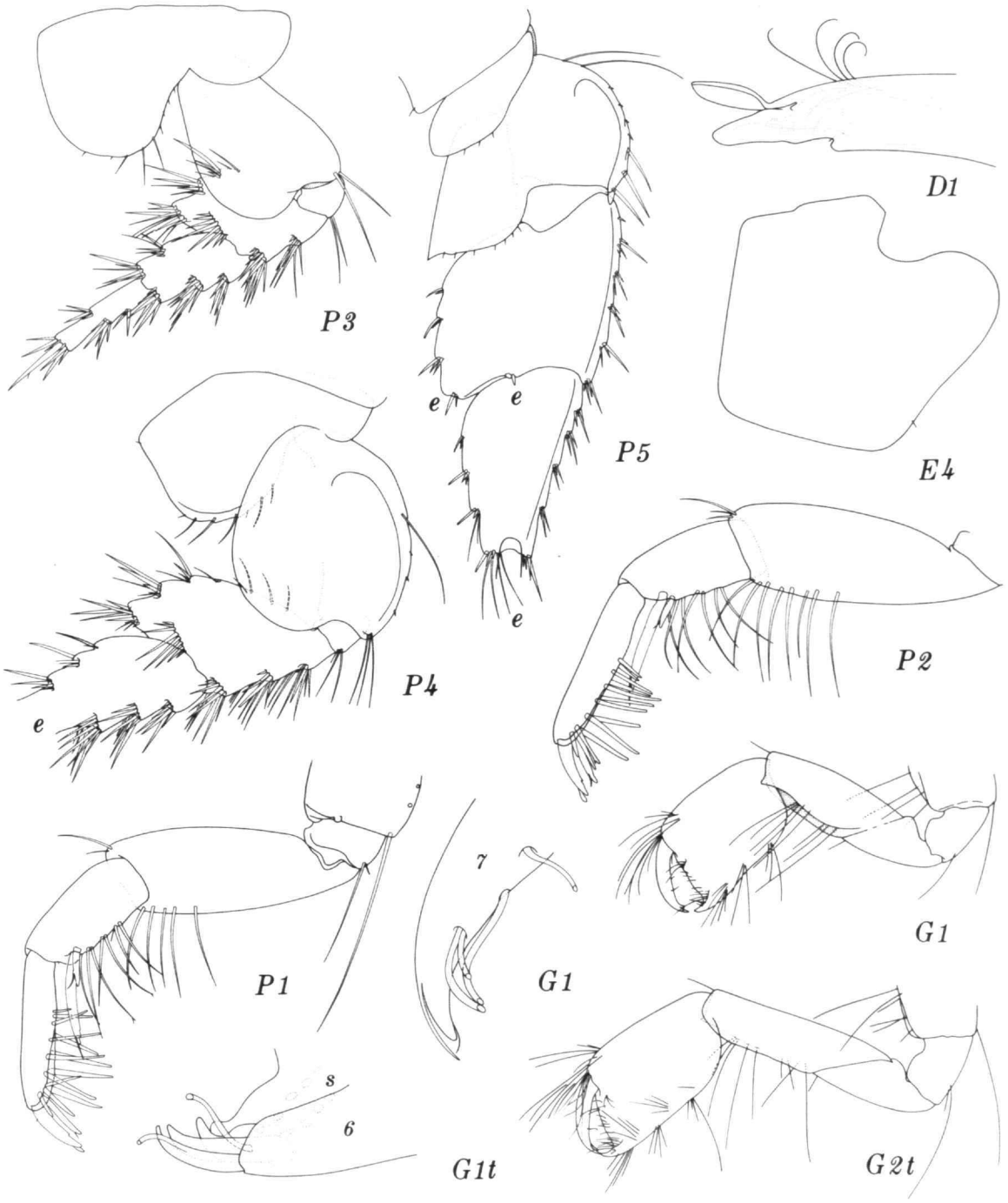

FIGURE 14.—*Yurrokus cooroo*, new species, holotype, female "b," 6.96 mm.

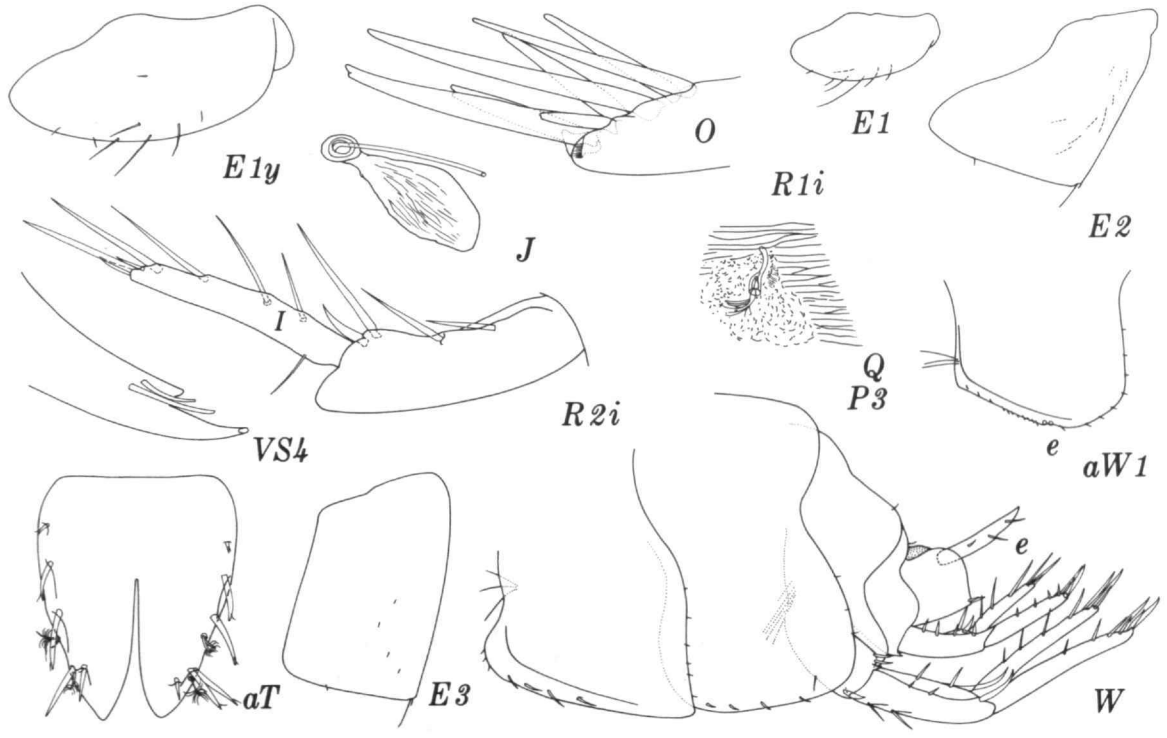

FIGURE 15.—*Yurrokus cooroo*, new species, holotype, female "b," 6.96 mm (*a* = female "a," 8.09 mm).

setules, unproduced dorsal apex with 4 setules, lateral face with brush of 5 setae; article 2 short, about as long as article 1, with 2 apical rows of 4 and 6 setae, ventral margin naked, distoventral corner unproduced, dorsodistal corner unproduced medially; article 3 about 0.5 times as long as article 1, ventral margin naked, ventral apex with 2 setules; primary flagellum 14-articulate, about 2.5 times as long as peduncle, article 1 of flagellum not elongate, some distal articles with medium aesthetascs; accessory flagellum about 0.67 times as long as primary flagellum, 10-articulate. Dorsal margin of article 4 on antenna 2 with 4 groups of 3–5 medium setae, ventral margin with 4–5 acclivities bearing dense setae, ventral apex with 5 thin spines and setae; article 5 about 0.7 times as long as article 4, dorsal and ventral margins with 2 groups of 2–5 setae; flagellum about 1.5 times as long as articles 4–5 of peduncle combined, 13-articulate.

Mandibles with strong palpar hump on margin above molar; incisors short, right with 3 teeth and notch, left with 3 humps in 2 branches; right lacinia mobilis clavate, trifid, left lacinia mobilis flabellate, with 4 teeth; right rakers 2 + one rudimentary, left rakers 3 + one rudimentary; molars of medium size, forming face on medial surface of mandible, ventral apices weakly triturative, otherwise surface fuzzy or carved into polygons and nodes, molars lacking accessory distal hump; palp generally stout, article 1 short, article 2 with 6 long to medium setae in 2 sets, article 3 about 1.2 times as long as article 2, oblique apex with 9 setal spines, facial formula = 0–3. Inner plate of maxilla 1 ordinary, with one medium apical seta and 2 shorter apicolateral setae; outer plate with 9 normal spines; palp weakly 2-articulate, reaching apex of outer plate, thin, bearing 3 long apical setae, one lateral, one apicomedial seta. Maxilla 2 normal, lobes extending equally, outer broadened, bearing 4 apicolateral setae, inner with one medial seta. Maxilliped normal, not large

basally; inner plate narrow, subtruncate, bearing 3 apical spines, 3 apicolateral larger setae and 1–2 mediofacial setae; outer plate elongate, with about 6 medial spines, ventral longitudinal row of setae; palp stout but of ordinary length, article 1 setose laterally, article 2 with medium density of medial setal groups, article 3 setose medially, with 3 sets of 1–2 apicolateral setae, 5–6 facial setae, article 4 of medium extension, apically pointed, inner margin guarded by cusp bearing 2 accessory setae.

Coxa 1 reduced, shoe-shaped, extended forward; coxa 2 much larger, shoe-shaped, extended forward; coxa 3 rectangular; coxa 4 very broad, anteroventral corner round–quadrate, anterior and posterior margins divergent, posterior margin oblique, slightly concave, posterodorsal corner rounded, posterodorsal margin elongate, S-shaped, width–length ratio = 1:1; coxae 1–3 not hidden by following coxae except for posterior thirds of their surfaces by each succeeding and overlapping coxa, when animal flexed anterior coxa 4 partially hidden by coxa 3; ventral setal formula of coxae 1–4 = 6–2–2–0, posteriormost seta of coxae 2–3 very short. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 1–2–6–3, long anterior setae = 10–8–0–1, short anteriors = 1–(3–4)–4–5, no others. Gnathopods with elongate article 5, not much longer than short article 6 on gnathopod 1, somewhat longer on gnathopod 2; sixth articles weakly chelate, subrectangular, anterior and posterior margins almost straight; width ratios of articles 5–6 on gnathopods 1–2 = 22:37 and 20:37, length ratios = 57:49 and 75:58; palmar humps sharp; article 3 short (though weakly elongate on gnathopod 2), apicolateral margin of article 5 produced, posteriorly setose sparsely. Pereopod 2 scarcely stouter than pereopod 1; main apical spine of article 5 extending to M. 55+ on article 6; spine formula of article 6 on pereopods 1 and 2 = 7 + 6 plus one middistal elongate spine; dactyls of pereopods 1–2 with strong inner acclivity, setule vestigial, apex with mostly immersed, scarcely visible nail bearing clavate scale, medial face with ordinary plusetule. Articles 4–5 of pereopods 3–5 very broad, facial spine rows dense except on pereopod 5, facial ridge formula on article 2 of pereopods 3–5 = 0–1–1; width ratios of articles 2, 4, 5, 6 of pereopod 3 = 47:42:23:9, of pereopod 4 = 68:50:34:? (missing), of pereopod 5 = 92:66:44:? (missing), length ratios of articles 2, 4, 5, 6 of pereopod 3 = 70:40:40:40, of pereopod 4 = 78:63:?:? (missing), of pereopod 5 = 76:87:74:? (missing); article 2 of pereopod 3 of medium breadth basally, widening towards distal end, weakly pyriform, of pereopod 4 broadly elliptic, or suborbicular, of pereopod 5 with posterodistal tooth; medial apex of article 6 unknown; dactyl of pereopod 3 long, article 4 of pereopod 3 scarcely extended posterodistally.

Posteroventral corner of epimeron 1 rounded, posterior margin convex, setulose, anteroventral quadrate margin with 3 medium setae, anterior part of ventral margin straight, setulate, posteriorly bearing 2 closely contiguous extremely long posteriorly projecting setae (missing but presumed, based on evidence of sockets); posteroventral corner of epimeron 2 weakly protuberant, weakly undulant, posterior margin setulate, anteroventral margin margin with 4–5 spines; posteroventral corner of epimeron 3 rounded, weakly convex, posterior margin with 3 setules, ventral margin with 4–5 spines.

Urosomite 1 with stout spine on side at base of uropod 1, one small midventral spinule bearing scarcely evident dorsal saddle; urosomite 2 weakly protuberant dorsally. Rami of uropods 1–2 densely spinose apically, outer ramus of uropod 1 with 2 dorsal spines, inner with 3 dorsal spines, outer ramus of uropod 2 with 3–4 small spines, inner with 3 large spines, peduncle of uropod 1 with one large apicolateral spine and 2 small spines in middle, 2 ventral spines, medial margin with 2 spines, one large apicomedial spine, peduncle of uropod 2 with 4 dorsal spines, medially with 4 spines, apicalmost short, lateral apex forming sharp cusp; inner ramus shorter than outer on uropod 2, scarcely shorter on uropod 1. Uropod 3 with slightly elongate peduncle bearing 2 groups of 2–4 lateral facial spines, basal group usually with 2 fewer spines than distal group, dorsolateral apex with 4 spines, medially with none, ventrally with 4–5 spines; outer rami unknown, missing; inner very short, bearing 2 mediobasal spinules. Telson elongate, length–width ratio = 16:13, cleft about 60 percent or more of length, forming weak gape, each apex rounded–sharp, bearing thin spines, no lateral acclivity but armed with 2–3 spines and setule, lateral margins each with small pair of plusetules, lateral margin with 3 dorsolateral spines on each side.

Bulbar setules on cuticle very sparse, cuticle otherwise with dense fingerprint striations, emergent setules plumose.

OBSERVATIONS.—Inner lobes of lower lip with small accessory apicofacial lobes.

ILLUSTRATIONS.—Known specimens of this species lack the apices of pereopods 4–5 and all but female "a" lack uropod 3, the latter bearing one left peduncle and inner ramus; joints between articles 4–5 of gnathopods 1–2 poorly preserved but reconstructed approximately; articles 2–3 of pereopod 3 slightly disjointed on illustration.

HOLOTYPE.—NMV, female "b," 6.96 mm.

TYPE-LOCALITY.—PPBES 981/5, 12 Oct 1971, Port Phillip Bay, Victoria, Australia, 4 m, sand.

VOUCHER MATERIAL.—Type-locality, female "a," 8.09 mm (illus.). Male unknown.

RELATIONSHIP.—This species differs from *Tomituka doowi* in the absence of a posteroventral tooth on epimeron 3, in the unproduced anteroventral corners of coxae 3–4, in the presence of two (not one) distal, stout spines on each lobe of the telson and in the lesser gape of those lobes, and in the absence of a nail on the dactyl of the maxillipedal palp.

MATERIAL.—PPBES, 3 samples from one station (5).

DISTRIBUTION.—Victoria, Port Phillip Bay, 4 m, sand.

Tittakunara, new genus

ETYMOLOGY.—Aboriginal name for flea-like tiger shark.

DIAGNOSIS.—Platyischnopidae with article 2 of antenna 1 not elongate, not spinose dorsally and ventrally, bearing setae distally. Mandibular incisors not elongate, ordinary, broad; lacinia mobilis different on right and left sides; definite sharp spines occurring in raker row. Spines on outer plate of maxilla 1 sharp, group of blunt spines arranged in mop not present. Plates of maxilla 2 ordinary, with rounded and setose apical margins. Inner plate of maxilliped not tapering apically, normal, bearing facial setae, basal attachment narrow and ordinary; dactyl with apical nail fully fused to member. Coxa 1 very small, shoe-shaped; coxae 2–4 large, only anteroventral corner of coxa 2 weakly protuberant; coxa 3 expanded apically. Article 5 of gnathopods much longer than article 6; hands weakly chelate. Article 2 of pereopod 3 expanded, of pereopod 5 lacking sharp cusp. Pleonite 3 dorsally smooth. Article 2 on outer ramus of uropod 3 thick, elongate and spiny. Telson short, bearing dorsal spines.

DESCRIPTION.—Articles of accessory flagellum thick and short. Inner plate of maxilla 1 broadened basally, setose, palp strong.

TYPE-SPECIES.—*Tittakunara katoa*, new species.

COMPOSITION.—Unique.

RELATIONSHIP.—The short telson bearing dorsal spines and the lack of a sharp tooth on article 2 of pereopod 5 differentiate this genus from *Tomituka* and *Yurrokus*. In addition, the thick and spiny article 2 on the outer ramus of uropod 3 is a very significant difference from *Tomituka*. That ramus on *Yurrokus* is unknown. *Tittakunara* otherwise differs from other platyischnopids in the ways cited for *Tomituka* and *Yurrokus*.

Tittakunara katoa, new species

FIGURES 16–18

DESCRIPTION OF FEMALE.—Head about 18 percent of total body length, greatest width about 46 percent of length; rostrum apically constricted, narrow, elongate, bearing subapical downturned blunt process flush with ventral cephalic tangent. Eyes medium, fully pigmented black. Article 1 of peduncle on antenna 1 about 0.66 times as long as wide, about 1.6 times as wide as article 2, ventral margin with 4 setules, unproduced dorsal apex with 4 setules, lateral face with comb of 3 tiny setules and pair of blunt penicillate setules; article 2 about 1.3 times as long as article 1, with 2 apical rows of 5 setae each, proximal row of 9 setae, ventral margin naked, distoventral corner unproduced, dorsodistal corner unproduced medially; article 3 about 0.5 times as long article 1, ventral margin naked, ventral apex with 2 setules; primary flagellum 16-articulate, about twice as long as peduncle, article 1 of flagellum not elongate, some distal articles with medium aesthetascs; accessory flagellum about 0.7 times as long as primary flagellum, 12-articulate. Dorsal margin of article 4 on antenna 2 with 4 groups of 3–6 medium setae, ventral margin with 9 acclivities bearing dense setal ranks (ventral apex included), lateral face with 3 sets of 2–8 setae; article 5 about 0.6 times as long as article 4, dorsal and ventral margins with 2 groups of 3–5 setae; flagellum about 1.4 times as long as articles 4–5 of peduncle combined, 15-articulate.

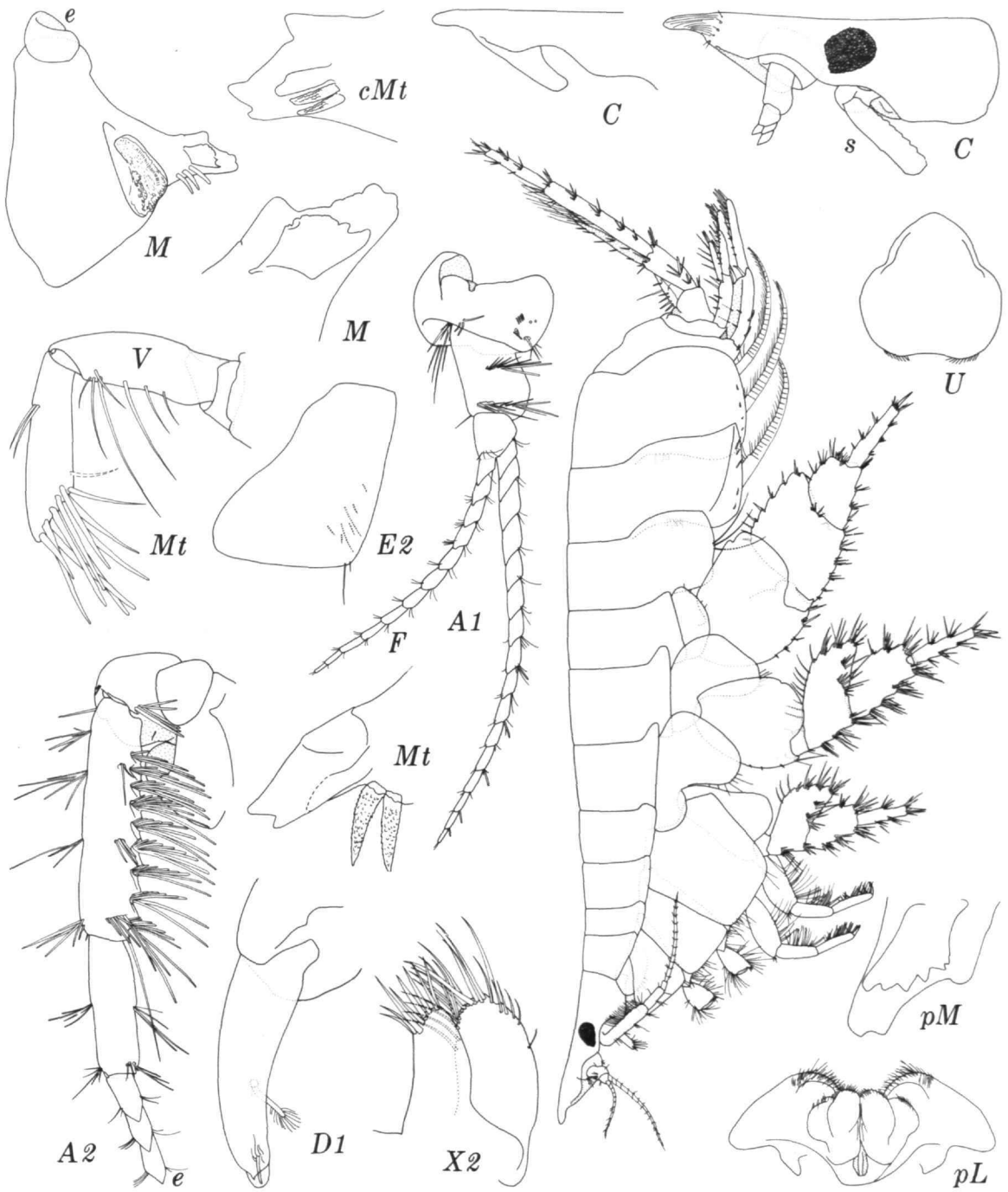

FIGURE 16.—*Tittakunara katoa*, new species, holotype, female "a," 10.37 mm (*c* = female "c," 8.81 mm; *p* = female "p," 11.16 mm).

