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Amphipoda (Crustacea) of the Thule area, Northwest Greenland: Faunistics and Taxonomy

Jean Just

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Instructions to authors. – See page 3 of cover.

Amphipoda (Crustacea) of the Thule area, Northwest Greenland: Faunistics and Taxonomy

Jean Just

GREENLAND BIOSCIENCE 2·80

Ampeliscidae

Amphilochidae

Corophiidae

Dexaminidae

Ischyroceridae

Lysianassidae

Oedicerotidae

Paramphithoidae

Pleustidae

Podoceridae

Stenothoidae

Amphipoda (Crustacea) of the Thule area, Northwest Greenland: Faunistics and Taxonomy

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The material reported on was collected in the Thule area, NW Greenland, in 1968 and includes 105 species. Four of these, *Aceroides goesi, Bathymedon antennarius, Monoculodes vibei* and *Parametopa crassicornis*, are new to science. An additional 6 species are new to Greenland, while 9 species have previously been found in E Greenland but not in W Greenland. Four genera, *Lembos, Arrhinopsis, Arctopleustes* and *Parametopa*, are recorded from Greenland for the first time.

Specimens belonging to 15 additional taxa are for various reasons not referred to species. Major taxonomic problems, warranting broadly based revisions, are outlined in the genera *Byblis, Gitanopsis, Ischyrocerus, Tmetonyx, Monoculodes* and *Stenula*. Three different forms of *Paroediceros lynceus* are discussed.

All known amphipod species from the Thule area are included in an annotated list. Forty-nine taxa are discussed and figured.

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Introduction

The material reported on in the present paper was collected in the Thule area in NW Greenland between 25 July and 24 August 1968 by J. Just and Chr. Vibe as part of the Danish Atomic Energy Commission's (Research Station Risø) radio-ecological expedition to Thule (Vibe, 1970; Hermann & Vibe, 1970). A small part of the collected material (*Menigratopsis* and *Acanthonotozoma*) has been treated separately by Just (1976, 1978).

The area treated herein as the Thule area is shown in Figs 1 and 2. To the north it is delimited by the entrance to the channels and basins between Greenland and Ellesmere Island, to the south by Melville Bay, and to the west by Baffin Bay, approximately along the 400 m isobath.

Fifty-three species of amphipods have been recorded from the Thule area in little more than 100 years. Information on amphipods from this area can be found in Stimpson (1863), Ohlin (1895a, b), Ortmann (1901), Stephensen (1931, 1933), Vibe (1950), Steele & Brunel (1968), and Just (1976, 1978). The present paper adds 63 species to the fauna of the Thule area. Of these, 4 are new to science (*Aceroides goesi, Bathymedon antennarius, Monoculodes vibei and Parametopa crassicornis*), 6 species are new to Greenland, and 9 species have been found in E Greenland but not before in W Greenland. The genera *Lembos, Arrhinopsis, Arctopleustes* and *Parametopa* are recorded from Greenland for the first time.

Table 1. Nomenclatorial changes and changes in previous identifications.

Ischyrocerus anguipes, Vibe (1950) is *I. latipes* Kröyer, 1842.
I. (*nanoides* (Hansen) ?), Stephensen (1933), changed by Stephensen (1944b) to *I. brusilovi* Gurjanova, is *I. stephenseni* Gurjanova, 1951.
I. brusilovi, Stephensen (1944a, b), is *I. stephenseni* Gurjanova, 1951.
Gammarellus homari?, Vibe (1950) is a juvenile *Atylus carinatus* (Fabricius, 1793).
Pseudalibrotus littoralis, Vibe (1950, Neqe sample), is partly *Onisimus edwardsi* (Kröyer, 1846) and partly *Orchomene minuta* (Kröyer, 1846). One of several specimens from Olriks Fjord recorded as *P. littoralis* in Vibe (1950) is *Pontoporeia femorata* Kröyer, 1842.
P. glacialis, Vibe (1950, Neqe sample) is *P. littoralis* (Kröyer, 1845).
Parapleustes glabricauda Dunbar, 1954, as *Neopleustes* in Barnard & Given (1960), is transferred to *Arctopleustes* Gurjanova, 1972.
Metopa cariana as recorded from E Greenland by Schellenberg (1935) and Stephensen (1944a) is *M. glacialis* Kröyer, 1842.
M. nordmanni Stephensen, 1931, as *Proboloides* in Shoemaker (1955), is transferred to *Stenula* Barnard, 1962.
M. sinuata as recorded from Greenland by Stephensen (1913, 1917) is transferred to *Stenula* sp.

In addition to the 105 species identified, the present material includes a number of specimens (in 15 taxa) which for various reasons have not been referred to species, particularly within the genera *Gitanopsis, Byblis* and *Ischyrocerus.* The material includes three different forms of *Paroediceros lynceus.* These problematica, which are due partly to inadequate material and partly to the lack of modern revisions on a geographically broad basis, are all outlined and discussed.

In the course of this study a number of nomenclatorial changes and changes in previous identifications have been made. These changes are summarized in Table 1.

Unless otherwise stated classification and nomenclature follow Barnard (1969a) except with regard to the name *Pseudalibrotus* Della Valle, 1893 (see Just, 1978: 10, footnote), and the Corophiidae, which follow Barnard (1973). Bousfield (1973) transferred *Rozinante* Stebbing, 1897, from the Eusiridae to the Calliopiidae, a move which is followed herein. In the same work Bousfield proposed a new family, the Melitidae. I follow Holsinger (1974), who advocates conservative classification of the melitids until the group has been better defined and delimited. Further, Bousfield redivided the Eusiridae (*sensu* Barnard, 1969a) into Eusiridae and Pontogeneiidae. Awaiting a more comprehensive discussion of this problem I have used Barnard's (1969a) concept of the Eusiriidae.

Material and methods

The material comprises about 4,400 specimens collected at 51 benthic and 9 plankton stations. Samples were obtained by hand (intertidally), by surface netting from a boat, by plankton hauls (small fine-meshed nets and a stramin net, diameter 1 m), and with the following

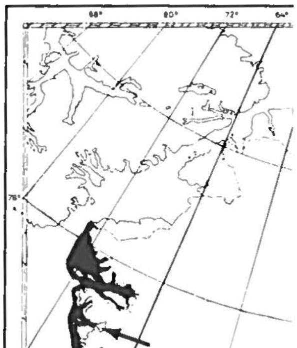


Fig. 1. NW Greenland with the Thule area (black), as defined herein, indicated. Arrow pointing towards Wolstenholme Fjord (see Fig. 2).

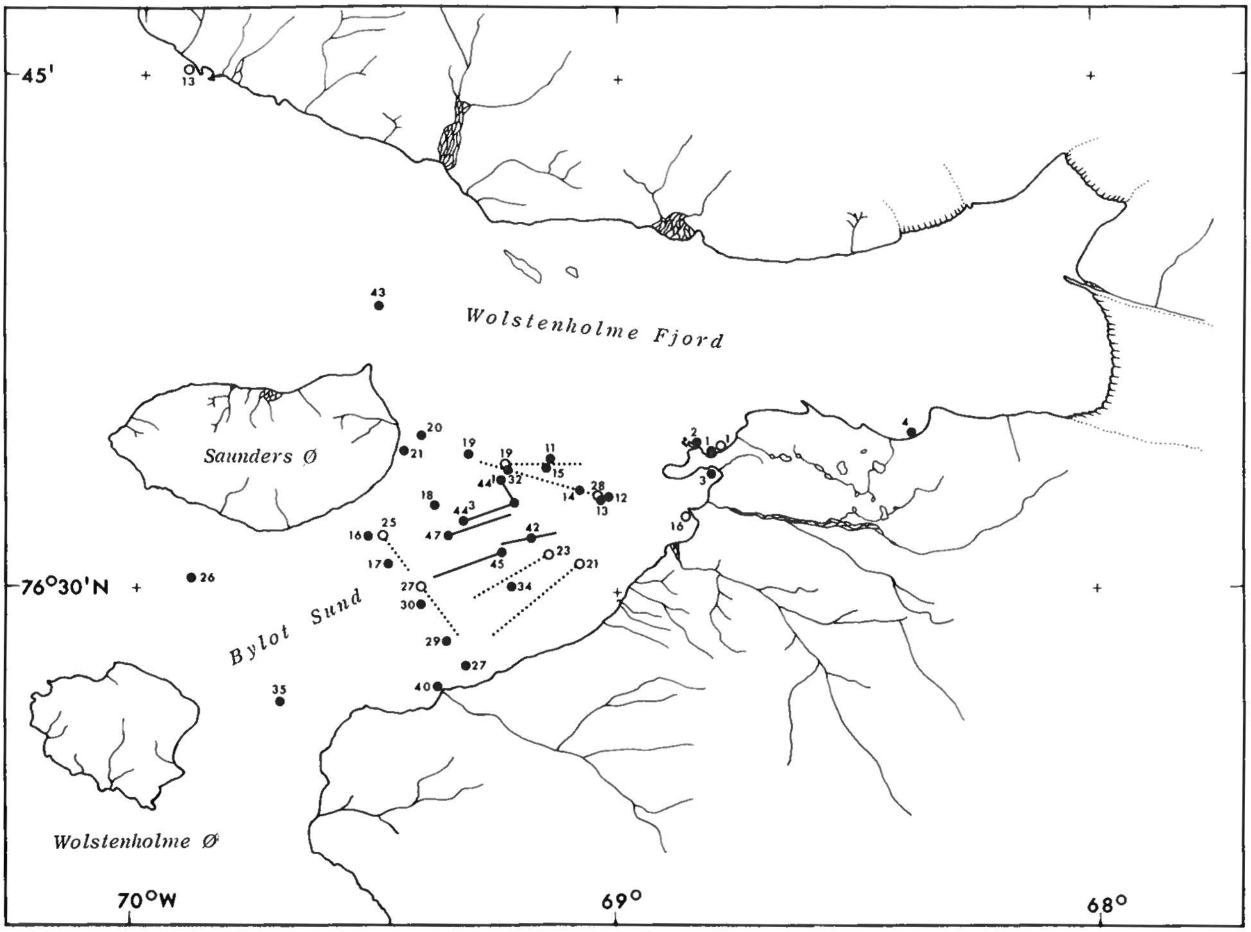


Fig. 2. The main sampling area in 1968 (see arrow in Fig. 1). A few additional samples were taken about 100 kilometers to the north. Station numbers indicated. Black: Benthic samplings; with black line = trawl. Open circles: Plankton samplings; with stippled line = stramin net haul.

benthos-collecting gear: a 1/10 m^2 van Veen grab; a triangular rough-bottom dredge with teeth; a rectangular dredge without teeth; an Ockelmann dredge: a soft-bottom detritus sledge designed by Ockelmann, 1964, modified by H. Lemche; an Albrechtsen dredge: a quantitative soft-bottom dredge with automatic closing (Mr. K. Albrechtsen constr., a few samples only); and finally a small experimental benthic fish trawl (mesh width 10 mm; Mr. Christiansen, Risø, constr.).

Some initial screening (1 mm mesh) and sorting was undertaken in the field; the rest was done after the return of the expedition (mesh <0.5 mm). The material was fixed in 4% buffered formalin and later (except the plankton samples) transferred to 80% alcohol.

Drawings were made with the aid of a camera lucida (Wild M5 and M20, including the use of phase contrast).

Body length of animals was measured according to Just (1978: 11) from the median front of the cephalon (tip of the rostrum when present) along the dorsal curvature to the insertion of the telson.

The following abbreviations are used in Figs 4–58: a 1–2: antenna 1 and 2; af: accessory flagellum; ar: article; c: cephalon; ce: cutting edge; cox: coxal plate; dv: dorsal view; ep: epistome; fv: frontal view; ll: lower lip; lv: lateral view; md: mandible; mv: medial view; mx 1–2: maxilla 1–2; mxp: maxilliped; p 1–7: pereopods 1–7; plp: palp; r: right side appendage; s: some or all setae omitted; t: telson; ul: upper lip; up 1–3: uropods 1–3.

Signatures in Figs 4–58 refer to scales in Fig. 3.

The 1968-material from the Thule area is deposited in the Zoological Museum, University of Copenhagen (abbreviated ZMUC throughout the text).

Faunistics

All amphipods recorded from the Thule area are presented in the annotated list, Table 2. The list comprises

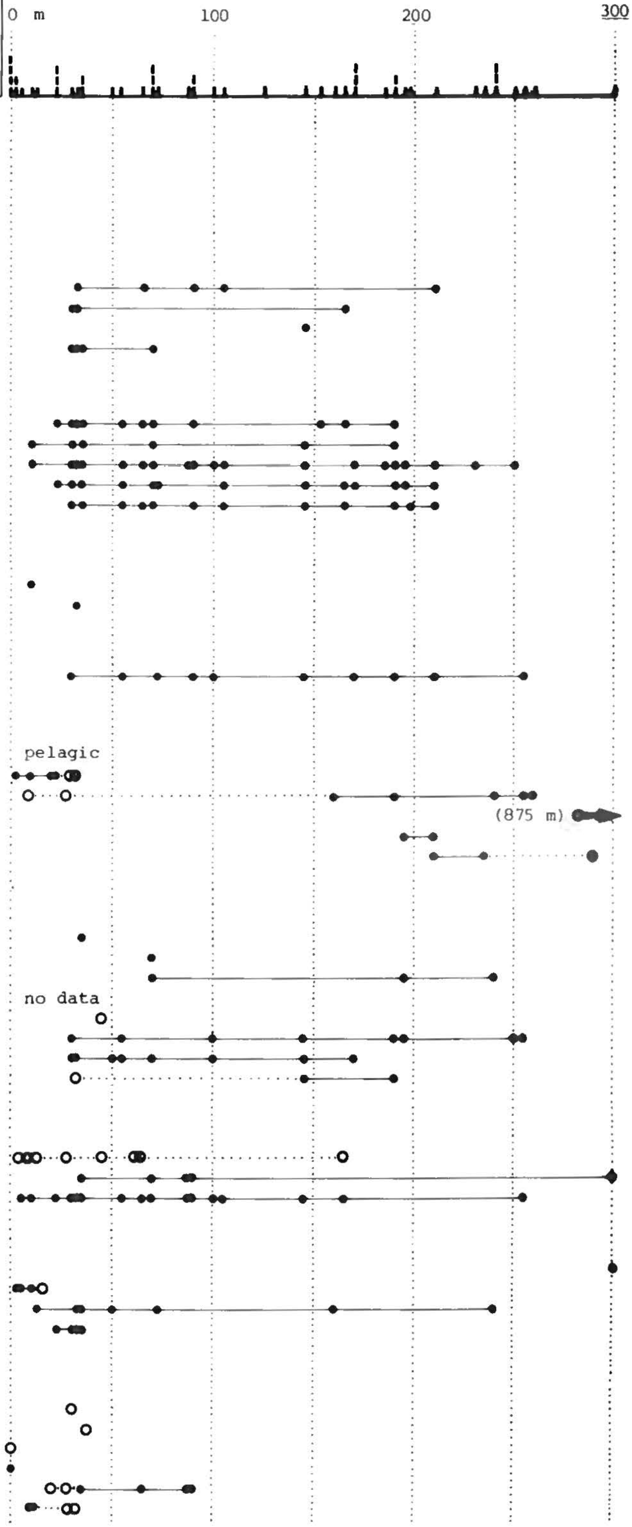
Table 2. Annotated list of Amphipoda from the Thule area, NW Greenland.

