

REVISION OF LAPHYSTIOPSIDAE (CRUSTACEA: AMPHIPODA):
NEW AND OLD SPECIES FROM SOUTH CHINA SEA, SOUTHEASTERN
AUSTRALIA, FALKLAND ISLANDS AND WESTERN ATLANTIC OCEAN

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Abstract

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Collections from Bass Strait and eastern Tasmania reveal two new species of *Laphystiopsis*, *L. wulgi* sp. nov. and *L. zomerysis* sp. nov. of the rarely encountered family Laphystiopsidae. To verify differences between *Prolaphystiopsis* and the type of the family, *Laphystiopsis*, old but unreported materials of *Laphystiopsis planifrons* Sars in the Smithsonian's National Museum of Natural History collections were reviewed and are presented herein. *Prolaphystiopsis platyceras*, type of the genus, was borrowed and redescribed. Sars' (1895) and Schellenberg's (1931) differentiation of the genera was based on erroneous observations of the palp of maxilla 1. A review of the family is presented, with updating of diagnoses and literature. *Prolaphystiopsis* differs from *Laphystiopsis* in the narrow rostrum, bulging head, and enlarged and lobate article 1 of antenna 1. *Laphystiopsis planifrons* is newly recorded from the western Atlantic Ocean. *Laphystiopsis iridometrae* Shoemaker, 1919 from the South China Sea is reviewed and illustrated for the first time. *Prolaphystiopsis latirostris* Ledoyer, 1986 is removed to *Laphystiopsis*. Individuals of the family are presumed to be inquiline parasites or commensals of sessile marine invertebrates, particularly erinoids, but are rarely noticed by amphipodologists.

Introduction

While examining amphipods from Bass Strait in Museum Victoria, Jean Just discovered a specimen of Laphystiopsidae, a family rarely collected. Later [in 1990] I visited him and Gary Poore at Museum Victoria and continued sorting through similar collections and found one more specimen from eastern Tasmania. The two specimens are reported on here as two new Australian species.

The remarkable morphological resemblance of *L. zomerysis* sp. nov. and *L. wulgi* sp. nov. to the North Atlantic *Laphystiopsis planifrons* Sars, 1895 in somatic aspect and the perfunctory generic distinction (1- or 2-articulate palp of maxilla 1) between *Laphystiopsis* and *Prolaphys-*

tiopsis necessitated reexamination of specimens of *L. planifrons* to verify the unarticulate condition of the palp on maxilla 1, and to search for other generic differences. In this examination, *L. planifrons* was found to occur in the western Atlantic Ocean. Maxilla 1 palp proved to be 2-articulate despite the analysis of Sars (1895). Thus, the only known difference between *Prolaphystiopsis* and *Laphystiopsis* evaporated. After examining the syntypes of *Prolaphystiopsis platyceras*, type species of the genus, it was determined that the narrow rostrum, bulging head, and enlarged and lobate article 1 of antenna 1 are new characters that diagnose *Prolaphystiopsis*. *Laphystiopsis ornitorhynchus* Bulycheva is transferred to *Prolaphystiopsis*.

Review of the scant literature of this family revealed that *Laphystiopsis iridometrae* Shoemaker, 1919 from the "China Sea" had been only briefly described but never illustrated. The holotype deposited in Smithsonian collections provided a detailed analysis of that species. Although more than 20 juveniles were also present in the Smithsonian collections, only the holotype was fully adult.

* Jerry Laurens Barnard died on 16 August 1991 shortly after completing a first draft of this manuscript. The editor thanks Elizabeth Harrison-Nelson for sending the paper to the *Memoirs of Museum Victoria* as Jerry had intended. J.D. Thomas, J.K. Lowry, J. Just and I made corrections and improvements to the original draft but these have been slight. Gary C. B. Poore

Species in Laphystiopsidae are assumed to be "parasites" on other organisms, much in the same manner that Lalystiidae (Sars, 1895; Bonsfield, 1987) are parasitic on fish. Indeed, *L. iridometrae* was originally found by Dr Austin H. Clark embedded in tissues of the crinoid *Iridometra melpomene* (*Iridometra adrestine* [A.H. Clark]) and given to Shoemaker who described it sparingly. If not for the excellent work of Bonsfield (1987), in collecting and soliciting specimens of Lalystiidae from fish, very little would be known of its presumed sister family. Because they have been collected secondarily from their hosts, laphystiopsids appear in amphipod collections only accidentally. Commensal amphipods that cling to the host initially on collection can be easily lost during routine curatorial activities, e.g., alcohol and/or container changes. For a more complete understanding of the group, active searches should be undertaken focusing especially on sessile or slow moving invertebrates such as gorgonians and crinoids.

Each species is diagnosed; the drawings form the principal descriptive material; the descriptions for each are composed only of comments amplifying the drawings. Diagnoses and descriptions are not congruous among species. The diagnosis of the family is based on new observations, not all of which have been confirmed in all species of the family. Geographic codes listed in brackets for each species taken from Barnard and Karaman (1991). Length and width of coxae are the same as length and width of any article on the pereopods; the words deeper and broader are not appropriate.

Material is deposited in Museum Victoria, Melbourne (NMV) and National Museum of Natural History, Smithsonian Institution, Washington (USNM).

Laphystiopsidae Stebbing, 1899

Diagnosis. Rostrum present or absent, if present well developed, reaching at least halfway along peduncular article of antenna 1. Accessory flagellum absent or unarticulate. Field of mouthparts quadrangular. Mandibular molar scarcely tritritative or not, rakers absent or 1 raker present. Inner plate of maxilla 1 feeble, poorly setose (1 seta or naked), outer plate with 5–7 spines; palp large, 2-articulate. Palp of maxilliped 4-articulate. Coxae 1–4 small, quadrate or anteroposteriorly rectangular or ovate, occasionally disjunct from each other. Gnathopods 1–2 feeble, simple. Urosomites free. Uropod 3 biramous, outer ramus longer than peduncle. Telson short, entire.

Description. Body broad, depressed, weakly to strongly carinate on pleonites 3–4 or 1–3 only.

Urosome slightly flattened, urosomite 1 elongate or not. Head flat, rostrum large and spatulate [or absent]; eyes present or absent; sides of head bulging or not. Antenna 1 dominant, peduncle short, flagellum elongate, article 1 of flagellum pubescent or not or developed as a weak calynophore; antenna 2 often as long as antenna 1 but of lesser thickness and lesser dominance. Mouthparts generally feebly armed. Upper lip broad, incised. Mandibular incisors ordinary, not attenuate for piercing, toothed; palp well developed, 3-articulate, very poorly setose, armaments mostly scales. Inner lobes of lower lip fleshy and well developed or absent. Inner plate of maxilla 1 small, ovate, with 1 small seta or none, outer plate with 5 spines; palp 2-articulate (but see the discussion of *Prolaphystiopsis ornitorhynchus* below). Plates of maxilla 2 narrow, inner setose medially or not. Maxillipeds small, feebly armed, plates ordinary except basal article of outer plate elongate; palp large or small. Coxae variable, short and evenly extending or middle coxae longer, occasionally coxae so small as to be disjunct. Gnathopods simple, carpi elongate. Pereopods 5–7 increasingly elongate or not, article 2 increasingly expanded. Epimeron 2 dominant. Pleopod 3 significantly shorter than pleopods 1–2. Uropods 1 and 3 exceeding uropod 2 (as far as known), outer rami slightly shortened or not; peduncle of uropod 3 scarcely elongate. Telson ovate.

Variables. *Prolaphystius* departs from the typical characterization in the total absence of a rostrum, lack of inner lobes on the lower lip, larger middle coxae, excavate coxa 4, long carpus of pereopod 3, lysianassid-like pereopods 5–7, elongate telson, and elongate urosomite 1. Specimens of this antarctic genus have not been observed; it may belong in another family. It keys out to the generalized "melting pot" of Eusiridae but differs from that group in the reduction of spines on the outer plate of maxilla 1 to 5 (versus generally 9–11), the feeble palp of the maxilliped, the elongated article on which the outer plate of the maxilliped is attached; the reduction of raker spines to 1 (versus generally 5+), and the elongation of urosomite 1.

Relationship. See Barnard and Karaman (1991) for comparisons with the families: Iphimediidae; Lalystiidae; Eusiridae (Calliopiidae, Pleustidae); Oedicerotidae; Stilipedidae; Astyridae; Colomastigidae; Maxilliphimediidae. The family differs from Lalystiidae in the 4-articulate (versus 2-articulate) palp of the maxilliped, the reduction of spines on the outer plate of maxilla 1 from 7 to 5, the presence of a molar, and well developed palp on maxilla 1, and except for *Prolaphystius*,

the presence of inner lobes on the lower lip, and the poorly developed and poorly setose (1 versus 2+ setae) inner plate of maxilla 1.

The Laphystiopsidae are similar to the Eusiridae, Calliopidae and Pleustidae but with feeble, simple gnathopods; feeble, and poorly setose maxillipedal palps. The lower lip of the type genus is like the characteristic labium of Pleustidae, and the inner lobes of *Laphystiopsis* are large and fleshy, whereas the inner lobes are lost in *Prolaphystius*.

Like the Lalystiidae, the Laphystiopsidae may have some roots in Iphimediidae. Lalystiidae have an acuminate coxa 4 and otherwise are similar to the Iphimediidae except for the reduced palp on the maxilliped. The Laphystiopsidae are so diverse that they must be characterized individually. *Laphystiopsis* and *Prolaphystiopsis* differ from Iphimediidae in the very short nonacuminate coxae and flattened (though strongly rostrate) head; *Prolaphystius* differs in the nonrostrate head and thin geniculate urosome.

The Stilipedidae and Astyridae bear large outer lobes on the maxillipeds and strongly dominant carpi on the gnathopods.

All but one genus of Oedicerotidae have elongate peduncles on uropod 3, and that genus, *Metoediceros*, like other oedicerotids, has slightly or strongly subchelate gnathopods, a disproportionately elongate pereopod 7, strongly setose pereopods, and unnotched upper lip.

Corophioids have triturative molars and usually subchelate or strongly setose and specialized gnathopods.

The Laphystiopsidae could be confused with

Phoxocephalidae that have an elongate, flat, spatulate rostrum, but Laphystiopsidae differ in the non-fossorial pereopods and antennae, and the large biramous uropod 3 lacking article 2 on the outer ramus (occasionally true in Phoxocephalidae, but only with short uropod 3), the small coxae, the weak antenna 2 and the unclleft telson.

The uniformity of Laphystiopsidae is broken by the loss of the rostrum in *Prolaphystius*. That genus has a long urosomite 1 as in Dulichiidae, but otherwise has little similarity to that family.

The Laphystiopsidae are analagous to Maxillipiidae in that both are inquilinous on sessile or semi-sessile invertebrates. Maxillipiidae occupy gorgonians (Thomas, 1996) while the Laphystiopsidae are definitely known from crinoids but possibly also from coelenterates (collected in fields of *Lophelia* in Norway). The two families resemble each other in what may be superficially convergent characters as follows: similar coxal shapes, bulging ocular regions, presence of calyptophore, feeble maxillae and maxillipeds, feeble gnathopods, huge oostegites, and weak telson (except *Prolaphystius*). In contrast, the Maxillipiidae are characterized by an enormously elongate pereopod 6, serrate spines on outer plate of maxilla 1, thickened article 2 of maxillipedal palp, elongate peduncle of uropod 3, unnotched upper lip, and one or both mandibles with 2+ slender rakers. Maxillipiids are free-living on gorgonians where they gather in large numbers with their elongate sixth pereopods stretched outward laterally and frequently rotating whereas the only known ecological observation of laphystiopsids is that they make surficial burrows on crinoids.

Key to genera of Laphystiopsidae

- 1. Rostrum absent; coxa 4 almost as long as broad, deeply excavate posteriorly *Prolaphystius*
- Rostrum elongate, apex exceeding first peduncular segment; coxa 4 small, much wider than long, not excavate posteriorly 2
- 2. Article 1 of antenna 1 enlarged, lobate; rostrum apically constricted, margin rounded; eye lobes strongly bulging *Prolaphystiopsis*
- Article 1 of antenna 1 not enlarged or lobate, lacking apical projection; rostrum not constricted, truncate; eye lobes not bulging *Laphystiopsis*

***Laphystiopsis* Sars**

Laphystiopsis Sars, 1895: 386.