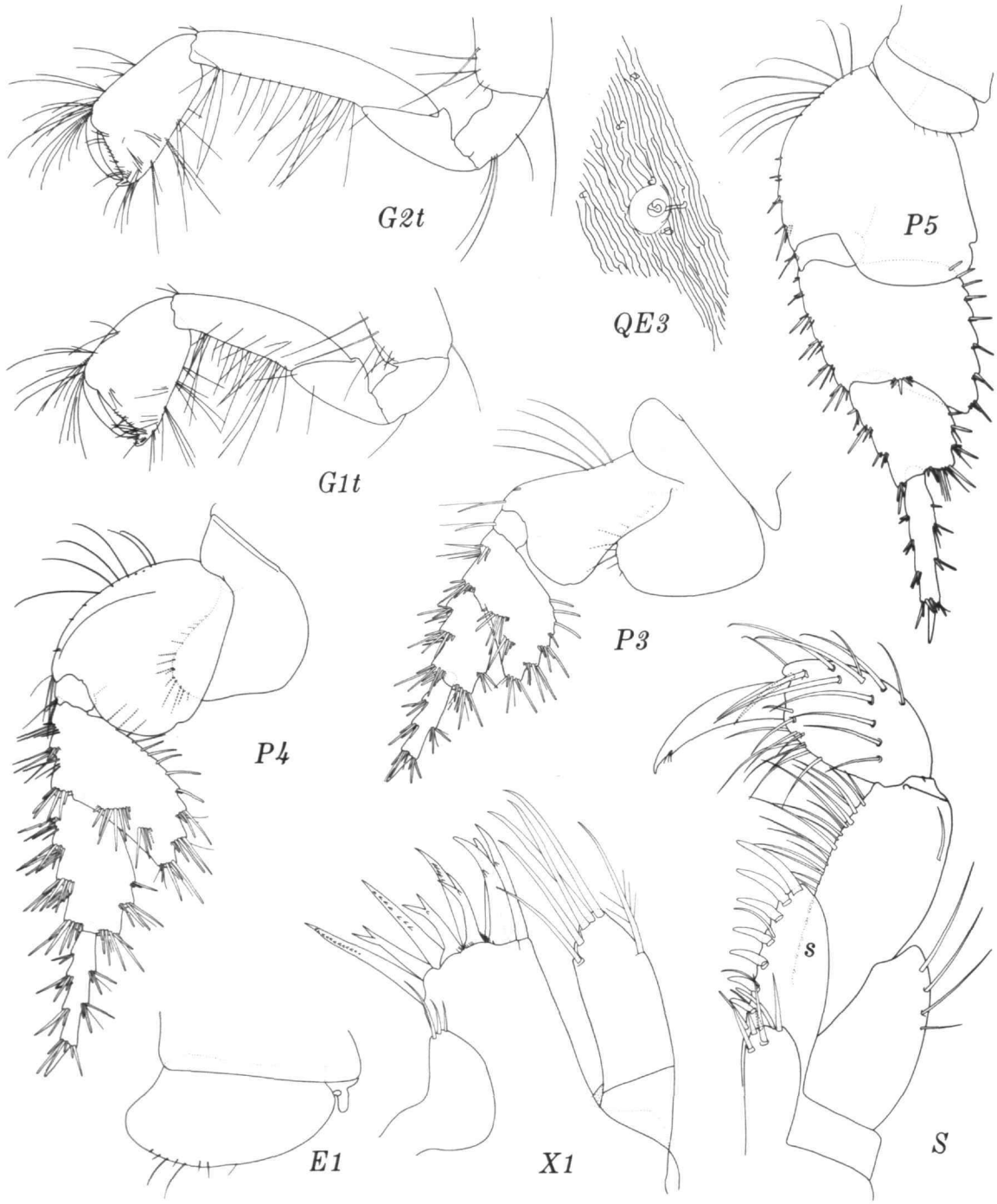

FIGURE 17.—*Tittakunara katoa*, new species, holotype, female "a," 10.37 mm.

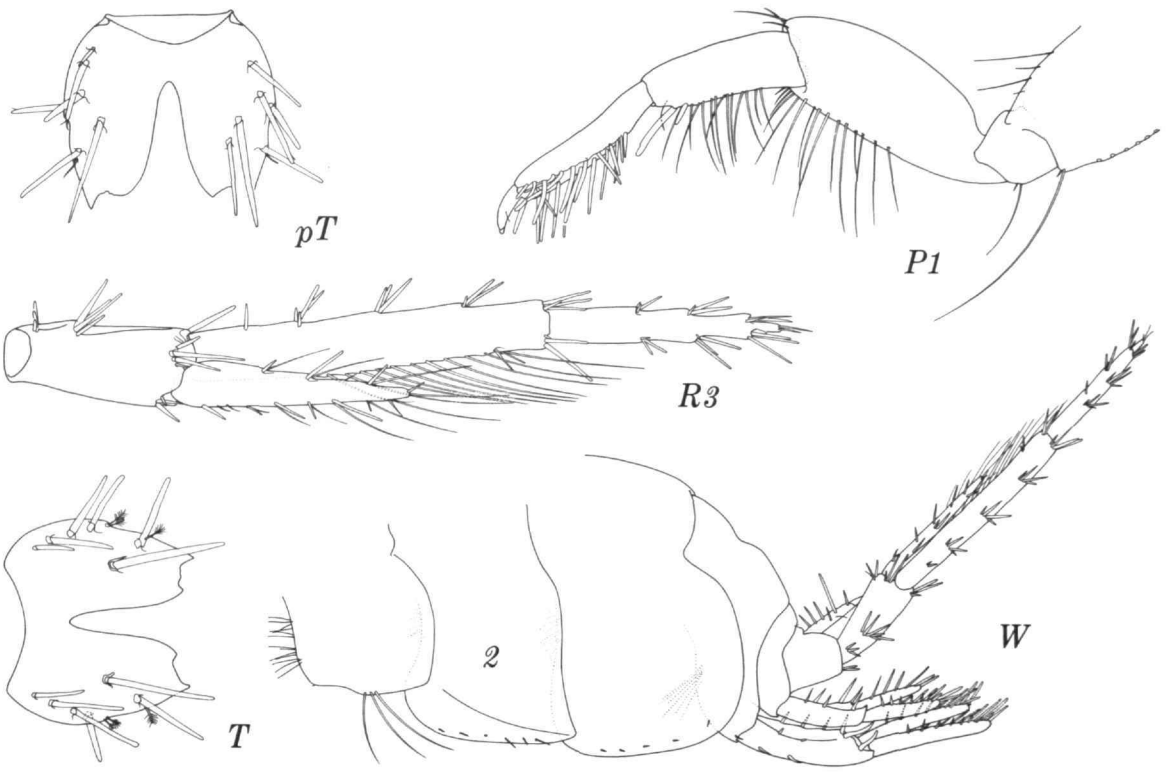

FIGURE 18.—*Tittakunara katoa*, new species, holotype, female "a," 10.37 mm (*p* = female "p," 11.16 mm).

Mandibles with strong palpar hump on margin above molar; incisors short, right with 3 teeth, left with 3 humps in 2 branches; right lacinia mobilis ?linguiform (occluded), left lacinia mobilis flabellate, with 5–7 teeth (often worn); right rakers 2, left rakers 3; molars of medium size, forming weak face on medial surface of mandible, ventral apices weakly triturative, otherwise surface fuzzy or carved into polygons and nodes, molars lacking accessory distal hump; palp of medium thickness, article 1 short, article 2 with 7–9 setae, article 3 almost 1.2 times as long as article 2, oblique apex with 9–10 setal spines, basofacial formula = 0–2. Inner plate of maxilla 1 ordinary, with 3 medium to short apical setae; outer plate with 9 normal spines; palp weakly 2-articulate, reaching apex of outer plate, of medium thickness, bearing 3 long apical setae, one lateral, 2 apicomedial setae. Maxilla 2 normal, lobes extending equally, outer broadened, bearing 5 apicolateral setae, inner without medial setae. Maxilliped normal, not large basally; inner plate narrow, subtruncate, bearing 2–3 apical spines, 2 apicolateral setae, 1–2 facial setae; outer plate elongate, with 7–8 medial spines, no ventral setal row; palp stout but of ordinary length, article 1 setose apicolaterally, article 2 with one apicolateral seta, with medium density of medial setal group, article 3 setose medially, with 4 sets of 1–2 lateral setae, 5 facial setae, article 4 elongate, apically pointed, inner margin guarded by cusp bearing 2–3 accessory setae.

Coxa 1 reduced, shoe-shaped, extended forward; coxa 2 much larger, shoe-shaped, extended forward; coxa 3 rectangular; coxae 2–3 not hidden by following coxae except for small overlap; ventral setal formula of coxae 1–4 = 8–2–2–2, posteriormost seta of coxae 2–4 very short; coxa 4 very broad, anteroventral corner round–quadrate, anterior and posterior margins divergent, posterior margin oblique, straight, posterodorsal corner rounded,

then obliquely truncate, posterodorsal margin elongate, V-shaped, width–length ratio = 1:1. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 6–8–7–9, short posteriors = 0–0–1–1, long anteriors = 11–6–4–2, short anteriors = 14–17–9–4. Gnathopods with elongate article 5, much longer than short article 6 only on gnathopod 2; sixth articles weakly chelate, subrectangular, anterior and posterior margins divergent; width ratios of articles 5–6 on gnathopods 1–2 = 19:36 and 17:32, length ratios = 72:52 and 99:57; palmar humps sharp, article 3 slightly elongate; apicolateral margin of article 5 produced, posterior setae moderately dense. Pereopod 2 with article 4 slightly larger than on pereopod 1; main apical spine of article 5 extending to M. 30 on article 6; spine formula of article 6 on pereopods 1 and 2 = 10 + 10 and 10 + 9 plus one middistal medium spine; dactyls of pereopods 1–2 without inner acclivity, apex with mostly immersed, scarcely visible nail bearing fused setule mark laterally, medial face with ordinary plusetule. Articles 4–5 of pereopods 3–5 very broad, facial spine rows dense except on pereopod 5; facial ridge formula of article 2 on pereopods 3–5 = 0–1–0; width ratios of articles 2, 4, 5, 6 of pereopod 3 = 44:42:22:9, of pereopod 4 = 59:53:30:10, of pereopod 5 = 73:61:32:10; length ratios of articles 2, 4, 5, 6 of pereopod 3 = 67:49:38:35, of pereopod 4 = 71:60:54:48, of pereopod 5 = 84:72:42:52; article 2 of pereopod 3 narrow basally, widening strongly towards distal end, pyriform, of pereopod 4 broadly pyriform, of pereopod 5 with posterodistal notch and rounded corner, medial apex weakly toothed; dactyl of pereopod 3 very short, article 4 extended posterodistally.

Posteroventral corner of epimeron 1 rounded, posterior margin convex, naked, anteroventral rounded corner with setule, anterior margin densely setose, ventral margin with group of 3 long setae; posteroventral corner of epimeron 2 weakly protuberant, weakly undulant, naked, ventral margin with 6 small spines; posteroventral corner of epimeron 3 rounded, posterior margin naked, weakly convex, ventral margin with 4 small spines.

Urosomite 1 with small ventral spine on each side, one spine also at base of uropod 1, bearing weak dorsal saddle; urosomite 2 scarcely protuberant dorsally. Rami of uropods 1–2 densely spinose apically; outer ramus of uropod 1 with 2 rows of 6+ dorsal spines, inner with single row of 9 dorsal spines; outer ramus of uropod 2 with 2 rows of 4–6 dorsal spines, inner with 4 large spines; peduncle of uropod 1 with one medium apicolateral spine, 2 spines in middle, 2 ventral spines, medial margin with 4 spines, one large apicomedial spine; peduncle of uropod 2 with 3 dorsal spines, medially with 3 spines, apicalmost short, lateral apex forming sharp cusp; inner ramus shorter than outer on uropod 2, scarcely shorter on uropod 1. Uropod 3 with slightly elongate peduncle bearing 2 groups of 3–6 lateral facial spines, basal group usually with 2–3 fewer spines than distal group, dorsolateral apex with 4 spines, medially with 3, ventrally with 3; inner rami feminine, extending to M. 62 on article 1 of outer ramus, setose and spinose medially and laterally, apex with seta and short spine; outer ramus elongate, article 1 with 4 lateral acclivities, spine formula = 1–4–3–3–4, article 2 stout and elongate, scarcely tapering, about 0.6 times as long as article 1, both margins with 3 acclivities bearing 3–4 spines each, apex with 2 short setae. Telson short, length–width ratio = 31:34, cleft about 68 percent of telsonic length, forming gape, each apex broad, with sharp lateral cusp, medial margin ragged and weakly produced at medial corner, each lateral margin with weak acclivity bearing 2 setules, another single setule more distad, each margin with 2 large spines, then basodorsally with 2–3 more spines, each lobe with 1–2 fully dorsal spines in addition, each lobe averaging 6 spines total.

Bulbar setules on cuticle very sparse, emergent whips short, thick, cuticle otherwise with dense fingerprint striations and numerous studs and pipes.

OBSERVATIONS.—Inner lobes of lower lip with medium accessory apicofacial lobes.

ILLUSTRATIONS.—Dissected coxa 1 enlarged more than dissected coxa 2.

HOLOTYPE.—AM, female "a," 10.37 mm.

TYPE-LOCALITY.—AM P.24851, Sandy Beach, S of Red Head Beach, New South Wales, Australia, intertidal.

VOUCHER MATERIAL.—Type-locality; female "p," 11.16 mm (illus.); female "c," 8.81 mm (illus.). Male unknown.

MATERIAL.—AM, 4 samples (7): AM P.24846, 24851, 24854, 24923.

DISTRIBUTION.—New South Wales, sandy beaches.

Indischnopus, new genus

ETYMOLOGY.—*Platyischnopus* of India; masculine.

DIAGNOSIS.—Platyischnopidae with article 2 of antenna 1 not elongate, not spinose anteriorly and posteriorly, often bearing setae distally. Mandibular incisors elongate, simple; lacinia mobilis either similar on both sides or absent or highly vestigial; raker spines absent or vestigial. Spines on outer plate of maxilla 1 sharp, generally alike. Plates of maxilla 2 ordinary, with rounded and setose apical margins or tending slightly to conical form and diversity seen in *Platyischnopus*. Inner plate of maxilliped weakly tapering apically but not in form of *Platyischnopus*, apex poorly armed, lacking facial setae, basal attachment narrow and ordinary. Coxae 1–3 large, rectangular, coxa 3 expanded apically. Article 5 of gnathopods longer than article 6, hands poorly chelate. Article 2 of pereopod 3 unexpanded, of pereopod 5 with sharp cusp. Pleonite 3 with dorsolateral teeth. Article 2 of outer ramus of uropod 3 elongate, slender, poorly spinose. Telson short, not spinose dorsally.

DESCRIPTION.—Articles of accessory flagellum very thin and elongate or thick and short. Inner plate of maxilla 1 naked, small, not broadened basally; palp variable or very slender. Truncate apex of maxillipedal palp article 4 bearing nail and setae.

TYPE-SPECIES.—*Platyischnopus herdmani* Walker, 1904.

COMPOSITION.—*Platyischnopus capensis* K. H. Barnard, 1925.

Key to the Species of *Indischnopus*

Telsonic cleft about one-third of telsonic length, cleft deeper than horizontal distance between telsonic apices, apices simple, sharp; teeth of epimera 1–2 large, article 2 of pereopod 5 with 4 cusps ..... *I. capensis*

Telsonic cleft about one-sixth or less of telsonic length, cleft shallower than horizontal distance between telsonic apices, apices complex, themselves excavate, with 2 points or protrusions each; teeth of epimera 1–2 small, article 2 of pereopod 5 with 2 cusps ..... *I. herdmani*

Indischnopus herdmani (Walker), new combination

Platyischnopus herdmani Walker, 1904:247–248, pl. 2: fig. 10.—Pillai, 1957:35–38, fig. 3.—Nayar, 1959:11–13, pl. 3: figs. 1–15; 1967:139.—Rabindranath, 1971:521–526, figs. 1, 2A–C.

DISTRIBUTION.—India and Sri Lanka.

Indischnopus capensis (K. H. Barnard), new combination

FIGURES 19, 20

Platyischnopus capensis K. H. Barnard, 1925:338–340, pl. 34: figs. 13, 14.

Platyischnopus mirabilis.—Stebbing 1914:32.—K. H. Barnard, 1916:142 [not Stebbing, 1888].

Platyischnopus herdmani.—Griffiths, 1974a:237; 1974b:322 [not Walker, 1904].

DESCRIPTION OF FEMALE (female "a," 5.61 mm).—Head about 17 percent of total body length, greatest width about 43 percent of length; rostrum apically constricted, narrow, elongate, bearing subapical downturned blunt process flush with ventral cephalic tangent. Eyes absent. Article 1 of peduncle of antenna 1 about 0.85 times as long as wide, over twice as wide as article 2, ventral margin with 3 setules in group, lateral face with scattered setules; article 2 scarcely elongate, about 1.1 times as long as article 1, with apical and subapical rows of 6 and 3 setae, ventral margin naked, distoventral corner weakly produced medially and setose; article 3 almost 0.7 times as long as article 1, ventral margin naked, ventral apex with one setule, primary flagellum 5-articulate, about 0.7 times as long as peduncle; article 1 of flagellum weakly elongate, each later article (but ultimate) with medium aesthetasc; accessory flagellum about 0.4 times as long as primary flagellum, 2-articulate. Dorsal margin of article 4 of antenna 2 with 7 groups of 1–2 medium to long setae, ventral margin with 4 acclivities bearing one spine and 1–4 short to medium setae, ventral apex with bundle of long setae; article 5 about 0.45 times as long as article 4, dorsal margin only with 2 groups of tiny setules;

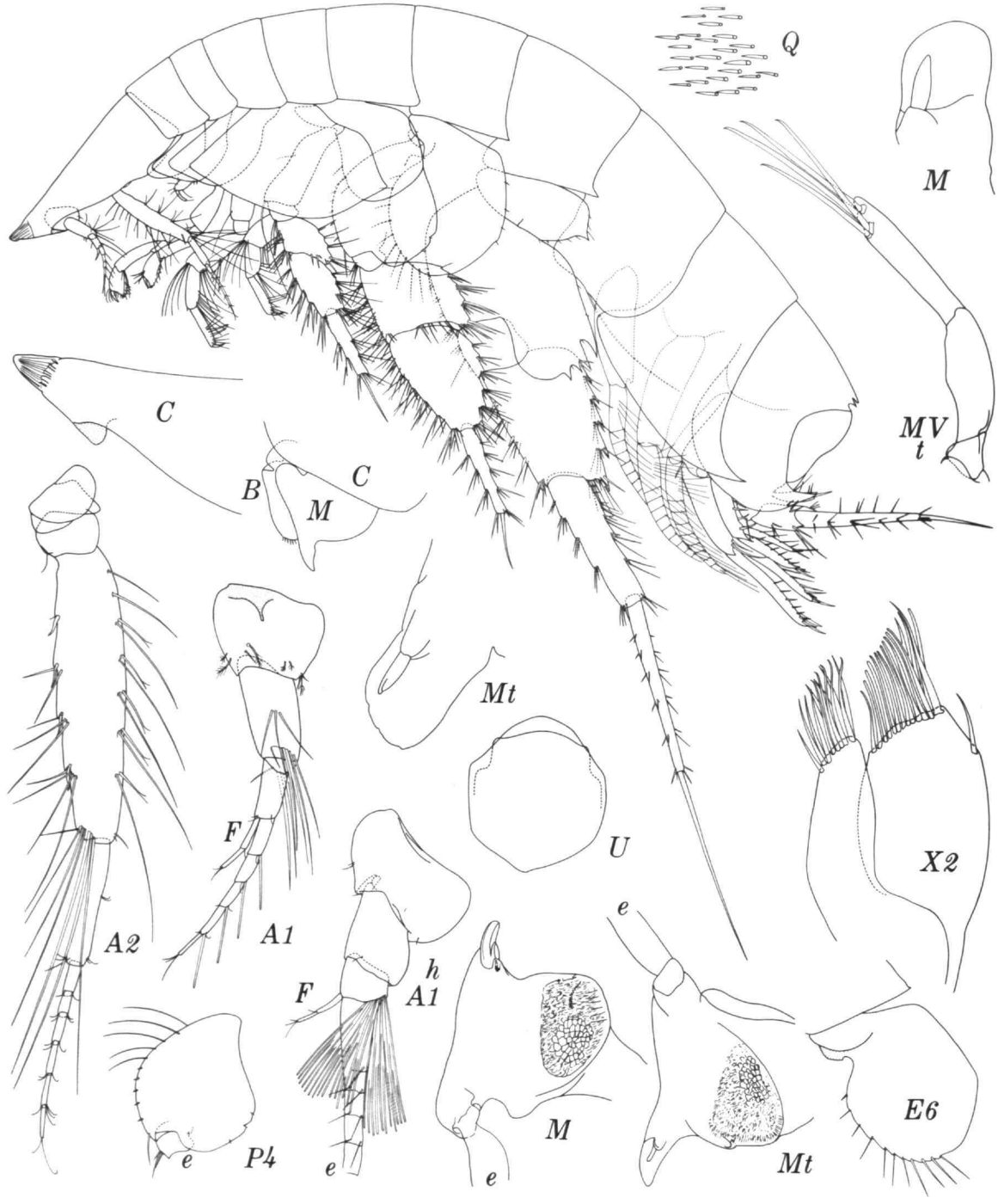

FIGURE 19.—*Indischnopus capensis* (K. H. Barnard), female "a," 5.61 mm (*h* = male "h," 6.05 mm).

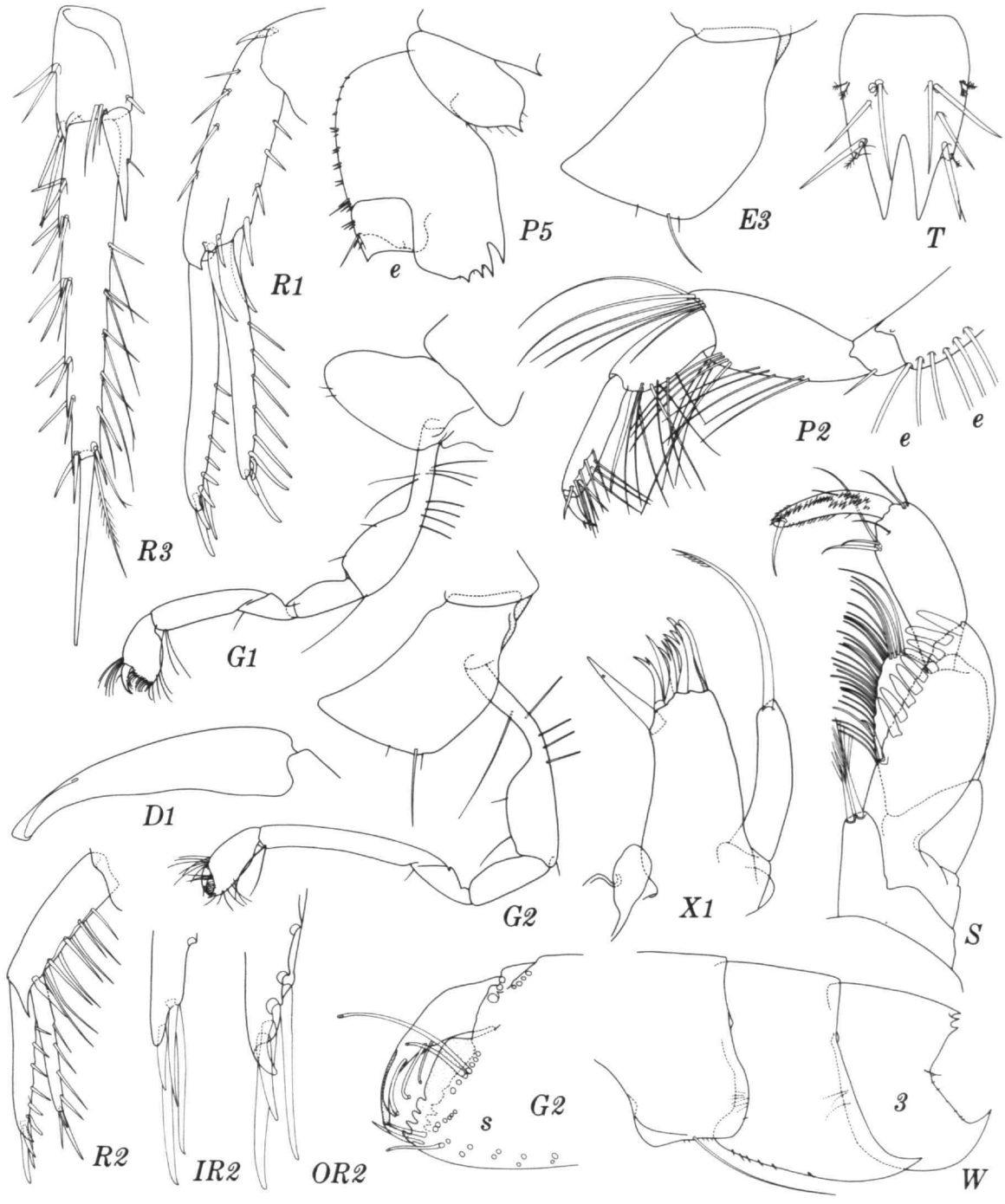

FIGURE 20.—*Indischnopus capensis* (K. H. Barnard), female "a," 5.61 mm.

flagellum about 0.45 times as long as articles 4–5 of peduncle combined, 6-articulate.