Column D: x = Collected 1968
(x) = Previously reported from, but not N of, the Thule area.
Column F: (x) = Not treated separately but in connection with a related species.
*: Species not collected in 1968.

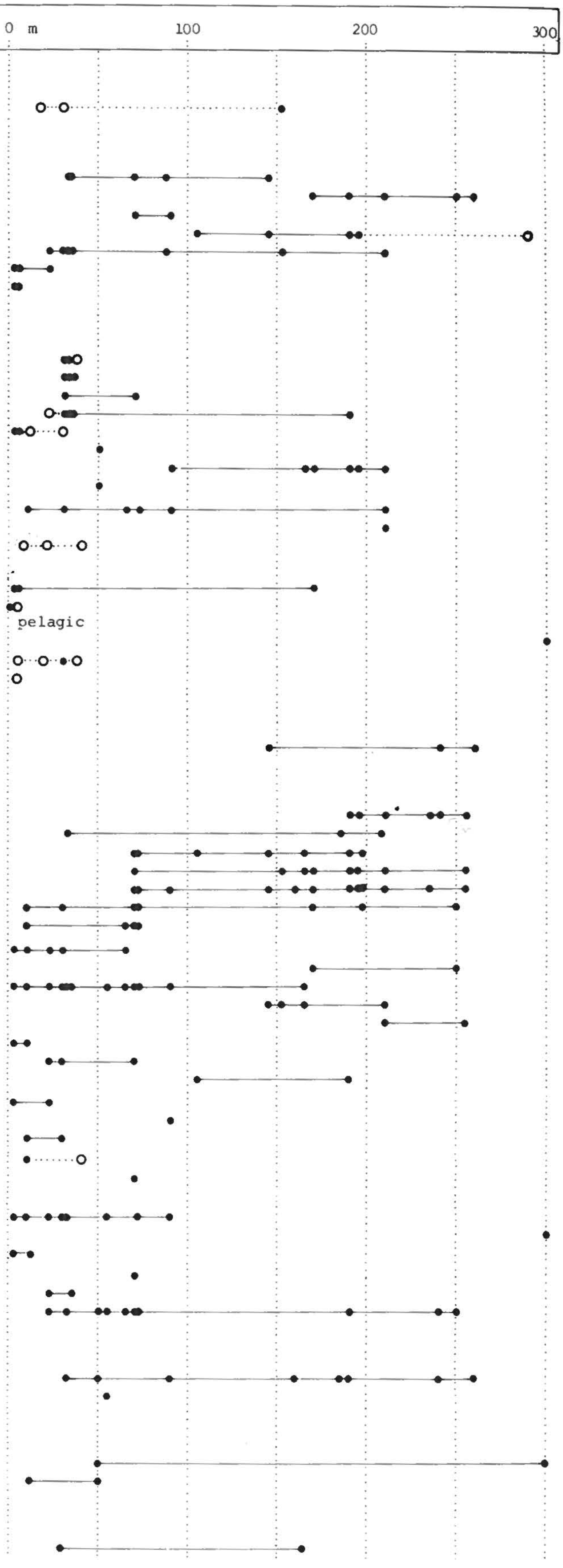
	New species A	New to Greenland B	New to W Greenland C	N-most rec. W Greenland D	Number of specimens (1968) E	Treated separately below F
Hyperiidae						
Hyperia galba (Montagu, 1813)					2	
**Hyperoche medusarum* (Kröyer, 1838)				(x)		
Parathemisto libellula (Mandt, 1822)					185	
- *abyssorum* Boeck, 1871				(x)	10	
Acanthonotozomatidae						
Acanthonotozoma magnum Just, 1978				(x)	8	
- *rusanovae* Bryazgin, 1974				(x)	5	
- *sinuatum* Just, 1978				(x)	1	
Odius carinatus (Bate, 1862)				x	5	
Ampeliscidae						
Ampelisca eschrichti Kröyer, 1842				(x)	46	
- *macrocephala* Lilljeborg, 1852				(x)	16	
Byblis spp.					488	x
Haploops laevis Hoeck, 1882				x	261	
- *tubicola* Lilljeborg, 1855				(x)	44	
Amphilochidae						
Gitanopsis species A					3	x
- species B					2	x
Argissidae						
Argissa hamatipes (Normann, 1869)				x	40	
Calliopiidae						
Apherusa glacialis (Hansen, 1887)					4	
- *megalops* (Buchholz, 1874)				(x)	327	
Halirages fulvocinctus (M. Sars, 1858)					20	
*- *quadridentatus* G.O. Sars, 1876				(x)		
Haliragoides inermis (G.O. Sars, 1882)			x		2	
Rozinante fragilis (Goes, 1865)				(x)	3	
Corophiidae						
Gammaropsis melanops G.O. Sars, 1882				x	4	
Goesia depressa (Goes, 1865)				x	1	
Lembos borealis Myers, 1976		x			3	x
**Neohela maxima* Stephensen, 1933				(x)		
*- *monstrosa* (Boeck, 1861)				(x)		
Photis tenuicornis G.O. Sars, 1882				x	91	
Protomedeia fasciata Kröyer, 1842				x	49	
Unciola leucopsis (Kröyer, 1845)				(x)	3	
Dexaminidae						
**Atylus carinatus* (Fabricius, 1793)						
- *smitti* (Goes, 1865)				(x)	11	
Guernea nordenskioldi (Hansen, 1887)				x	287	x
Eusiridae						
Eusirus sp. (mutilated)					1	
Pontogeneia inermis (Kröyer, 1838)				(x)	35	
Rhachotropis aculeata (Lepechin, 1780)					20	
- *inflata* (G.O. Sars, 1882)				x	9	
Gammaridae						
**Ceradocus torelli* (Goes, 1865)				(x)		
**Gammarellus homari* (Fabricius, 1779)				(x)		
**Gammaracanthus loricatus* (Sabine, 1821)						
Gammarus setosus Dementieva, 1931					359	
Melita dentata (Kröyer, 1842)				(x)	5	
Weyprechtia pinguis (Kröyer, 1838)					6	

Vertical distribution

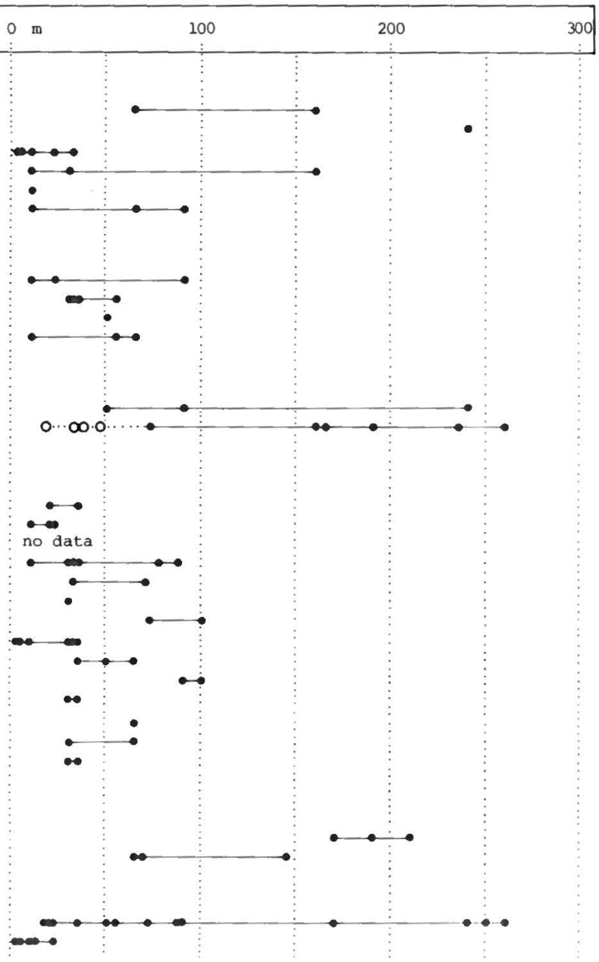
Top of column shows depth and number of 1968-samples. Black: 1968-records. Open: Previous records falling outside the depth range found in 1968.
Hyperiidea and a few pelagic Gammaridea not shown as closing nets were not applied.



	A	B	C	D	E	F
Haustoriidae						
Pontoporeia femorata Kröyer, 1842				(x)	1	
Ischyroceridae						
Ischyrocerus latipes Kröyer, 1842				x	147	x
- *megacheir* Boeck, 1871			x		9	x
- *megalops* G.O. Sars, 1894			x		4	x
- *stephenseni* Gurjanova, 1951		x			11	x
- "species" T-1					37	x
- - T-2					239	x
- - T-3					4	x
Lysianassidae						
Anonyx affinis Ohlin, 1895				(x)	2	x
- *laticoxae* Gurjanova, 1962					9	
- *lilljeborgi* Boeck, 1871				x	7	
- *nugax* (Phipps, 1774)					18	
- *sarsi* Steele & Brunel, 1968					11	
Aristias tumidus (Kröyer, 1846)				x	1	
Hippomedon abyssi (Goes, 1865)				x	105	
- *holbolli* (Kröyer, 1846)				x	1	
Menigratopsis svennilssoni Dahl, 1945				(x)	8	
- specimen A, in Just (1976)					1	
**Onisimus edwardsi* (Kröyer, 1846)						
Opisa eschrichti (Kröyer, 1842)				x	1	
Orchomene minuta (Kröyer, 1846)				(x)	3	
Pseudalibrotus littoralis (Kröyer, 1845)					23	
- *glacialis* G.O. Sars, 1900				x	11	
Schisturella pulchra (Hansen, 1887)				x	1	
Socarnes bidenticulatus (Bate, 1858)				(x)	1	
**Tmetonyx cicada* (Fabricius, 1780)					3	x
Melphidippidae						
Melphidippa goesi Stebbing, 1899			x		4	
Oedicerotidae						
Acanthostepheia malmgreni (Goes, 1865)				(x)	70	
Aceroides goesi nov.sp.	x				3	x
- *l. latipes* (G.O. Sars, 1895)				x	11	
Arrhinopsis longicornis Stappers, 1911		x			14	x
Arrhis phyllonyx (M. Sars, 1858)				x	70	
Bathymedon antennarius nov.sp.	x				26	x
- *obtusifrons* (Hansen, 1887)				x	5	(x)
Monoculodes borealis Boeck, 1871				(x)	18	(x)
- *intermedius* Shoemaker, 1930		x			5	x
- *latimanus* (Goes, 1865)				x	45	
- *longirostris* (Goes, 1865)			x		6	x
- *packardi* Boeck, 1871			x		4	x
- *schneideri* G.O. Sars, 1895				x	4	
- *simplex* Hansen, 1887				x	4	
- *tuberculatus* Boeck, 1871				x	2	
- *vibei* nov.sp.	x				35	x
- sp., in Just (1970)			x		1	x
Monoculopsis longicornis (Boeck, 1871)				x	5	
Oediceros borealis Boeck, 1870				(x)	1	(x)
- sp.					1	x
Paroediceros lynceus (M. Sars, 1858):				(x)		
- - form A					61	x
- - form B					4	x
- - form C					3	x
- *propinquus* (Goes, 1865)				x	1	
Westwoodilla brevicalcar (Goes, 1865)				x	4	
- *caecula* (Bate, 1856)				(x)	21	x
Paramphithoidae						
Paramphithoe hystrix (J.C. Ross, 1835)					29	x
- sp.					1	x
Pardaliscidae						
Pardalisca abyssi Boeck, 1871				x	4	
- *cuspidata* Kröyer, 1842				x	3	
Phoxocephalidae						
Harpinia serrata G.O. Sars, 1879				(x)	15	



	A	B	C	D	E	F
Pleustidae						
Arctopleustes glabricauda (Dunbar, 1954)		x			2	x
Neopleustes pulchellus (Kröyer, 1846)					3	
Parapleustes bicuspis (Kröyer, 1838)				(x)	151	
Pleustes p. panoplus (Kröyer, 1838)				(x)	3	
Pleusymtes glabroides (Dunbar, 1954)			x		9	x
Stenopleustes olriki (Hansen, 1887)				x	12	x
Podoceridae						
Dulichia tuberculata Boeck, 1871				x	2	
- *wolffi* Laubitz, 1977				x	10	x
Dyopedus porrectus Bate, 1857				x	1	
Paradulichia typica Boeck, 1871				(x)	3	
Stegocephalidae						
Stegocephalopsis ampulla (Phipps, 1774)				(x)	4	
Stegocephalus inflatus Kröyer, 1842				(x)	27	
Stenothoidae						
Metopa bruzeli (Goes, 1865)				x	12	x
- *glacialis* (Kröyer, 1842)				x	5	x
*- *groenlandica* Hansen, 1887				(x)		
- *longicornis* (Boeck, 1871)				x	83	x
- *pusilla* G.O. Sars, 1895		x			8	x
- *tenuimana* G.O. Sars, 1895			x		1	x
- sp.					2	x
Metopella carinata Hansen, 1887				x	336	x
- *longimana* (Boeck, 1871)				x	3	x
- *nasuta* (Boeck, 1871)				x	2	x
Mesometopa neglecta (Hansen, 1887)				x	10	x
Parametopa crassicornis nov.sp.	x				1	x
Stenula nordmanni (Stephensen, 1931)				x	3	x
- sp.					5	x
Synopiidae						
Syrrhoe crenulata Goes, 1865				x	3	
Tiron spiniferum (Stimpson, 1854)				x	3	
Caprellidae						
Aeginina longicornis (Kröyer, 1842-43)					146	
Caprella septentrionalis Kröyer, 1838				(x)	39	



116 species, well over half the number known from W Greenland (194 spp.) and nearly half that known from the entire Greenland (247 spp.). The species fall into 78 genera and 24 families. Eleven of these species were not found during the 1968 investigations. An additional 15 taxa are not referred to species. The number of amphipod taxa presently known from the Thule area thus totals 131.

Taxonomy

Ampeliscidae

Byblis Boeck, 1871

Byblis gaimardi (Kröyer, 1846), type species of the genus, was described on specimens from SW Greenland. The type material, which is in good condition, is kept in the collections of ZMUC.

With the exception of the blind *B. crassicornis* Metzger, 1875, reported once from the Davis Strait (Stephensen, 1925), *B. gaimardi* has until quite recently been the only known representative of the genus from the entire western Arctic, *viz.*, from the Bering Strait to Newfoundland including the Canadian Arctic Archipelago and Greenland. Just (1970) described a new species, *B. arcticus*, from Peary Land, N Greenland, and found it to be present also in E Greenland, probably south to Scoresby Sund.