Type species. Laphystiopsis planifrons Sars, 1895 (monotypy).

Diagnosis. Rostrum well developed, very broad; ocular lobes not bulging. Article 1 of antenna 1 not grossly lobate. Mandibular molar conical, unridged. Inner lobes of lower lip present. Palp of

maxilla 1 unarticulate. Coxae short, broad, anterior coxae ovate, often not touching serially, coxa 4 much wider than long, not excavate posteriorly. Pereopods 3-4 alike, with carpus very short. Pleonite 3 dorsally carinate but not forming horizontal shelf, urosomite 1 carinate and saddled. Telson short, oval.

Description. Article 1 of antenna 1 weakly carinate to strongly produced apically and massive.

Coxae produced forward or not. Articles 2–7 of pereopod 3 like pereopod 4. Pleonites 3–4 carinate and pleonite 4 saddled, or only pleonites 1–3 carinate.

Included species.

L. iridometrae (Shoemaker, 1919) (Vader, 1978), near Hong Kong, inquilinous [6521]

L. latirostris Ledoyer, 1986, Geysir Bank, Indian Ocean, abyssal [618A]

L. planifrons Sars, 1895 (Stephensen, 1926, 1931, 1938; Gurjanova, 1951), north boreal Atlantic, sublittoral to bathyal [240 + B]

L. wulgi sp. nov., eastern Tasmania, Australia [782]

L. zomerysis sp. nov., eastern Bass Strait, Australia, bathyal [782]

L. species "k", herein [254]

Transferred species.

L. ornitorhynchus Bulycheva, 1952 to *Prolaphystiopsis*.

Distribution. Marine; South China Sea; boreal North Atlantic, 167–900 m; northeast of Geysir Bank near Madagascar, Indian Ocean, 2300–2500 m; and southeastern Australia, 102–1000 m; often on crinoids or corals.

Key to species of *Laphystiopsis*

1. Pleonite 4 lacking dorsal process *L. latirostris*
- Pleonite 4 with dorsal process 2
2. Epimeron 2, posteroventral corner truncate *L. zomerysis*
- Epimeron 2, posteroventral corner rounded 3
3. Dorsal cusps of pleonites 3–4 pointed *L. planifrons*
- Dorsal cusps of pleonites 3–4 rounded 4
4. Rostrum reaching or exceeding second peduncular segment; ventral margin of coxa 4 even, broadly emarginate *L. iridometrae*
- Rostrum barely reaching end of first peduncular segment; ventral margin of coxa 4 produced midventrally *L. wulgi*

***Laphystiopsis planifrons* Sars**

Figures 1–3

Laphystiopsis planifrons Sars, 1895: 386, pl. 135.—Norman, 1895: 488.—Stebbing, 1906: 209.—Stephensen, 1926: 73; 1928: 185, fig. 36 (6–10); 1929: 106, fig. 25 (156); 1931a: 208; 1938b: 182.—Oldevig, 1933: 113.—Gurjanova, 1951: 495, fig. 323.—Oldevig, 1959: 48.

Material examined. U.S. Fish Commission Lot 547, which in written records (not on label) is: Gloucester Fisheries Expedition, on schooner *Proctor Brothers*, Sable Island Bank off Nova Scotia, 7 Nov 1879, 43°16'N, 60°35'W, 350 fm (written records cite as 640 m), [?dredge], sample includes sea-anemone, pectens, crinoid *Acanthogorgia pinnata*, and *Alcyonium multiflorum* and *Pennata borealis* USNM 36124 (female "p" 8.25 mm).

U.S. Fish Commission Steamer *Albatross* stn 2429, off Newfoundland, 42°55'30"N, 50°51'00"W, 471 fm, 23 Jun 1885, gray mud, large beam trawl, bottom temperature 38.7°F USNM 31966 (male "o" 6.43 mm). U.S. Fish Commission *Albatross* stn 2540, northwestern Atlantic Ocean, off Massachusetts, 39°58'20"N, 70°52'00"W, 7 Aug 1885, 144 fm, large beam trawl, green sand, bottom temperature 46.7°F (note in vial reads: "many frags of erinoids were found in bottle from which these specimens were taken C.R.S[Shoemaker]") USNM 230425 (young male "m" 5.06 mm).

Diagnosis. Head slightly longer than pereonites 1–3, scarcely bulging laterally (as seen from dorsal view); pleonites 1–4 each with conspicuous dorsal bulge or carina; pleonite 4 not longer than pleonite 3; coxa 5, 50% as long as wide; coxa 6 bilobed and wide anteroposteriorly (80% as wide as coxa 5 and 160% as wide as coxa 7), 60+% as long as wide; epimeron 2 rounded posteroventrally; article 5 of pereopods 3–4, 1.5 times as wide as long; article 2 of pereopod 7 broadly pyriform, articles 3–7 together about 3 times as long as article 2 (from Sars, 1895; articles 5–7 absent on present material).

Description of female "p". See illustrations. Head with apparent glandular tissue in place of eye. Antennae 1 broken apically but probably not longer than antenna 2, flagellum with 13+ articles, callynophore with 6 groups of aesthetascs, proximal to distal = 2rudimentary-2-5-4-3-7, following articles 1–8 aesthetasc formula = 2-3-3-3-0-3-0-2. Antenna 2 ordinary, flagellum 20-articulate. Callynophore articles without ridges besides insertion points for rows of aesthetascs. Accessory flagellum very poorly developed. Ventral surface of article 1 on antenna 1 and medioventral surfaces on articles 3–4 of antenna 2 with sparse ridges, stiff setules, weak scales.

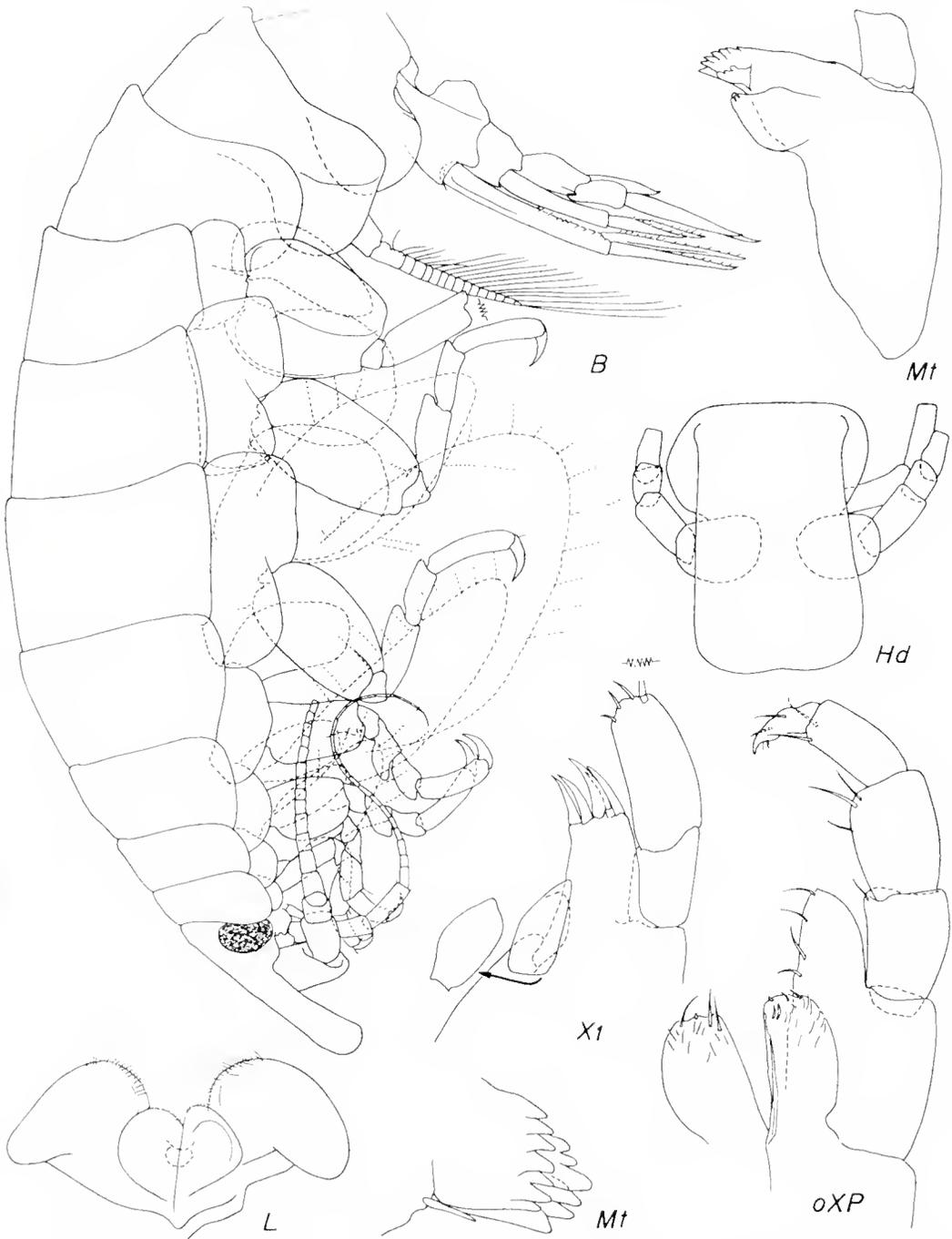


Figure 1. *Laphystiopsis planifrons*, unattributed figures = female "p" 8.25 mm; "o" = male "o" 6.43 mm. Capital letters in figures refer to parts; lower case letters to left of capital letters refer to specimens and to the right refer to adjectives as follows: B, body; C, coxa; D, dactyl; E, epimeron; F, accessory flagellum; G, gnathopod; H, head; L, labium; M, mandible; O, oostegite; P, pereopod; PL, pleopod; R, uropod; T, telson; U, upper lip; V, palp; W, pleon; X, maxilla; Z, gill; d, dorsal; i, inner; m, medial; o, outer; r, right; t, left.