Mandibles with strong palpar hump on margin above molar; incisors moderately long, almost smooth, left side with cornified side ridge; both laciniae mobiles linguiform, right thin and weakly bifid, left simple and slightly stouter; rakers absent; molars large, with weak accessory hump, surface fuzzy and weakly polygonal; palp article 1 short and almost fused at both ends, article 2 naked, article 3 about 1.15 times as long as article 2, oblique apex with 4 spines, basofacial formula = 0. Inner plate of maxilla 1 small, subovate, naked; outer plate with 9 spines, innermost enlarged and straight, outermost 8 weakly curved, several bifid; palp uniarticulate, failing apex of outer plate, with one giant apical seta. Maxilla 2 with narrow inner and broad outer plate weakly tending to conical shape, lobes extending equally, outer with one lateral seta, naked on inner medial margin. Maxilliped normal, not large basally; inner plate almost rectangular, apically blunt, bearing 2 stout apical setae; outer plate elongate, with 10 blunt medial spines, no ventral setae; palp of ordinary size, articles 1–2 naked laterally, article 2 produced and densely setose medially, article 3 naked medially except for terminal group of setae, one terminal facial seta, article 4 elongate, apically blunt, bearing articulate spine and strong scaling.

Coxa 1 shoe-shaped, extended forward, coxae 2–3 larger and adz-like, apically expanded and weakly extended anteroventrally; coxae 1–4 overlapping tightly and partially concealing coxae 1–3; ventral setal formula of coxae 1–4 = 0–1–1–0 plus sparse setules, posterior margins naked; coxa 4 very broad, acute anteroventrally, ventral margin long, sweeping to oblique posteroventral margin divergent from anterior margin, posterodorsal margin sinuous, joining ventral margin in sharp cusp, width–length ratio = 5:3. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 4(+5 facial)–4(+1 facial)–8–7, long anterior setae = 0–0–1–0, short anteriors = 2–2–7–0; article 2 of gnathopods with abruptly tapered bases; article 3 elongate; article 5 much longer than short article 6, far more elongate on gnathopod 2 than on gnathopod 1, article 5 with few apicoventral setae; sixth articles weakly chelate, ellipsoid (gnathopod 1) or narrowly ovate (gnathopod 2), anterior and posterior margins almost tangential; width ratios of articles 5–6 on gnathopods 1–2 = 10:16 and 8:13, length ratios = 45:24 and 73:28; palmar humps serrate, palms protruding as hyaline lobe. Pereopod 2 stouter but shorter than pereopod 1; main apical spine of article 5 extending to M. 80 on article 6; spine formula on article 6 of pereopods 1 and 2 = 6+7 and 5+6 plus one middistal elongate spine; dactyls of pereopods 1–2 smooth, lacking setule or acclivity, bearing apical scale. Articles 4–5 of pereopod 3 of medium breadth, of pereopod 4 very broad; article 4 of pereopod 5 very broad; facial ridge formula of article 2 on pereopods 3–5 = 0–0–0; width ratios of articles 2, 4, 5, 6 of pereopod 3 = 21:26:22:9, of pereopod 4 = 64:56:48:11, of pereopod 5 = 82:59:25:10, length ratios of pereopod 3 = 61:34:42:45, of pereopod 4 = 83:56:72:58, of pereopod 5 = 128:96:91:108; article 2 of pereopod 3 linear, of pereopod 4 pyriform, of pereopod 5 with 4 posterodistal teeth; article 4 slightly extended posterodistally; dactyls elongate.

Posteroventral corner of epimeron 1 forming rounded adz, posterior margin convex, ventral margin with acclivity bearing giant seta; epimeron 2 with large sharp tooth and small ventral spines; epimeron 3 subdominant, with sharp medium upturned tooth posteroventrally, naked ventrally.

Urosomite 1 with stout spine on side at base of uropod 1, urosomites straight dorsally. Rami of uropods 1–2 densely spinose apically, inner scarcely shorter than outer, outer ramus of uropod 1 with 5 dorsal spines, inner with 5, outer of uropod 2 with 5, inner with 4, inner ramus scarcely shorter than outer on uropods 1–2; peduncle of uropod 1 with 4 ventrofacial spines, one large apical on each side, each apex also with subsidiary small spine; medial margin of uropod 1 with 3 spines, of uropod 2 with 4 thin spines; peduncle of uropod 2 with 5 dorsolateral spines, apicalmost thick, lateral apex forming sharp cusp. Uropod 3 with scarcely elongate peduncle bearing pair of facial spines, dorsolateral apex with 2 spines, medially with one small spine, dorsally with quartet of setae; rami feminine, inner very short, extending to M. 30 on article 1 of outer ramus, bearing one medial spinule and apical setule, outer ramus immensely elongate, lateral margin of article 1 with 5 acclivities bearing 2–5 spines each, medial margin with 5 acclivities bearing 2–3 medium setae each, article 2 elongate, apex with setule. Telson elongate, length–width ratio = 8:5, cleft about 40 percent of telsonic

length, forming narrow gape, each apex sharp, bearing deep lateral acclivity armed with spine and setule, lateral margins each with pair of small setules, dorsal surface on each side with triangle of spines. Cuticle covered densely with articulate blades.

DESCRIPTION OF MALE (male "h," 6.03 mm).—Like female but article 1 of outer ramus on uropod 3 slightly more setose and peduncle of antenna 1 very short, article 2 almost naked, short, article 3 bearing dense apical brush of aesthetascs, flagellum highly elongate and proliferate.

VOUCHER MATERIAL.—South African Museum, University of Cape Town Ecological Survey FBY 51 P: female "a," 5.61 mm (illus.); females "b," 5.05 mm, "c," 5.67 mm, "f," 4.50 mm, "g," 5.03 mm, (courtesy of Dr. C. L. Griffiths); and LBT 126 m (deposited in National Museum of Canada Acc. 73–65): male "h," 6:03 mm (illus.) (courtesy of Dr. E. L. Bousfield).

RELATIONSHIP.—This species differs from *I. herdmani* in the larger epimeral teeth, the more numerous teeth on article 2 of pereopod 5, and the deeper cleft of the telson.

DISTRIBUTION.—South Africa (see Griffiths, 1974a: 237, 1974b:322).

Western Hemisphere Species

DIAGNOSIS.—Platyischnopidae with article 2 of antenna 1 not elongate, not spinose anteriorly and posteriorly, often bearing setae distally. Mandibular incisors not elongate, ordinary, broad; lacinia mobilis different on right and left sides; definite sharp spines occurring in raker row. Spines on outer plate of maxilla 1 sharp, group of blunt spines arranged in mop not present. Plates of maxilla 2 ordinary, with rounded and setose apical margins. Inner plate of maxilliped not tapering apically, normal, bearing facial setae, basal attachment narrow and ordinary. Coxae 1–3 large and evenly rectangular; coxa 3 expanded apically. Article 5 of gnathopods shorter than article 6; hands strongly chelate. Article 2 of pereopod 5 variable. Pleonite 3 dorsally smooth. Uropod 3 and telson variable.

DESCRIPTION.—Articles of accessory flagellum thick and not highly elongate. Inner plate of maxilla 1 usually broadened basally, often setose. Palp of maxilla 1 stout. Apex of maxillipedal palp article 4 simple.

COMPOSITION.—*Platyischnopus metagracilis* J. L. Barnard, 1964; *P. viscana* J. L. Barnard, 1964; *P. gracilipes* Schellenberg, 1931; and *Phoxocephalus capuciatus* Oliveira, 1955, assigned to *Platyischnopus* by J. L. Barnard (1964:224).

RELATIONSHIP.—This American group of platyischnopids is distinguished at first sight from eastern hemisphere groups (with the exception of the Australian *Yurrokus*) in the short article 5 of the gnathopods. Whether or not additional generic subdivisions will be necessary in the western group must await description of additional species known to exist in museum collections and analysis of mouthparts in *Platyischnopus gracilipes*, omitted by Schellenberg. The basal part of the maxillipeds in *Phoxocephalus capuciatus* is unclearly depicted by Oliveira, as only an inner plate (?) is shown. This group also appears to be characterized by thick palps on maxilla 1 and by the loss or fusion of apical ornaments on palp article 4 of the maxillipeds.

UROTHOIDAE

Urothoides Stebbing

Urothoides Stebbing, 1891:26; 1906:132.

DIAGNOSIS.—Head and rostrum short and broad. Eyes absent. Antenna 1 geniculate between articles 2 and 3. Flagellum of antenna 2 reduced to a few articles, primarily 2-articulate in female. Prebuccal parts coalesced and massive. Mandibles large; molars medium to large in size, poorly but minutely triturative; raker spines absent; palp 3-articulate. Palp of maxilla 1 biarticulate; inner plate thin and bearing only 1–2 apical setae. Maxilla 2 with narrow lobes bearing primarily apical setae; no maxilla with baler lobe. Maxillipedal palp 4-articulate, article 3 apically produced or weakly so, article 4 elongate, bearing apical setae. Gnathopods 1–2 alike (type) or not, small, subchelate; article 5 longer than article 6; hand of gnathopod 2 short and almost transverse (type) or like gnathopod 1. Pereopods 1–2 of similar orientation. Article 2 of pereopod 3 of medium to great width; pereopod 5 shorter or of shape distinctive from that of pereopod 4; article 2 of pereopod 5 with shape typical of phoxocephalid facies. Urosome ordinary. Telson deeply cleft but lobes basally contiguous.

DESCRIPTION.—Antenna 2 usually geniculate between articles 4 and 5 and again between article 5 and flagellum; antenna 2 in death held in various positions, often thrust dorsally or obliquely dorsoanterior, spiniest margins aimed dorsally, or alternatively antenna 2 pointing somewhat laterally, twisted basally on article 4 with spiniest margins pointing dorsally or medially (as if the ordinary antenna 2 of a phoxocephalid had been twisted 180 degrees). Gills present on coxae 2–6 only, on coxa 6 small. Thin brood plates of female present only on coxae 3–5.

TYPE-SPECIES.—*Urothoe lachneessa* Stebbing, 1888 (monotypy).

COMPOSITION.—*Urothoides inops* J. L. Barnard, 1967, and seven new species: *U. kurrawa, U. mabingi, U. makoo, U. mammarta, U. odernae, U. tondea,* and *U. wamïnoa.*

REMARKS.—In contrast to the type-species of the genus, from Kerguelen Island, the species of *Urothoides* from Australia have similar gnathopods 1–2. Gnathopod 2 of the type-species is of the mittenform variety, with reduced and transverse palm. There are undoubtedly good reasons on that basis to separate the Australian from the Kerguelen species but the taxonomic picture is clouded by the situation in *Urothoe* Dana, 1855. The type-species of that genus, *U. irrostrata* Dana, 1855, from the Sulu Sea, is partially obscure. The concept of the genus has been based, more or less, on the much more familiar *U. marina* (Bate) (see Sars, 1895), perhaps in conjunction with other species from the North Atlantic Ocean. *Urothoe* appears to be a dumping ground for the 35 species already attributed to it and it is doubtful that more than a few of the species actually can be classified with the type-species. Presumably the type-specimen of *U. irrostrata* was destroyed in the Chicago (USA) fire of 1871. Until the Sulu Sea can be investigated thoroughly and Dana's species identified, the situation will be obscure; we suggest the probability that *U. irrostrata* is very close to *U. gelasina* Imbach, 1967, from the South China Sea.

Various groups, some erroneous, of *Urothoe* and *Urothoides,* were discussed by J. L. Barnard (1962) who showed the extreme diversity of the group in gnathopods and pereopod 5. Now that many more species have been described one may note much more diversity in numerous attributes. Among these are the size and shapes of anterior coxae, the shapes of articles on pereopods 3–5, the similarity or dissimilarity between pairs of gnathopods and numerous gradations from subchelate to simple, from obliquely to transversely palmate, and with other distinctions in maxillipedal palps and uropods. The reduction in size of anterior coxae and loss of gnathopodal prehensility is a trend progressing from the high northern hemisphere into the tropics and then southward into the genus *Urohaustorius* of Australia (14 species examined).

The only firm distinction between *Urothoe* (type only) and *Urothoides* yet known is the phoxocephalid-like protruding shield of article 2 on pereopod 5 in *Urothoides.* This contrasts to the generally ovate article 2 in *Urothoe.* The precise phoxocephalid configuration so far has been found only in the species from Kerguelen and Australia and in *Urothoides inops* J. L. Barnard, 1967, of the eastern Pacific abyss. A tendency to such a form of shield is seen in a few tropical species such as *Urothoe orientalis* Gurjanova, 1938.

We believe that the Australian species of *Urothoides* form a species cluster generically distinct from that represented by the type-species of *Urothoides,* but until the type-species of *Urothoe* can be properly described and an evolutionary tree of all other species in *Urothoe* and *Urohaustorius* constructed, this evaluation cannot be implemented.

Key to the Australian Species of *Urothoides*

(*U. odernae* cited twice)

1. Rami of uropod 1 extending equally 2
   Inner ramus of uropod 1 shortened 6
2. Dactyls of pereopods 1–2 knobby 3
   Dactyls of pereopods 1–2 smooth 4
3. Epimeron 3 rounded posteroventrally ..... *U. odernae,* new species
   Epimeron 3 with posteroventral tooth ..... *U. mabingi,* new species
4. Mouthparts degenerate, pereopod 5 of phoxocephalid form ..... *U. makoo,* new species
   Mouthparts fully formed, pereopod 5 not of phoxocephalid form 5

5. Epimeron 3 with posteroventral tooth, rami of uropod 2 with dorsal spines ..... *U. waminoa*, new species
   Epimeron 3 rounded posteroventrally, rami of uropod 2 naked ..... *U. kurrawa*, new species
6. Dactyls of pereopods 1–2 smooth, epimeron 3 with 2 ventral setae .... *U. mammarta*, new species
   Dactyls of pereopods 1–2 knobby, epimeron 3 lacking ventral setae 7
7. Epimeron 3 with posteroventral tooth ..... *U. tondea*, new species
   Epimeron 3 rounded posteroventrally ..... *U. odernae*, new species

Urothoides kurrawa, new species

FIGURES 21, 22, 24 (part)

DESCRIPTION OF FEMALE.—Rostrum broad from dorsal view, anterior margin weakly sinuous and projecting bluntly in middle. Eyes absent. Article 1 of antena 1 about 0.65 times as wide as long; article 2 as long as article 1 but only 0.60 times as wide; article 3 about 0.60 times as long as articles 1 and 2; primary flagellum with 5 long articles; accessory flagellum with 3 long articles; peduncle geniculate between articles 2 and 3. Article 3 of antenna 2 with faciodistal seta; article 4 with 7 alternately short and long dorsal spines and row of facial setae, ventral margin with 2 main setae; article 5 scarcely shorter than article 4, dorsal margin with 3 pairs of spines, one long and one short in each pair, plus distofacial spine and second subdistal facial seta, ventral margin largely naked; flagellum about 1.1 times as long as article 4 of peduncle, composed of 2 long articles, first article with apicofacial cusp.

Prebuccal complex massive, dorsally protruding; epistome and upper lip amalgamated, ventral margin rounded and with weak protrusion. Mandibles huge; incisors blunt, broad; right lacinia mobilis thin, apically bifid, left lacinia mobilis broad, dome shaped, weakly toothed; raker spines absent; molars large, weakly triturative; palp small, about as long as body of mandible, mostly concealed from oral view, article 1 elongate, article 2 with long seta on mid margin, article 3 about 0.7 times as long as article 2, apex oblique and short, bearing 3 setae. Lower lip massive; inner lobes fully separate, large, long; outer plates with ordinary mandibular lobes. Inner plate of maxilla 1 narrow, apex with one seta; outer plate with 9 large spines, mostly simple, aberrantly with tenth medioapical spine; palp article 2 exceeding apex of outer plate, apex with one stout and 2 slender spines. Inner plate of maxilla 2 narrower than outer plate but extending almost as far as outer. Inner plate of maxilliped with 3 apical spines; outer plate with about 12 medial spines and setae of varying thicknesses; articles 2 and 3 of palp apically produced, article 4 with 2 apical setae.

Coxa 1 broadly expanded distally, almost clavate, anterior margin concave, ventral margin broad, weakly convex, anterodistal corner weakly attenuate; coxa 2 expanded distally, anteroventral corner rounded, posteroventral corner sharp and extended; coxae 3 and 4 broad, comma-shaped, posterior margins deeply concave, ratios of widths to lengths of coxae 3–4 = 1:1.6 and 1:1.2. Gnathopods 1–2 similar to each other; article 2 of gnathopod 1 with 5 long posterior setae, 3 anterior short setae, of gnathopod 2 with 6–7 long posterior and 4 short anterior setae; article 5 elongate, posterior margin long and flat, weakly quadrate distally, more strongly so on gnathopod 1 than on gnathopod 2, corner not extended, distomedial margin of article 5 with comb on gnathopod 1 only, article 5 more densely setose on gnathopod 1 than on gnathopod 2; article 6 narrowly subovate, not strongly widened in middle; palm and posterior margin blending evenly but marked by defining spine; dactyl fitting palm. Pereopod 2 much larger than pereopod 1; article 2 lacking long posterior setae, anterior margins with 2 short setae; article 4 with midposterior facial spray of setae, pair of midapical setae; article 5 with 3 and 2 anterofacial setae on pereopods 1–2, posterodistal margin with circlet of 5 spines, main spine extending almost or fully to apex of article 6; article 6 with rows of 4 and 2 spines, row of 4 with 2 spines paired proximally, spines strongly distal; dactyls elongate, bearing sharp inner acclivity near apex, acclivity with tiny setule, apex with outer scale. Coxa 5 of ordinary familial form, posterior lobe slightly larger and extending more deeply than anterior lobe. Article 2 of pereopod 3 broad, article 2 of pereopod 4 broad, ordinary, posterodistal lobe weakly extended, article 3 of short and ordinary form; ratio of widths of articles 2, 4, 5, 6 of pereopod 3 = 55:33:28:13, of pereopod 4 = 66:29:23:10, of pereopod 5 = 100:21:15:7; ratio of lengths of articles 2, 4, 5, 6 of pereopod 3 = 66:32:33:39, of

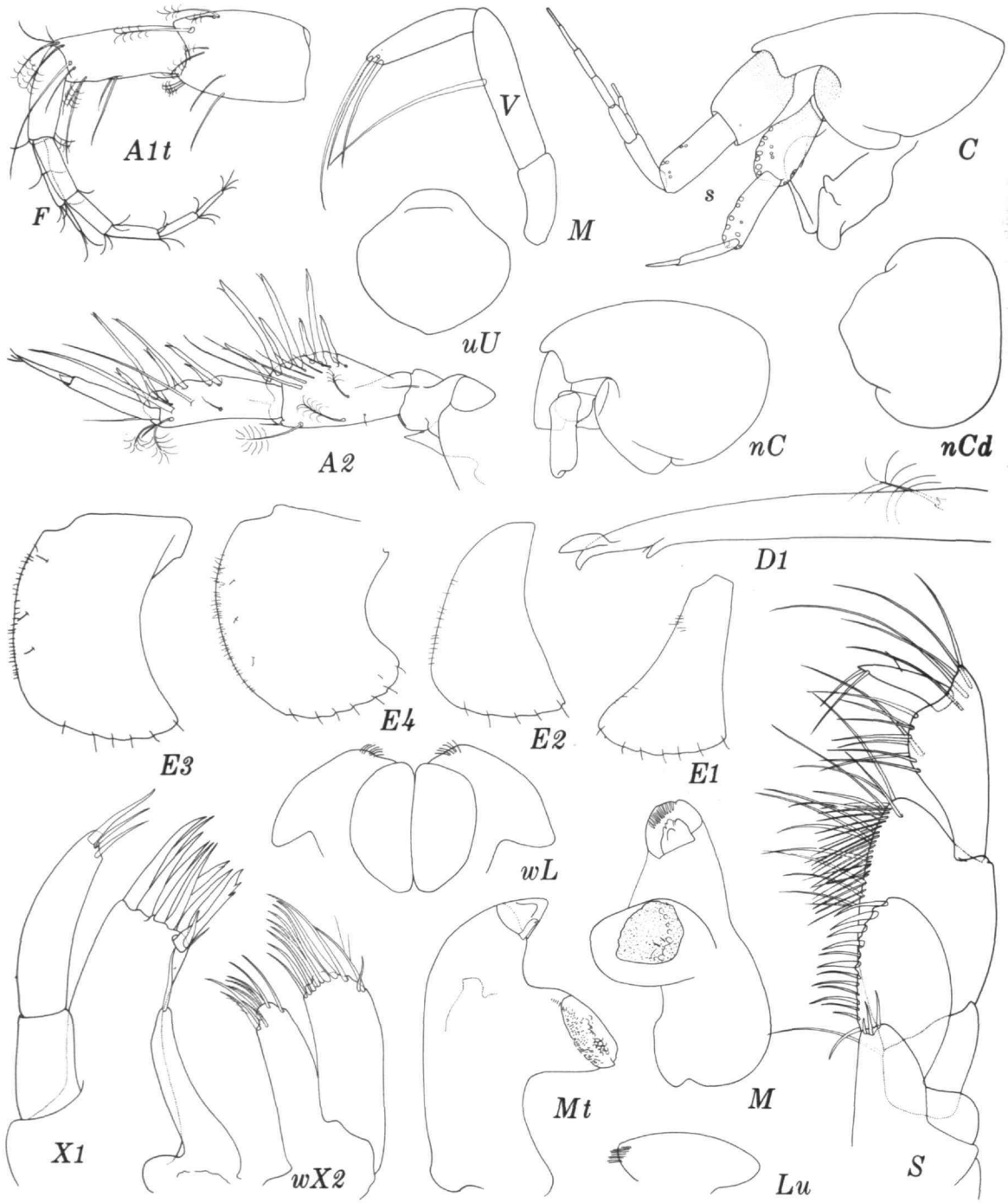

FIGURE 21.—*Urothoides kurrawa*, new species, female "a," 2.83 mm (*n* = female "n," 2.46; *u* = female "u," 2.58 mm; *w* = holotype, female "w," 2.81 mm).