The present material (including that reported by Vibe, 1950) comprises nearly 500 specimens. It consists of at least three different taxa, none of which can at present be unequivocally referred to any known species. A study of material from the entire western Arctic and the Gulf of St. Lawrence revealed the same three unidentified taxa and showed that *B. gaimardi* (s.s.) apparently does not occur in truly Arctic water (Just, unpublished).

The situation can be untangled only through a complete redescription of *B. gaimardi* based on the

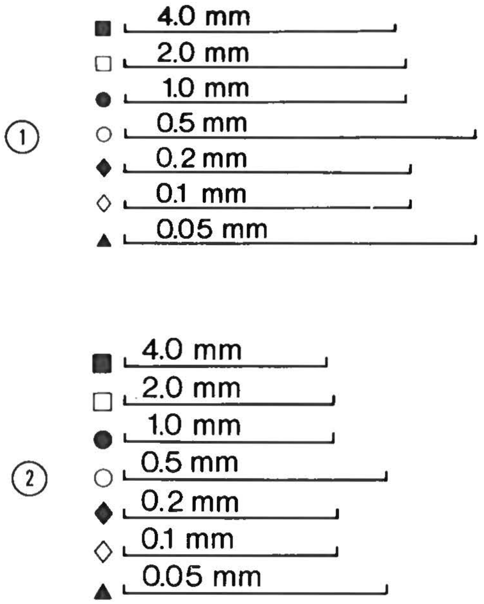


Fig. 3. Scales referring to Figs 4–58 as indicated by number in circle.

above-mentioned type material and a total revision of what has up till now been recorded as *B. gaimardi*.

Amphilochidae

Gitanopsis G. O. Sars, 1892
Gitanopsis species A and B (Fig. 4)

Five specimens belong to this genus. They represent two different species, treated below as species A and species B.

Species A bears a strong resemblance to *G. inermis* (G. O. Sars, 1882), but the rami of uropod 3 seem to be somewhat shorter and broader. Species A, furthermore, has a small one-articulate accessory flagellum in antenna 1, which is in contrast to Barnard's diagnosis of the family (1969a: 132, "Accessory flagellum absent"), but agrees with several descriptions and drawings of species of *Gitanopsis* in Barnard (1962a, 1972) and Myers (1974). Until the type material of *G. inermis* has been fully redescribed, at least Greenland specimens cannot safely be referred to this species.

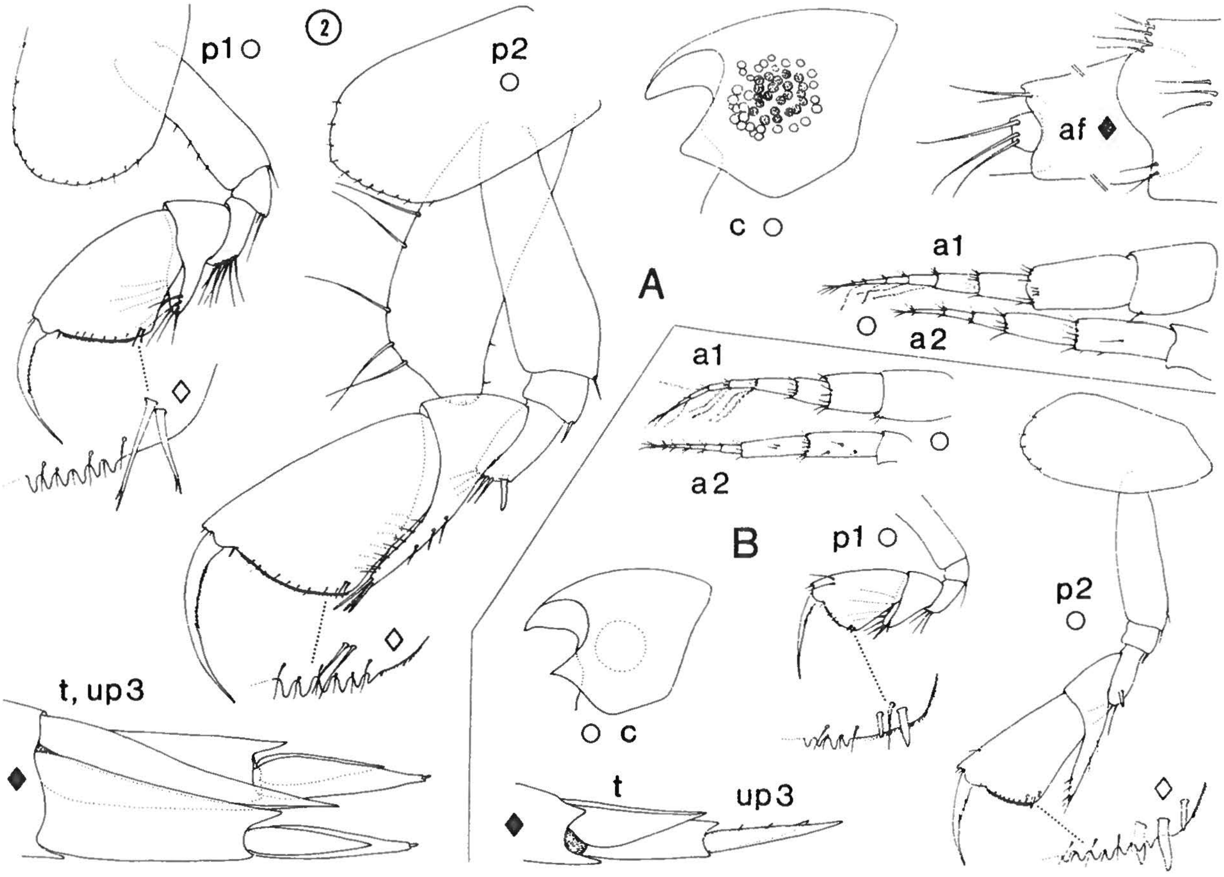


Fig. 4. A: *Gitanopsis* species A, adult female of 5.2 mm, St. 40–2+3. B: *Gitanopsis* species B, ?male of 3.0 mm, St. 26.

Species B differs from species A primarily in having the lateral lobes of the cephalon acutely pointed, in lacking an accessory flagellum, in having the palm of pereopods 1 and 2 defined by strong spines, in the shape and proportions of uropod 3, and in the length of the telson. With regard to the cephalon and pereopods 1 and 2 species B is in good agreement with *G. oculata* (Hansen, 1887b, as *Amphilocus oculatus;* synonymized with *G. inermis* by Stephensen, 1925) as represented in Hansen's tab. III, fig. 2. Three (the Godthaab locality) out of Hansen's original four specimens of *A. oculatus* are still in existence in the ZMUC. They all have the defining spines on pereopods 1 and 2, but the cephalic lobes of all three specimens are less acute than shown in Hansen's figures, and more closely resemble those of *G. inermis* and species A. Uropod 3 is missing in all of Hansen's specimens.

I have examined all specimens identified as *G. inermis* in the collections of the ZMUC (Greenland and the North Atlantic); both species A and species B plus several other distinct forms are present. The problems can be solved only through a full-scale revision of the North Atlantic and Arctic members of the genus, primarily involving a redescription and developmental study of *G. inermis* (G. O. Sars, 1882).

Corophiidae

Lembos Bate, 1856

Stephensen (1944b) recorded a single specimen of *Lembos* (*longidigitans* (Bonnier)?) from deep water south of the Davis Strait off W Greenland. From truly arctic waters of the entire western Arctic, however, the only

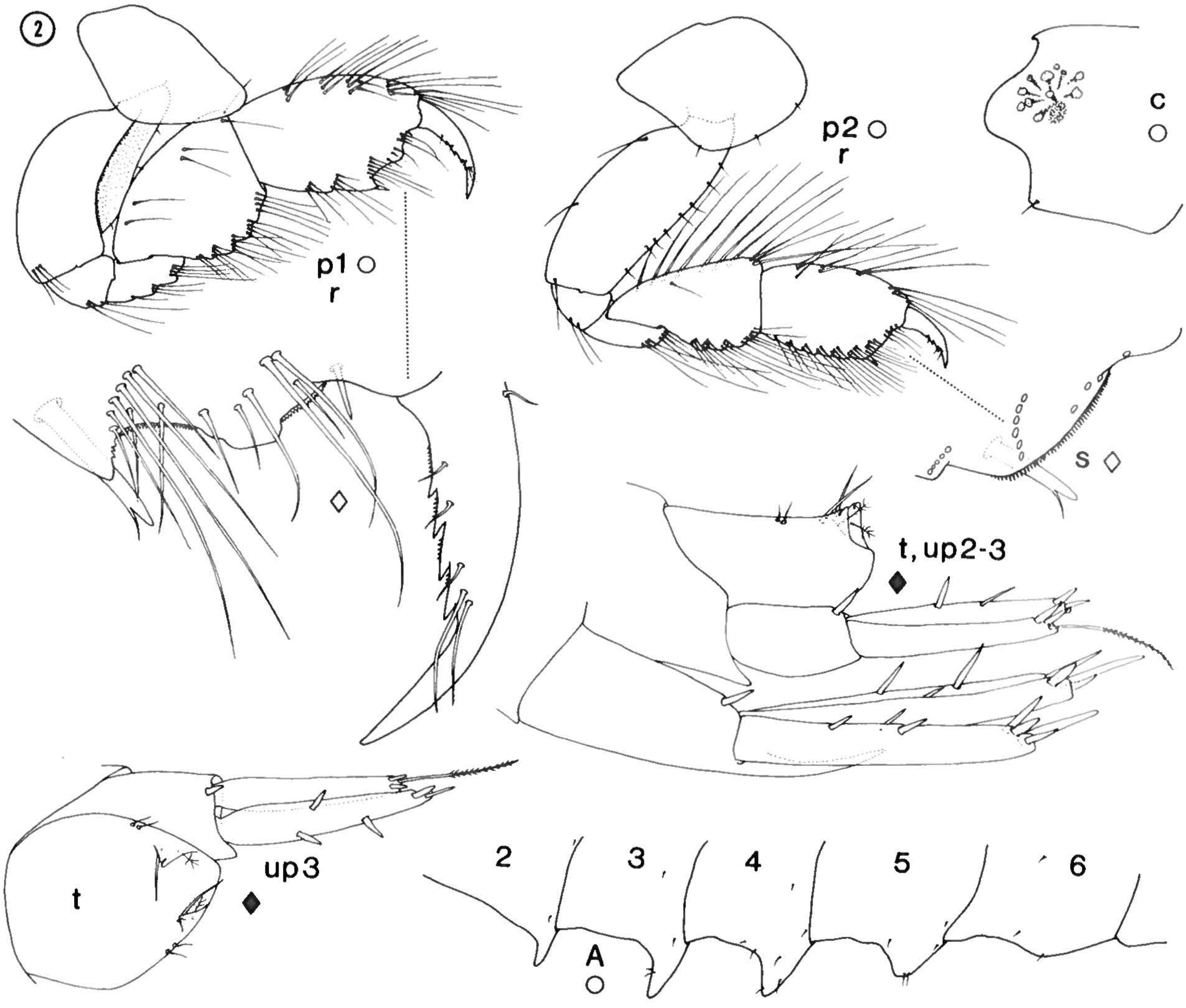


Fig. 5. *Lembos borealis* Myers, 1976. Young male of 3.5 mm, St. 32–1. A: Ventral side of pereonites 2–6.

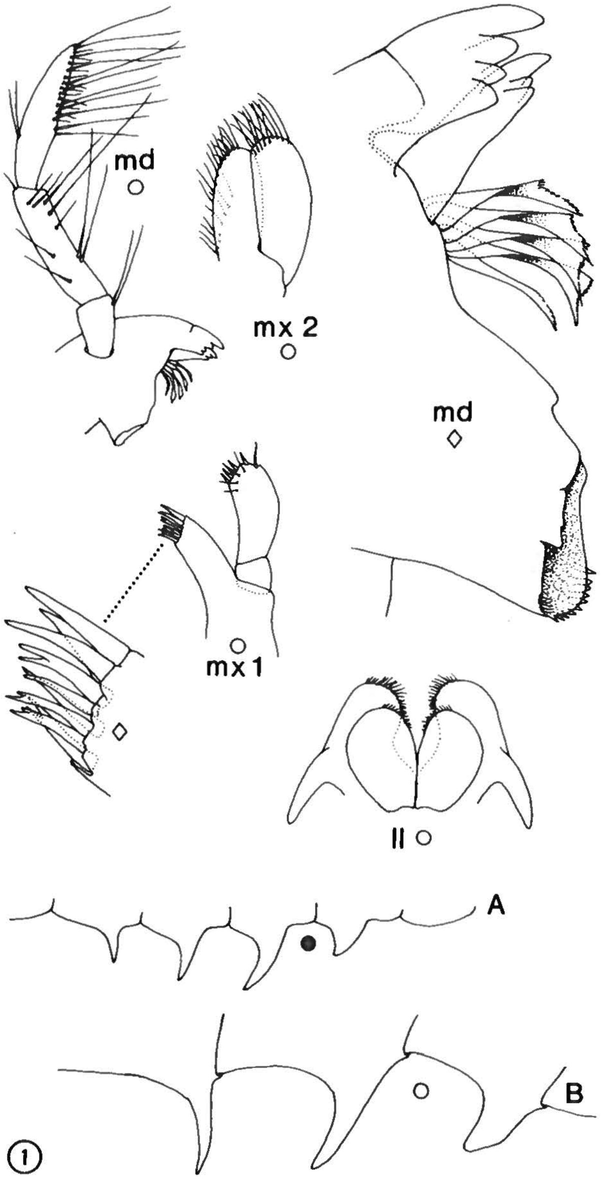


Fig. 6. *Lembos borealis* Myers, 1976. Male from St. 32–1 (same male as Fig. 5), except A: ventral side of pereonites 1–6 of male from the Beaufort Sea (St. 860–08), and B: ventral side of pereonites 3–6 of male from the Kara Sea (see Hansen, 1887a).

previous record of the genus is that of *L. arcticus* (Hansen, 1887a) from off Point Barrow (Shoemaker, 1955).