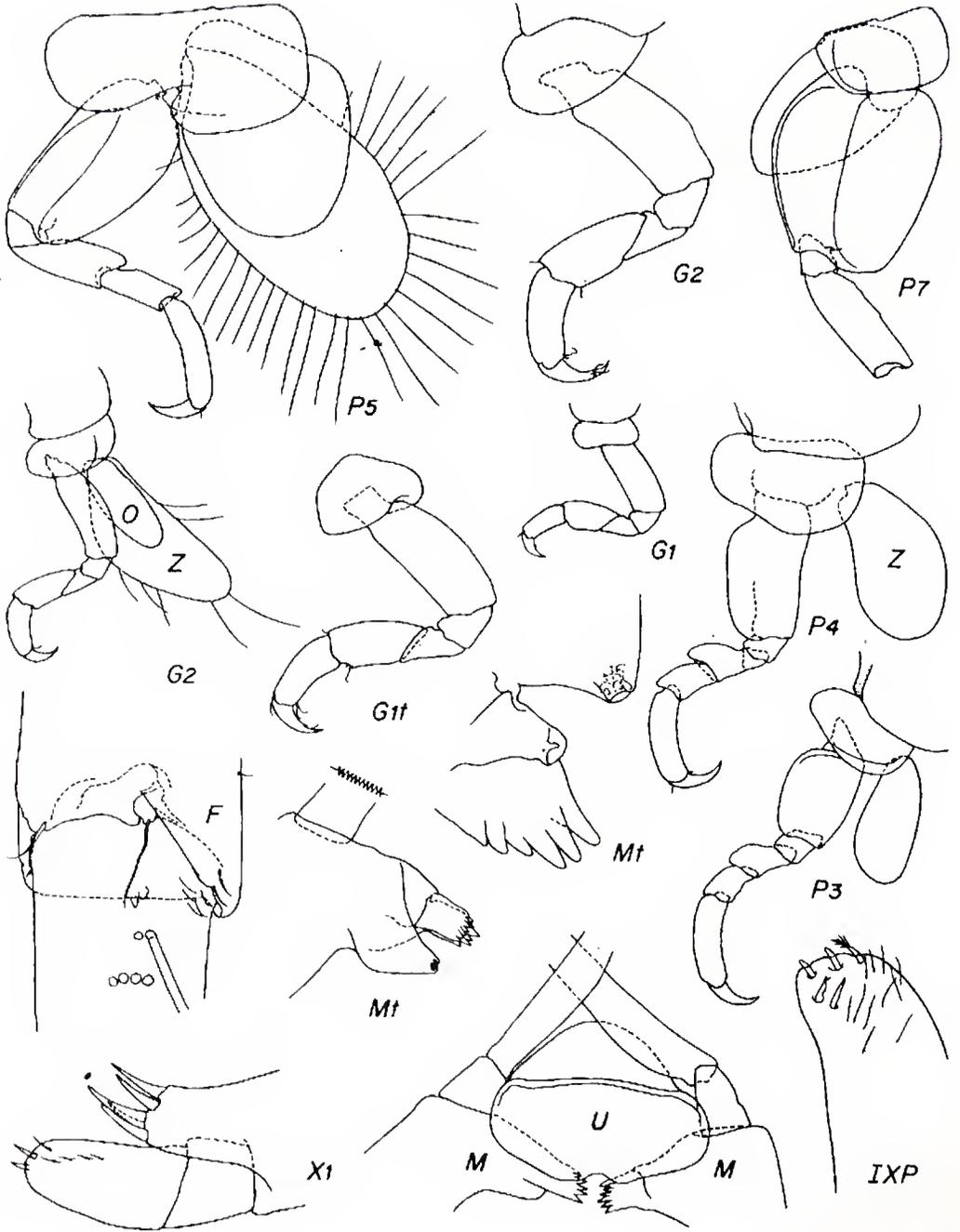


Figure 2. *Laphystiopsis planifrons*, female "p" 8.25 mm.

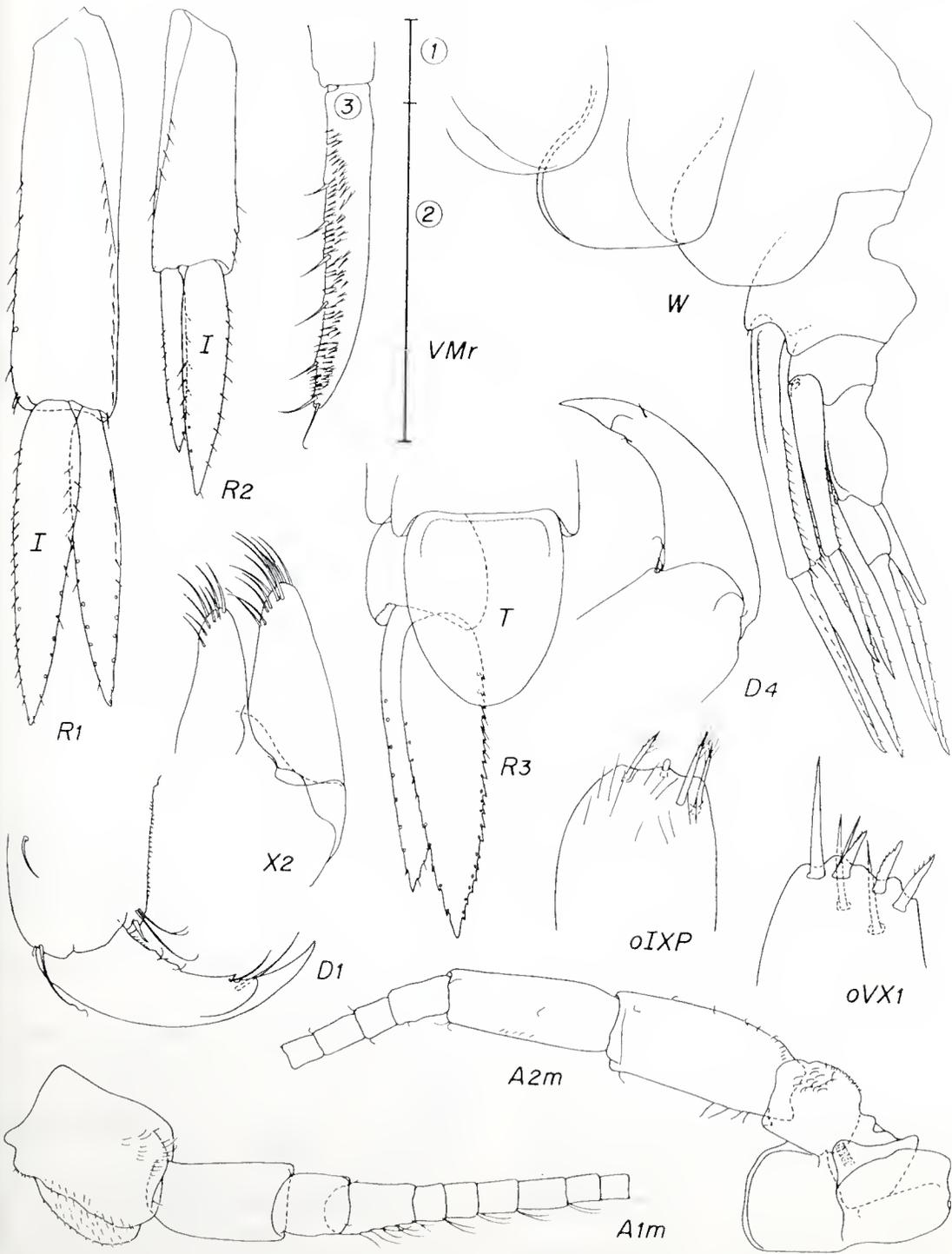


Figure 3. *Laphystiopsis planifrons*, unattributed figures = female "p" 8.25 mm; "o" = male "o" 6.43 mm.

One raker present on left mandible. Right lacinia mobilis very transparent, with 3 teeth, in direct view showing as column. Comb of setae on palp article 3 of complexity shown by Sars (1895). Pleopods 1-2 alike but pleopod 3 smaller, like pleopods of *L. zomerysis*; all inner rami with 12-13 articles, outer with 13. Most spines of uropods 1-2 and setae of uropod 3 missing and marked with pits. Cuticle with saw-tooth ridges and denticles similar to *L. zomerysis* below.

Male "o". Like female but callynophore twice as long, right mandibular palp like female but left with primary marginal setae absent, other scales present.

Illustrations. Pereopod 6 not enlarged, see body; oostegite of pereopod 4 not enlarged, see body; drawing of antenna 2 reduced in relation to antenna 1; apices of maxillae badly eroded; maxillipeds missing (see drawing taken from male "o"); most spines on uropod 3 broken.

Relationship. Because this is the type species of the genus, it will serve as model for comparison of the other species.

Distribution. Northeast Atlantic generally from the Skagerrak northward along Norwegian coast and into Norwegian Sea, 50-900 m; here recorded for first time from northwestern Atlantic Ocean off Massachusetts, Newfoundland and Nova Scotia, 264-861 m.

Laphystiopsis iridometrae Shoemaker

Figures 4-6

Laphystiopsis iridometrae Shoemaker, 1919: 245-246. —Vader, 1978: 126-127 (discussion only).

Material. Holotype. U.S. Fish Commission *Albatross* stn 5310, South China Sea, near Hong Kong, 21°33'N, 116°13'E, 100 fm, 4 Nov 1908, 12 ft tanner beam trawl, sand, shell, bottom temperature 65.5°F, parasitic upon crinoid *Iridometra melpomene* A.H. Clark [= *I. adrestine* A.H. Clark], USNM 49599 (male "g" (newly designated letter) 4.55 mm, with penial processes of regular size).

Other material. *Albatross* stn 5311, South China Sea, near Hong Kong, 21°33'N, 116°15'E, 88 fm, 4 Nov 1908, coarse shell sand, 12 foot tanner beam trawl, mud bag on *Iridometra melpomene*, USNM 49801 (3 subadults and 5 tiny juveniles, including subadults "h" 3.11 mm and "i" 3.15 mm; lacking penes and oostegites). USNM 49600, same data as 49599 (1 subadult and 13 tiny juveniles).

Diagnosis. Head equally as long as pereonites 1-3, scarcely bulging laterally (as seen from dorsal view); pleonites 1-4 each with conspicuous dorsal bulge or carina; pleonite 4 not longer than pleonite 3; coxa 5 60% as long as wide; coxa 6

bilobed and wide anteroposteriorly (more than 90% as wide as coxa 5 and 135% as wide as coxa 7), 70+% as long as wide; epimeron 2 rounded posteroventrally, corner rounded; article 5 of pereopods 3-4 1.2 times as wide as long; article 2 of pereopod 7 broadly ovate, articles 2-7 together about equally as long as article 2.

Description of holotype male "g" 4.55 mm. See illustrations. Head with apparent glandular tissue in place of eye. Left antenna 1 broken apically but right one not longer than antenna 2, flagellum with 15 articles, callynophore with 3 groups of 3 setae each, following articles 2-8 aesthetasc formula = 2-3, 2, 1-2, 0, ?, 0, 1-?2 (damaged). Antenna 2 rather short and stunted on left side, but normal on right (see body illustration, with left antenna 2 replaced by right), flagellum 15-articulate. Callynophore article without ridges besides insertion points for rows of aesthetascs. Accessory flagellum very poorly developed. Ventral surface of article 1 on antenna 1 and medioventral surfaces on articles 3-4 of antenna 2 with sparse ridges, stiff setules, weak scales. Maxilliped, inner plate with 2 short marginal setae (1 stout) and 1 stout + 2 thin apical setae, outer plate with 3 marginal setae. One possible raker present on left mandible. Right lacinia mobilis very transparent, with 4 teeth. Comb of setae on article 3 of palp much less complex than shown by Sars (1895) for *Laphystiopsis planifrons* and *L. zomerysis* to follow. Pleopods 1-2 alike but pleopod 3 smaller, drawing of pleopod 1 like pleopod 2, lengths of peduncle and rami of uropod 3 shown; however, all inner rami with 10 articles, outer with 11. Most spines of uropods 1-2 and setae of uropod 3 missing and marked with pits. Cuticle with saw-tooth ridges and denticles similar to *L. zomerysis* below.

Illustrations. Palp of mandible reduced in relation to body of mandible.

Relationship. See *L. wulgi* for differences. Differing from other members of the genus in the very short set of articles 3-7 on pereopods 5-7.

Distribution. South China Sea near Hong Kong, on crinoids; 161-183 m.

Laphystiopsis zomerysis sp. nov.

Figures 7-9

Material examined. Holotype. Australia, Victoria, S of Point Hicks, 38°21.90'S, 149°20.00'E, 1000 m, 23 Jul 1986, WHOI epibenthic sled, G.C.B. Poore et al. on RV *Franklin* (SLOPE stn 32), NMV J18521 (female "f" 4.60 mm).