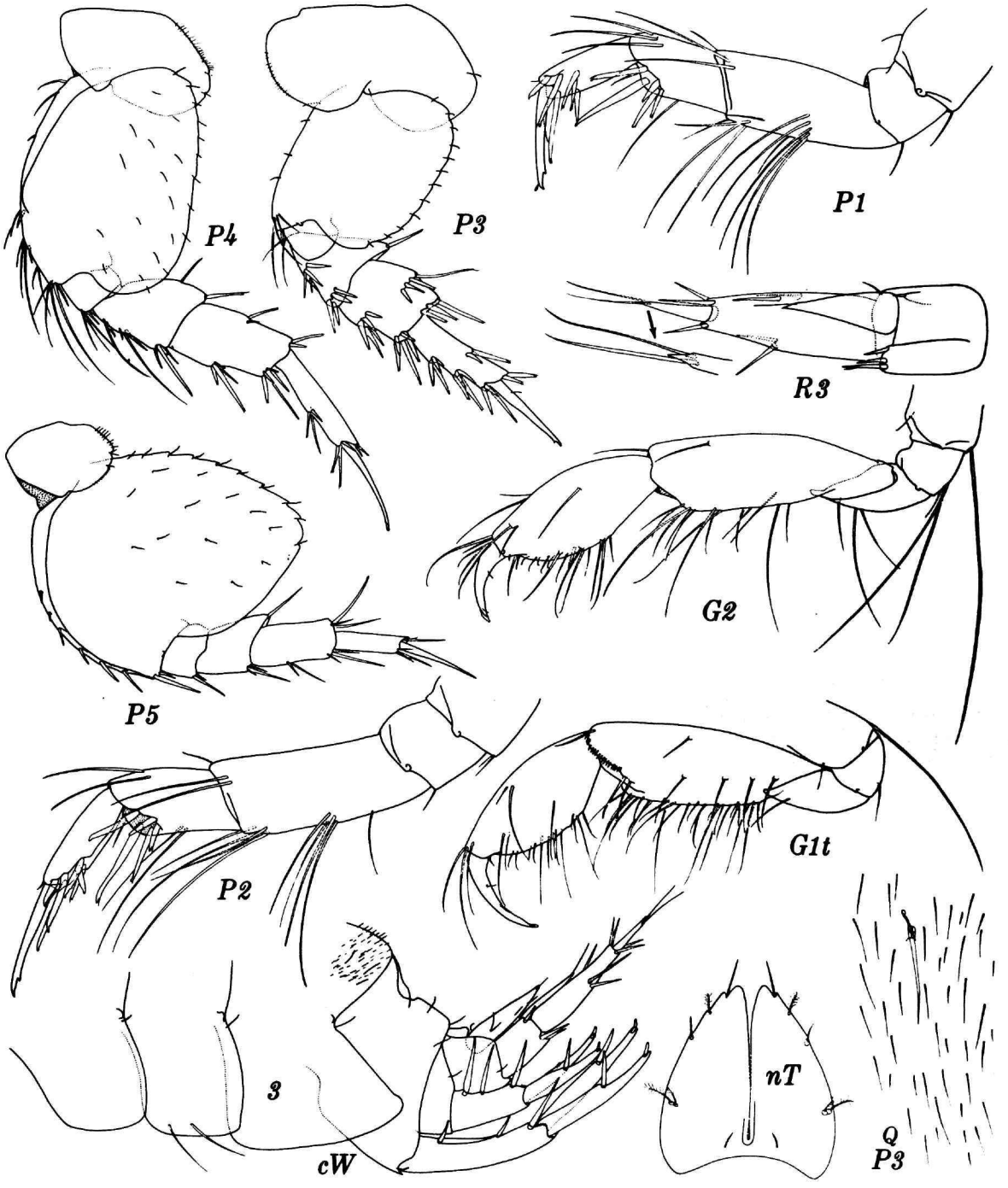

FIGURE 22.—*Urothoides kurrawa*, new species, female "a," 2.83 mm (*c* = female "c," length unknown, broken; *n* = female "n," 2.46 mm).

pereopod 4 = 90:35:42:45, of pereopod 5 = 90:26:33:26.

Epimera 1–2 with weakly convex posterior margins, subquadrate posteroventral corners; epimeron 2 with 2 ventrofacial setae in horizontal tandem; epimeron 3 expanded below, posterior margin flat and oblique, posteroventral corner quadrate but with weak hump, bearing seta at notch forming boundary of epimeron to pleonite 3, similar seta on epimera 1–2.

Urosomites articulate; urosomite 1 dorsally with weakly elevated, flat hump and weak saddle, ventrally with one small seta basolateral to peduncle of uropod 1, with 2 long spines in crotch between uropod 1 peduncles medially (hidden from lateral view), urosomite 1 concealing dorsum of urosomite 2. Peduncle of uropod 1 with 3 lateral spines, apicalmost elongate, medially with 4 spines; rami of uropods 1–2 with fully articulate apical nail, each ramus with middorsal notch bearing long spine, or inner ramus of uropod 2 occasionally naked or bearing rudimentary spine; peduncle of uropod 2 with 3 long lateral peduncular spines, medially with one apical spine, peduncles of uropods 1–2 with ragged apical comb. Uropod 3 elongate, peduncle with 3 apicolateral spines, one apicomedial spine; rami feminine, inner extending to M. 60 on article 1 of outer ramus; inner ramus tapering to sharp point, bearing one subapical seta; article 1 of outer ramus with pair of lateral spines, 2 medial spines on opposite faces, apices of article 1 with 1 and 2 spines, article 2 elongate, thin, tapering to sharp attenuate point bearing 2 medium setae. Telson short, about 1.1 times as long as wide, deeply cleft, subcordate, lobes rapidly tapering to narrow but rounded apex, each with lateral acclivity bearing one small seta, next acclivity bearing penicillate setule, next acclivity fully lateral and bearing one small seta, pair of subbasal plusetules strongly lateral, each lobe with small dorsal seta mediobasally.

Cuticle covered densely with short setae and occasional large seta.

OBSERVATIONS.—Female "h" with extra subterminal seta on article 3 of mandibular palp (illus.); peduncle of uropod 1 with 4 spines, epimeron 2 with 3 setae. An aberrant maxilla 2 is shown for female "u."

ILLUSTRATIONS.—Head of female "a" shown as reconstructed composite with lateral cephalic lobes extended dorsoposteriorly obliquely and artificially; apices of outer lobes on lower lip of females "a" and "w" poorly elucidated, usually poorly preserved but shown flattened in offset view. Animals of this species poorly preserved, mouthparts especially flabby or mushy, dissections and mountings necessarily accomplished in lactic acid owing to inability to infiltrate animals with glycerine without shrinkage.

HOLOTYPE.—NMV, female "w," 2.81 mm.

TYPE-LOCALITY.—CPBS 31S/269, 20 Feb 1969, Western Port, Victoria, Australia, 15 m, muddy sand.

VOUCHER MATERIAL.—CPBS C3/4 (all illustrated): female "a," 2.83 mm; female "c," length unknown, head missing; female "n," 2.46 mm; female "u," 2.58 mm. SBS C6S2: female "h," 2.30 mm; female "k," 2.11 mm. SBS4: female "r," 2.45 mm. Male unknown.

RELATIONSHIP.—This species differs from *Urothoides inops* J. L. Barnard, 1967, from abyssal depths off California, in the much broader article 2 of pereopod 3, the poorly extended article 2 of pereopod 4, the short article 4 of pereopod 4, the presence of 2 setae on epimeron 2, the narrow inner lobe of maxilla 2, the short rostrum with sinuous anterior margin, the poorly inflated article 6 of gnathopods 1–2 and the distinctive shapes of coxae 1–5 and article 2 of pereopod 5 among numerous other minor distinctions.

Urothoides lachneessa (Stebbing, 1888) differs from this species and *U. inops* in the distinctive gnathopod 2, almost mitten-shaped and unlike gnathopod 1. This may have generic value.

MATERIAL.—CPBS, 27 samples from 14 stations (39); PPBES, 5 samples from one station (15); SBS, 3 samples from 3 stations (4).

DISTRIBUTION.—Victoria: Western Port and Port Phillip Bay, 4.8–15 m, sand, fine sand and mud, coarse sand. New South Wales, off Malabar, sandy gravel, 66–75 m.

Urothoides waminoa, new species

FIGURES 23, 24 (part), 25

DESCRIPTION OF FEMALE.—Rostrum broad from dorsal view, anterior margin weakly sinuous, weakly humped in middle. Eyes absent. Article 1 of antenna 1 about 0.65 times as wide as long; article 2 about 0.8 times as long and 0.6 times as wide as article 1; article 3 about 0.6 times as long as article 2; pri-

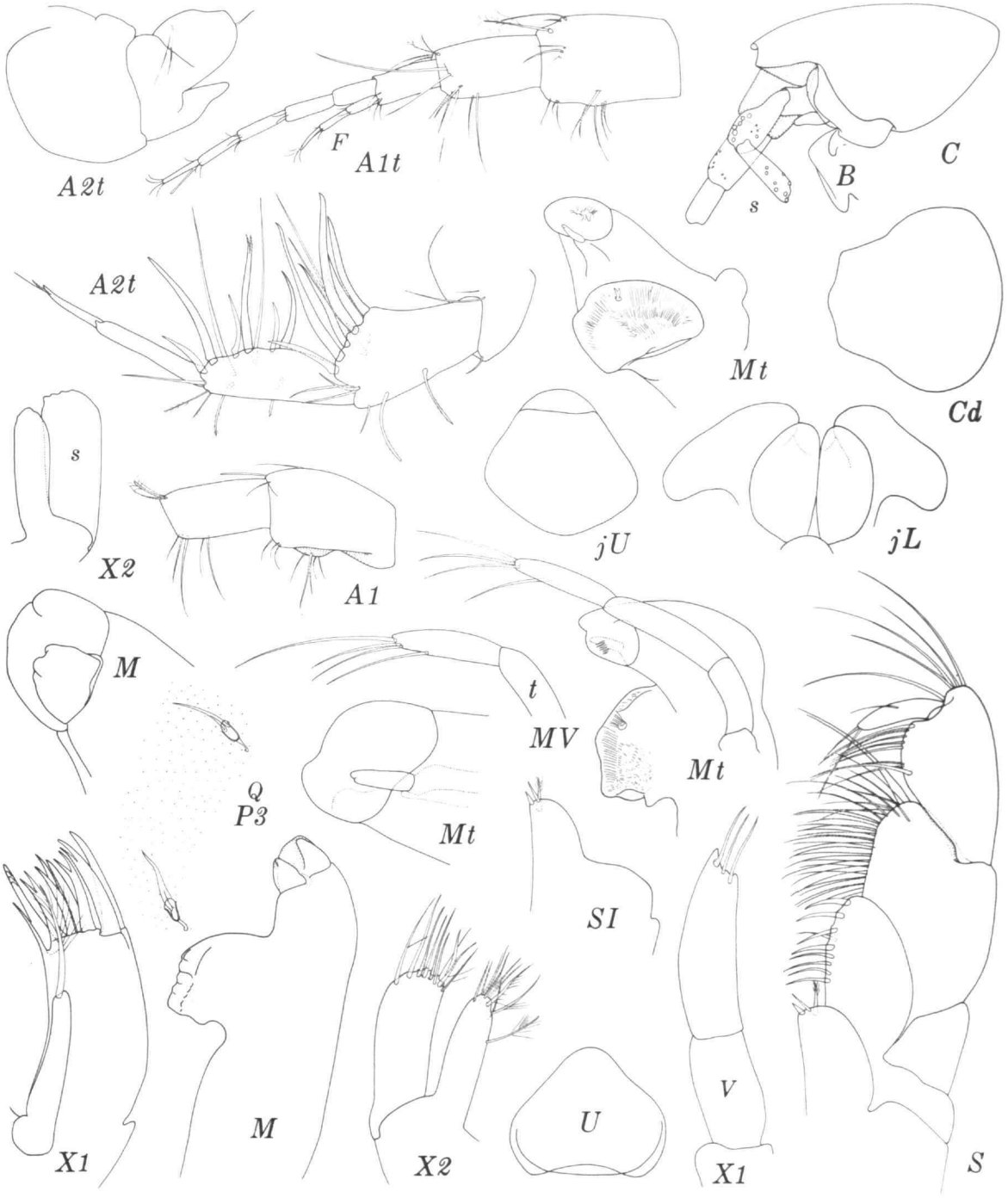

FIGURE 23.—*Urothoides waminoa*, new species, holotype, female "a," 1.87 mm (*j* = juvenile "j," 1.52 mm).

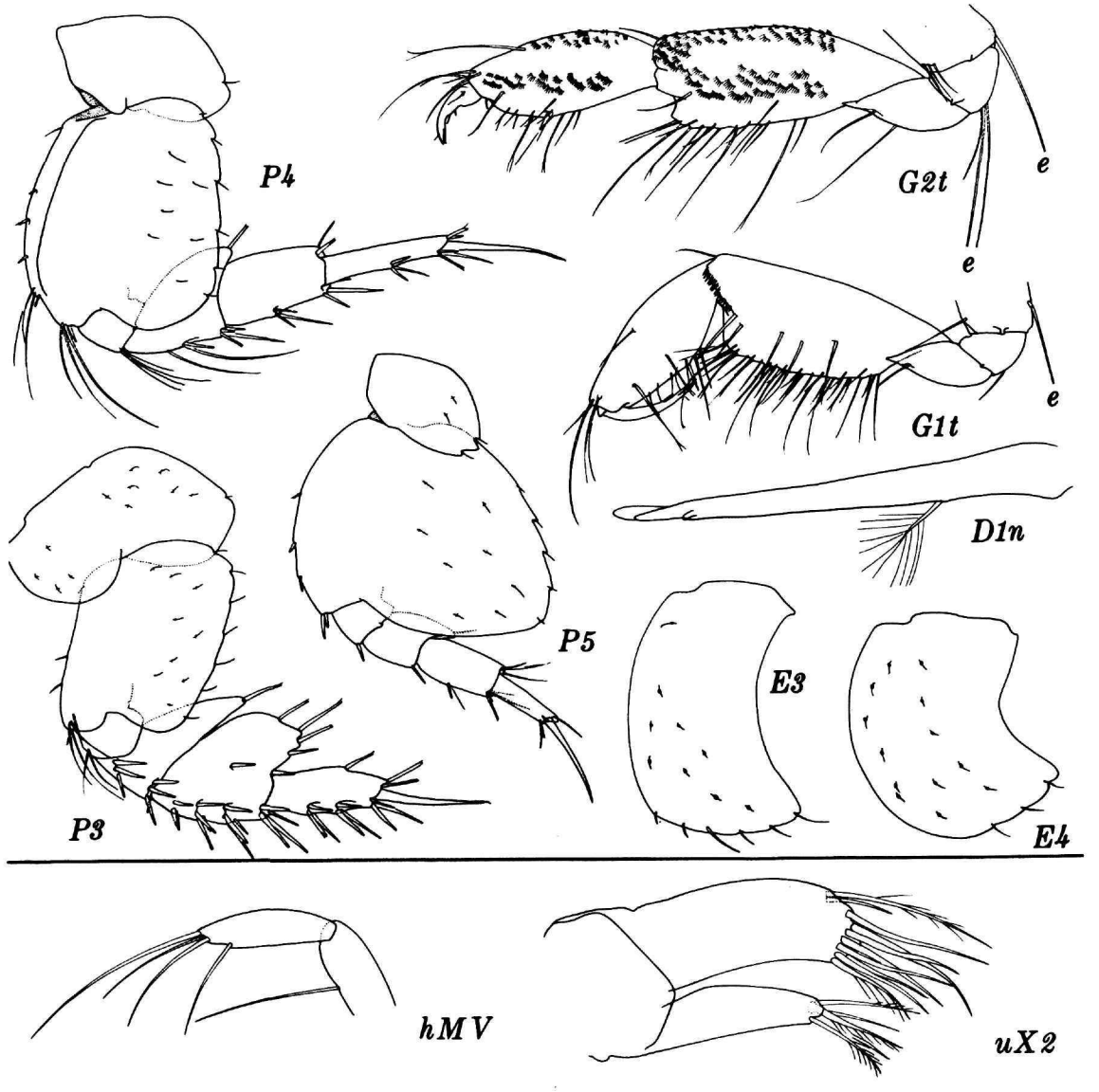

FIGURE 24.—*Upper: Urothoides waminoa,* new species, holotype, female "a," 1.87 mm. *Lower: Urothoides kurrawa,* new species (*h* = female "h," 2.30 mm; *u* = female "u," 2.58 mm).

mary flagellum with 5 long articles; accessory flagellum with 2–3 long articles; peduncle not clearly geniculate between articles 2 and 3. Article 3 of antenna 2 with 2 faciodistal setae; article 4 with 5 alternatively short and long dorsal spines and row of facial setae, ventral margin with 2 main setae; article 5 about 0.9 times as long as article 4, dorsal margin with 3 pairs of spines, one long and one short in each pair, plus 2 long distofacial setal-spines, ventral margin naked but with 2 facial plusetae; flagellum about 1.2 times as long as article 5 of peduncle, composed of 2 long articles, first article with apicofacial cusp.

Prebuccal complex massive, dorsally protruding. Epistome and upper lip amalgamated, ventral margin rounded and protruding. Mandibles huge; in-

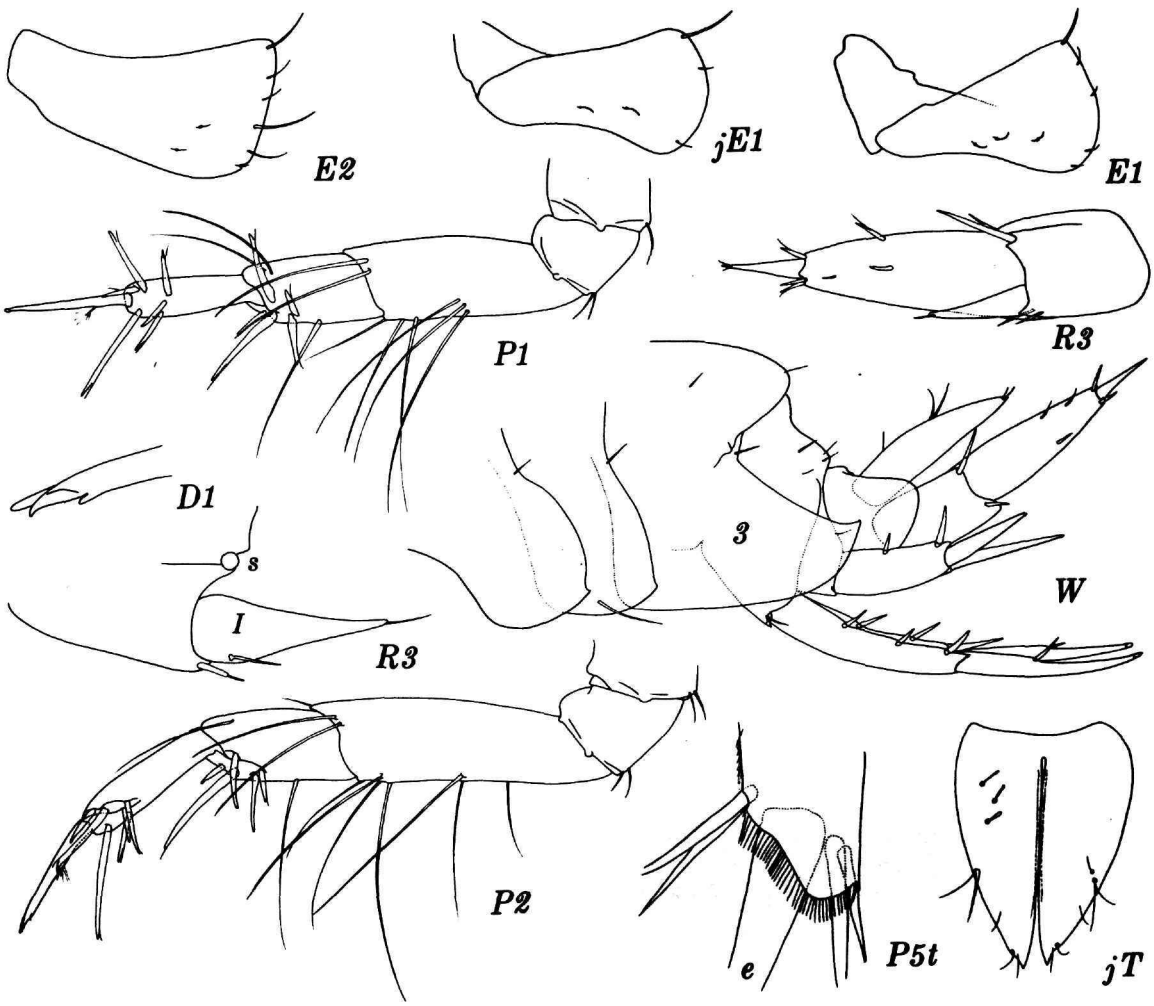

FIGURE 25.—*Urothoides waminoa*, new species, holotype, female "a," 1.87 mm (*j* = juvenile "j," 1.52 mm).

cisors blunt, broad; right lacinia mobilis thin, apical bifidation obsolescent, left lacinia mobilis broad, dome-shaped, weakly toothed, raker spines absent; molars large, weakly triturative or fuzzy; palp of medium size, about as long as body of mandible, mostly concealed from oral view, article 1 elongate, article 2 naked, article 3 about 0.8 times as long as article 2, apex oblique and short, bearing 3 setae and one seta on inner margin at M. 60. Lower lip massive, inner lobes fully separate, large, outer plates with ordinary mandibular lobes. Inner plate of maxilla 1 narrow, apex with one seta; outer plate with 9 spines, mostly simple, with tenth apicomedial spine-like cusp; palp article 2 exceeding apex of outer plate, apex with 3 wire-like setae. Inner plate of maxilla 2 narrower than outer plate, plates extending equally or inner slightly shorter (variable). Inner plate of maxilliped with 2 apical spines and short ventrofacial pluseta; outer plate with 9 medial spines and setae; articles 2 and 3 of palp apically produced, article 4 with 2 apical setae.

Coxa 1 broadly expanded distally, almost clavate, anterior margin concave, ventral margin broad, weakly convex, anterodistal corner rounded; coxa 2 expanded distally, anteroventral corner rounded, posteroventral corner subsharp; coxae 3–4 broad,

comma-shaped, posterior margins deeply concave; ratios of widths to lengths of coxae 3–4 = 5:9 and 3:4. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 3–3–0–0 (including subdistal corner), short posterior setae = 0–0–0–2, long anterior setae = 1–0–0–0, short anterior setae = 1–1–2–(1–2). Gnathopods 1–2 weakly similar to each other; article 5 elongate, posterior margin flat and extended, subquadrate distally, corner weakly extended on gnathopod 2, distomedial margin of article 5 with comb on gnathopod 1 only, medial faces of articles 5–6 on gnathopod 2 with numerous fan-combs, article 5 more densely setose on gnathopod 1 than on gnathopod 2; article 6 narrowly subovate, not strongly widened in middle, palm and posterior margin blending almost evenly but marked by defining spine; dactyl fitting palm. Pereopod 2 larger than pereopod 1; facial formula of setae on articles 4–5 = 2–2 and 2–1; article 4 of pereopod 1 with midposterior facial spray of setae and 3 other distal setae, pereopod 2 simply with 3 groups of 1–3 posterior setae; main spine of article 5 reaching about M. 70 on article 6, apicolateral face with 2 spines in tandem, apicoposterior margin with 2 short spines; article 6 with distal rows of 3 and 2 spines and one distomedial spine; dactyls elongate, bearing sharp inner acclivity and protrusion, no setule apparent, apex with outer scale. Coxa 5 of ordinary familial form, posterior lobe larger and extending more deeply than anterior lobe; article 2 of pereopods 3–5 broad, only pereopod 4 with anterior facial ridge; articles 4–5 of pereopod 3 broad, of pereopod 4 narrow; ratio of widths of articles 2, 4, 5, 6 of pereopod 3 = 53:50:40:18, of pereopod 4 = 68:32:24:9, of pereopod 5 = 90:20:15:7; ratio of lengths of articles 2, 4, 5, 6 of pereopod 3 = 74:27:40:40, of pereopod 4 = 83:39:41:45, of pereopod 5 = 75:26:29:26.

Epimera 1–2 with convex posterior margins, posteroventral corners with weak tooth; epimeron 2 with 1–2 ventrofacial setae in horizontal tandem; epimeron 3 expanded below, posterior margin weakly concave and oblique, posteroventral corner extended as weakly upturned sharp tooth, bearing seta at notch forming boundary of epimeron to pleonite 3, similar seta on epimera 1–2.