Lembos borealis Myers, 1976 (Figs 5–6)

Myers (1976) described the present species from four specimens collected near Jan Mayen by the "Ingolf" Expedition. Apart from the present three specimens (Table 2) I have examined three specimens of *Lembos* from Frobisher Bay, Baffin Island (2 females, 1 male), and 32 specimens (15 females, 8 males, 7 juveniles, 2 defect) from the Beaufort Sea (all material unpublished). All belong to *L. borealis.* In addition, the single male from the Kara Sea (ZMUC) recorded by Hansen (1887a) as *Authonoe longipes* (Lilljeborg) belongs to *L. borealis.*

The shape of male pereopods 1 and 2 immediately distinguishes the present species from other members of the genus, and the entire material mentioned above is in good agreement with Myers' description and drawings. In other respects, however, the material shows certain deviations from that of Myers. The telson is somewhat longer and more pointed than shown by Myers. With regard to the sternal processes Myers writes (holotype male of 4.5 mm): "Pereon segments 2–5 each with a

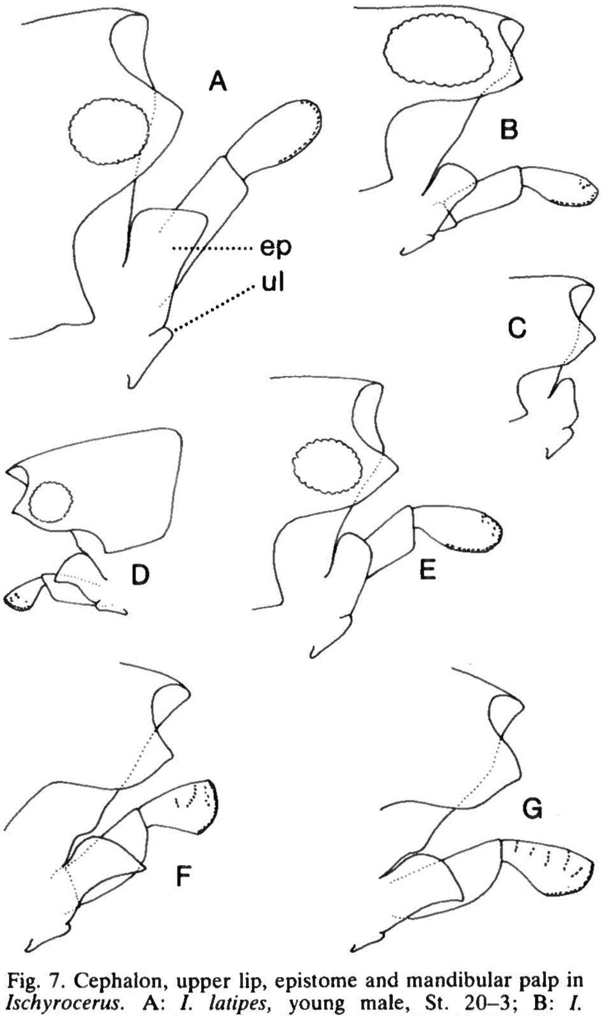


Fig. 7. Cephalon, upper lip, epistome and mandibular palp in *Ischyrocerus.* A: *I. latipes,* young male, St. 20–3; B: *I. megalops,* male (same specimen as in Fig. 11 A); C: *I. stephenseni,* male (same specimen as in Fig. 12); D: *I.* "species" T-1, male, St. 14–2; E: *I. megacheir,* ovigerous female, St. 14–2; F: *I. anguipes,* terminal male, Dyrholaey, S Iceland, coll. J. Just, 1974; G: *I.* "species" T-3, male (same specimen as in Fig. 17).

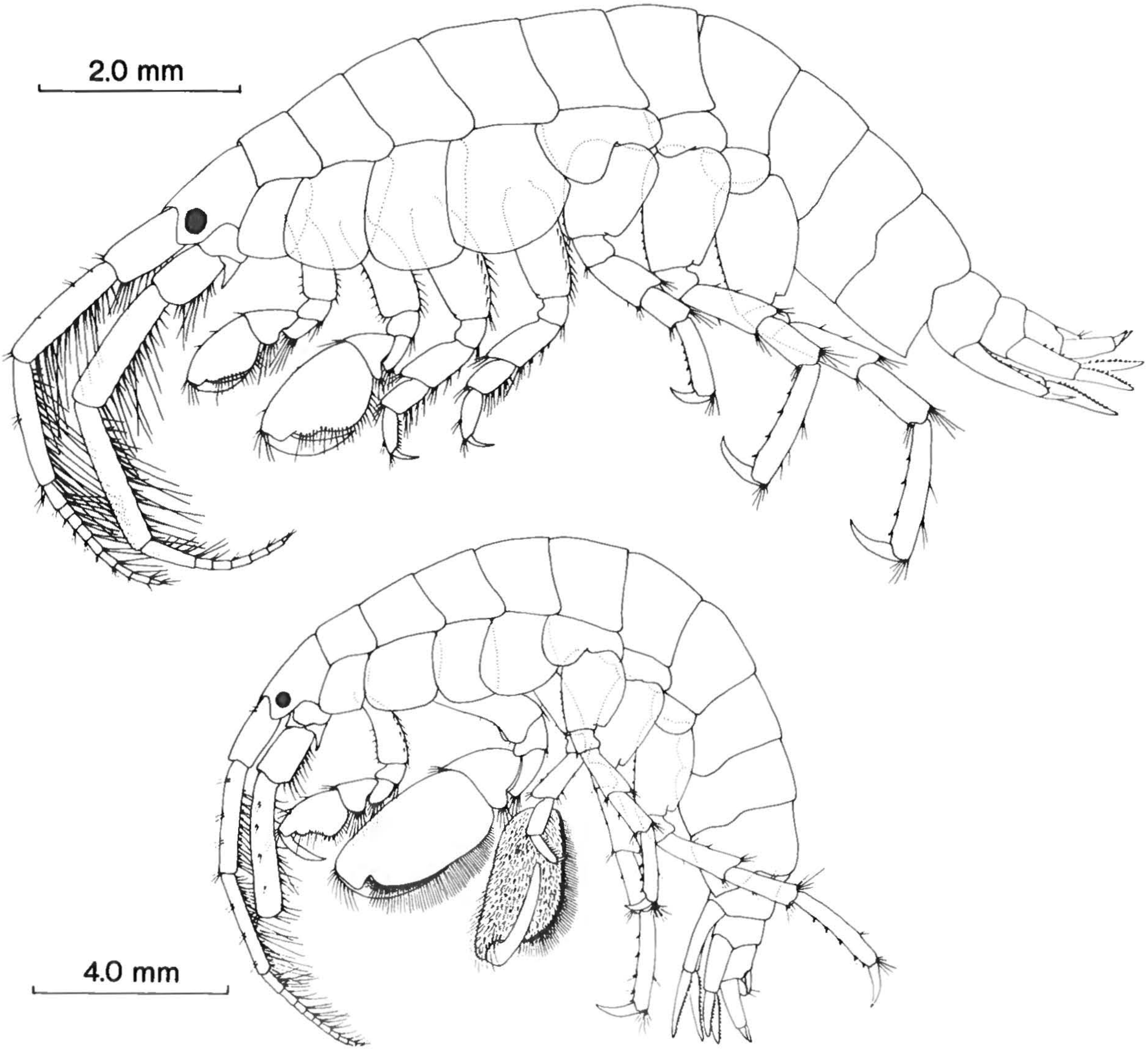


Fig. 8. *Ischyrocerus latipes* Kröyer, 1842. A: Largest syntype, adult female (setiferous oostegites), 10.3 mm. B: Adult male, 18.9 mm, St. 20–3. – Note different scales.

sternal process, that of segment 4 well developed, stout, those of segments 2, 3, and 5 weakly developed". This description closely fits his fig. 99, 3 (female). In the present new material the female sternites agree with Myers' drawing, while the sternal processes in adult males are markedly more well developed. Fig. 5A shows the processes of a male of 3.5 mm (Thule, st. 32–1), and Fig. 6A shows a male from the Beaufort Sea. Hansen's male from the Kara Sea (see above) has the sternal processes equal in length and strength (Fig. 6B) to those of the Beaufort Sea specimen.

The three Thule specimens, all males, measure 3.5, 3.5, and 3.8 mm. The Frobisher Bay material comprises one male of 3.5 mm and two subadult females of 4.5 and 5.0 mm. The three largest females (oostegites fully developed) from the Beaufort Sea measure 4.8, 4.8, and 5.0 mm, the three largest males 3.8, 3.8, and 4.8 mm.

Dexaminidae

Guernea Chevreux, 1887
Guernea (Prianassus) nordenskioldi (Hansen, 1887)

This species, here represented by nearly 300 specimens, was described by Hansen (1887b; *Prianassus nordenskioldi*) on the basis of two specimens from W Greenland, *viz.*, one from Sukkertoppen and one from Christianshaab. Later the species has not been found in

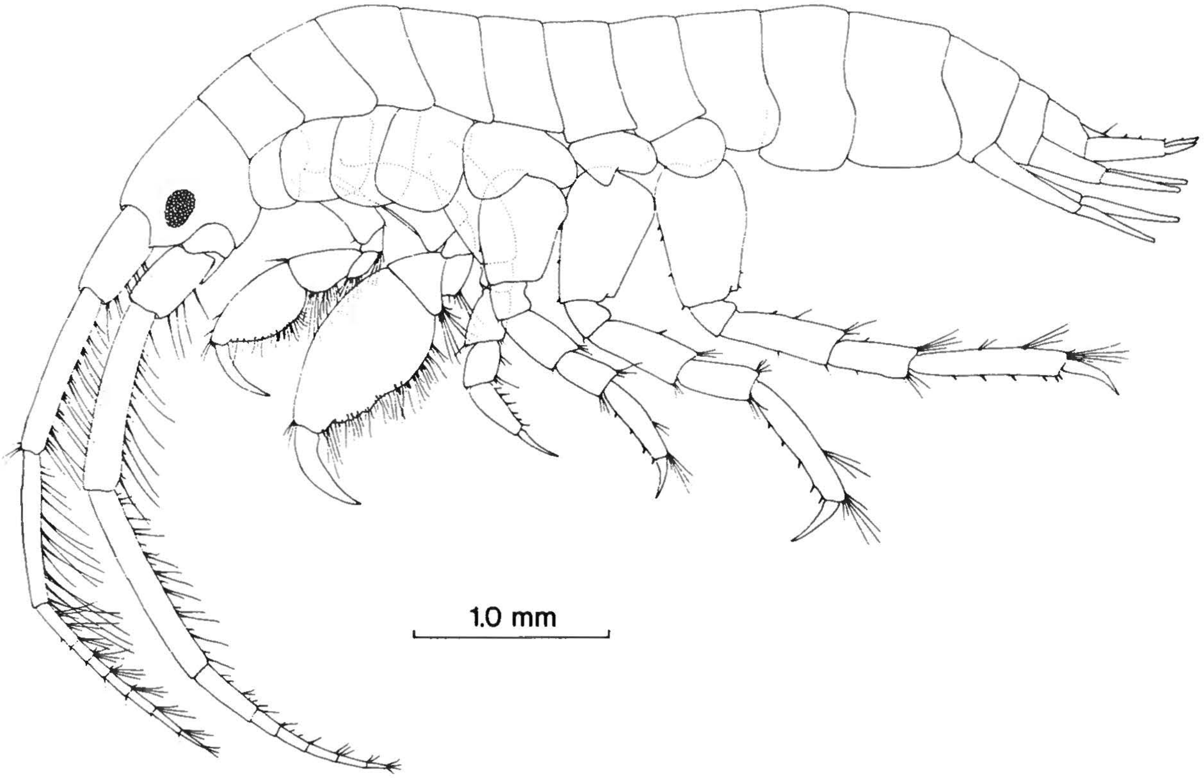


Fig. 9. *Ischyrocerus megacheir* Boeck, 1871. Adult male of 5.6 mm, St. 14–2.

Greenland, and for no obvious reason it is omitted from Stephensen's compilations of Greenland amphipods (1933, 1944a).

Barnard has recently (1970) revised the classification within *Guernea* and places *G. nordenskioldi* in the subgenus *Prianassus* Hansen, 1887.

Ischyroceridae

Ischyrocerus Kröyer, 1838

In the Thule area this genus is represented by four previously described species and three taxa treated below as "species" T-1, T-2, and T-3. At least "species" T-1 and T-2 fall within the present very broad concept of *I. anguipes* Kröyer, 1838, but I prefer to report on them separately in order to facilitate a long overdue total-distribution study of morphological development and geographic variation in *I. anguipes.* "Species" T-3 can be immediately distinguished from *I. anguipes* (s.l.) by the shape of its pleonal sideplate 3. "Species" T-1, T-2 and T-3 are all present in the large material of *Ischyrocerus* (ZMUC) identified as *I. anguipes,* primarily by Hansen and Stephensen although often with a question mark on the label, indicating that the specific identification is uncertain. *Ischyrocerus anguipes* as figured by Dunbar (1954) seems to be identical with the present "species" T-1. Although in many respects similar to *I. anguipes, I.* species A, and *I.* species B in Barnard (1969b), none of the present "species" are identical with any of Barnard's taxa.

A character, perhaps of generic significance, which has hitherto been overlooked in *Ischyrocerus,* is the peculiar development of the epistome. In all the taxa listed below, and in terminal males of "normal" *I. anguipes* (from S Iceland), the epistome is strongly produced into a very thin, broad plate, which is well hidden between the bases of the lower antennae and the short, stout mandibular palps. Fig. 7 shows the findings in the present material, but the specific significance of the small differences found, particularly between *I. anguipes* and "species" T-1, T-2 and T-3, cannot be evaluated at present.

Ischyrocerus latipes Kröyer, 1842 (Fig. 8)

This species is easily recognized at all stages, males as well as females, by the combination of the characteristic pereopod 2, the telson which has two setae and no spines, and the outer ramus of uropod 3, which has only a single low triangular tooth immediately proximal to the terminal curved tooth. As the habitus of the species

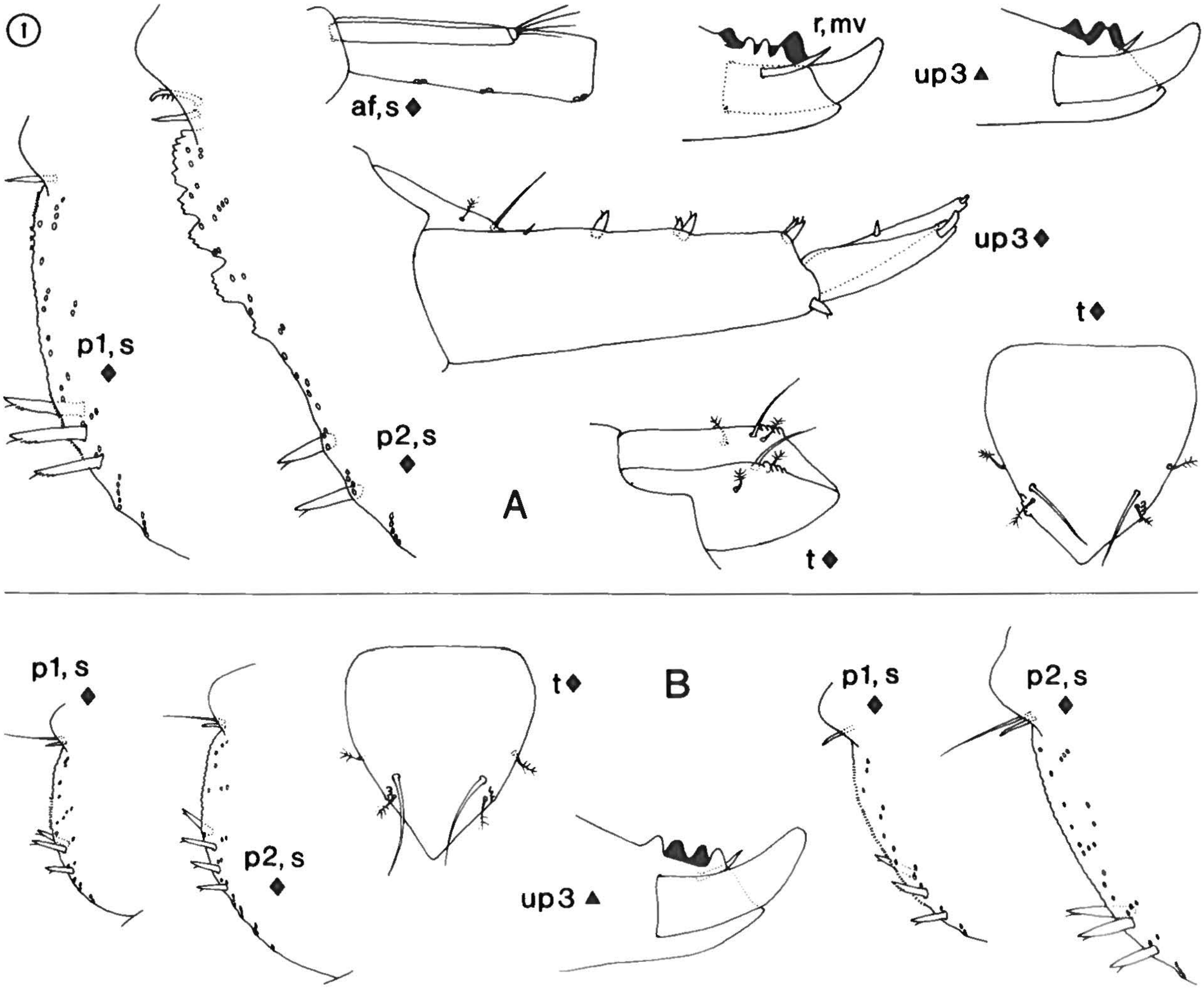


Fig. 10. *Ischyrocerus megacheir* Boeck, 1871. A: Male (same specimen as in Fig. 9). B1: Ovigerous female, 6.7 mm, St. 32–2. B2: Young male, 4.3 mm, St. 32–2.

has never been depicted, the largest female in Kröyer's syntype material (fide Hansen, 1887b) and a fully grown male from Thule are figured here.