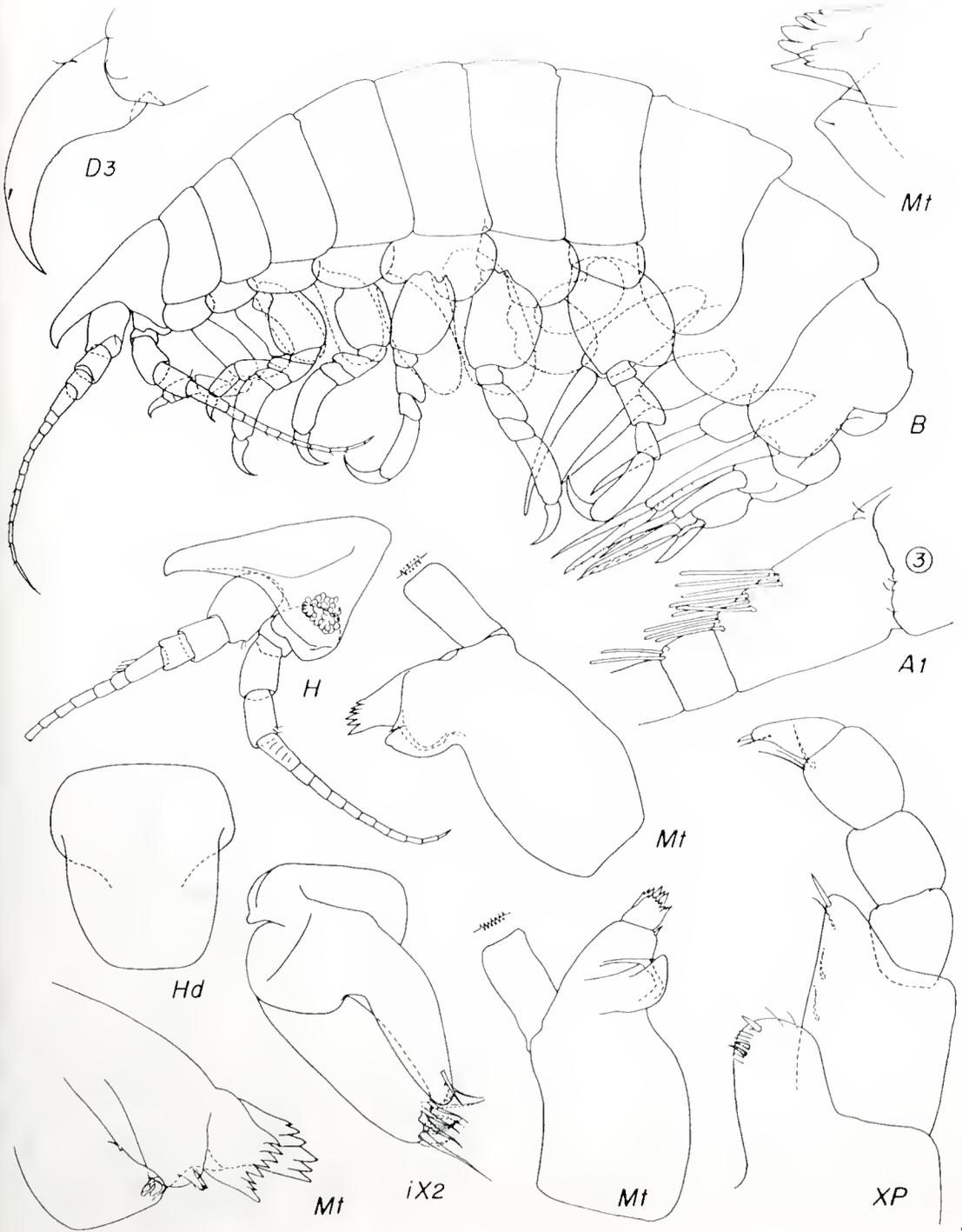


Figure 4. *Laphystiopsis iridometrae*, unattributed figures = holotype male "g" 4.55 mm; "i" = subadult "i" 3.15 mm.

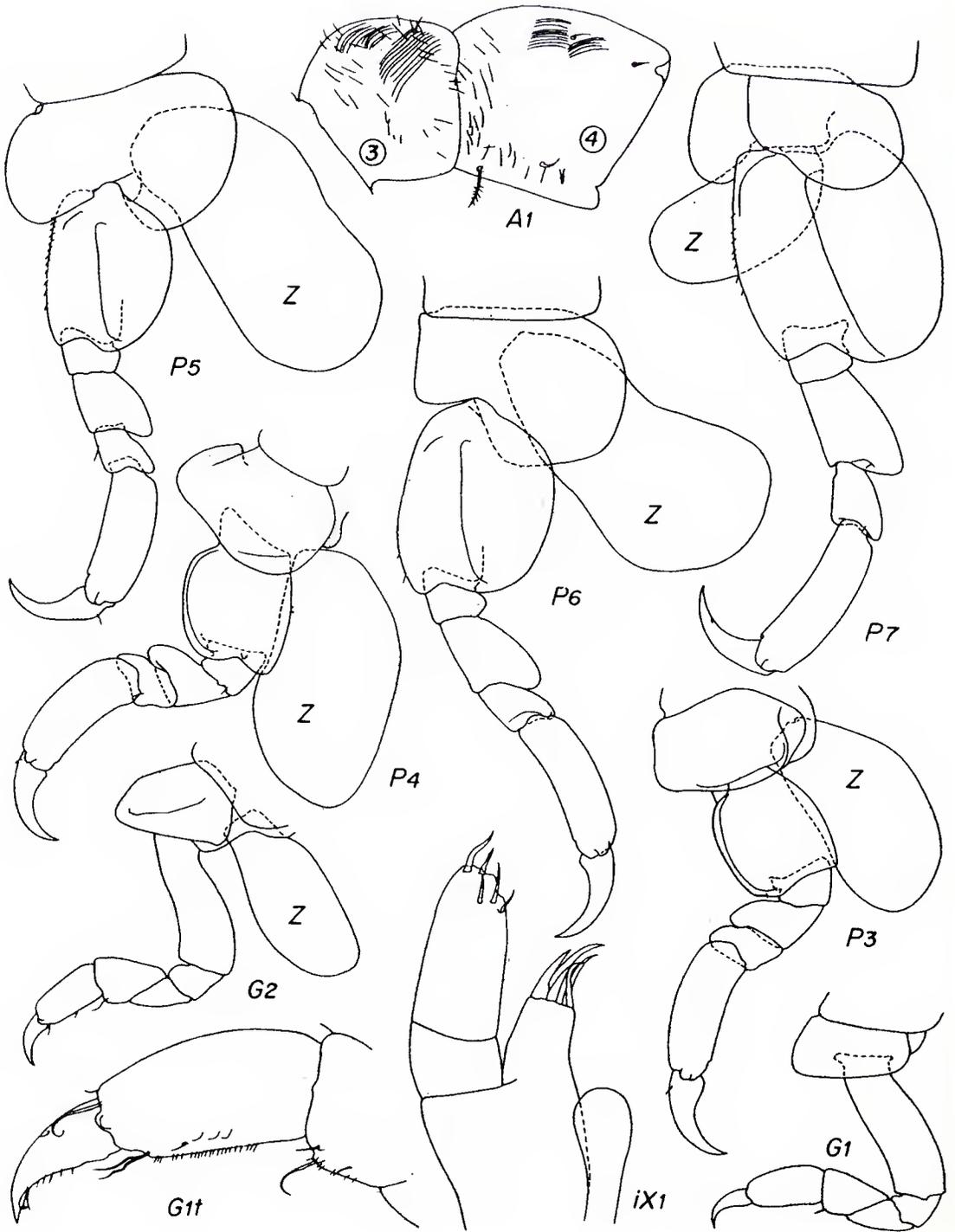


Figure 5. *Laphystiopsis iridometrae*, unattributed figures = holotype male "g" 4.55 mm; "i" = subadult "i" 3.15 mm.

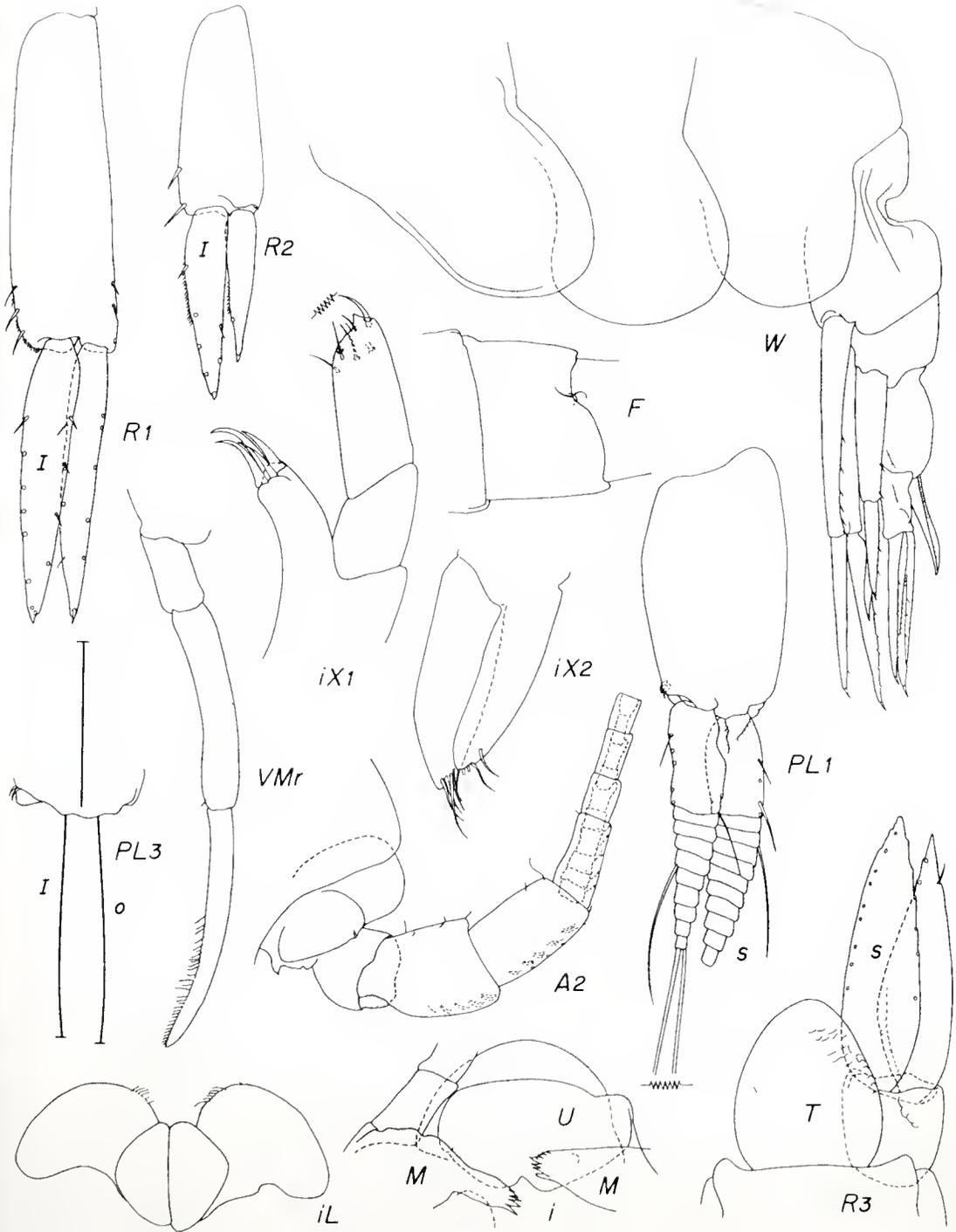


Figure 6. *Laphystiopsis iridometrae*, unattributed figures = holotype male "g" 4.55 mm; "i" = subadult "i" 3.15 mm.