Urosomites largely articulate but urosomites 1–2 apparently partially fused but articulation lines almost complete; urosomite 1 weakly elevated dorsally, flat hump and weak saddle, ventrally with one small seta basolateral to peduncle of uropod 1, with 2 long spines in crotch between uropod 1 peduncles medially (hidden from lateral view), urosomite 1 concealing dorsum of urosomite 2. Peduncle of uropod 1 with 3 lateral spines, apicalmost weakly elongate, medially with 3 spines, apicalmost elongate; rami of uropods 1–2 with apical nails amalgamated and immersed in ramus, almost invisible on uropod 2; rami of uropod 1 each with dorsal spine; rami of uropod 2 naked; peduncle of uropod 2 with 2 lateral spines, spine on midmargin small, medially with one apical spine; peduncles of uropods 1–2 with ragged apical comb. Uropod 3 large; peduncle with one apical spine ventrolaterally, one dorsolaterally, 2 smaller medial spines dorsally and ventrally; rami feminine, inner extending to M. 43 on article 1 of outer ramus; inner ramus tapering to sharp point, bearing one short apical setule and one medial subbasal seta; article 1 of outer ramus with one lateral spine, one dorsofacial spine opposite lateral spine, one apicolateral spine, 2 apicomedial spines, article 2 elongate, thin, tapering to sharp attenuate point bearing 2 short setules. Telson of ordinary dimensions, about 1.35 times as long as wide, deeply cleft, weakly subcordate, lobes rapidly tapering to sharp apex bearing minute lateral acclivity armed with 2 setules, another lateral setule at M. 75, pair of lateral plusetules highly distad at M. 65, dorsal surface with cuticular setules occasionally prominent and irregularly distributed.

Cuticle covered to moderate extent with large bulbar setules, chitinous surface apparently pebbled extremely minutely but part of appearance resulting from agglutinated detritus.

OBSERVATION.—One adult female bearing 2 large eggs fully filling brood pouch; several other females with large pouches but eggs missing.

ILLUSTRATIONS.—One view of dactyl on pereopod 1 in oblique view, other fully flattened.

HOLOTYPE.—NMV, female "a," 1.87 mm.

TYPE-LOCALITY.—CPBS 31S/769, 15 Jul 1969, Western Port, Victoria, Australia, 15 m, muddy sand.

VOUCHER MATERIAL.—CPBS A1/4, juvenile "j," 1.52 mm (illus.); CPBS 21S/1, female "t," 2.1 mm. Male unknown, but see possible male described as *Urothoides makoo*.

RELATIONSHIPS.—This species differs from *Urothoides kurrawa* in the following characteristics: (1)

the larger and sharper posteroventral tooth extension on epimeron 3; (2) the stronger posteroventral points on epimera 1–2; (3) the apically immersed nails on the rami of uropods 1–2; (4) the naked rami of uropod 2; (5) the larger telson and uropod 3 relative to the size of pleonite 6; (6) the more truncate anterior margin of the head; (7) the stouter articles 4–5 of pereopod 3; (8) the broader article 5 of gnathopods 1–2; (9) the narrower telson; (10) the sparsity of cuticular setules; (11) the shorter article 2 of antenna 1; and numerous minor differences in shapes, numbers, and placement of setae on mouthparts as shown in the illustrations.

MATERIAL.—CPBS, 11 samples from 9 stations (30); WPBES, one sample (2).

DISTRIBUTION.—Victoria, Western Port, 3–15 m, sandy gravel, sand and mud, seagrass.

Urothoides makoo, new species

FIGURES 26, 27

DESCRIPTION OF MALE.—Head and rostrum damaged, not illustrated, apparently similar to female *Urothoides waminoa*. Eyes absent. Antenna 1 peduncle and article 1 of primary flagellum broad and inflated; article 1 about 1.1 times as wide as long; article 2 about 0.4 times as long and 1.04 times as wide as article 1, with dorsal and ventral wings, no clear geniculation present; article 3 nearly as long as and about 0.8 times as wide as article 2; basal article (5 total) of primary flagellum heavily swollen and bearing 2 main sets of aesthetascs, primary flagellum beyond article 1 with 4 long articles and 2 aesthetascs; accessory flagellum subequal in length to primary flagellum, with 4 articles. Antenna 2 geniculate between articles 4–5 and between article 5 and flagellum; article 3 with 2 short facial setae and one dorsodistal seta; article 4 with 5 alternately long and short dorsal spines, one long facial seta and other setae-setules, ventral margin largely naked; article 5 about 0.9 times as long as article 4, dorsal margin with 3 apical spines, lateral face with one distal spine-seta and other setules, ventral margin largely naked; flagellum over 1.1 times as long as articles 4–5 of peduncle combined, composed of 4–5 long articles.

Prebuccal complex massive. Epistome and upper lip amalgamated, ventral margin rounded and protruding. Mouthparts degenerate. Mandibles huge; incisors blunt, broad, lacking teeth; laciniae mobiles and raker spines absent; molars large, weakly triturative or fuzzy; palp of medium size, thin, about as long or slightly longer than body of mandible, mostly concealed from oral view, article 1 elongate, article 2 naked, article 3 about 0.8 times as long as article 2, apex rounded, with 2 long setae. Lower lip massive, inner lobes fully separate, large, outer plates with ordinary mandibular lobes. Maxilla 1 degenerate; inner plate thin, bearing extended apical salivary spout; outer plate spineless, apically bifid, weakly setulose apicomedially, lateral branch with apparent extended (or exuded) salivary spout; palp apparently uniarticulate, also bearing salivary spout. Maxilla 2 degenerate; inner plate shorter than outer, apically ragged or pointed (depending on view); outer plate apically truncate and ragged, possibly with minute salivary spout (this appendage at ultimate limit of oil-immersion lens), additional glans-like device seen on one maxilla 2 (unexplained). Maxillipeds degenerate, lacking setae, apices of plates with possible spouts; article 2 of palp expanded medially and bearing appearance of stridulation ridges where setae normally occurring, possibly rudiments of setal bulbs, article 3 narrow; article 4 unguiform, apex possibly with immersed nail. Coxa 1 broadly expanded distally, anterior margin almost straight, ventral margin broad, weakly convex, anterodistal corner rounded; coxa 2 expanded distally, anteroventral corner rounded, posteroventral corner subsharp; coxae 3–4 broad, comma-shaped, posterior margins deeply concave, ratio of widths to lengths of coxae 3–4 = 13:19 and 11:16. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 2–2–0–0 (not including distal corner), short posterior setae = 0–0–0–1, short anterior setae = 4–4–2–1, no long anterior setae. Gnathopods 1–2 weakly similar to each other; article 5 elongate, posterior margin flat, poorly extended, and weakly expanded, lacking combs, more densely setose and setulose on gnathopod 1 than on gnathopod 2; article 6 narrowly subovate, not strongly widened in middle, palm and posterior margin blending almost evenly and lacking discrete defining spine. Pereopod 2 larger than pereopod 1; facial formula of setae on articles 4–5 = 0–1 and 1–1; article 4 of pereopod 1 with midposterior facial spray of 2 setae and 2 other distal setae, pereopod 2 simply with 2 groups of 1 and 4 posterior setae;

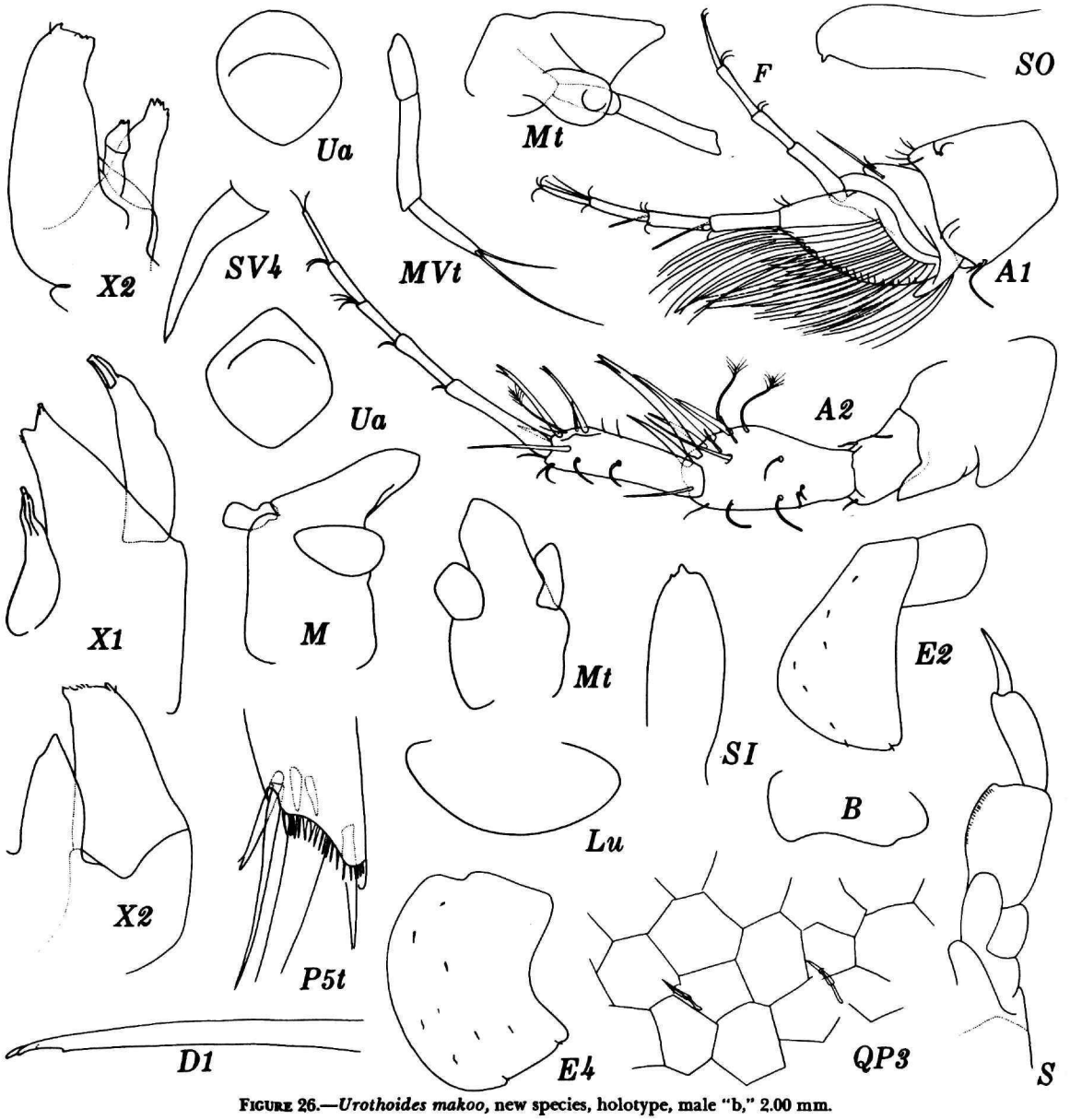

FIGURE 26.—*Urothoides makoo*, new species, holotype, male "b," 2.00 mm.

main spine of article 5 reaching to about M. 90 on article 6, apicolateral face with 2 spines in tandem, apicoposterior margin with 2 other spines on pereopod 2, only one other spine on pereopod 1; dactyls elongate, thin, bearing weak distal inner acclivity and protrusion, no visible nail, one distal scale, no setule apparent. Coxa 5 of ordinary familial form, posterior lobe larger and extending more deeply than anterior lobe; article 2 of pereopods 3–4 broad; pereopods 4–5 with anterior facial ridge; articles 4–5 of pereopod 3 wide, of pereopod 4 narrow; ratio of widths of articles 2, 4, 5, 6 of pereopod 3 = 50:42:36:11, of pereopod 4 = 62:27:22:11, of pereopod 5 = 72:17:14:8; ratio of lengths of articles

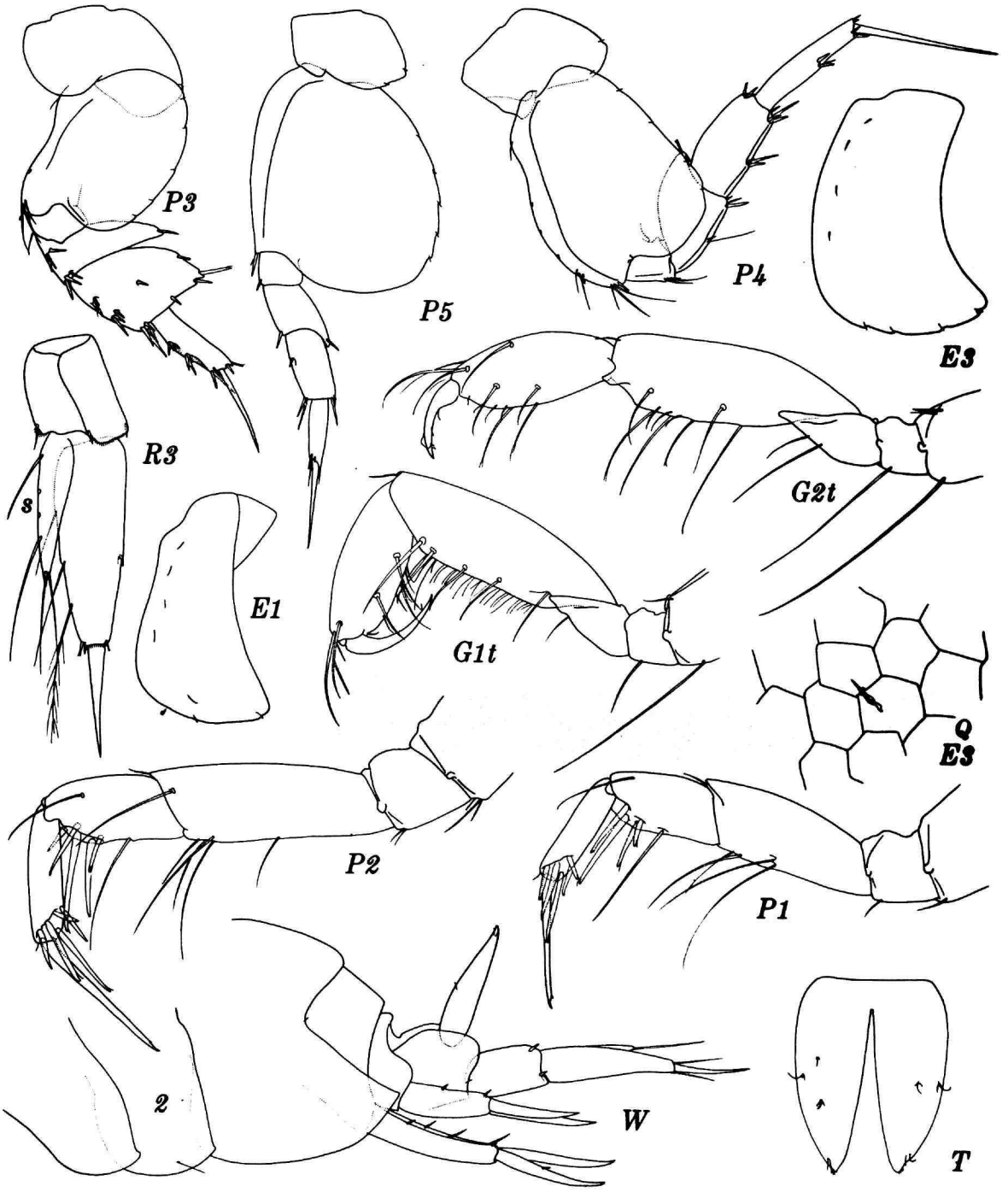

FIGURE 27.—*Urothoides makoo*, new species, holotype, male "b," 2.00 mm.

2, 4, 5, 6 of pereopod 3 = 65:26:40:32, of pereopod 4 = 83:36:40:49, of pereopod 5 = 90:25:28:29.

Epimera 1–2 with tiny sharp posteroventral tooth; posterior margin of epimeron 1 convex, of epimeron 2 straight; epimeron 2 with one facial seta or none; epimeron 3 expanded below, posterior margin weakly sinuous–concave and oblique, posteroventral corner extended and sharp, naked, no long setae on epimera at dorsal boundaries.

Urosomites articulate; urosomite 1 elevated dorsally; urosomite 2 with dorsal hump; urosomite 3 forming saddle posterior to hump of urosomite 2, with 2 very small spines in crotch between uropod 1 peduncles (hidden from lateral view). Peduncle of uropod 1 with 2 short lateral spines, medially with 3 long spines, apicalmost weakly elongate; rami of uropods 1–2 with apical nails amalgamated and immersed in ramus and almost invisible; only outer ramus of uropod 1 with dorsal spine; peduncle of uropod 2 with 2 short lateral spines, one apicomedial spine, peduncles of uropods 1–2 with ragged and sparse apical comb, inner ramus of uropod 2 with weak marginal comb. Uropod 3 large, peduncle with one apical spine ventrolaterally, one dorsolaterally, one thinner more elongate spine dorsomedially; rami feminine(!), inner extending to M. 70 on article 1 of outer ramus; inner ramus tapering to slightly blunted apex bearing 2 long apical setae, medial margin with 4 setae; article 1 of outer ramus with one lateral spine, one apicolateral spine, 2 apicomedial spines, article 2 elongate, thin, tapering to sharp, attenuate naked point. Telson slightly elongate, about 1.3 times as long as wide, not fully cleft, indistinctly subcordate, lobes tapering to subsharp apices bearing minute lateral acclivity armed with 2 setules, pair of lateral setules at M. 53, dorsal surface with other setules.

Cuticle covered with weak polygonal structure especially prominent on anterior coxae and article 2 of pereopods 3–5, sabre-like bulbar setules very sparse, cuticular surface apparently pebbled but also bearing agglutinated detritus.

Observation.—Male "d" with only one dorsodistal spine but with one small dorsoventral spine in addition to faciodistal spine on article 5 of antenna 2.

Illustrations.—Geniculation of antenna 2 between articles 4–5 and between article 5 and flagellum unfolded. Short facial setae on article 3 of antenna 2 rotated ventrally.

Holotype.—NMV, male "b," 2.00 mm.

Type-Locality.—CPBS A1/4, 14 Jul 1964, Western Port, Victoria, Australia, 5.2 m, sand.

Voucher Material.—Type-locality, male "d," 1.68 mm. Female unkown but possibly *Urothoides waminoa*.

Relationship.—These two males are so aberrant (degenerate mouthparts) that their identification with females of *Urothoides kurrawa* and *U. waminoa* is problematical. The mouthparts of the *U. makoo* male provide no clues to affinities because they are considerably degenerate. The gnathopods and epimeron 3 of *U. makoo* are similar to *U. kurrawa* while the apices of uropods 1–2, articles 3–4 of pereopod 3 and the telson are similar to *U. waminoa*. The latter similarities seem to be of significance so that if one had to choose a female for affinity, *U. waminoa* would be chosen. Pereopod 5 of *U. makoo* is quite distinctive, unlike that of the female of either of the other two species and resembling that of a typical phoxocephalid.

Urothoides makoo differs from *U. waminoa* also in the shorter spines of uropods 1–2, the cuticle, the more elongate dactyls of pereopods 1–5, the weaker tooth of epimeron 3, and the narrower article 5 of gnathopods 1–2. These differences are of sufficient degree to suggest that *U. makoo* is distinct from *U. waminoa* although some of these shape differences may prove to be normal male distinctions.

The greater degree of distinction between *U. makoo* and *U. kurrawa* is reflected in the absence of apical nails on uropods 1–2, the long telson, and broad articles 4–5 of pereopod 3. Lesser distinctions include cuticle, short spines of uropods 1–2, and elongate dactyls of pereopods.

Material.—CPBS, one sample (2).

Distribution.—Victoria, Western Port Bay, 5.2 m, sand.

Urothoides tondea, new species

Figures 28–30

Description of Female.—Rostrum broad from dorsal view, anterior margin weakly sinuous, weakly excavate in middle. Eyes absent. Article 1 of antenna 1 almost 0.6 times as wide as long; article 2 about 0.95 times as long and 0.7 times as wide as article 1; article 3 about 0.6 times as long

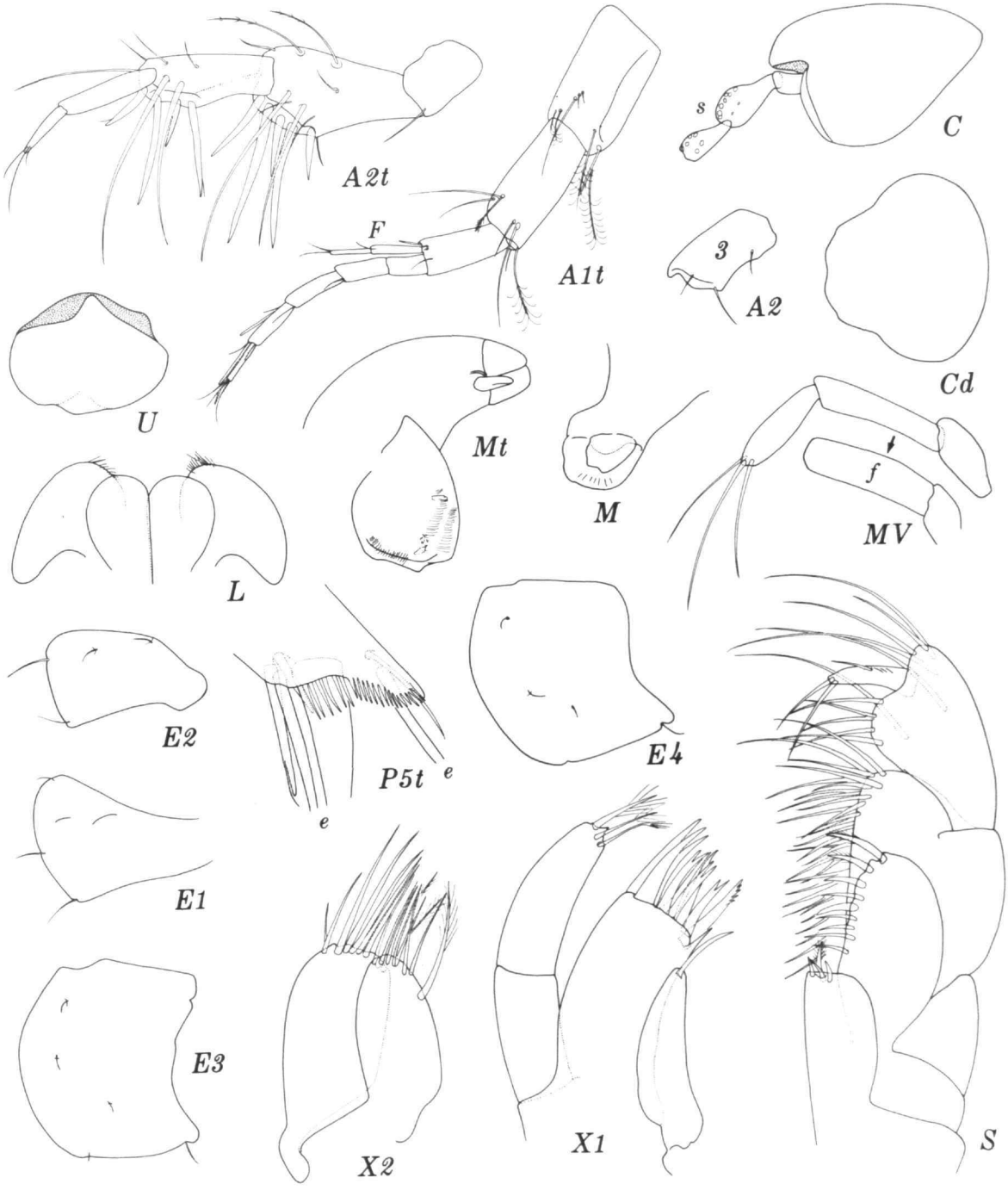

FIGURE 28.—*Urothoides tondea*, new species, holotype, female "a," 1.63 mm.