Dunbar (1954) and Shoemaker (1955) independently considered *I. assimilis* (G. O. Sars, 1885), and in the case of Dunbar also *I. pachtusovi* Gurjanova, 1933, to be synonyms of *I. latipes*. This synonymy was accepted by Barnard (1958), but it has never been thoroughly tested.

Ischyrocerus megacheir Boeck, 1871 (Figs 9–10)

There is good agreement between the present material and Sars' (1894, pl. 211) figures, except that the Thule specimens have an irregular double row of tiny denticles on the distal part of the outer ramus of uropod 3. The denticles can be ascertained only under high resolution (oil immersion).

In the very large material from the "Ingolf" Expedition (Stephensen, 1944b) I have not been able to find these denticles. In addition, the "Ingolf" specimens generally have much heavier antennae with longer and stronger setae, and the outer ramus of uropod 3, even in specimens comparable in size to the Thule specimens, is broader at the base and more curved.

Whether the "Ingolf" material, as represented by Stephensen's fig. 21 (1944b), is a deep-water form of *I. megacheir* or a separate species closely related to *I. megacheir* is a question yet to be solved.

The two males in the Thule material measure 4.7 and 5.6 mm, while three ovigerous females measure 6.7, 7.0, and 7.6 mm.

Ischyrocerus megalops G. O. Sars, 1894 (Fig. 11)

Dunbar (1954) made some comments on this species

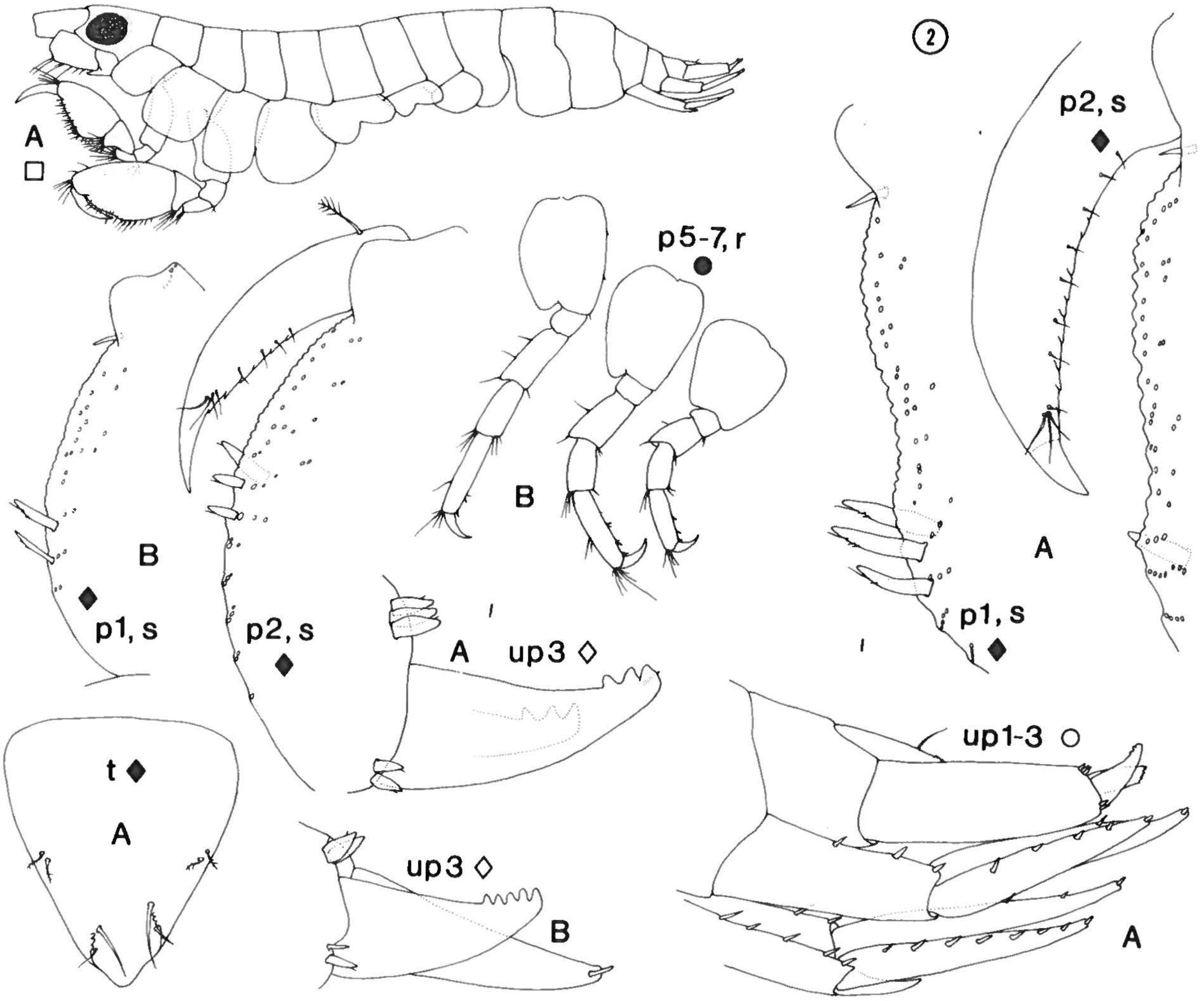


Fig. 11. *Ischyrocerus megalops* G. O. Sars, 1894. A: Adult male, 5.6 mm, St. 29–1. B: Subadult female, St. 29–1.

from Ungava Bay. The antennae are lacking in the present specimens, so it cannot be stated whether they have been as short and stout as those shown by Dunbar (fig. 36). The present material is otherwise in close agreement with Norwegian and North Atlantic specimens in the ZMUC.

Dunbar states that the uropod 3 shown by him (fig. 36) is atypical in lacking a terminal spine on the outer ramus. Neither the Thule specimens nor specimens in the material mentioned above have such a spine. The armature shown by Dunbar and in my Fig. 11 thus seems to be normal in *I. megalops*.

Ischyrocerus stephenseni Gurjanova, 1951 (Fig. 12)

Gurjanova (1951: 939) gave a very brief diagnosis of this species, which she erected primarily on the "Ingolf" material recorded by Stephensen (1944b) as *I. brusilovi* Gurjanova. Gurjanova did not designate a holotype, but reproduced (fig. 655) some of the drawings given by Stephensen (1944b, fig. 24). The male dissected and figured by Stephensen must be considered the holotype for *I. stephenseni*. The specimen (including two slides) is in the ZMUC and has been labelled holotype by me.

The Thule specimens agree completely with the holotype and the eight other "Ingolf" specimens. Stephensen shows the telson of the holotype to be naked, but this is not correct, as it is like the telson shown in Fig. 12. Also, the telson in Stephensen's fig. 24 is broader and less pointed than those in the present material; this is due to the fact that the urosome of the holotype, which is permanently mounted on a slide, is strongly squeezed, resulting in unnatural broadening of the telson and the uropodal rami.

Stephensen (1933) recorded two specimens from the northernmost part of the baffin Bay as *I. (nanoides* (Hansen)?), but later (Stephensen, 1944b: 33) he referred these two specimens to *I. brusilovi* Gurjanova.

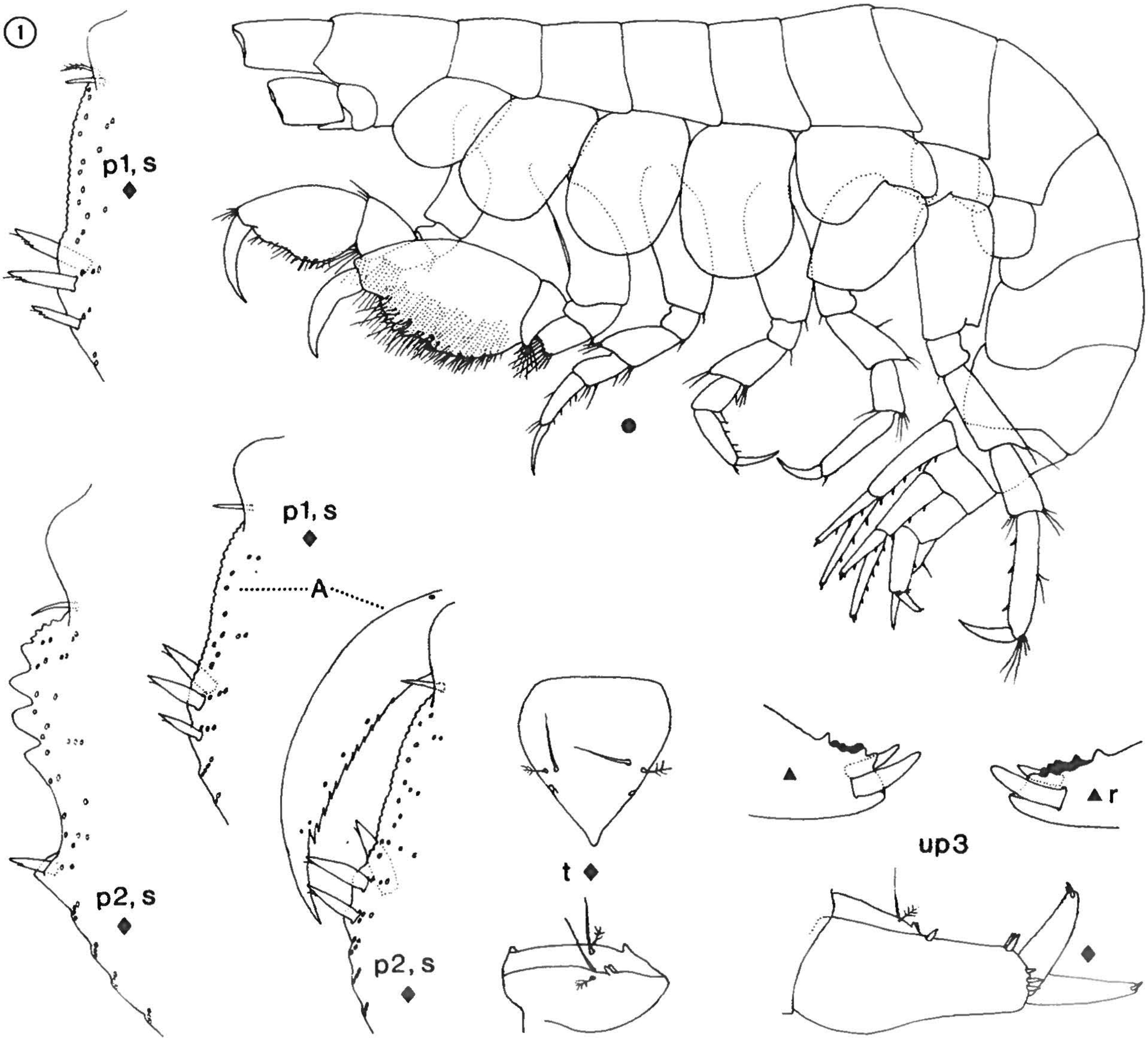


Fig. 12. *Ischyrocerus stephenseni* Gurjanova, 1951. Male of 5.1 mm, St. 19–2, except A: p 1–2 of ovigerous female, 7.2 mm, St. 19–2.

Both specimens in fact belong to *I. stephenseni.* This is also the case with the single other record of *I. brusilovi* from Greenland (Stephensen, 1944a: 125, fig. 14).

The largest male in the Thule material (Fig. 12) is 5.1 mm, the largest female (ovigerous) 7.2 mm.

Ischyrocerus "species" T-1 (Figs 13–14)

Large males (5.0–5.6 mm) as shown in Fig. 13 are characterized by very large eyes, by having the anterior lobe of coxal plate 5 nearly as deep as coxal plate 4, by the hind corner of pleonal sideplate 3 being nearly quadrate and the hind margin being convex in the middle. Article 6 of pereopod 1 is broadly ovate, broadest in the middle. Article 6 of pereopod 2 is broad, inflated, slightly less than twice as long as greatest width, cutting edge with a well defined, low, tuberculate keel which is distally produced into a nearly square, apically denticulate process. Article 2 of pereopods 5–7 broad, distally tapering, posteroapically with a rounded projection. Telson is broadly triangular, apically rounded, with two strong subequal spines near each midlateral margin. Lateroapical spines on peduncle of uropod 3 short and stout, outer ramus dorsally with a single row of about seven equal-sized blunt teeth and dorsally as well as laterally beset with tiny, sharp denticles.