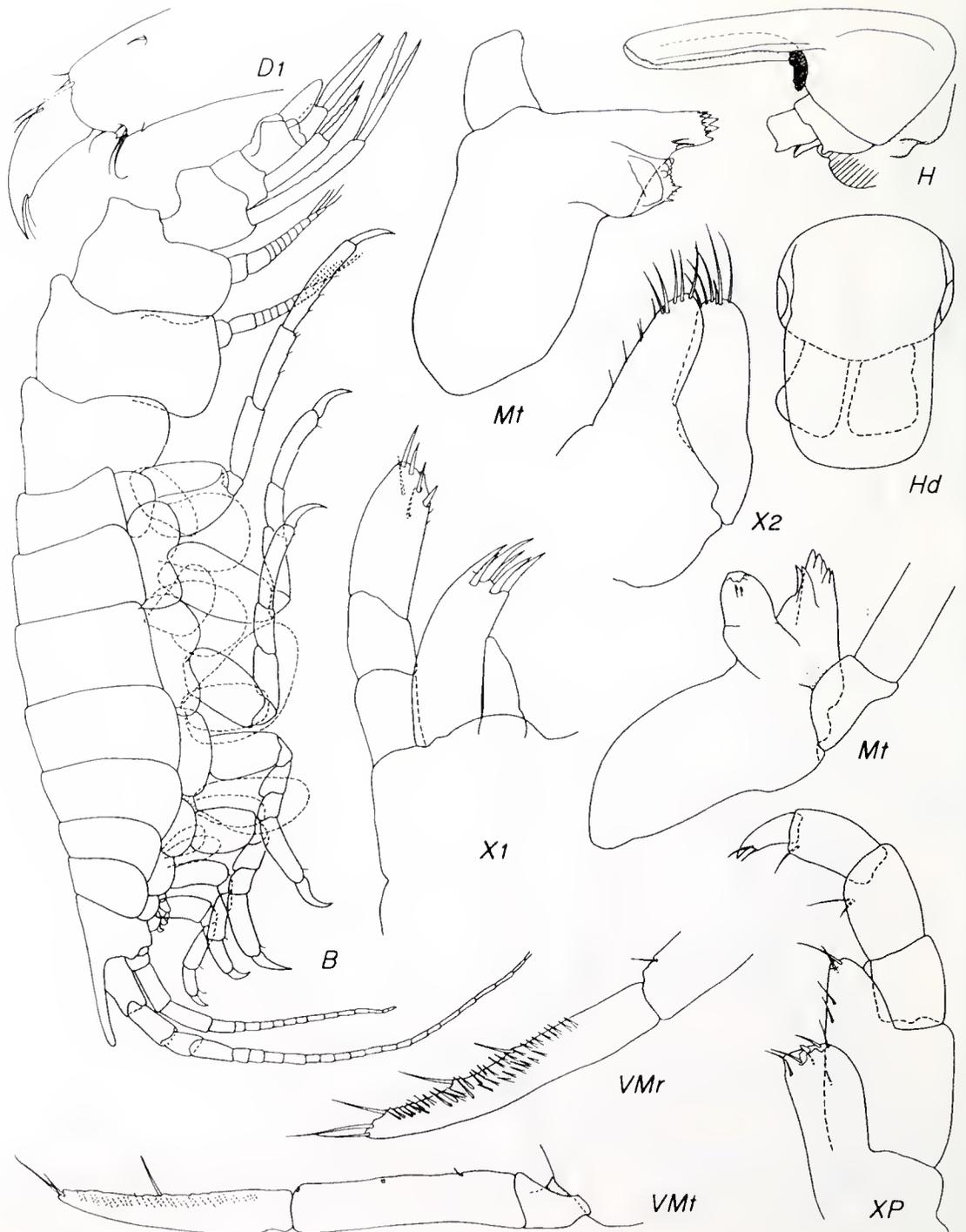


Figure 7. *Laphystiopsis zomerysis*, holotype female "F" 4.60 mm.

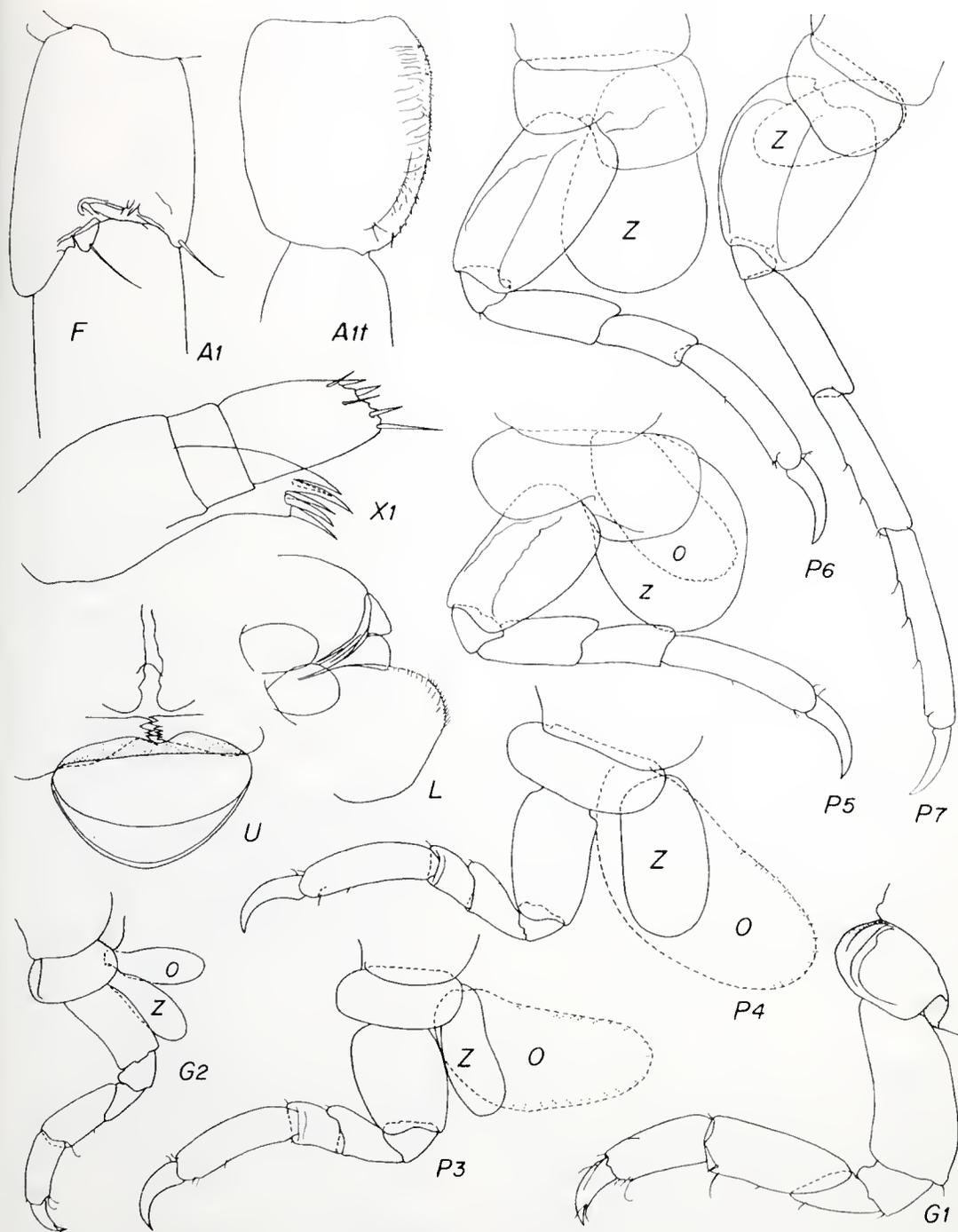


Figure 8. *Laphystiopsis zomerysis*, holotype female "P" 4.60 mm.

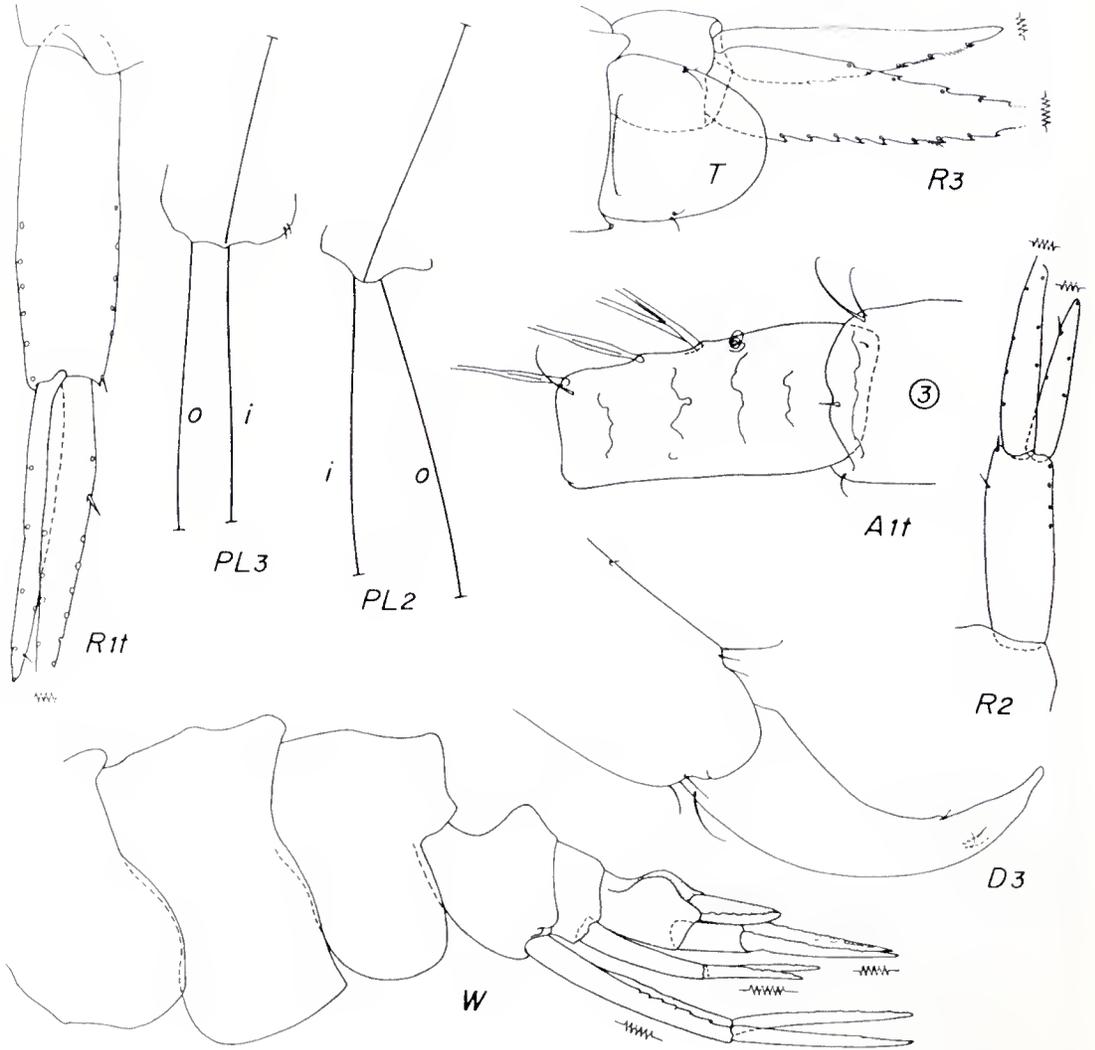


Figure 9. *Laphystiopsis zomerysis*, holotype female "f" 4.60 mm. Stick figures of pleopods show lengths of parts.

Diagnosis. Head about 1.25 times as long as pereonites 1–3 together, scarcely bulging laterally (as seen from dorsal view); pleonites 1–4 each with conspicuous dorsal bulge or carina; pleonite 4 not longer than pleonite 3. Coxa 5 about half as long as wide. Coxa 6 bilobed and wide anteroposteriorly (more than 80 % as wide as coxa 5 and 170% as wide as coxa 7), about 60% as long as wide. Article 5 of pereopods 3–4 about 1.3 times as long as wide. Article 2 of pereopod 7 narrowly pyriform, articles 2–7 together about 3.25 times as long as article 2. Epimeron 2 not beveled, almost quadrate, Posteroventral corner quadrate.

Description. See illustrations. Individual very close to ecdysis, with duplicated parts easily seen inside appendages. Wholemout view with urosomite 3 slightly tilted towards observer to show telson. Setae of oostegites rudimentary. Ventral surface of article 1 on antenna 1 and article 3 on antenna 2 with dense, minute, sharp and ragged ridges and projecting scales and short stiff embedded setules, forming a surface resembling velero. Left accessory flagellum illustrated, right with 2 setae. Inner (or ventral) surface of callynophore with 4 crosswise sharp meandering ridges, similar ridges present on next 7 flagellar articles, ridge numbers on articles 2–8 as follows: 1-2-2-2-1-1-1, vestigial ridge on article 9; callynophore also with 3 sets of 1–2 aesthetases, next instar apparently to develop many more multiple sets. Antenna 1 broken apically, thus relationship to length of antenna 2 unknown. Right mandible only with deeply bifid lacinia mobilis, no raker spines; left lacinia mobilis broadly toothed like incisor, not distinctly separated from mandibular body (not a next-instar duplicate of incisor because that complex observable deep within body of mandible), therefore 2 spines proximal to incisor called rakers. Outer plate of maxilla 1 with 6 spines, the sixth smallest and thinnest overlapping face of fourth spine from medial margin; inner plate lacking seta. Pleopods: see stick-figures of lengths, pleopods 1–2 alike, pleopod 3 much shorter, outer rami with 11 articles, inner with 10, coupling hooks 2, peduncles not setose. All setae of uropod 3 broken off, their insertions marked as circles at the bases of the hooked serrations on margins of rami.