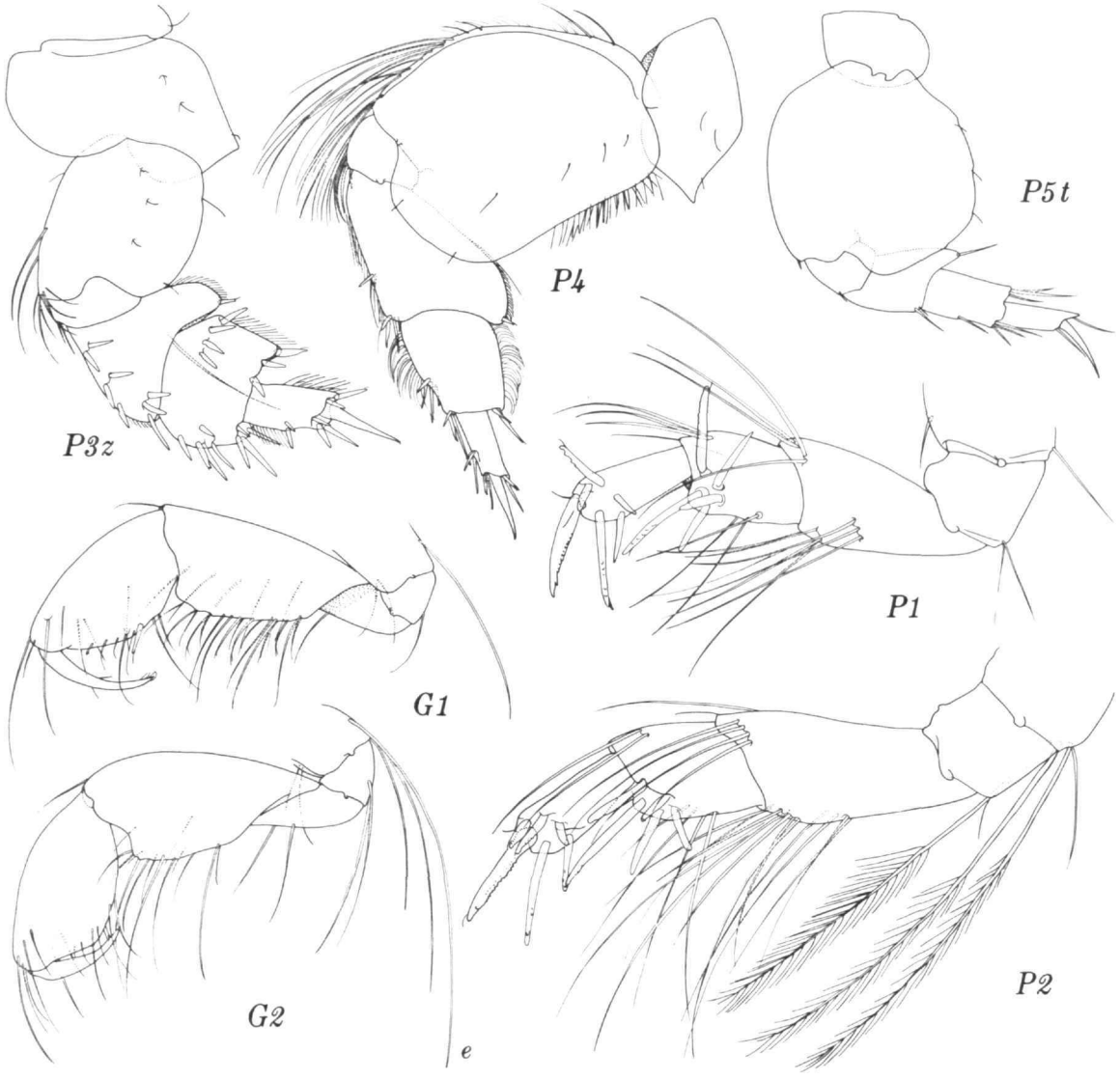

FIGURE 29.—*Urothoides tondea*, new species, holotype, female "a," 1.63 mm (z = right side converted to left).

as article 2; primary flagellum with 5 long articles; accessory flagellum with 2 long articles; peduncle geniculate between articles 2 and 3. Article 3 of antenna 2 with 2 faciodistal setae and one basoventral seta; article 4 with 5 alternately short and long dorsal spines and 2 facial setae, ventral margin with 2 main setae; article 5 about 0.9 times as long as article 4, dorsal margin with 2 pairs of spines, one long and one short in each pair, plus 2 long facial setal-spines, ventral margin naked but with 2 facial plusetae; flagellum about 1.15 times as long as article 5 of peduncle, composed of 2 long articles.

Prebuccal complex massive, dorsally protruding; epistome and upper lip amalgamated, ventral margin rounded and protruding but with basolateral false lobes. Mandibles huge; incisors blunt, broad, right bifid; right lacinia mobilis thin, apical bifi-

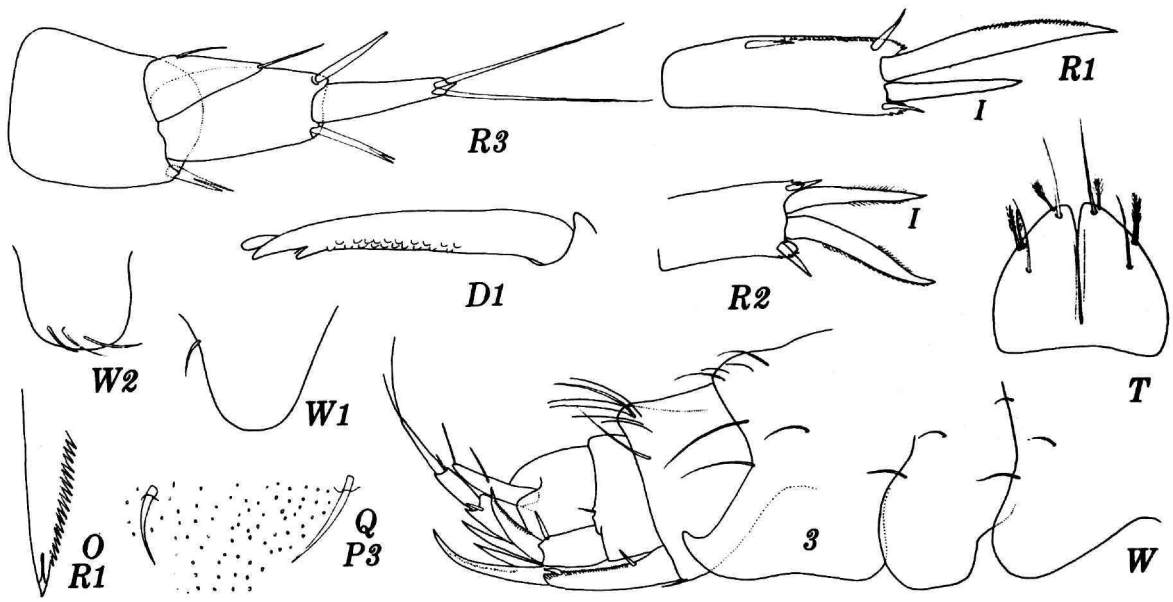

FIGURE 30.—*Urothoides tondea*, new species, holotype, female "a," 1.63 mm.

dation obsolescent, left lacinia mobilis broad, dome-shaped, weakly bifid; raker spines absent; molars large, weakly triturative or fuzzy; palp of medium size, about as long as body of mandible, mostly concealed from oral view, article 1 elongate, article 2 naked, article 3 about 0.8 times as long as article 2, apex rounded–oblique, short, bearing 3 setae. Lower lip massive, inner lobes fully separate, large, outer plates with weakly elongate mandibular lobes. Inner plate of maxilla 1 narrow, apex with one seta; outer plate with 9 spines, mostly simple, with tenth apicomedial spine-like cusp; palp article 2 exceeding apex of outer plate, apex with 3 setae, one of these stout. Plates of maxilla 2 broad, extending subequally; inner narrower than outer. Inner plate of maxilliped with 3 apical spines and short ventrofacial pluseta; outer plate with 9 medial spines and setae; articles 2 and 3 of palp apically produced, article 4 with 2 apical setae.

Coxa 1 broadly expanded distally, almost clavate, anterior margin concave, ventral margin broad, convex, anterodistal corner rounded; coxa 2 short, weakly expanded distally, anteroventral corner rounded, posteroventral corner subsharp; coxae 3–4 broad, comma-shaped, posterior margins deeply concave, ratios of widths to lengths of coxae 3–4 = 59:77 and 61:72. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 5–7–1–4 (including posteroventral corner), short posterior setae = 0–0–0–1 (latter at posteroventral corner), long anterior setae = 0–0–0–(2–3), short anterior setae = 3–3–2–(0–2). Gnathopods 1–2 similar to each other, article 5 weakly elongate, posterior margin flat and extended, subquadrate or weakly produced distally, combs absent; article 5 more densely setose on gnathopod 1 than on gnathopod 2; article 6 broadly ovate, not strongly widened in middle, palm and posterior margin almost blending evenly but marked by defining spine; dactyl overlapping palm. Pereopod 2 larger than pereopod 1; facial formula of setae on articles 4–5 = 4–3 and 4–2; article 4 of pereopod 1 with midposterior facial spray of 3 setae and 3 other distal setae on face, pereopod 2 simply with 2 groups of 4–6 posterior setae; main spine of article 5 reaching apex of article 6, apicolateral face with 3 spines in tandem, apicoposterior margin with one short spine; article 6 with distal rows of 3 and 2 spines (one spine of row 2 may be considered as medial); dactyls of pereopods 1–2 of ordinary length, lacking facial seta, bearing inner distal tooth, outer apical scale, inner margin with 2 rows of small knobs, setule from acclivity extremely weak (if not absent, scarcely resolvable on oil-immersion). Coxa 5 of ordinary familial form but

posteroventral angle acutely pointed, coxa 6 also with posteroventral point; article 2 of pereopods 3–5 broad, only pereopod 4 with anterior facial ridge, article 2 of pereopod 5 not posteroventrally extended (see illustrations for other peculiarities of pereopods 3–5); articles 4–5 of pereopod 3, and to some extent pereopod 4, wide; ratio of widths of articles 2, 4, 5, 6 of pereopod 3 = 51:52:45:16, of pereopod 4 = 76:43:30:10, of pereopod 5 = 71:25:16:8; ratio of lengths of articles 2, 4, 5, 6 of pereopod 3 = 60:40:34:30, of pereopod 4 = 99:57:39:23, of pereopod 5 = 74:28:28:27.

Epimera 1–2 with convex posterior margins, posteroventral corners rounded; epimeron 2 with 2–3 (abnormally none) facial setae in horizontal tandem; epimeron 3 expanded below, posterior margin almost straight and oblique, posteroventral corner bearing medium sized upturned, sharp tooth; epimera 1–3 with one seta each at dorsal boundaries; pleonites with other dorsofacial setae.

Urosomites articulate; urosomite 1 evenly elevated dorsally, setose (some setae possibly algae), ventrally with one small seta at base of uropod 1, with one long spine on each side, just basomedial to each uropod 1; urosome very broad, spines thus widely separated from side to side unlike other species of this genus. Peduncle of uropod 1 with 2 lateral spines, medially with one apical spine; rami of uropods 1–2 with apical nails fully immersed and almost invisible, no dorsal spines, inner ramus of uropod 1 short, outer ramus of uropod 1 and both rami of uropod 2 with combs on margins; peduncle of uropod 2 with one apicolateral and one apicomedial spine, peduncles of uropods 1–2 with ragged apical comb, uropod 1 with dorsolateral marginal comb. Uropod 3 of medium size; peduncle with one apical spine ventrolaterally; rami feminine, inner extending to M. 67 on article 1 of outer ramus; inner ramus bearing one apical seta and one medial subbasal seta; article 1 of outer ramus with one spine on each side apically, article 2 elongate, tapering to attenuate point bearing 2 long setae. Telson short, about 0.8 times as long as wide, not fully cleft, weakly subcordate but short, lobes slowly tapering to subsharp or blunt apex lacking lateral acclivity, apices armed with long medial seta and short lateral setule, pair of lateral setules on each side at M. 73, one dorsofacial seta at M. 55.

Cuticle covered sparsely to moderately with sharp setae and extremely minute denticles.

ILLUSTRATIONS.—Basoventral seta and one faciodistal seta on article 3 of antenna 2 concealed; prebuccal mass deformed by preservation, not illustrated from lateral view, aspect of upper lip from anterior view also poor; lateral view of head poor resulting from poor preservation; view of pereopod 3 drawn from right member but converted to left lateral view; uropods 1–3 and telson taken from in situ position; urosomite 3 on pleonal drawing tilted obliquely towards observer.

HOLOTYPE.—NMV, female "a," 1.63 mm.

TYPE-LOCALITY.—PPBES 986/1, 12 Oct 1971, Port Phillip Bay, Victoria, Australia, 4 m, sand.

VOUCHER MATERIAL.—Type-locality, female "b," 1.76 mm. Male unknown.

RELATIONSHIP.—This species appears to have more characters in common with *U. waminoa* than with *U. kurrawa* and *U. makoo* but differs from *U. waminoa* in the following items: fewer spines on uropods 1–2, smaller uropod 3, broader articles 4–5 of pereopods 3–4, a relatively normal phoxocephalid-like pereopod 5, presence of points on coxae 5–6, presence of knobs on the dactyls of pereopods 1–2, broader coxae 3–4, shorter telson, much longer apical setae on the rami of uropod 3, and a stout maxilla 2.

Urothoides tondea resembles *U. makoo*, known only for the male, in the similarity of pereopod 5 but otherwise differs in the larger tooth of epimeron 3, small uropod 3, broader articles 4–5 of pereopods 3–4, points on coxae 5–6, knobs of pereopodal dactyls, stouter gnathopods, broader coxae 3–4, shorter telson, nonpolygonal cuticle, and normal mouthparts, among numerous other minor characteristics.

The articulate nails on the rami of uropods 1–2 of *U. kurrawa* and lack of modifications in epimera, spines of uropods, shapes of pereopods, gnathopods coxae, telson, and maxilla 2 suggest that *U. kurrawa* is the most primitive of these species yet discovered, whereas *U. tondea* is a highly specialized member of the group.

See "Key to the Australian Species of *Urothoides*" for relationship to *U. odernae*.

MATERIAL.—PPBES, 3 samples from 3 stations (4).

DISTRIBUTION.—Victoria, Port Phillip Bay, 4 m, sand.

Urothoides odernae, new species

FIGURES 31–33

DESCRIPTION OF FEMALE.—Rostrum broad from dorsal view, anterior margin broadly and deeply rounded. Eyes absent. Article 1 of antenna 1 almost 0.60 times as wide as long; article 2 about 0.85 times as long and 0.7 times as wide as article 1; article 3 about 0.75 times as long as article 2; primary flagellum with 5 long articles; accessory flagellum with 2 long articles; peduncle weakly geniculate between articles 2 and 3. Article 3 of antenna 2 with 2 faciodistal setae and one basoventral seta; article 4 with 5 alternately short and long dorsal spines and 2 long and one short facial setae, ventral margin largely naked; article 5 about 1.1 times as long as article 4, dorsal margin with 2 pairs of spines, one long and one short in each pair, plus 2 long facial setal-spines and another facial seta, ventral margin naked but with 2 facial plusetae; flagellum about 1.1 times as long as article 5 of peduncle, composed of one long basal article and 2 shorter apical articles (possibly just divided in holotype), basal article with apical cusp.

Prebuccal complex massive, dorsally protruding; epistome and upper lip amalgamated, ventral margin rounded and protruding. Mandibles huge; incisors blunt, broad, right bifid and weakly denticulate; right lacinia mobilis thin, simple, left lacinia mobilis broad, domeshaped, weakly bifid (arrow-shaped); raker spines absent; molars large, weakly triturative or fuzzy; palp of medium size, about as long as body of mandible, mostly concealed from oral view, article 1 elongate, article 2 naked, article 3 about 0.80 times as long as article 2, apex weakly truncate and oblique, bearing 3 setae. Lower lip massive, inner lobes fully separate, large, outer plates with elongate mandibular lobes. Inner plate of maxilla 1 narrow, apex with one seta; outer plate with 9 spines, mostly simple, with tenth apicomedial spine-like cusp, and 3 setae; palp article 2 exceeding apex of outer plate, apex with long thin cusp. Inner plate of maxilla 2 much shorter and narrower than outer plate. Inner plate of maxilliped with 3 apical spines and short ventrofacial pluseta; outer plate with 12 medial spines and seta; articles 2 and 3 of palp apically produced, article 4 with 2 apical setae.

Coxa 1 broadly expanded distally, almost clavate, anterior margin concave, ventral margin broad, convex, anterodistal corner rounded; coxa 2 expanded distally, anteroventral corner rounded, posteroventral corner subsharp; coxa 4 broad, coxa 3 scarcely broadened, comma-shaped, posterior margins of both concave, deeply on coxa 4, ratios of widths to lengths of coxae 3–4 = 42:73 and 56:66. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = (3–5)–(5–7)–0–1, short posterior setae = 0–0–0–0, long anterior setae = 0–0–0–2, short anterior setae = (2–3)–2–2–0. Gnathopods 1–2 similar to each other; article 5 elongate, posterior margin flat and weakly extended, scarcely produced distally, combs absent, article 5 more densely setose on gnathopod 1 than on gnathopod 2, article 6 ovate, not strongly widened in middle, palm and posterior margin almost blending evenly but marked by defining spine, dactyl overlapping palm only on gnathopod 1. Pereopod 2 larger than pereopod 1; facial formula of setae on articles 4–5 = 3–3 and 3–2; article 4 of pereopod 1 with midposterior facial spray of setae and 3 other distal marginal setae, pereopod 2 simply with 3 groups of 2–8 posterior setae; main spine of article 5 almost reaching (on pereopod 1) or exceeding (on pereopod 2) apex of article 6, apicolateral face of article 5 on pereopods 1–2 with 3 and 2 spines in tandem, apicoposterior margin with one other spine on each pereopod; article 6 with distal rows of 3 and 2 spines and one medial spine on pereopods 1–2; dactyls of pereopods 1–2 slightly elongate, lacking facial seta, bearing inner distal tooth, outer apical scale, inner margin with 2 rows of small knobs, setule from acclivity absent. Coxa 5 of ordinary familial form, coxa 6 almost pointed posteroventrally; article 2 of pereopods 3–5 broad, article 2 of pereopod 5 obliquely truncate ventroposteriorly (see illustrations for other peculiarities of pereopods 3–5); pereopods 4–5 with anterior facial ridge, articles 4–5 of pereopod 3 and to some extent pereopod 4, wide, ratio of widths of articles 2, 4, 5, 6 of pereopod 3 = 53:49:41:14, of pereopod 4 = 68:41:32:12, of pereopod 5 = 74:23:17:9; ratio of lengths of articles 2, 4, 5, 6 on pereopod 3 = 58:31:37:32, of pereopod 4 = 88:43:37:31, of pereopod 5 = 70:28:28:29.

Epimeron 1 with strongly protruding posterior margin, epimeron 2 with weakly convex posterior margin, posteroventral corners of both rounded, epimeron 1 with small posteroventral setule, epimeron 2 with 3 facial setae in horizontal tandem; epimeron 3 slightly expanded below, posterior margin almost straight and weakly oblique, postero-

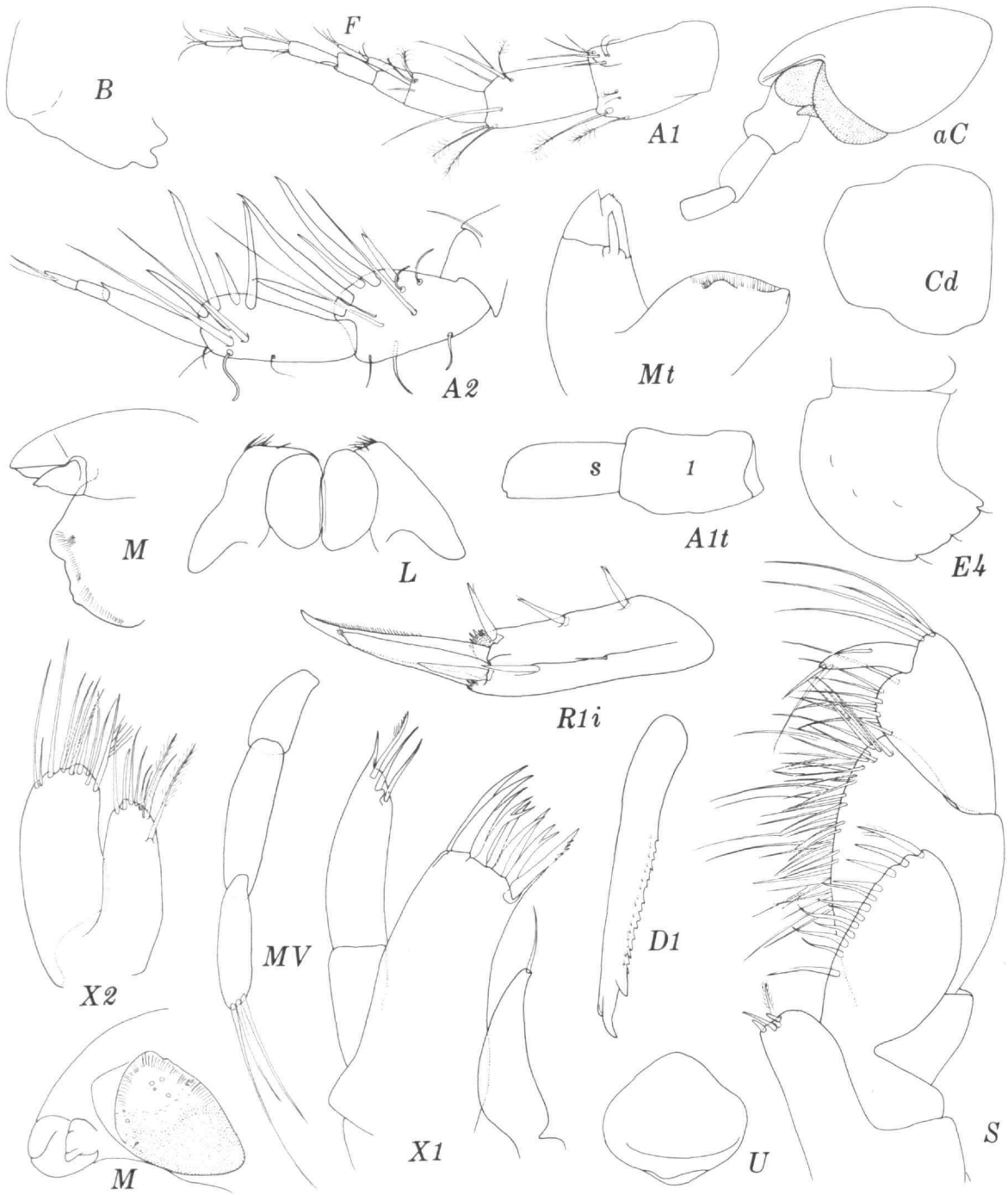

FIGURE 31.—*Urothoides odernae*, new species, holotype, female "d," 1.82 mm (*a* = female "a," 1.52 mm; stipple on *aC* = antenna 2).