Females referred to "species" T-1 (ovigerous females range from 4.5 to 5.5 mm, average 5.1 mm, N = 14)

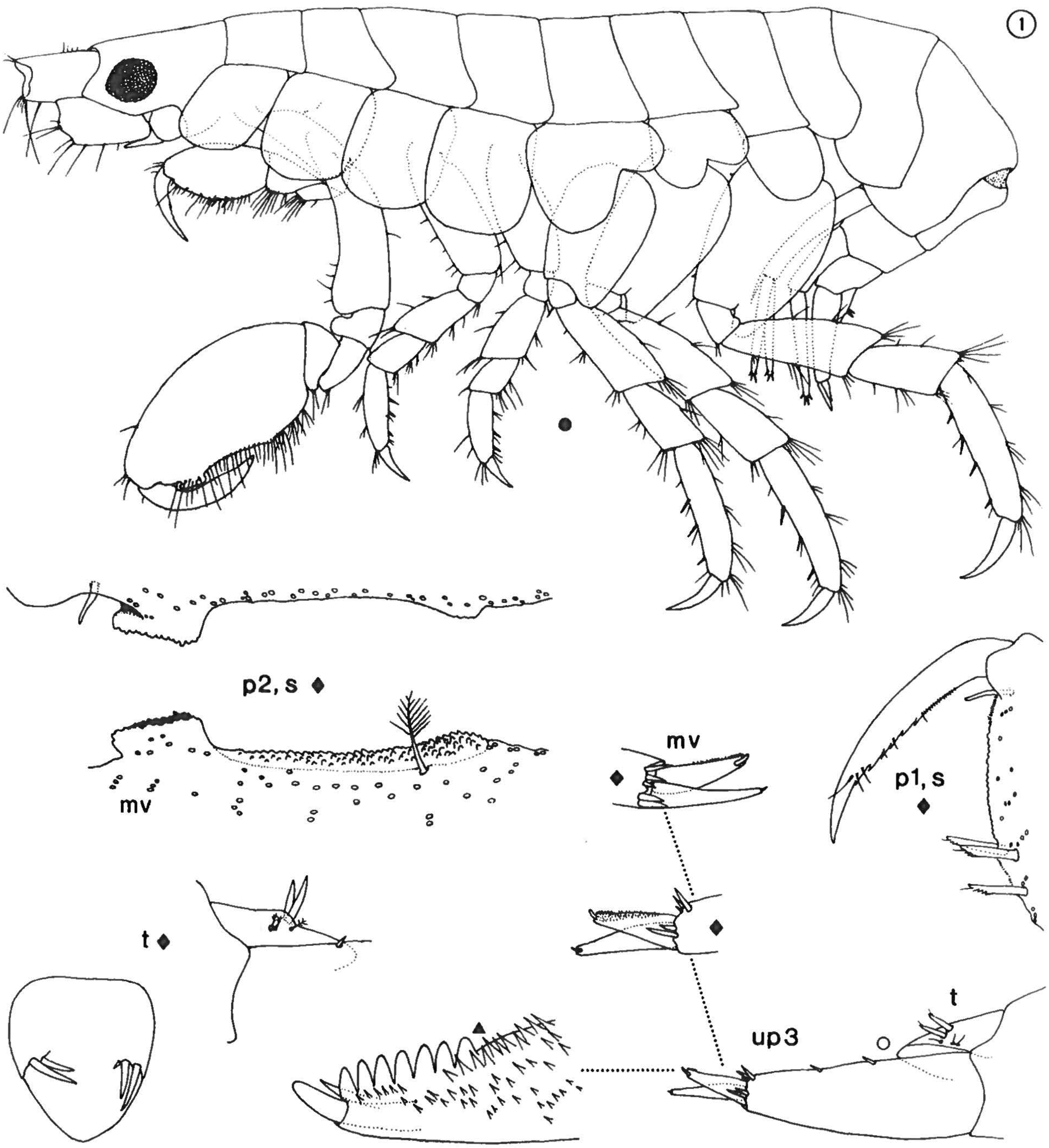


Fig. 13. *Ischyrocerus* "species" T-1. Adult male of 5.0 mm, St. 26.

have pereopod 1 broadly ovate as in males, and pleonal sideplate 3, article 2 of pereopods 5–7, uropod 3, and the telson as described above.

Ischyrocerus "species" T-2 (Figs 15–16)

Males of "species" T-2 (Fig. 15, 7.2 mm; five other males from St. 40–2+3: 5.7 to 6.2 mm, average 5.9 mm) differ from "species" T-1 as follows: anterior lobe of coxal plate 5 is only 2/3 the length of plate 4; article 6 of pereopod 1 more slender, broadest in proximal third; article 6 of pereopod 2 inflated but more slender, in the male figured nearly three times as long as broad, in the five other males slightly shorter, hind margin straight, without defined cutting edge, distally with a rounded protuberance; article 2 of pereopods 5–7 slender, with

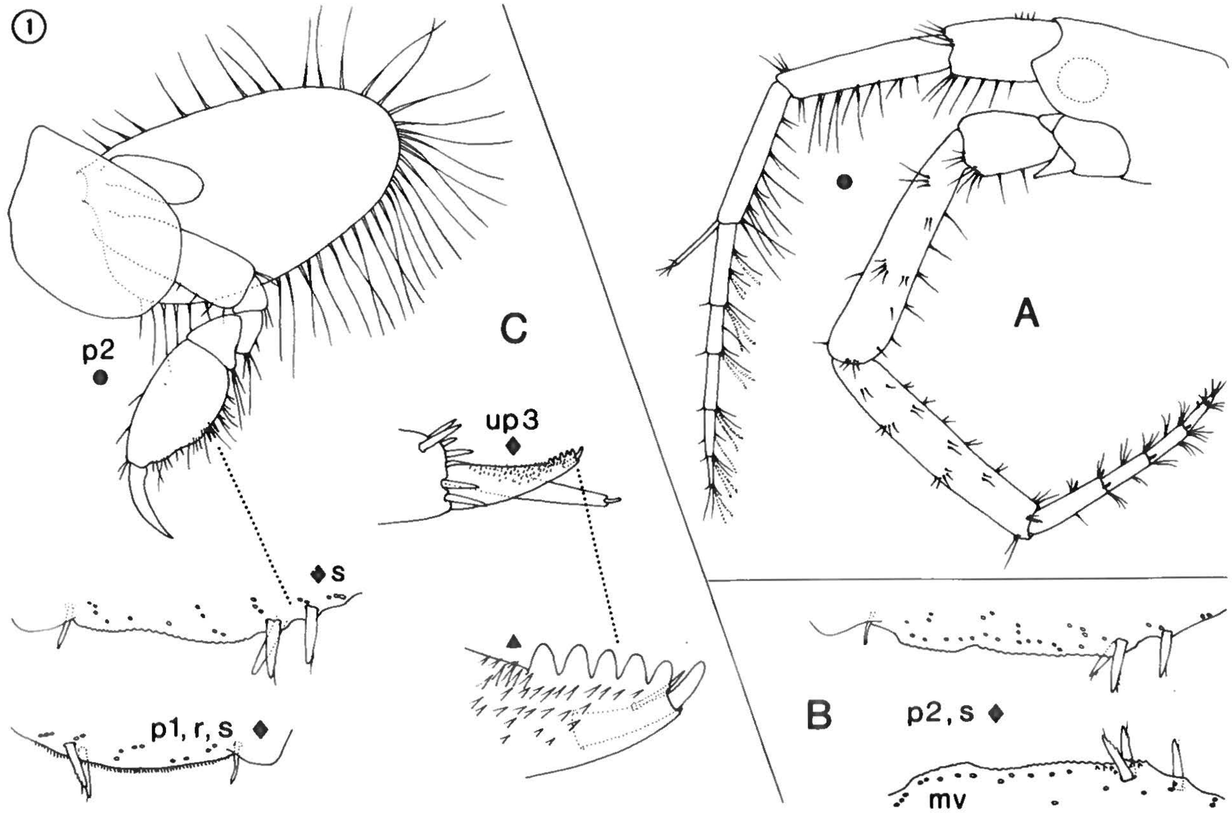


Fig. 14. *Ischyrocerus* "species" T-1. A: Adult male of 5.1 mm, St. 20–1. B: Young male of 3.8 mm, St. 20–2. C: Ovigerous female of 5.4 mm, St. 26.

nearly parallel anterior and posterior margins; spines on telson more slender, outer spine in each pair distinctly longer than inner spine (occasionally a third small spine is present in one or both groups); lateroapical spines of peduncle of uropod 3 long and slender, the longest spine about 2/3 the length of outer ramus; rami of uropod 3 more slender, outer ramus with an irregular double row of between 5 and 11 teeth (number may differ radically between right and left uropod in same specimen), and tiny sharp denticles arranged in dorsal and lateral rows.

Young males (Fig. 16A) of 4.5 to 5.5 mm (compare "species" T-1, males of same size) have pereopod 2 article 6 similar to that of adult females (Fig. 16), uninflated, slender ovate with a beginning of the rounded hump on the distal part of the cutting edge.

Females referred to "species" T-2 (ovigerous females from St. 40–2+3 range from 5.2 to 7.6 mm, average 6.6 mm, N = 16) are very similar to "species" T-1 females, but they share with "species" T-2 males the more slender pereopod 1, the more slender lateral spines of unequal length on the telson, and the long lateroapical spines on peduncle of uropod 3.

"Species" T-2 females have article 2 of pereopods 5–7 broader than in males, about as broad as in "species" T-1. "Species" T-2 females, furthermore, do not have the dorsal teeth of the outer ramus of uropod 3 arranged in two rows, but in a single row of 4–7 bluntly triangular teeth).

Ischyrocerus "species" T-3 (Figs 17–18)

One male (9.1 mm) and three ovigerous females (7.3, 7.9, and 8.9 mm) have been referred to "species" T-3. The male differs from males of the two preceding "species" in not having article 6 of pereopod 2 inflated but subequal in shape to that of pereopod 1, though considerably larger; article 2 of pereopods 5–7 is almost as slender as in "species" T-2, but that of pereopod 5 is very slightly produced posteroapically; inferior and posterior margins of pleonal sideplate 3 form a completely smooth curve; the telson is less strongly tapering, barely longer than broad, with two or three short spines in each lateral group; outer ramus of uropod 3 has a double row of teeth dorsally as in "species" T-2, but the teeth of the two rows differ markedly in size, those of the medial row being by far the largest; dorsally and laterally the ramus is heavily beset with large, irregular placed denticles; the higher number of lateroapical spines on the peduncle of uropod 3 as com-

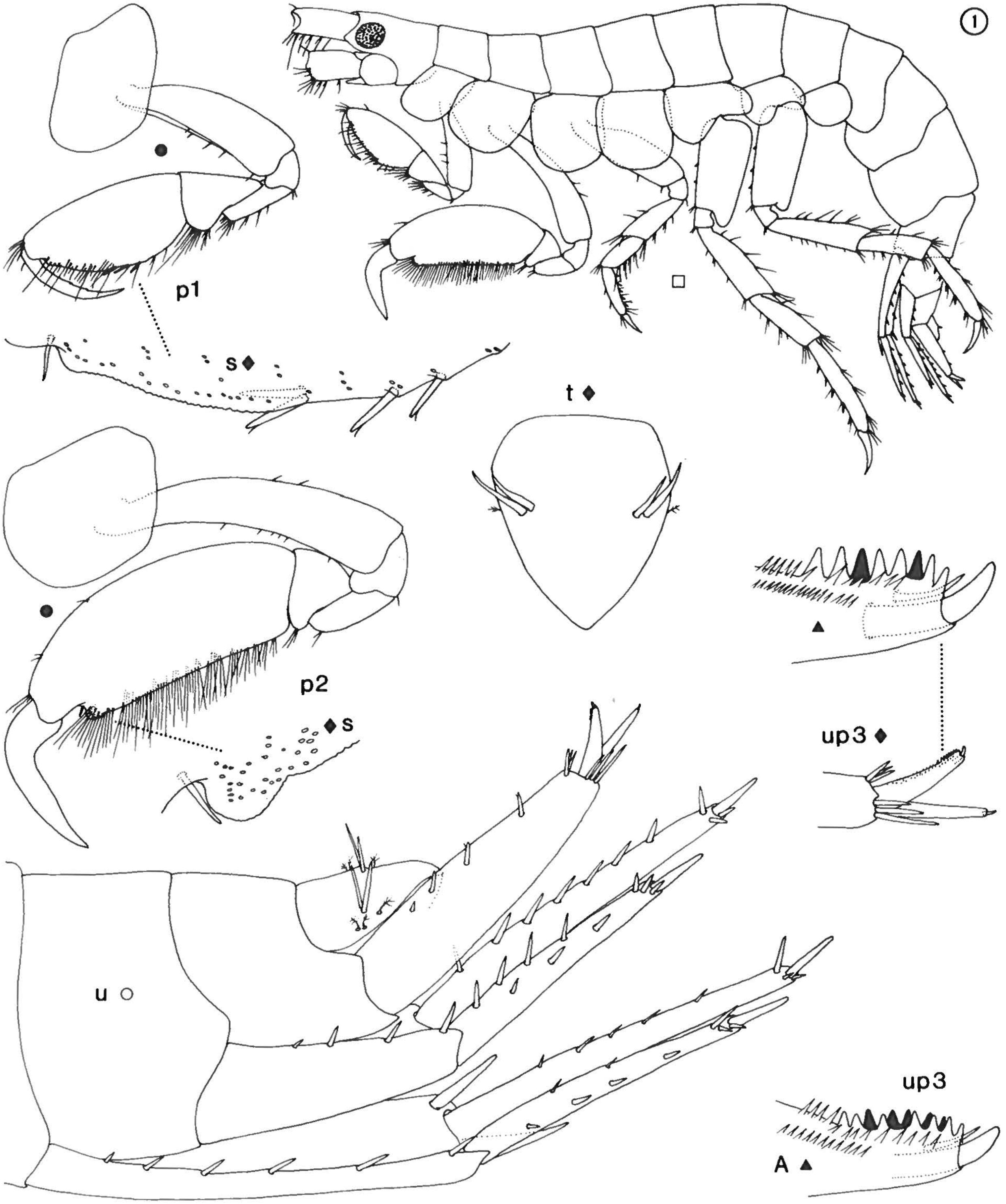


Fig. 15. *Ischyrocerus* "species" T-2. Male of 7.2 mm, St. 40–2+3, except A: male of 6.2 mm, St. 40–2+3.