Illustrations. Drawing of left mandibular palp reduced compared with body of mandible but apex of right palp drawn at same magnification as body of mandible.

Etymology. From Greek, *zomerysis*, meaning "spoon" or "ladle", referring to the rostrum of this animal.

Relationship. The new species differs from *L. latirostris* in dorsal armament and coxae. The outer and inner plates of maxilla 1 of *L. latirostris* were not described. The lower lip of *L. zomerysis* is also poorly known. In *L. latirostris* coxa 6 is only about half as long as coxa 5 and shorter than coxa 7.

There is an uncanny resemblance of *L. zomerysis* to *Laphystiopsis planifrons* in general body aspect but *L. zomerysis* differs from *L. planifrons* in the shorter and less robust rostrum, the stronger dorsal protrusions on pleonites 1–2, a blunter protrusion on pleonite 4, a broader notch on the upper lip, a definite triturrative area on the molar, lack of a seta on the inner plate of maxilla 1, and, the squared posteroventral corner of epimeron 2. Differing from *L. iridometrae* in the squared epimeron 2 and the longer set of articles 3–7 on pereopods 5–7.

Distribution. Australia, eastern Bass Strait, 1000 m.

Laphystiopsis wulgi sp. nov.

Figures 10–12

Material. Holotype. Tasman Sea, 15 km E of Maria Island, Tasmania, 42°37'S, 148°20'E, 9 Oct 1984, 102 m, WHOI epibenthic sled, R.S. Wilson (stn S05-84-1), NMV J18530 (female "j" 4.28 mm).

Diagnosis. Head only 80% as long as pereonites 1–3, scarcely bulging laterally (as seen from dorsal view); pleonites 1–4 each with conspicuous dorsal bulge or carina; pleonite 4 not longer than pleonite 3; coxa 4 with midventral projection; coxa 5 60% as long as wide; coxa 6 bilobed and wide anteroposteriorly (more than 80 % as wide as coxa 5 and 200% as wide as coxa 7), 70% as long as wide; epimeron 2 beveled posteroventrally, corner rounded; article 5 of pereopods 3–4 1.1 times wider than long; article 2 of pereopod 7 broadly ovate, articles 2–7 together about 2.2 times as long as article 2.

Description. See illustrations. Setae of oostegites well developed, oostegites huge, oostegite on coxa 2 absent. Ventral surface of article 1 on antenna 1 and article 3 on antenna 2 with dense, minute, sharp and ragged ridges and projecting scales and short stiff embedded setules, forming a roughened surface. Inner (or ventral) surface of callynophore without crosswise sharp meandering ridges, no ridges present on flagellar articles. Callynophore also with 3 sets of 2 aesthetases each, next instar not visible. Flagellum of antenna 1 with 19 articles, of antenna 2 with 17, distal reach of antenna 2 two flagellar articles shorter than antenna 1 when stretched out together. Right

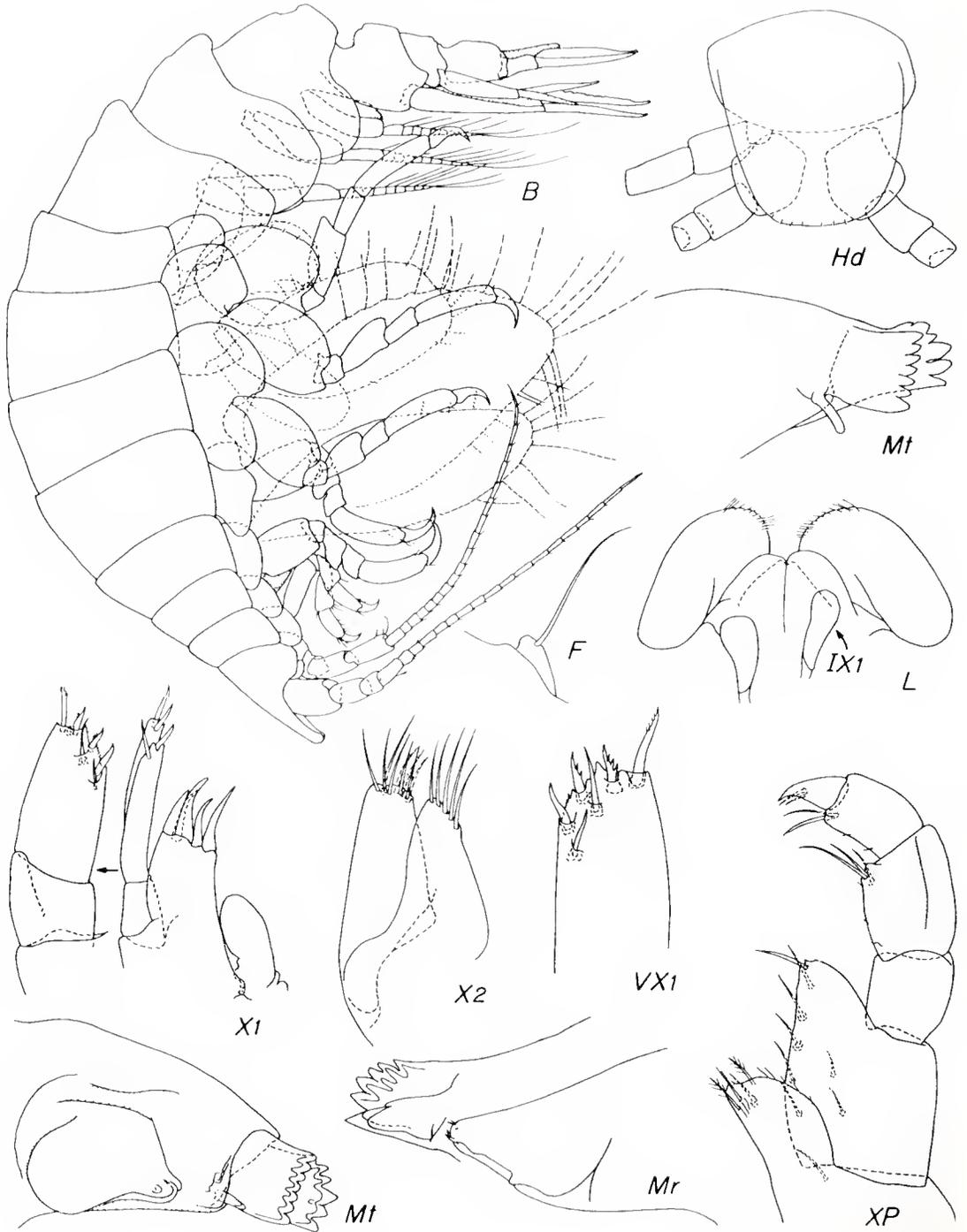


Figure 10. *Laphystiopsis wulgi*, holotype, female "j" 4.28 mm.

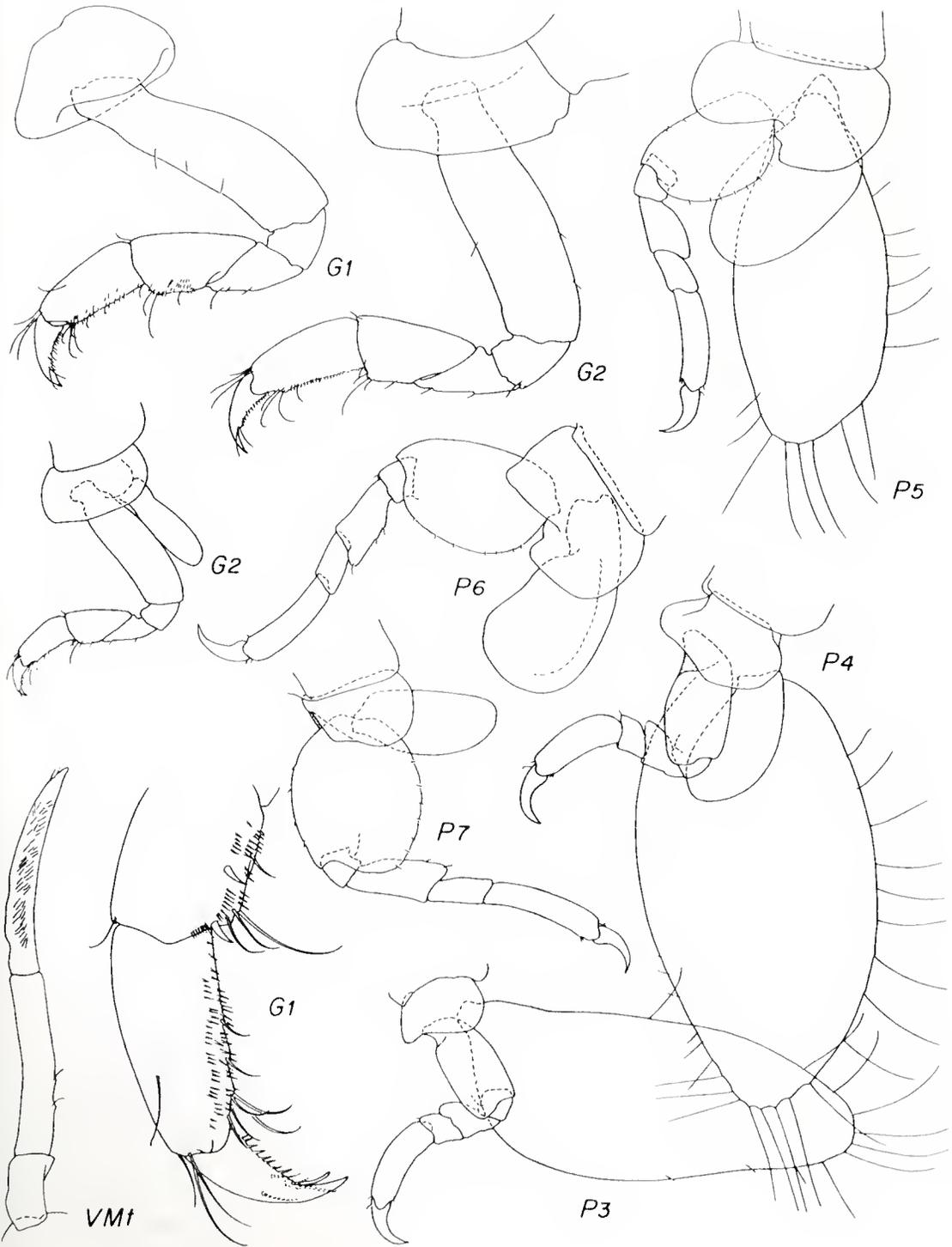


Figure 11. *Laphystiopsis wulgi*, holotype, female "j" 4.28 mm.