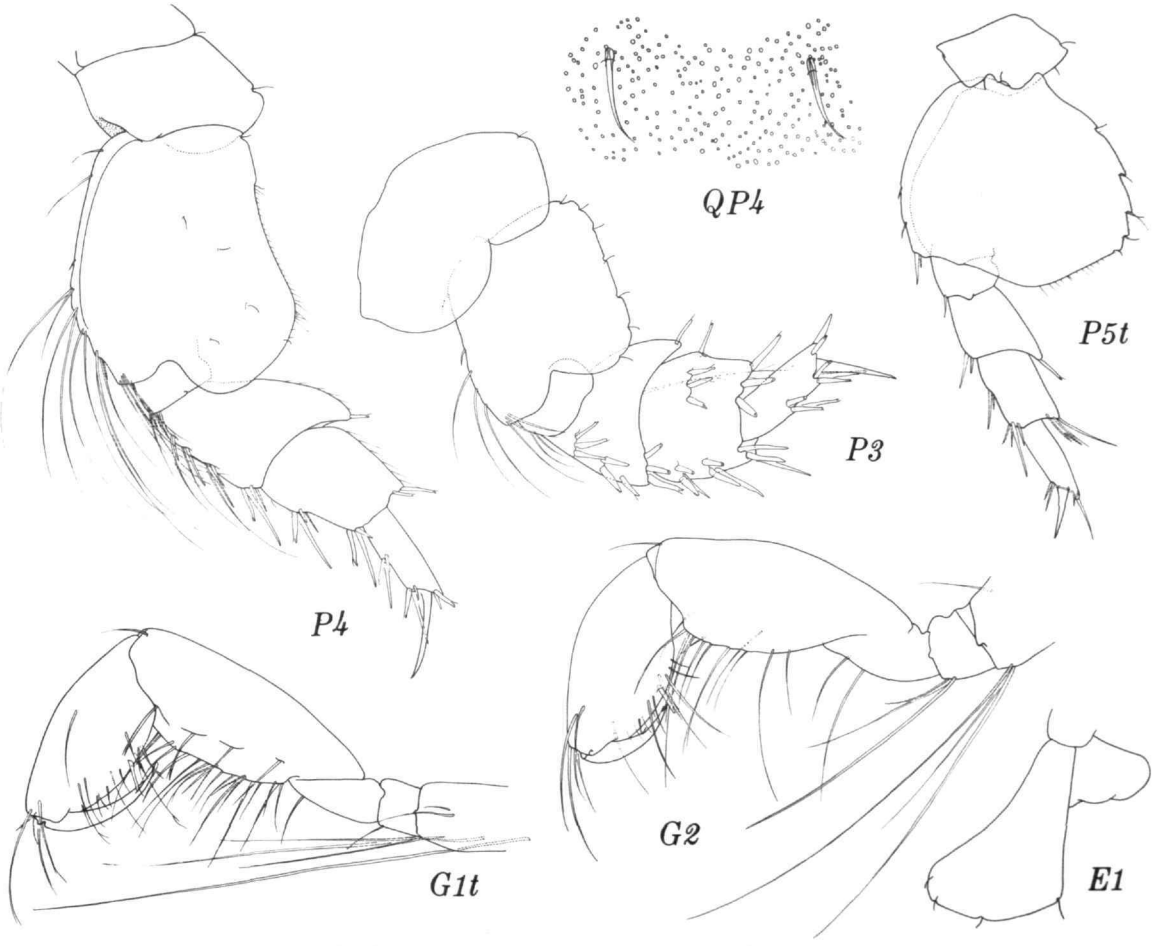

FIGURE 32.—*Urothoides odernae*, new species, holotype, female "d," 1.82 mm.

ventral corner subquadrate; epimera 1–3 with one small seta each at dorsal boundaries, pleonite faces otherwise poorly setose.

Urosomites articulate; urosomite 1 evenly elevated dorsally, with one setule at base of uropod 1 ventrally, with one long spine on each side basomedial to each uropod; urosome broad. Peduncle of uropod 1 with 3 lateral spines widely spaced, medially with 3 similarly spaced but smaller spines; rami of uropods 1–2 lacking apical nails (or fully immersed and almost invisible), no dorsal spines, inner ramus of uropod 1 possibly shorter than outer ramus (only one unbroken example available), outer ramus of uropod 1 with heavy marginal comb, weak on inner ramus, rami of uropod 2 naked; peduncle of uropod 2 with 2 lateral spines widely spaced, medially with one spine, peduncles of uropods 1–2 with ragged apical comb. Uropod 3 small; peduncle with one apical spine ventrolaterally, one apicomedial dorsal spine; rami feminine, inner extending to M. 60 on article 1 of outer ramus; apex of inner ramus bearing one apical seta and one medial subbasal seta; article 1 of outer ramus short, with one spine on each side apically, article 2 elongate, tapering to attenuate point bearing 2 medium sized setae. Telson short, about 0.8 times as long as wide, almost fully cleft, weakly subcordate but short, lobes slowly tapering to subsharp apex with weak lateral acclivity, apices armed with medium seta and slightly shorter lateral setule, pair of lateral setules on each side at M. 50.

Cuticle covered sparsely with sharp setae and

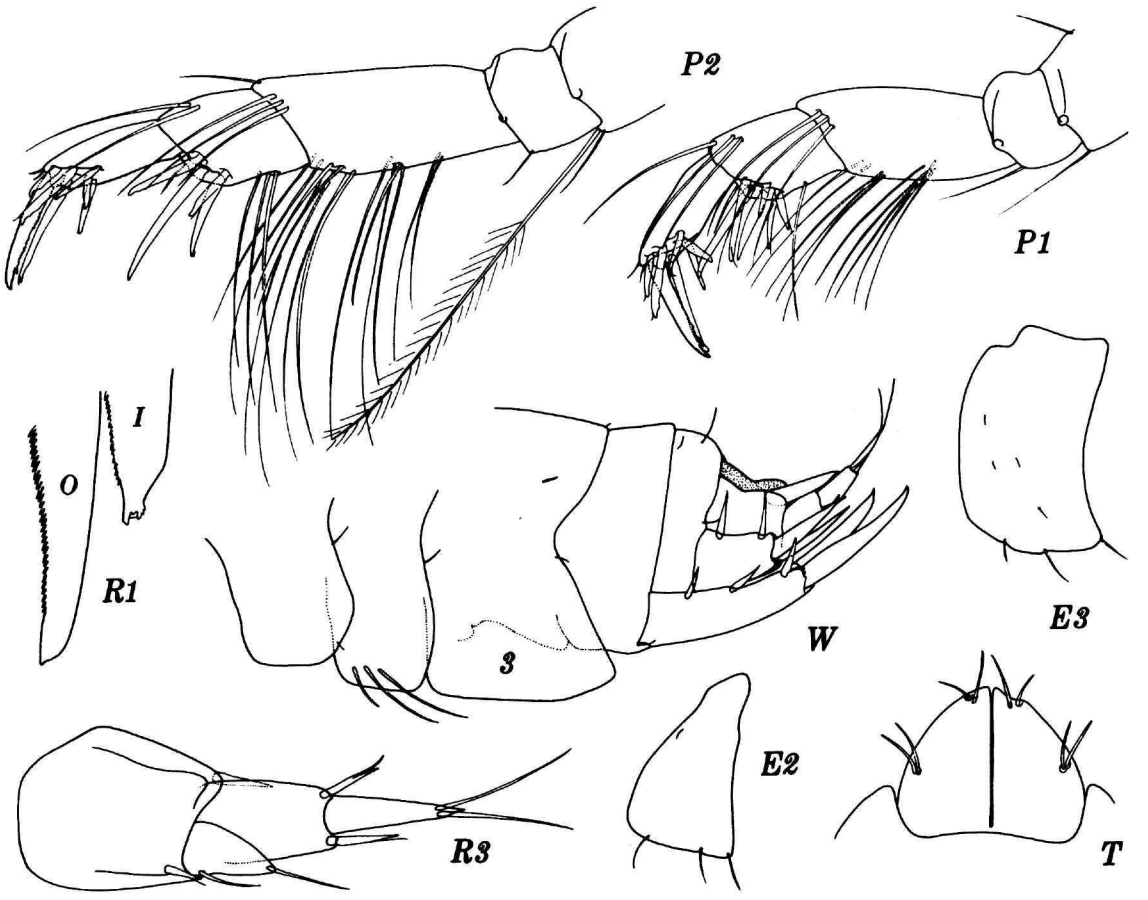

FIGURE 33.—*Urothoides odernae*, new species, holotype, female "d," 1.82 mm.

extremely minute denticles or pebbles.

OBSERVATIONS.—Right epimeron 2 of holotype with only one facial seta; epimeron 2 of female "a" with 2 setae.

ILLUSTRATIONS.—Basoventral seta and one faciodistal seta on article 3 of antenna 2 concealed; dorsal view of head with rostrum turning downwards anteriorly very slightly; lateral view of head of female "a" with base of antenna 2 stippled, remainder removed; urosomite 2 detelescoped slightly in view of pleon; article 6 of pereopod 5 with apical medial comb as in other species, not illustrated.

HOLOTYPE.—NMV, female "d," 1.82 mm.

TYPE-LOCALITY.—CPBS A1/4, 14 Jul 1964, Western Port, Victoria, Australia, 5.2 m, sand.

VOUCHER MATERIAL.—Type-locality, female "a," 1.52 mm (illus.); CPBS C5/5, female "k," 1.64 mm (females "a" and "k" not firmly identified, see "Remarks"). Male unknown.

RELATIONSHIP.—Generalities of urosome and pereopods 3–5 and knobbed dactyls of pereopods 1–2 suggest affinity of this species with *Urothoides tondea*. *Urothoides odernae* differs from *U. tondea* in the subequally extending rami of uropod 1, the absence of a tooth on epimeron 3, the dorsally naked urosomite 1, larger posterior teeth on article 2 of pereopod 5, absence of a cusp on coxa 5, narrower coxa 3 and in minor details of the telson, palp of maxilla 1, and plates of maxilla 2. See "Key to the Australian species of *Urothoides*" for relationship to *U. mabingi*.

REMARKS.—Identification of female "a" and female "k" uncertain because both rami of uropod 1 extending equally and blunt apically.

MATERIAL.—CPBS, 3 samples from 3 stations (5, including the holotype, the doubtful females "a" and "k," and 2 juveniles); PPBES, 4 samples from 3 stations (4).

DISTRIBUTION.—Victoria: Western Port and Port Phillip Bay, 5–10 m, sand.

Urothoides mammarta, new species

FIGURES 34, 35

DESCRIPTION OF FEMALE.—Rostrum broad from dorsal view, anterior margin broadly rounded. Eyes absent. Article 1 of antenna 1 about as wide as long, article 2 about 0.65 times as long and 0.90 times as wide as article 1; article 3 about 0.85 times as long as article 2; primary flagellum with 4 long articles attached to short stout basal article; accessory flagellum with 3 long articles, geniculation weak. Article 3 of antenna 2 with only one faciodistal setal-spine; article 4 with 7 alternately short and long dorsal spines and pair of long facial setae, ventral margin with 2 main setae; article 5 about 0.75 times as long as article 4, dorsal margin with 3 apical spines, distal face with 2 long setae, ventral margin with 2 short setae; flagellum almost 1.5 times as long as article 5 of peduncle, composed of 3 long articles, no cusps.

Prebuccal complex massive, dorsally protruding; epistome and upper lip apparently amalgamated, but with ventral crescentic appendage possibly representing upper lip. Mandibles huge; incisors blunt, broad, fuzzy; right lacinia mobilis thin, apically trifid or humped, left lacinia mobilis broad, dome-shaped, weakly toothed; raker spines absent; molars large, weakly fuzzy and scarcely triturative on edge; palp of medium size, about as long as body of mandible, mostly concealed from oral view, article 1 elongate, article 2 with one long and one short medial setae, article 3 about 0.8 times as long as article 2, apex oblique and short, bearing 3 setae. Lower lip massive, inner lobes fully separate, large, outer plates with elongate mandibular lobes. Inner plate of maxilla 1 narrow, apex with 2 setae; outer plate with 9 spines, with tenth apicomedial spine-like cusp; palp article 2 reaching apex of outer plate, apex with 3 setae, one stout. Inner plate of maxilla 2 narrower and shorter than outer plate. Inner plate of maxilliped with 2 apical spines, 2 short dorsal and one short ventral plusetae plus smaller terminal pluseta, apex with excavation; outer plate with 11 medial spines and setae; articles 2–3 of palp apically produced, article 4 with 2 apical and one inner subapical setae.

Coxa 1 scarcely expanded distally, anterior margin weakly concave, posterior almost straight, ventral margin short, weakly convex, anterodistal corner rounded; coxa 2 grossly expanded distally, anteroventral corner rounded, posteroventral corner strongly extended posteriorly; coxae 3–4 narrow, comma-shaped, posterior margins deeply concave; coxa 4 shorter than coxa 3; ratios of widths to lengths of coxae 3–4 = 3:8 and 4:6. Long posterior setae of article 2 of gnathopods 1–2 and pereopods 1–2 = 5–5–0–0, short posteriors = 0–1–1–1, short anteriors = 3–2–2–0, long anteriors = 1–(side)–0–0–0. Gnathopods 1–2 almost identical to each other; article 5 elongate, posterior margin flat and extended, subquadrate distally, corner weakly extended, distomedial margin of article 5 with comb on both pairs, fan-combs absent, setae on posterior margin of article 5 on gnathopod 1 shorter and denser than on gnathopod 2; article 6 narrowly subovate, palm and posterior margin blending almost evenly but marked by defining spine; dactyl slightly overriding palm. Pereopod 2 slightly larger than pereopod 1; facial formula of setae on articles 4–5 = 1–1 and 3–2; article 4 of pereopod 1 with 2 groups of 3 posterior setae, pereopod 2 with groups of 3 and 2; main spine of article 5 reaching to M. 66 on article 6, apicolateral face with one spine, apicoposterior margin with 2 long spines (including main spine); article 6 with distal rows of 3 and 2 spines, no distomedial spine; dactyls elongate, bearing sharp inner acclivity forming erect thorn, no setule, apex with outer scale. Coxa 5 of ordinary familial form, posterior lobe larger and extending more deeply than anterior lobe, pointed posteroventrally; article 2 of pereopods 3–5 broad; pereopods 4–5 with anterior facial ridge; articles 4–5 of pereopods 3–4 narrow; ratio of widths of articles 2, 4, 5, 6 of pereopod 3 = 47:22:21:10, of pereopod 4 = 63:20:18:9, of pereopod 5 = 78:19:17:8; ratio of lengths of articles 2, 4, 5, 6 of pereopod 3 = 55:15:33:34, of pereopod 4 = 77:30:43:43, of pereopod 5 = 94:20:34:32; distomedial margin of article 6 on pereopod 5 combed.

Epimera 1–2 with attenuate, sharp tooth at posteroventral corner, posterior margins weakly convex; epimeron 2 with 2 ventrofacial setae in

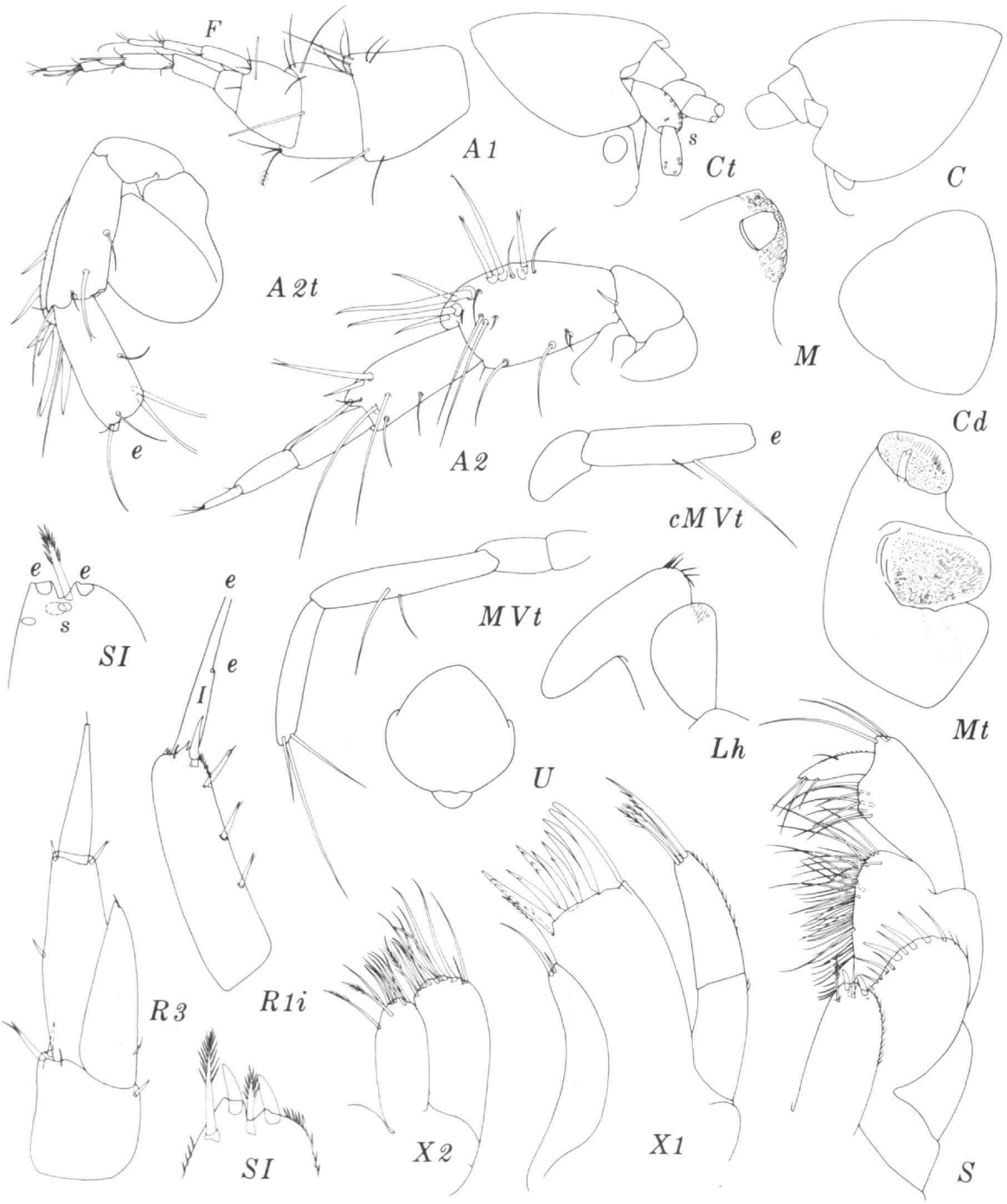

FIGURE 34.—*Urothoides mammarta*, new species, holotype, female "b," 2.32 mm (*c* = juvenile "c," 2.22 mm).

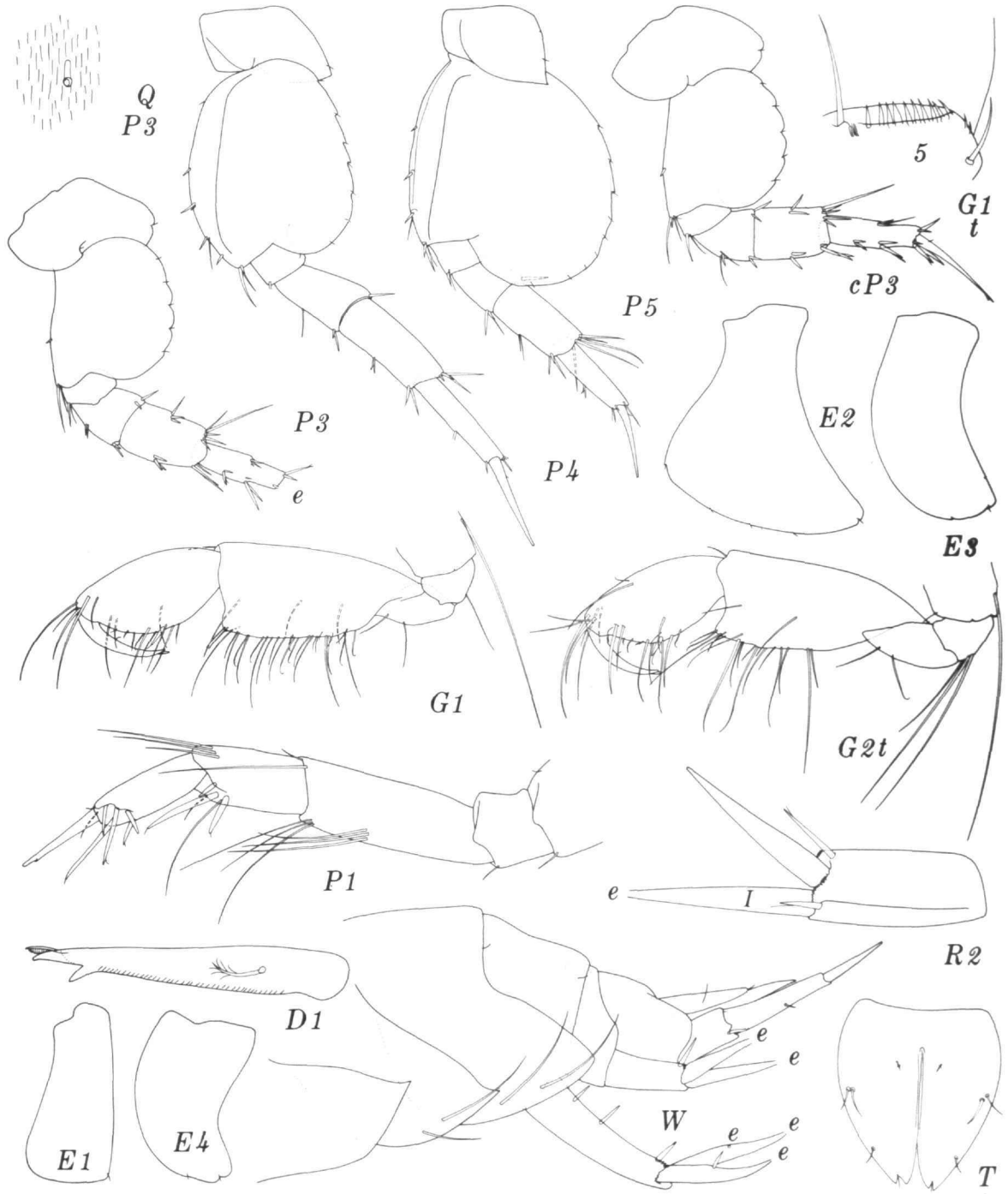

FIGURE 35.—*Urothoides mammarta*, new species, holotype, female "b," 2.32 mm (*c* = juvenile "c," 2.22 mm).

horizontal tandem; epimeron 3 expanded below, posterior margin convex, oblique, posteroventral corner subquadrate, bearing 2 ventrofacial setae in tandem.

Urosomites articulate; urosomite 1 almost flat dorsally, with 2 medium spines in crotch between uropod 1 peduncles medially, urosomite 1 almost fully concealing dorsum of urosomite 2. Peduncle of uropod 1 with 3 lateral spines, none elongate, medially with 4 spines, apicalmost stout; rami of uropods 1–2 apparently lacking nails (mostly broken off), rami of uropod 1 each with dorsal spine, rami of uropod 2 naked; peduncle of uropod 2 with one apicolateral elongate spine, medially with one apical spine, peduncles of uropods 1–2 with ragged apical comb. Uropod 3 large; peduncle with one apical spine ventrolaterally, one dorsolaterally, one small medial spine dorsally; rami submasculine, inner extending almost to M. 80 on article 1 of outer ramus; inner ramus tapering to blunt or sharp point bearing apicolateral setule, one basomedial setule; article 1 of outer ramus with one lateral spine, one apicolateral spine, one apicomedial spine, article 2 elongate, tapering to narrow truncation bearing one setule. Telson ordinary, about 1.2 times as long as wide, deeply cleft, weakly subcordate, lobes rapidly tapering to bifid apex bearing setule, no lateral acclivity, each lobe with lateral subapical setule and 2 midlateral dorsal setules on each side at M. 50.

Cuticle covered with occasional pipes, very minutely fuzzy.

OBSERVATIONS.—Juvenile "c" from type-locality: epimera and uropods similar to holotype.

HOLOTYPE.—AM, female "b," 2.32 mm.

TYPE-LOCALITY.—SBS 4, 30 Jul 1973, off Malabar, New South Wales, Australia, 66 m, bottom unknown.

VOUCHER MATERIAL.—Type-locality, juvenile "c," 2.22 mm (illus.).

RELATIONSHIP.—This species differs from all others described in the pair of ventral setae on epimeron 3. In terms of pereopod 5 it seems to have the closest resemblance to *Urothoides makoo*, but differs strongly in narrower articles 4–5 of pereopods 3–4, the longer posterior lobe on article 2 of pereopod 5, in the extended wrists of the gnathopods, shorter dactyls on pereopods 1–2, distinctive telson, and the unusually small coxa 4 and broadly expanded coxa 2, among numerous other distinctions.