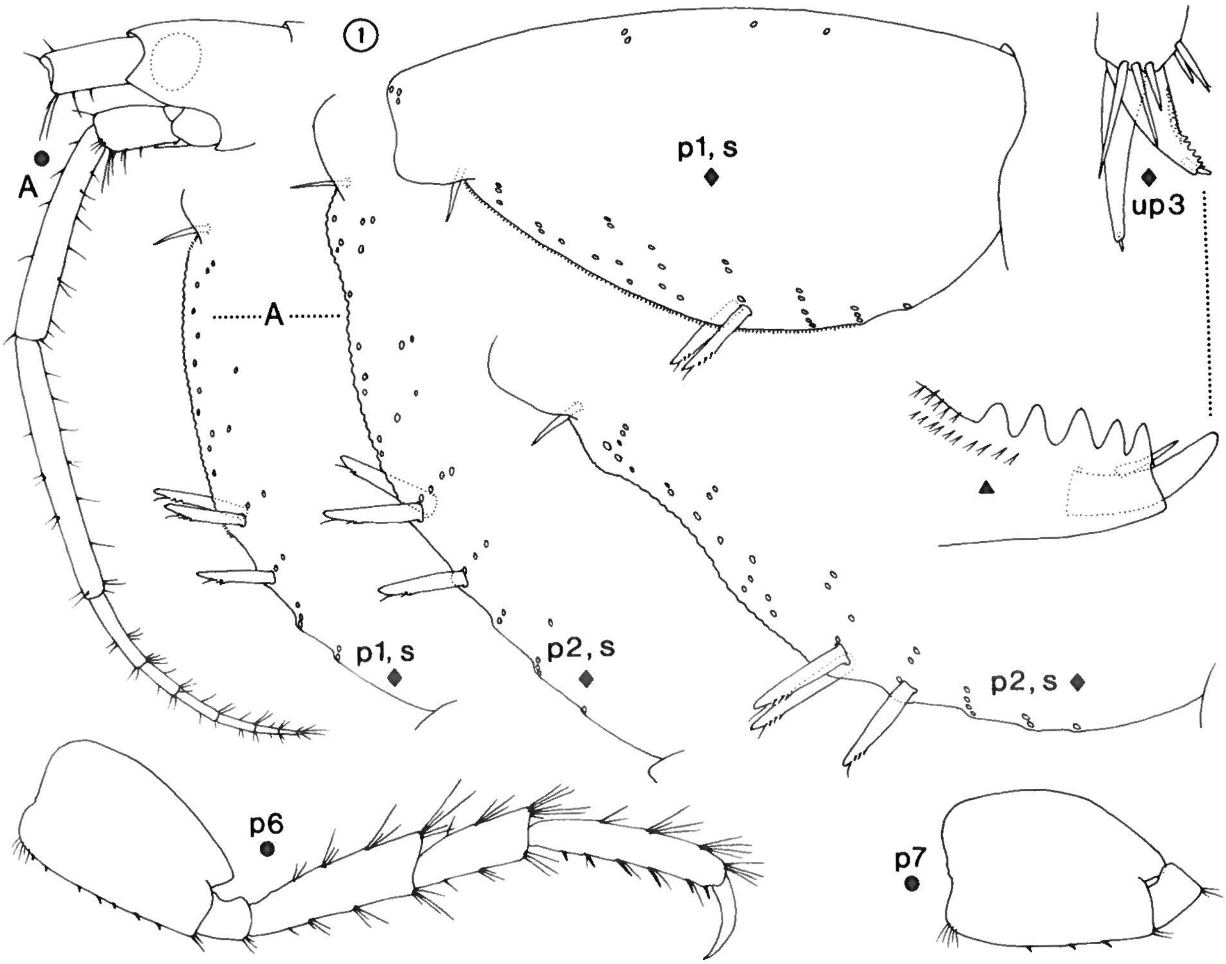


Fig. 16. *Ischyrocerus* "species" T-2. A: Young male, 4.7 mm, St. 40–2+3. All others: Ovigerous female, 7.3 mm, St. 40–2+3.

pared with the preceding two "species" may be significant, but changes in the number of spines with growth cannot be ruled out.

"Species" T-3 females differ from the single male in having pereopod 2 only slightly larger than pereopod 1, and in having a single row of 3–4 strong teeth dorsally on the outer ramus of uropod 3 instead of the double row present in the male.

Lysianassidae

Anonyx Kröyer, 1838
Anonyx affinis Ohlin, 1895 (Figs 19–20)

The present species was described by Ohlin (1895a; with additional comments 1895b) from four females collected in the southernmost part of the Thule area. Steele & Brunel (1968) were unable to locate Ohlin's type material and considered *A. affinis* a doubtful species. I fully agree with them that specimens referred by Gurjanova (1951, 1962) to *A. affinis* in several important characters deviate to such an extent from Ohlin's rather detailed description that they cannot reasonably belong to this species.

Kudrjaschov (1972) recorded *A. affinis* from littoral and shallow sublittoral water in the eastern Sea of Okhotsk. Kudrjaschov does not give any systematic information on his specimens, but the fact that he cites Ohlin (1895) and Gurjanova (1951, 1962), but not Steele & Brunel (1968), makes it almost certain that what he had at hand was not *A. affinis* Ohlin, 1895, but the species described and figured by Gurjanova (1951, 1962).

I have compared the larger of the present two specimens (a male of 10.0 mm, with well-developed copulatory papillae) with Ohlin's description (in Swedish). The specimen possesses all the attributes listed by Ohlin, which can be considered of diagnostic value within the genus, and differs from Ohlin's description in the following points only:

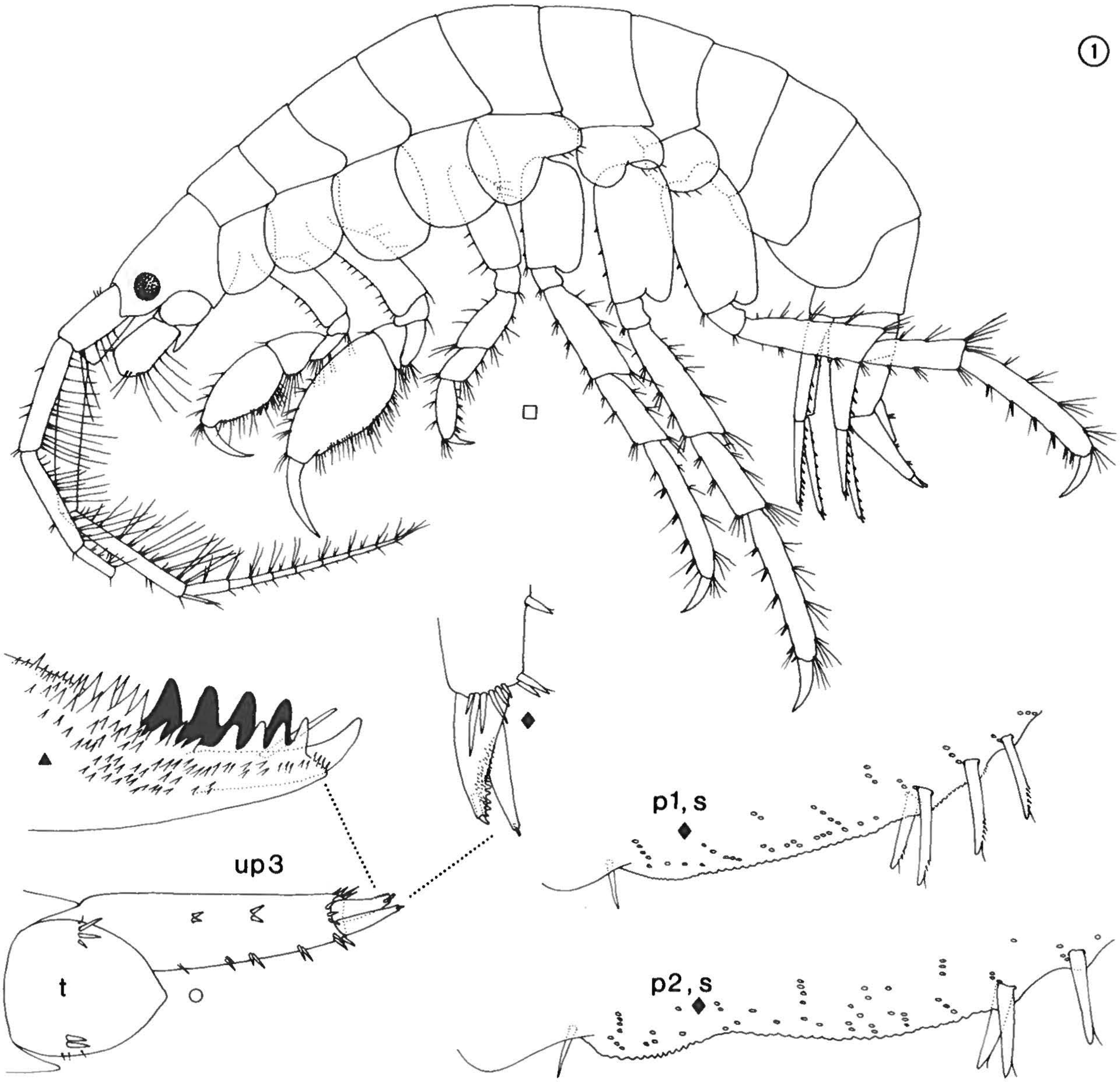


Fig. 17. *Ischyrocerus* "species" T-3. Male of 9.1 mm, St. 40–5.

Ohlin (1895a), female:	Present male:
1) Cephalic lobes rounded.	Cephalic lobes broadly triangular, apex rounded.
2) Accessory flagellum almost as long as flagellum of antenna 1.	Accessory flagellum about 2/3 the length of flagellum of antenna 1.
3) Telson with one apical spine on each lobe.	Telson with one apical seta and one subapical spine on each lobe.
4) Uropod 3, inner ramus 1/3 shorter than outer ramus.	Uropod 3, inner ramus about 1/8 shorter than outer ramus.
5) Uropod 1 reaching beyond uropod 3.	Uropod 1 reaching to the tip of uropod 3.

Points 1, 2, 4, and 5 are commonly occurring sexual or allometric differences in the Lysianassidae, and the difference in point 3 may very well be sexual in nature, ordinary infraspecific variation, or an incorrect interpretation by Ohlin.

The present specimens share with *A. affinis* as described and figured by Ohlin the diagnostically characteristic combination of a strongly oblique palm of pereopod 1, a very short projection of the otherwise nearly rectangular pleonal sideplate 3, and a simple unconstricted inner ramus of uropod 2.

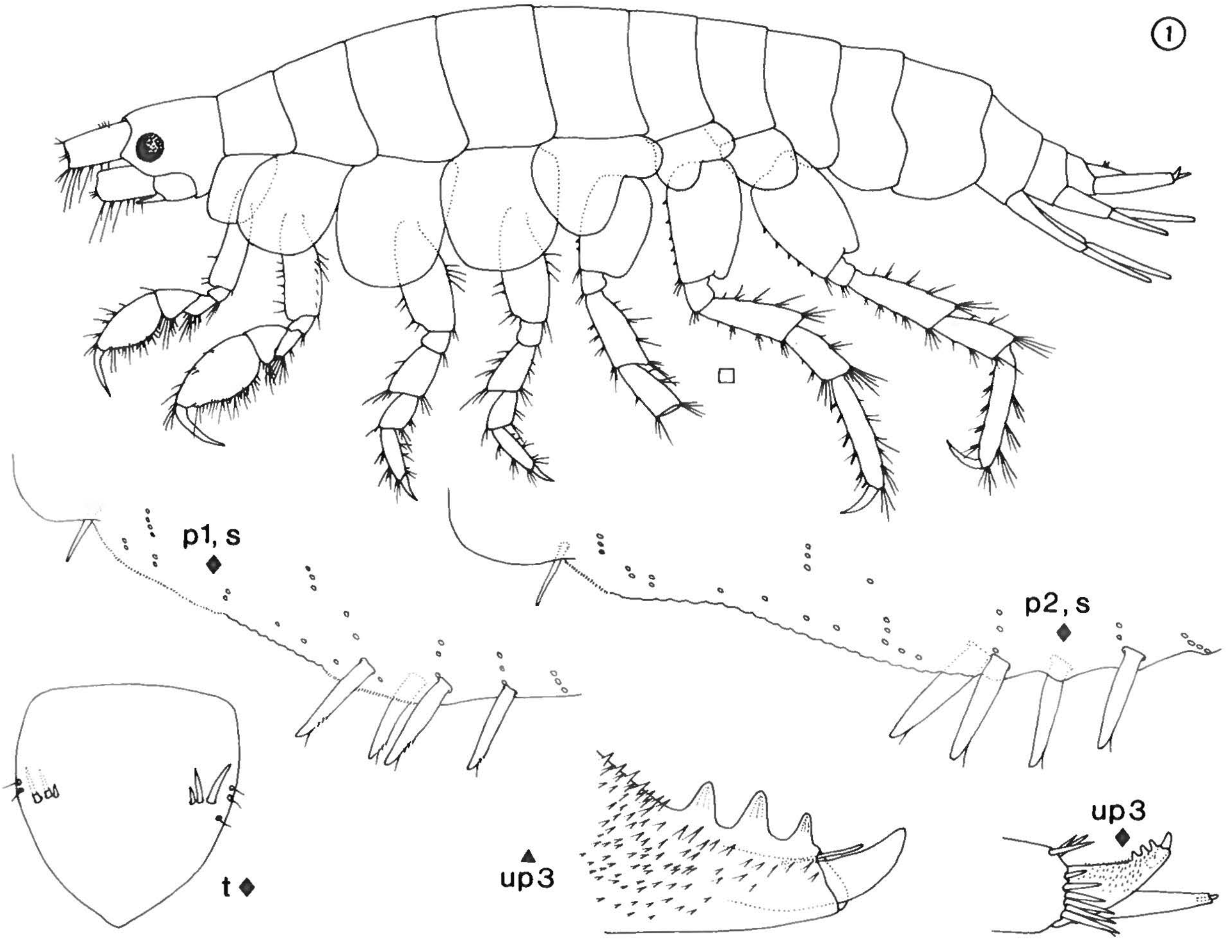


Fig. 18. *Ischyrocerus* "species" T-3. Ovigerous female, 7.5 mm, St. 40–5.

Tmetonyx Stebbing, 1906 (*sensu* Barnard, 1969a)

Tmetonyx cicada (O. Fabricius, 1780)

Tmetonyx cicada was described by Fabricius (1780: as *Oniscus cicada*) on material from SW Greenland. The type material is no longer in existence. The present material agrees with other collections from W and E Greenland (ZMUC), but attention is drawn to the fact that European and Northeast Atlantic specimens (including G. O. Sars, 1891, pl. 32) differ from the Greenland material with regard to the shape of coxal plate 4 and the spination of pereopods 3–7 and uropods 1–2.

In view of the above-mentioned facts concerning Fabricius' original material, and the homogeneity of the Greenland material, I find it reasonable to refer the present specimens to *T. cicada*.

Stephensen (1925) drew attention to variations in the shape of coxal plate 4, but he considered the eastern form to be the "typical" one.

Dunbar (1954) discussed *Tmetonyx orchomenoides* Stephensen, 1925, *T. cicada* (Fabricius, 1780) and *T. similis* (G. O. Sars, 1891), having found the first mentioned species in his Ungava Bay material. He doubted the possibility of separating the three species.

T. similis, however, has a distally tapering coxal plate 1 and thus falls to *Tryphosella* (see Barnard, 1969a: 365). *T. orchomenoides,* which was also transferred to *Tryphosella* by Barnard (1969a), has the epistome produced in front of the upper lip (*Tryphosella*), but coxal plate 1 is similar to that of *Tmetonyx cicada* (*Tmetonyx* sensu Barnard, 1969a: monotypic).

Although the classification of *orchomenoides* is thus uncertain, this species as well as *similis* differ distinctly from what is here considered *Tmetonyx cicada.*

A revision of *T. cicada* is warranted and should include material from the entire range of the "species".