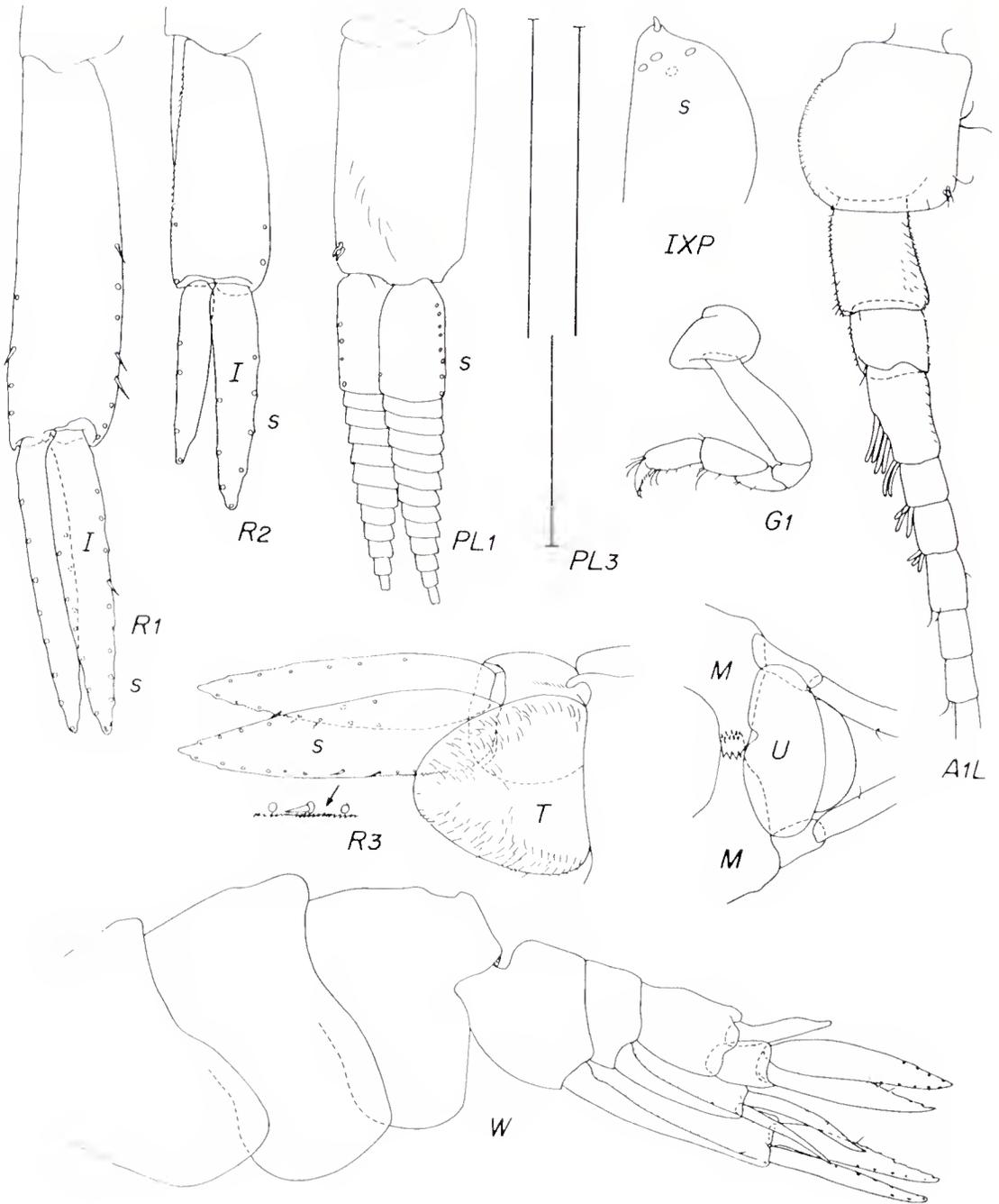


Figure 12. *Laphystiopsis vulgi*, holotype, female "j" 4.28 mm.

mandible only with deeply bifid lacinia mobilis, no raker spines, drawing showing incisor flat and molar only slightly offset unnaturally; left lacinia mobilis broadly toothed like incisor, not distinctly separated from mandibular body, therefore 1 spine proximal to incisor called raker. Outer plate of maxilla 1 with 5 spines, the fifth smallest and thinnest overlapping face of third spine from medial margin; inner plate lacking seta. Pleopods 1–2 alike but pleopod 3 smaller, drawing of pleopod 1 like pleopod 2, lengths of peduncle and rami of uropod 3 shown as stick-drawing; however, inner rami of pleopods 1–2 with 12 articles, outer with 13 and 14 respectively; pleopod 3 inner ramus with 11, outer with 13 articles. Margins of rami on uropods densely and minutely serrate (see offset enlargement on uropod 2). Most spines of uropod 3 broken off, their insertions marked as circles at the bases of the hooked serrations on margins of rami. Telson covered apically and laterally with cuticular ridges.

Illustrations. Wholemout view with urosomite 3 slightly tilted towards observer to show telson. Left accessory flagellum illustrated, right similar. Drawing of left mandibular palp reduced in size compared with body of mandible.

Etymology. Australian Aboriginal, an Aboriginal spirit.

Relationship. *Laphystiopsis vulgi* differs from *L. latirostris* in the parts of the diagnosis involving dorsal armament and coxa 6. The outer and inner plates of maxilla 1 of *L. latirostris* were not described. The lower lip of *L. zomerysis* is also poorly known. In *L. latirostris* coxa 6 is only about half as long as coxa 5 and shorter than coxa 7.

Laphystiopsis vulgi differs from *L. zomerysis* in the shorter head, wider coxae 5–6, much shorter pereopods 5–7, posteroventrally rounded epimeron 2, and thick articles 4–5 of pereopods 3–4. In addition *L. vulgi*, based on a single specimen, has much larger oostegites, a character of uncertain value because the oostegites of the single specimen of *L. zomerysis* are immature (setae rudimentary). It differs from *L. iridometrae* in the longer combined set of articles 3–7 on pereopods 5–7, and the ventrally produced coxa 4, and the smaller posterior lobe of coxa 6.

Distribution. Australia, off eastern Tasmania; 102 m.

Laphystiopsis species k

Material. U.S. Fish Commission *Fish Hawk* stn 1026, off Marthas Vineyard, Massachusetts, 39°50'30"N, 71°23'W, 182 fm, 8 Sep 1881, green mud and sand, on

Hathrometra tenella (Retzius) (also a label "on *Antedon dentata* (Say)"). USNM 38155 (specimen "k").

Notes. Specimen in poor condition with shriveled antenna 1, legs 1–4, some broken posterior pereopods; pleonite 4 with giant hood, pleonite 3 scarcely produced dorsally, coxae 5–7, head, urosomal appendages, pleonites 1–2 and pereonite 7 like *L. planifrons*; coxae 1–4 tiny, 3–4 with gaps in front and behind, 1–2 very short but overlapping. Clearly a new species whose formal description is reserved for better material.

Prolaphystiopsis Schellenberg

Prolaphystiopsis Schellenberg, 1931: 115.

Type species. *Prolaphystiopsis platyceras* Schellenberg, 1931 (monotypy).

Diagnosis. Rostrum well developed but much narrower from dorsal view than in *Laphystiopsis*, sides of head thus bulging laterally on each side almost as much as width of rostrum. Article 1 of antenna 1 formed into huge lobe. Mandibular molar conical, weakly ridged. Inner lobes of lower lip present. Palp of maxilla 1 biarticulate, outer plate with 6–7 spines. Coxae short, broad, anterior coxae ovate, barely touching or weakly disjunct serially, coxa 4 much wider than long, not excavate posteriorly. Pereopods 3–4 alike, with carpus very short. Pleonite 3 very weakly carinate dorsally, but not forming horizontal shelf, urosomite 1 carinate and saddled. Telson short, oval.

Description. Coxae produced forward or not. Articles 2–7 of pereopod 3 like pereopod 4.

Relationship. Differing from *Laphystiopsis* in the narrower rostrum, laterally bulging head and huge lobe on article 1 of antenna 1.

Included species.

P. ornitorhynchus (Bulycheva, 1952) Sea of Japan, 167–510 m [391 + B] comb. nov.

P. platyceras Schellenberg, 1931, Falkland Is, 197 m [831]

Distribution. Sea of Japan, and Falkland Islands, 167–510 m.

Prolaphystiopsis platyceras Schellenberg

Figures 13–15

Prolaphystiopsis platyceras Schellenberg, 1931: 115, fig. 62.

Material examined. "Svenska Südpolar exp. 1901–03 No 58 11/9 1902, 179 m, Bodentemp. 4.1°, Sand und Kies, 52°29' S, 60°36' W, S von W Falkland, Typen,

Typsaml. 712". Swedish State Museum 6622, (8 syntypes). **Lectotype** selected herein: female "a" 7.64 mm. Paralectotypes: "b" female 4.3 mm, "c" broken, sex not determined 3.2 mm, "d" in 2 pieces ?sex, 2.0 mm, "e" juvenile 1.55 mm, "x" female 5.6 mm, "y" female 6.2 mm, "z" 4.6 mm female; sex of certain specimens not determined to avoid further breakage, probably no males present; lectotype measured to nearest 0.01 mm, others to nearest 0.1 mm.

Diagnosis. (In same context as *Laphystiopsis* spp.) Head scarcely longer than pereonites 1–2, strongly bulging laterally (as seen from dorsal view); pleonites 2–3 each with indistinct dorsal bulge or carina; pleonite 4 shorter than pleonite 3; coxa 5 45% as long as wide; coxa 6 bilobed and not very wide anteroposteriorly (66% as wide as coxa 5 and 162% as wide as coxa 7), 45% as long as wide; epimeron 2 rounded posteroventrally, corner rounded; article 5 of pereopods 3–4, 0.9 times as wide as long; article 2 of pereopod 7 narrowly pyriform, articles 2–7 together [unknown, broken].

Description of lectotype female "a" 7.64 mm. See illustrations. Head with apparent glandular tissue in place of eye. Antenna 1 longer than antenna 2, about as long as head plus pereonites 1–4 together, flagellum with 22 articles, callynophore with 4 groups of 3–4 aesthetascs each (not all shown in figure), following articles 2–9 aesthetasc formula = 4-3-2-2-1-1-1-0. Antenna 2 short, about 60% as long as antenna 2, flagellum with 14 articles. Callynophore article without ridges besides insertion points for rows of aesthetascs. Accessory flagellum very poorly developed. Ventral surface of article 1 on antenna 1 and medioventral surfaces on articles 1–3 of antenna 2 with sparse ridges, stiff setules, weak scales. One raker present on each mandible. Right lacinia mobilis very transparent, with 2 teeth. Comb of setae on article 3 of palp about as complex as shown by Sars (1895) for *Laphystiopsis planifrons* and *L. zomerysis*. Pleopods 1–2 alike but pleopod 3 slightly smaller, stick drawing of pleopod 1 like pleopod 2, lengths of peduncle and rami of uropod 3 shown, appearance of pleopods like those drawn herein for one or more species of *Laphystiopsis*; however, inner rami of pleopod 1 with 11 articles, outer with 13, inner of pleopods 2–3 with 13, outer with 15; coupling hooks 2 per pleopod, no accessories. Most spines of uropods 1–2 and setae of uropod 3 missing and marked with pits. Cuticle with saw-tooth ridges and denticles similar to *L. zomerysis* above.

Juvenile "e" 1.55 mm. Smallest available; very similar to adult, principal noticeable external difference: coxae 5 and 6 narrower, longer, posterior

lobes slightly longer than anterior lobes; appendages much less spinose and setose, for example, outer rami of uropods 1–3 with 4-2-4 spines only; flagellum of antenna 2 with 9 articles, antenna 1 broken.

Illustrations. Uropod 1 enlargement reduced to 75% of uropods 2-3-telson. Two views of lower lip from female "x" are anterior and posterior, one tilted, other flatter; upper and lower lips of lectotype damaged and not analyzed. Drawings of mandibles purporting to show more than raker but other projections apparently are scales or setules.

Distribution. South of West Falkland Islands; 179 m.

***Prolaphystiopsis ornitorhynchus* (Bulycheva)
comb. nov.**

Laphystiopsis ornitorhynchus Bulycheva, 1952: 199–201, fig. 4.

Remarks. No body view of this species was given in the original description so many elements of a diagnosis cannot be calculated (sizes of coxae, for example). I presume this species to be distinct from *P. platyceras* but there is not much character information to go on: the long setae on the huge lobe of antenna 1; and slightly different shapes and setation patterns on gnathopods, pereopod 7, mandibular palp and other mouthparts.

Distribution. Petra Velikogo (Peter the Great Bay), Sea of Japan; 167–510 m.

***Prolaphystius* K.H. Barnard**

Prolaphystius K.H. Barnard, 1930: 342.

Type species. *Prolaphystius isopodops* K.H. Barnard, 1930 (monotypy).

Diagnosis. Rostrum absent, head not bulging. Article 1 of antenna 1 not grossly lobate. Mandibular molar columnar, scarcely triturative, raker spine = 1. Inner lobes of lower lip absent. Palp of maxilla 1 biarticulate. Coxae of ordinary size, touching serially, coxa 4 about as long as wide, excavate posteriorly. Pereopod 3 with elongate carpus. Pleonite 3 dorsally flattened and forming horizontal shelf projecting posteriorly; urosomite 1 unmodified (young) or in adult weakly saddled. Telson elongate, linguiform.