MATERIAL.—AM, one sample (2).

DISTRIBUTION.—New South Wales, off Malabar, 66 m, bottom unknown.

Urothoides mabingi, new species

FIGURES 36–38

DESCRIPTION OF FEMALE.—Rostrum broad from dorsal view, anterior margin weakly bisinuate. Eyes absent. Article 1 of antenna 1 about 1.6 times as long as wide; article 2 about as long as and about 0.6 times as wide as article 1; article 3 about 0.6 times as long as article 2; primary flagellum with 5 long articles; accessory flagellum with 3 long articles; geniculation strong between articles 2 and 3 of peduncle. Article 3 of antenna 2 with basofacial setule and distolateral setule; article 4 with 5 alternately short and long dorsal spines and group of 4 long distofacial setae, ventral margin with 3 setules; article 5 about 0.8 times as long as article 4, dorsal margin with 5 spines, distal face with 2 thin and one thick long setae, ventral margin with 2 setules; flagellum about 1.1 times as long as article 5 of peduncle, composed of 2 long articles tipped with a tiny third article, article 1 with cusp.

Prebuccal complex massive, scarcely protruding dorsally; epistome and upper lip partially amalgamated but marked by articulation line, ventral margin formed of anterior protruding hump overriding 2 lateral lobes with weak sinus between them. Mandibles huge; incisors blunt, broad, fuzzy; right lacinia mobilis thin, weakly bifid, left lacinia mobilis broad, dome-shaped, weakly humped; raker spines absent; molars large, weakly fuzzy and sharp but nontriturative on one edge; palp of medium size, about as long as body of mandible, mostly concealed from oral view, article 1 elongate, article 2 naked, article 3 about 0.8 times as long as article 2, apex oblique and short, bearing 3 setae, inner subapical margin with one seta. Lower lip massive, inner lobes fully separate, large, outer plates with elongate mandibular lobes. Inner plate of maxilla 1 narrow, apex with one seta; outer plate with 9 spines, with tenth apicomedial spine-like cusp; palp article 2 well exceeding apex of outer plate, apex with 3 setae. Inner plate of maxilla 2 narrower than outer plate, not as long as outer plate, with one

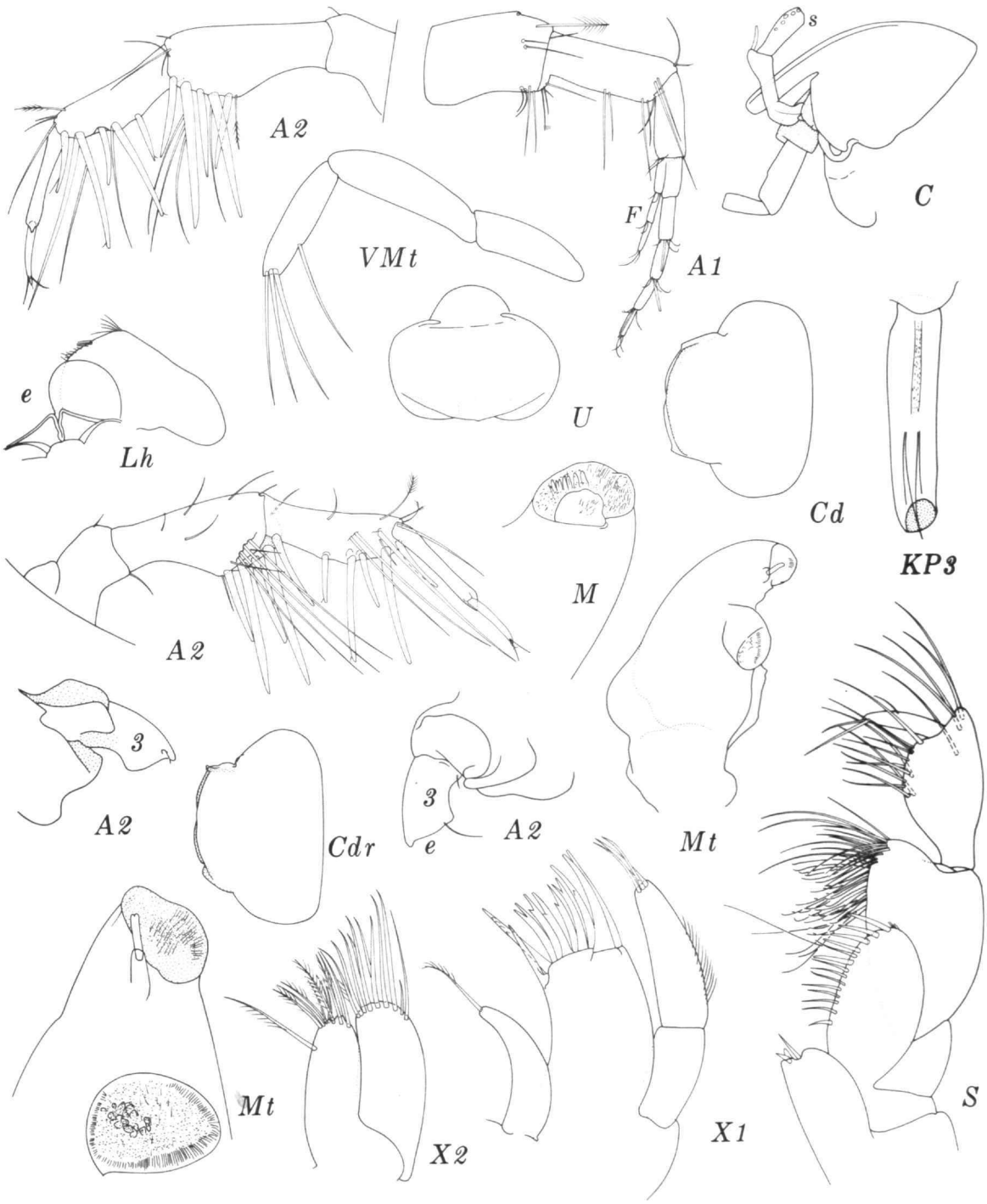

FIGURE 36.—*Urothoides mabingi*, new species, holotype, female "a," 2.70 mm.

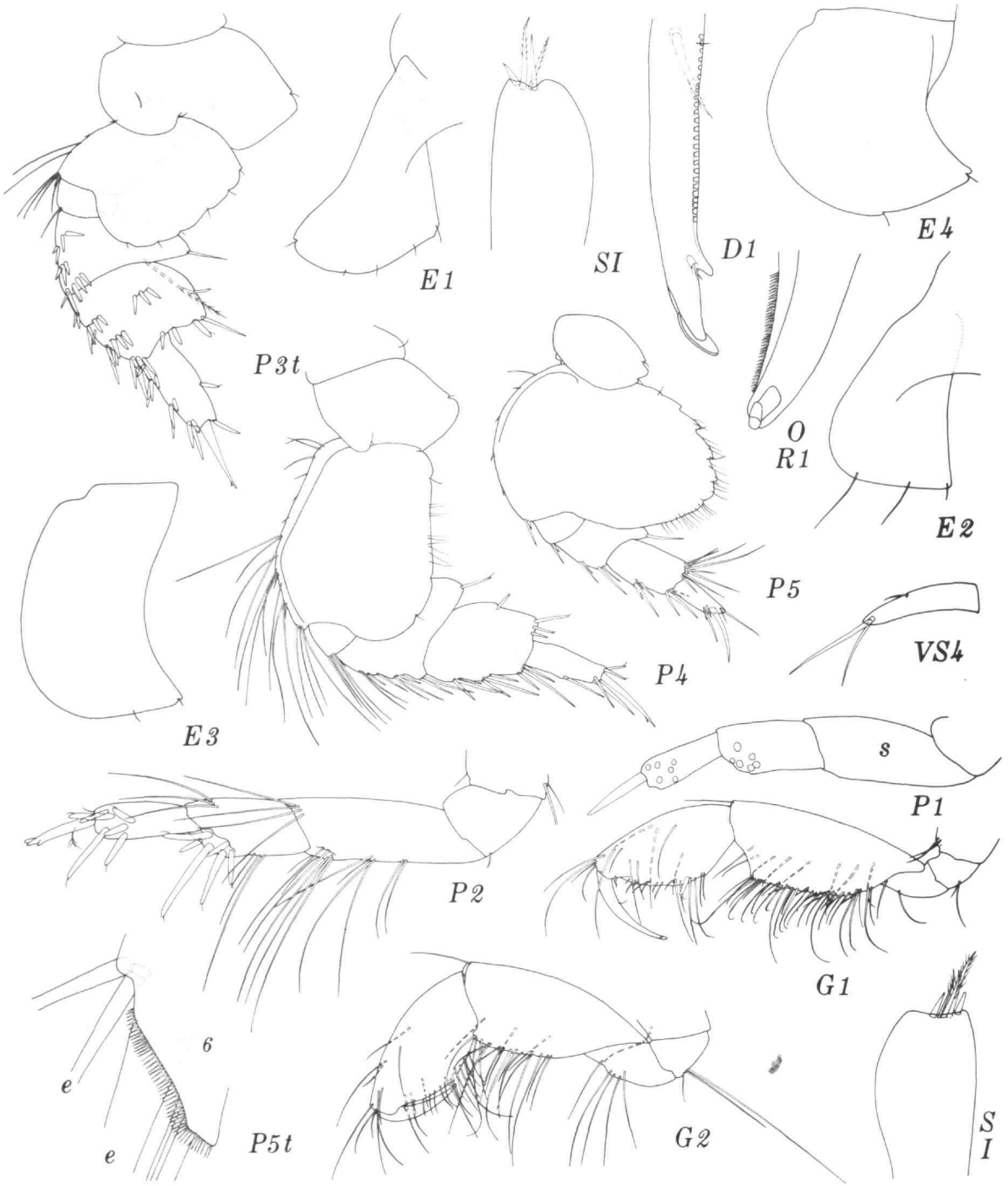

FIGURE 37.—*Urothoides mabingi*, new species, holotype, female "a," 2.70 mm.

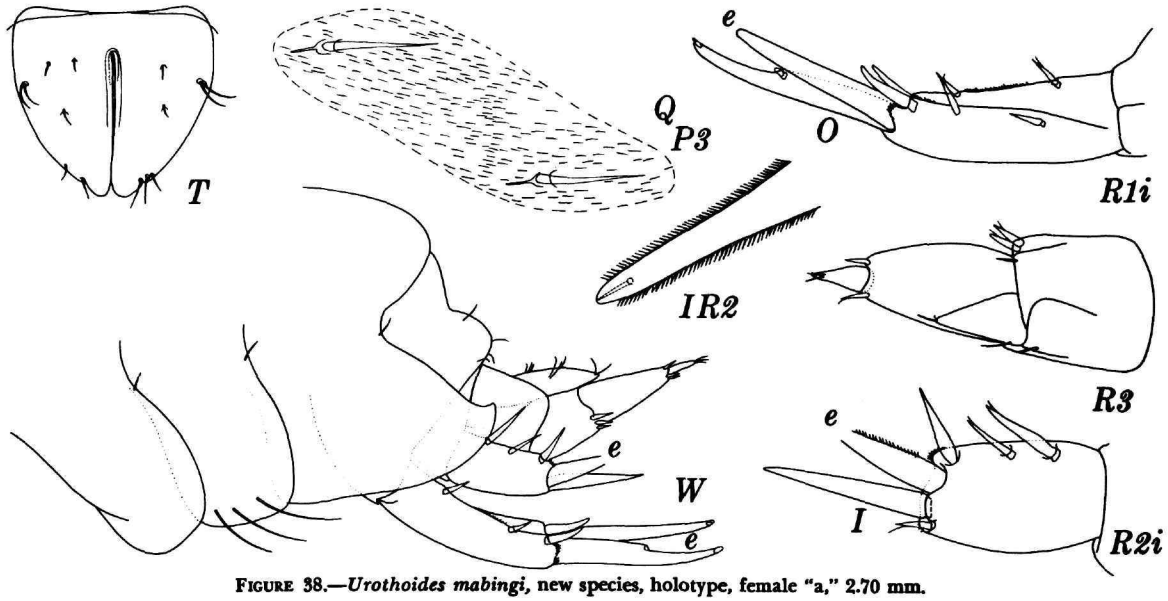

FIGURE 38.—*Urothoides mabingi*, new species, holotype, female "a," 2.70 mm.

medial seta. Inner plate of maxilliped with 2–3 apical spines and 2–3 short plumose setae (variable side to side), apex with or without weak excavation; outer plate with 14 medial spines and setae; articles 2–3 of palp apically produced, article 4 with 2 apical setae.

Coxa 1 broadly expanded distally, anterior margin concave, ventral margin broadly rounded but asymmetrical, anterodistal corner rounded, with setule notch; coxa 2 ordinary, anterior margin convex, anteroventral corner rounded, posteroventral corner quadrate; coxa 3 ordinary, comma-shaped, posterior margin deeply concave; coxa 4 shorter and broader than coxa 3; ratios of widths to lengths of coxae 3–4 = 5:9 and 6:8. Long posterior setae on article 2 of gnathopods 1–2 and pereopods 1–2 = 2–3–2–4, short posteriors = 0–0–0–1, short anteriors = 4–2–1–0, long anteriors = 8 (+2 facial)–12–0–0. Gnathopods 1–2 almost identical to each other; article 5 elongate, posterior margin flat and extended, subquadrate distally but extended on gnathopod 2, distomedial margin of article 5 with comb on both pairs but very weak on gnathopod 2 (elements abundant but tiny), fan-combs absent, setae on article 5 of gnathopod 1 shorter and denser than on gnathopod 2; article 6 narrowly subovate, palms distinct, marked by defining spines; dactyl scarcely overriding palm. Pereopod 2 larger than pereopod 1; facial formula of setae on articles 4–5 = 4–4 and 3–3; article 4 of pereopod 1 with 3 groups of 8, 4–5, and one posterior setae, pereopod 2 with 3 groups of 7, 4, and 2; main spine of article 5 reaching to M. 90 on article 6, apicolateral face with 2 spines, apicoposterior margin with 4 spines (including main spine); article 6 with distal rows of 3 and 2 spines plus distomedial spine; dactyls elongate, bearing sharp inner acclivity forming erect thorn, setule extremely minute, apex with outer scale. Coxa 5 with subquadrate posteroventral corner, posterior lobe larger and extending somewhat more deeply than anterior lobe; article 2 of pereopods 3–5 broad; pereopods 4–5 with anterior facial ridge; articles 4–5 of pereopods 3–4 broad; ratio of widths of articles 2, 4, 5, 6 of pereopod 3 = 52:52:42:16, of pereopod 4 = 62:42:31:11, of pereopod 5 = 83:22:17:7; ratio of lengths of articles 2, 4, 5, 6 of pereopod 3 = 57:30:38:39, of pereopod 4 = 78:35:40:31, of pereopod 5 = 70:26:30:22; distomedial margin of article 6 on pereopod 5 combed. Epimera 1–2 rounded posteroventrally, posterior margins convex; epimeron 2 with 3 ventrofacial setae in horizontal tandem; epimeron 3 expanded below, posterior margin weakly convex, oblique, posteroventral corner extended as medium upturned blunt tooth; each epimeron with posterodorsal setule.

Urosomites articulate, urosomite 1 with dorsal

hump-crest, with one large spine on each side in crotch between uropod 1 peduncles medially, urosomite 1 concealing dorsum of urosomite 2. Peduncle of uropod 1 with 3 lateral spines, apicalmost enlarged, medially with 3 spines, apicalmost enlarged; rami of uropods 1–2 with nails reduced and mostly immersed, outer ramus of uropod 1 with dorsal spine, rami of uropod 2 naked, peduncle of uropod 2 with 3 lateral spines, medially with one small apical spine; peduncles of uropods 1–2 with ragged apical comb. Uropod 3 of medium size; peduncle with 2–3 apical spines ventrolaterally, one spinule each dorsolaterally and mediolaterally; rami feminine, inner extending to M. 55 on article 1 of outer ramus; apex of inner ramus bearing apical setule, one basomedial setule; article 1 of outer ramus with one apicolateral and one apicomedial spine, article 2 of medium length, tapering to subsharp apex bearing 2 setules. Telson ordinary, about 0.95 times as long as wide, cleft about 0.8 of its length, lobes rapidly tapering to rounded apex bearing 2–3 setules in or near weak notch, each lobe with 2–3 dorsal setules and 2 midlateral dorsal setules on each side at M. 40.

Cuticle covered sparsely with large setules amidst dense minute fuzz.

OBSERVATIONS.—Brood plates rudimentary on holotype.

ILLUSTRATIONS.—Head shown dorsally in 2 views, shorter illustration from right posterodorsal aspect, other view flat dorsally with rostrum hanging downward away from observer, note weak crests apically and apicolaterally; upper lip not fully flattened; inner ramus of figured uropod 1 stumped, possibly regenerative, other uropod 1 with rami extending equally; pereopod 3 composed of right-left composite; many spines of pereopods 3–4 with blunt apical bevel, almost appearing to have meatus but also minutely fuzzy, with outer facial cusp-setule (not emerging internally despite appearance of drawing).

HOLOTYPE.—AM, female "a," 2.70 mm. Unique.

TYPE-LOCALITY.—SBS 4, 19 May 1972, off Malabar, New South Wales, Australia, 66 m, bottom unknown.

RELATIONSHIP.—This species has its closest resemblance to *U. waminoa* but differs in the absence of posteroventral teeth on epimera 1–2, the presence of weak knobs on the dactyls of pereopods 1–2, absence of fancombs on the gnathopods, shorter telson and uropod 3, and the more broadly expanded coxa 1.

From *U. kurrawa,* this species differs in the broader articles 4–5 of pereopods 3–4, presence of a tooth on epimeron 3, the short apical setae on outer ramus of uropod 3, the presence of knobs on the pereopodal dactyls, poorly developed apical nails on uropods 1–2, shorter uropod 3, and broader rostrum.

The other species of *Urothoides* have a distinctive pereopod 5.

MATERIAL.—AM, one sample (1).

DISTRIBUTION.—New South Wales, off, Malabar, 66 m, bottom unknown.

Appendix

Australian Samples and Localities

(Additional samples and localities not recorded in Barnard and Drummond, 1978)

AM samples from Hunter District Water Board Survey, collected by N. Carrick:

P.24846, S of Hunter River, Belmont Beach, New South Wales, 19 Jul 1976, sta A, 151°40′36″E, 33°02′46″S, low tide transect.

P.24851, S of Red Head Beach, New South Wales, 19 Jul 1976, sta X, 151°42′40″E, 33°01′15″S, low tide transect.

P.24854, same as P.24851, sta B.X.3.

P.24923, same as P.24851, transect 15.02.03.02.

WAM Trawl sta 6, off Cronulla, Jibbon Point, New South Wales, 24 Jul 1943, 30°05′S, 151°13′E, 40 m, bottom unknown.

Literature Cited

Barnard, J. L.

1962. South Atlantic Abyssal Amphipods Collected by R. V. *Vema*. *Abyssal Crustacea, Vema Research Series,* 1:1–78, figures 1–79.

1964. Los Anfipodos bentonicos marinos de la costa occidental de Baja California. *Revista de la Sociedad Mexicana de Historia Natural,* 24:205–274, figures 1–11.

1967. Bathyal and Abyssal Gammaridean Amphipoda of Cedros Trench, Baja California. *United States National Museum Bulletin,* 260: vi + 204 pages, 92 figures.

Barnard, J. L., and M. M. Drummond

1978. Gammaridean Amphipoda of Australia, Part III: The Phoxocephalidae. *Smithsonian Contributions to Zoology,* 245: 551 pages, 269 figures.

Barnard, K. H.

1916. Contributions to the Crustacean Fauna of South Africa, 5: The Amphipoda. *Annals of the South African Museum,* 15:105–302, plates 26–28.

1925. Contributions to the Crustacean Fauna of South Africa, Number 8: Further Additions to the List of Amphipoda. *Annals of the South African Museum,* 20:319–380, plate 34.

Chilton, C.

1922. Amphipoda: Results of Dr. E. Mjöbergs Swedish Scientific Expeditions to Australia 1910–13, XXXI. *Kungliga Svenska Vetenskapsakademiens Handlingar,* 63(3):1–11, figures 1–4.

Dana, J. D.

1853–1855. Crustacea, Part 2. *United States Exploring Expedition,* 13:689–1618, atlas of 96 plates.

Griffiths, C. L.

1974a. The Amphipoda of Southern Africa, Part 3. *Annals of the South African Museum,* 62:209–264, figures 1–18.

1974b. The Amphipoda of Southern Africa, Part 4. *Annals of the South African Museum,* 65:251–336, figures 1–18.

Gurjanova, E.

1938. Amphipoda Gammaridea of Siaukhu Bay and Sudzuhke Bay (Japan Sea). *Reports of the Japan Sea Hydrobiological Expedition of the Zoological Institute of the Academy of Sciences, USSR, in 1934,* 1:241–404, figures 1–79. [In Russian with English title and summary.]

Imbach, M. C.

1967. Gammaridean Amphipoda from the South China Sea. *Naga Report,* 4:39–167, plates 1–33.

Nayar, K. N.

1959. The Amphipoda of the Madras Coast. *Bulletin of the Madras Government Museum,* new series, Natural History Section, 6(3):1–59, plates 1–16.

1967. On the Gammaridean Amphipoda of the Gulf of Mannar [sic], with Special Reference to Those of the Pearl and Chank Beds. *Proceedings of the Symposium on Crustacea, Ernakulam,* 1:133–168, figures 1–17.

Oliveira, L.P.H.

1955. Phoxocephalus capuciatus, nova espécie de crustacea amphipoda, Phoxocephalidae. *Memorias do Instituto Oswaldo Cruz,* 53:313–319, plates 1, 2.

Pillai, N. K.

1957. Pelagic Crustacea of Travancore, 3: Amphipoda. *Bulletin of the Central Research Institute, University of Travancore,* series C (Natural Science), 5:29–68, figures 1–18.

Rabindranath, P.

1971. Haustoriid Amphipods (Crustacea) from India. *Hydrobiologia,* 38:521–539, figures 1–7.

Sars, G. O.

1895. Amphipoda. *An Account of the Crustacea of Norway with Short Descriptions and Figures of All the Species,* 1:i–viii, 1–711, plates 1–240, supplementary plates 1–8.

Schellenberg, A.

1931. Gammariden und Caprelliden des Magellangebietes, Südgeorgiens und der Westantarktis. *Further Zoological Results Swedish Antarctic Expedition, 1901–1903,* 2(6):1–290, figures 1–136, plate 1.

Stebbing, T.R.R.

1888. Report on the Amphipoda Collected by H.M.S. Challenger during the Years 1873–76. *Report on the Scientific Results of the Voyage of H.M.S. Challenger during the Years 1873–76: Zoology,* 29:i–xxiv, 1–1737, plates 1–210 [in 3 volumes].

1891. On the Genus *Urothoe* and a New Genus *Urothoides*. *Transactions of the Zoological Society London,* 13:1–30, plates 1–4.

1906. Amphipoda, I: Gammaridea. *Das Tierreich,* 21:1–806, figures 1–127.

1910. Crustacea, Part 5: Amphipoda. *In* Scientific Results of the Trawling Expedition H.M.C.S. *Thetis*. *Memoirs of the Australian Museum* 4(2):565–658, plates 47–60.

1914. Crustacea from the Falkland Islands Collected by Mr. Rupert Vallentin, F.L.S., Part II. *Proceedings of the Zoological Society London,* 1914(1):341–378, plates 1–9.

Walker, A. O.

1904. Report on the Amphipoda Collected by Professor Herdman, at Ceylon, in 1902. *Supplementary Report, Government of Ceylon: Pearl Oyster Fisheries in the Gulf of Manaar, 1904,* 17:229–300, plates 1–8.

Index

Principal accounts in italics

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