Description. Article 1 of antenna 1 thick, not carinate. Coxae not produced forward. Pereopod 4 distinct from pereopod 3. Pleonites 1–2 not carinate.

Included species.

P. isopodops K.H. Barnard, 1930 [876B]

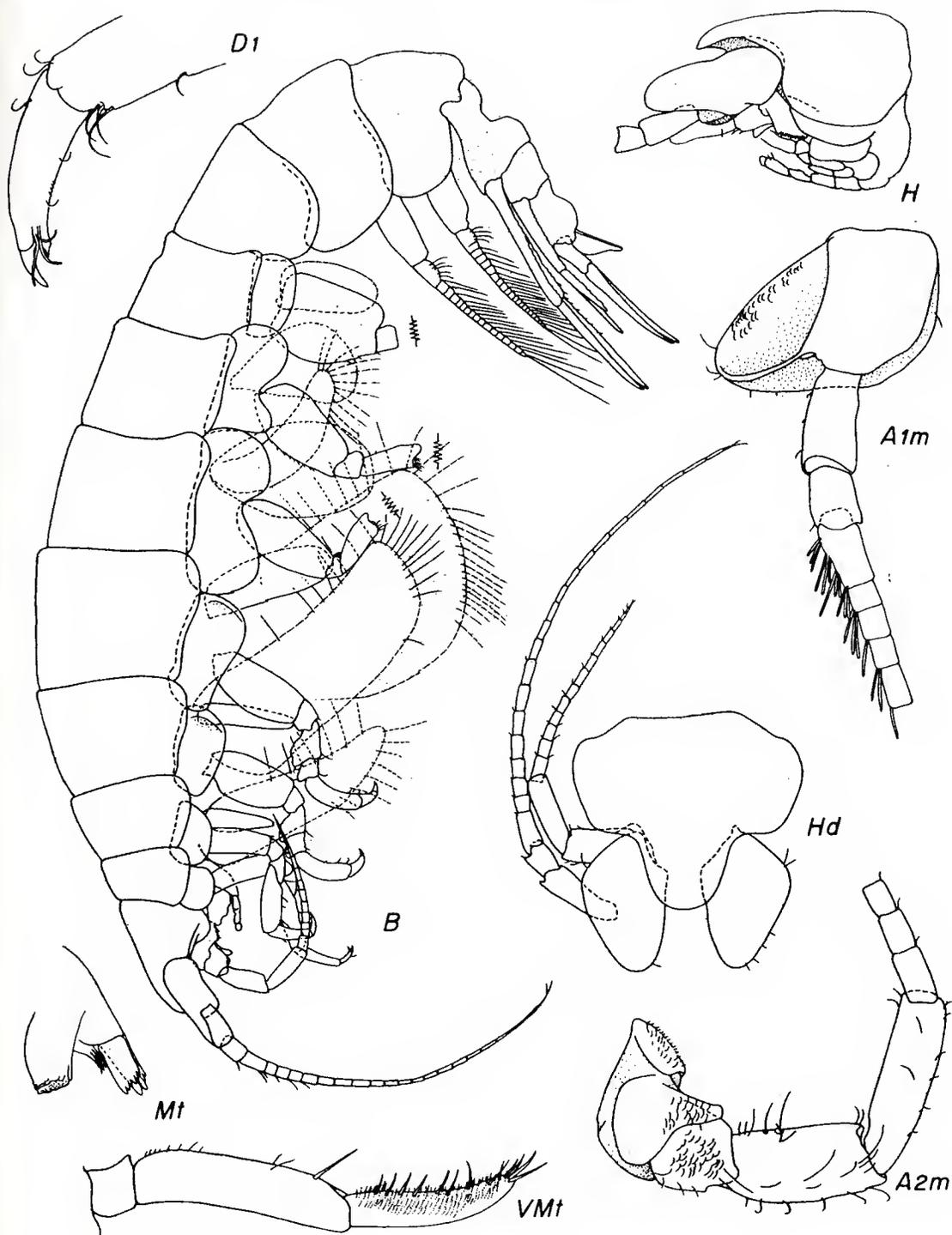


Figure 13. *Prolaphystiopsis platyceras*, lectotype female "a" 7.54 mm.

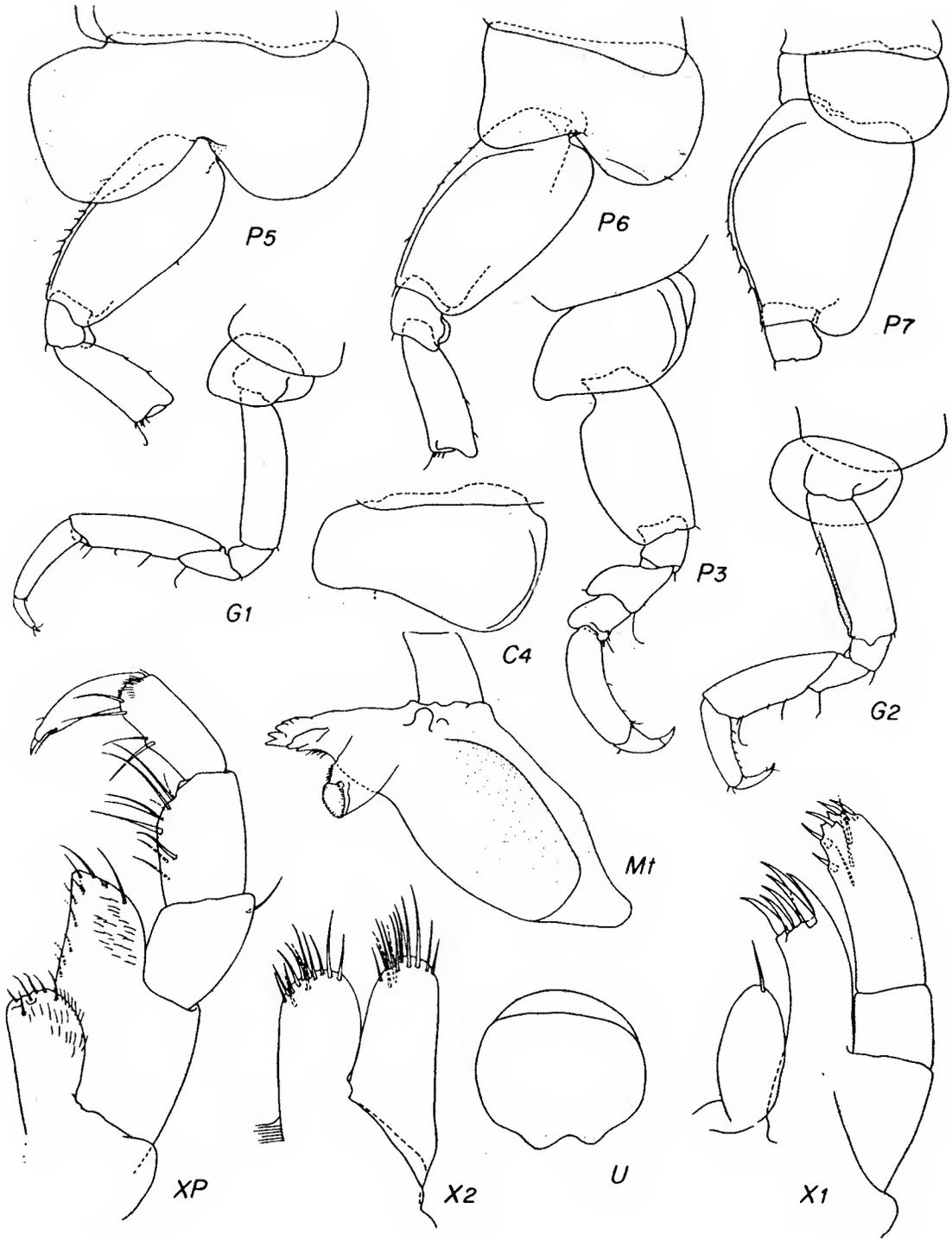


Figure 14. *Prolaphystiopsis platyceras*, unattributed figures = lectotype female "a" 7.54 mm; "x" = female "x" 5.6 mm.

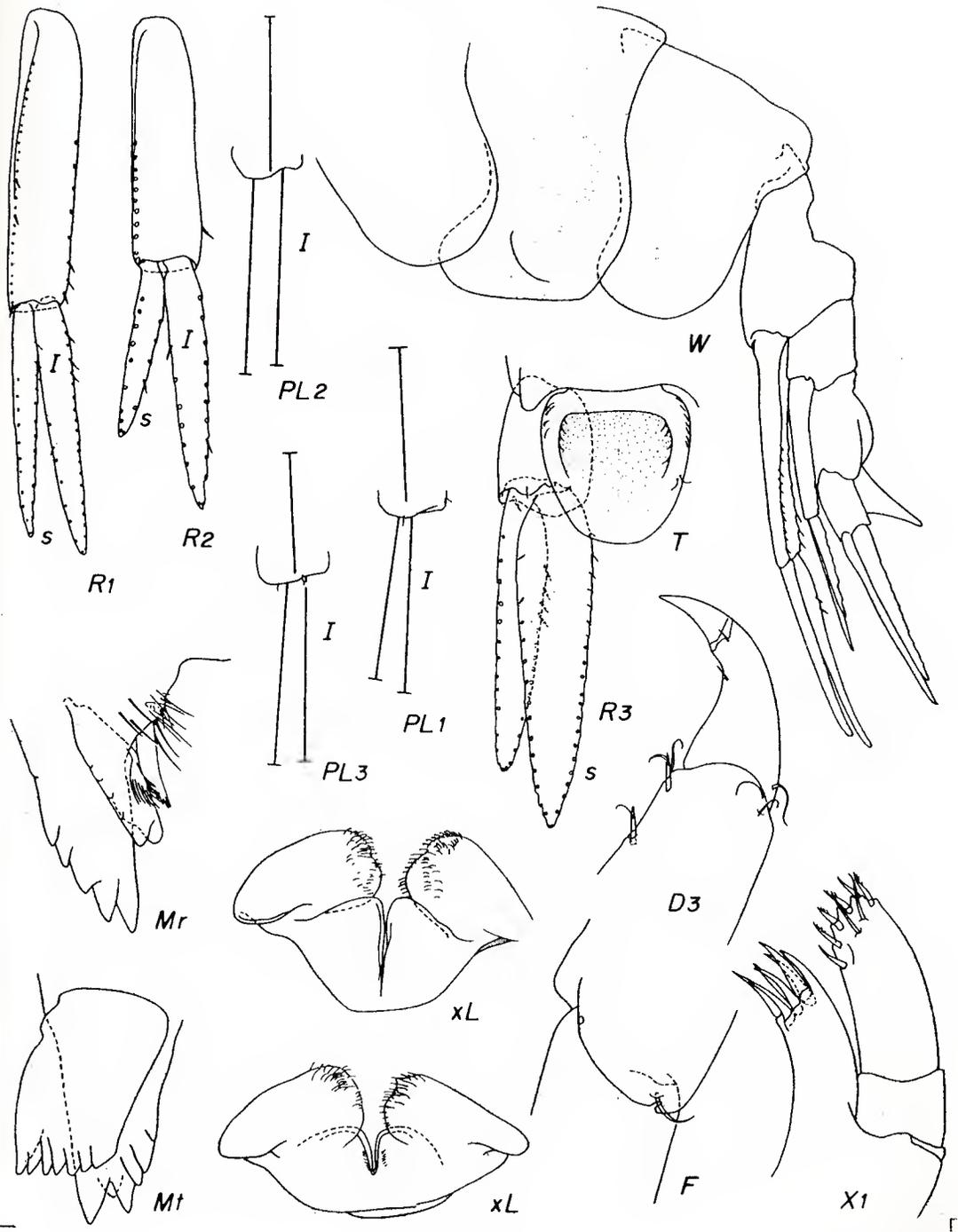


Figure 15. *Prolaphystiopsis platyceras*, unattributed figures = lectotype female "a" 7.54 mm; "x" = female "x" 5.6 mm. Note two views of lower lip.

Distribution. Marine, Antarctica, McMurdo Sound; 406–441 m.

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