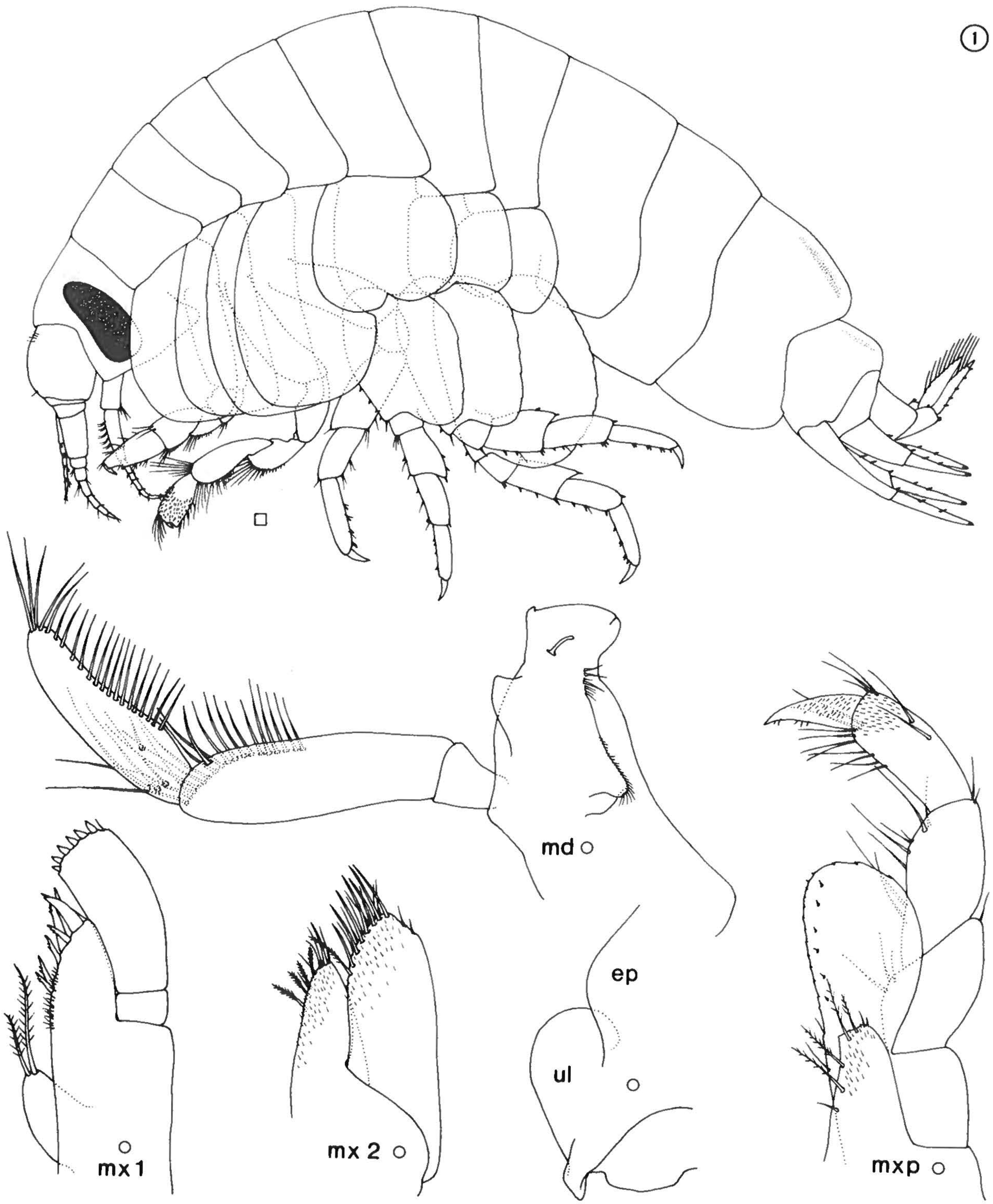


Fig. 19. *Anonyx affinis* Ohlin, 1895. Male of 10.0 mm, St. 26. Outer plate of maxilla 1 with only 8 of the 10 spines shown.

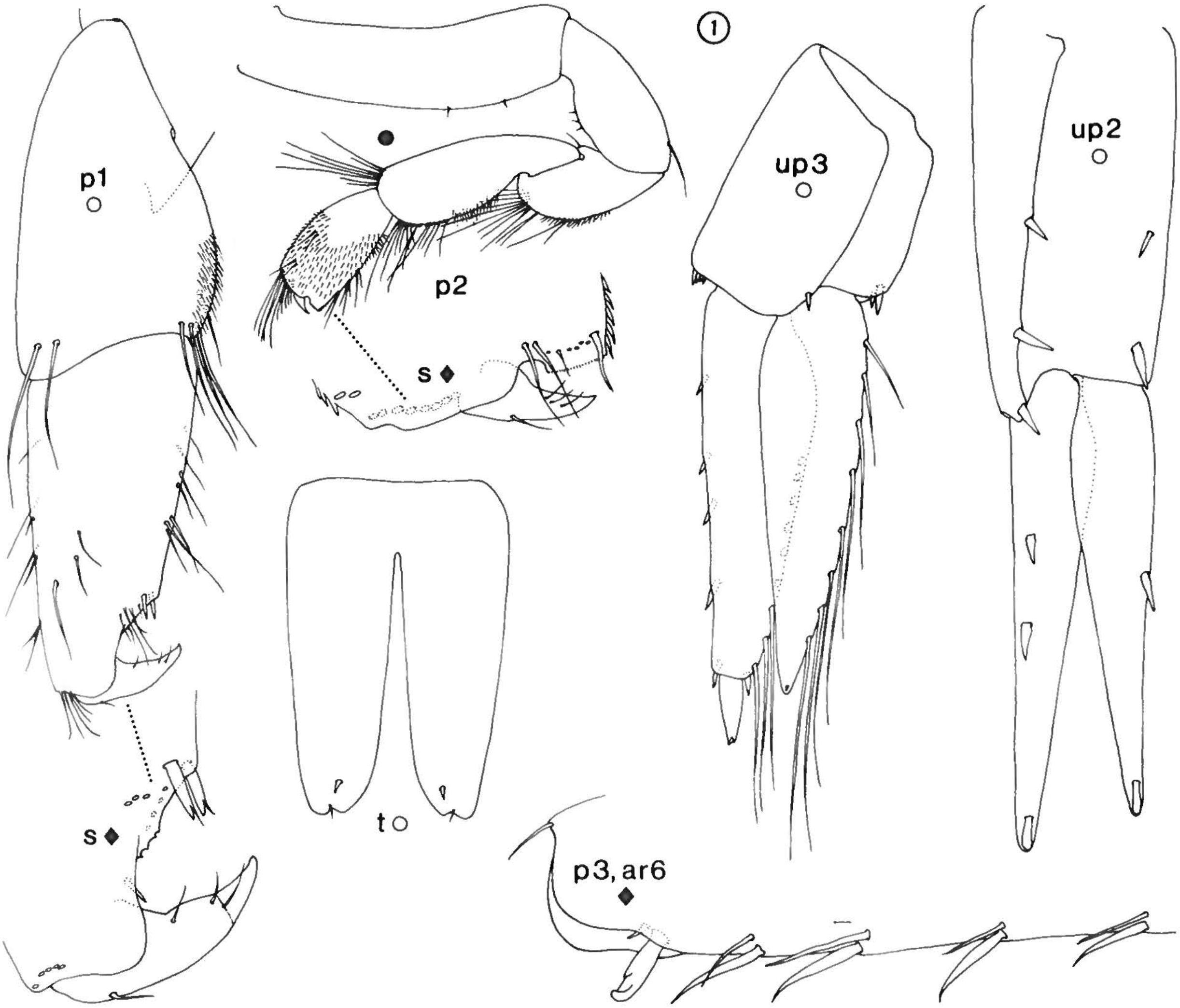


Fig. 20. *Anonyx affinis* Ohlin, 1895. Same specimen as in Fig. 19.

Oedicerotidae

Aceroides G. O. Sars, 1892

Oediceros obtusus Bruzelius, 1859, is now *Arrhis phyllonyx* (M. Sars, 1858). Hansen (1887b), when describing *Aceros distingendus* from Greenland, believed this species to be identical with *Oediceros obtusus* var. Goes, 1865 (tab. 40, fig. 24). G. O. Sars (1892) followed Hansen's view, but placed *A. distingendus* in synonymy with *Halicreion latipes* G. O. Sars, 1882, under the new generic name *Aceroides*. The inclusion of *Aceros distingendus* in *Aceroides latipes* has never been questioned. I have examined what exists of Hansen's type material (one male labelled cotype) and have found it to be in good accordance with *Aceroides latipes*.

Oediceros obtusus var. Goes, 1865, is, however, a distinct unnamed species of *Aceroides*. Three specimens from the present collection agree well with Goes' drawings. They are referred below to a new species, for which I propose a name in honour of the first recorder.

Aceroides goesi nov. sp. (figs 21–22)

Synonym: *Oediceros obtusus* var. Goes, 1865, tab. 40, fig. 24.
Holotype: Male of 12.1 mm, Bylot Sund, trawl from 76°32′N, 69°19.8′W to 76°33.5′N, 69°14.8′W, 185 m, clay, gravel, bryozoans, 20 Aug. 1968, Thule Exped., Just & Vibe St. 44–3. – ZMUC.
Additional material: One male of 11.5 mm (St. 26), one male of 10.2 mm (St. 32–1).
Description (male holotype): Body slender. Cephalon with faintly projecting, in dorsal view broadly rounded,

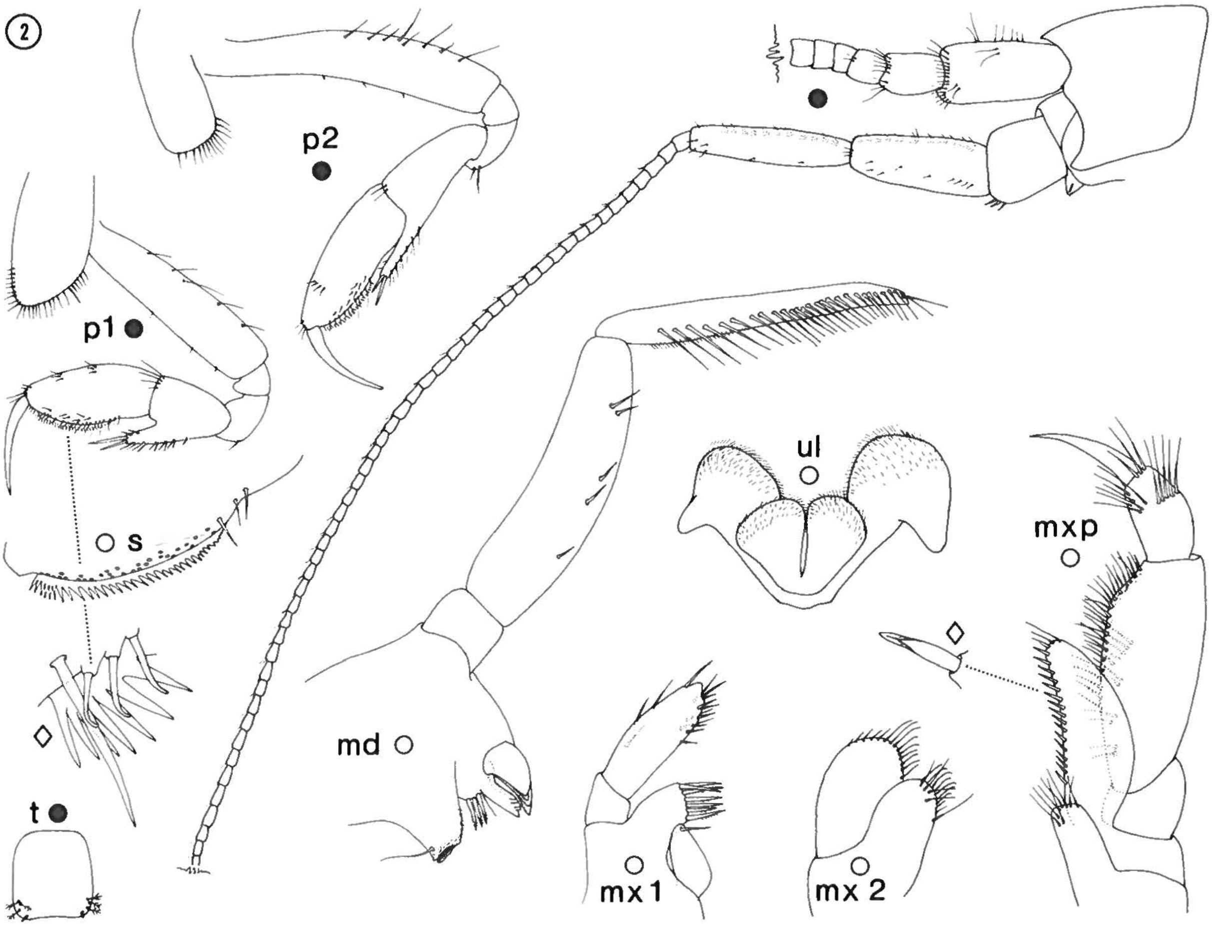


Fig. 21. *Aceroides goesi* nov. sp. Holotype male of 12.1 mm, St. 44–3.

rostrum; lateral cephalic front margin bi-insinuate, interantennal lobes rounded, inferior corner produced, bluntly pointed.

Mandibular palp very stout, articles 2 and 3 of subequal length, article 3 slightly tapering towards apex, with a row of equal-sized setae along almost entire margin. Article 4 (dactylus) of maxillipedal palp 1/6 longer than article 3, which tapers distally to a width equalling that of the base of article 4; outer plate with a medial row of equal-sized, distally compressed spines.

Antenna 1 about twice as long as peduncle of antenna 2 (antenna 1 broken in holotype, but observation made on male from St. 32–1), peduncular article 1 subequalling the combined length of articles 2 and 3, article 2 twice as long as 3; flagellum 3 times as long as peduncle (observed on male from St. 32–1). Antenna 2 distinctly longer than entire body (how much longer cannot be stated as the tip of antenna 2 is broken off in all three specimens); peduncular articles 4 and 5 cylindrical, article 4 slightly shorter and broader than article 5; flagellum extremely slender and composed of well over 50 articles.

Pereopods 1 and 2 slender, article 6 tapering distally, dactylus extending beyond cutting edge; cutting edge without defining spine(s) proximally, but with a row of sharply pointed, slender denticles along its entire length. Posterodistal lobe of article 5 of pereopod 1 narrow, with 2 long spines apically, corresponding lobe in pereopod 2 longer and more slender than in pereopod 1.

Pereopods 3–6 generally as in *A. latipes* but more slender. Pereopods 3–4 with scattered, short setae (compared with *A. latipes*) on anterior and posterior margins of article 2 and a pair of spines proximally on the posterior margin. Pereopods 5–6 differing in the setation of article 2, pereopod 5 with a heavy row of equal-sized short setae anteriorly and fewer, unequal-sized setae posteriorly; pereopod 6 with an anterior row of long plumose setae and a single plumose seta posteriorly, together with a couple of proximal setules.

Pereopod 7 with the combined length of articles 3–7 three and a half times longer than article 2, articles 2 and 4–7 with spines, but without long setae (observed in male from St. 26).

Uropod 1 (and presumably uropod 2) with outer

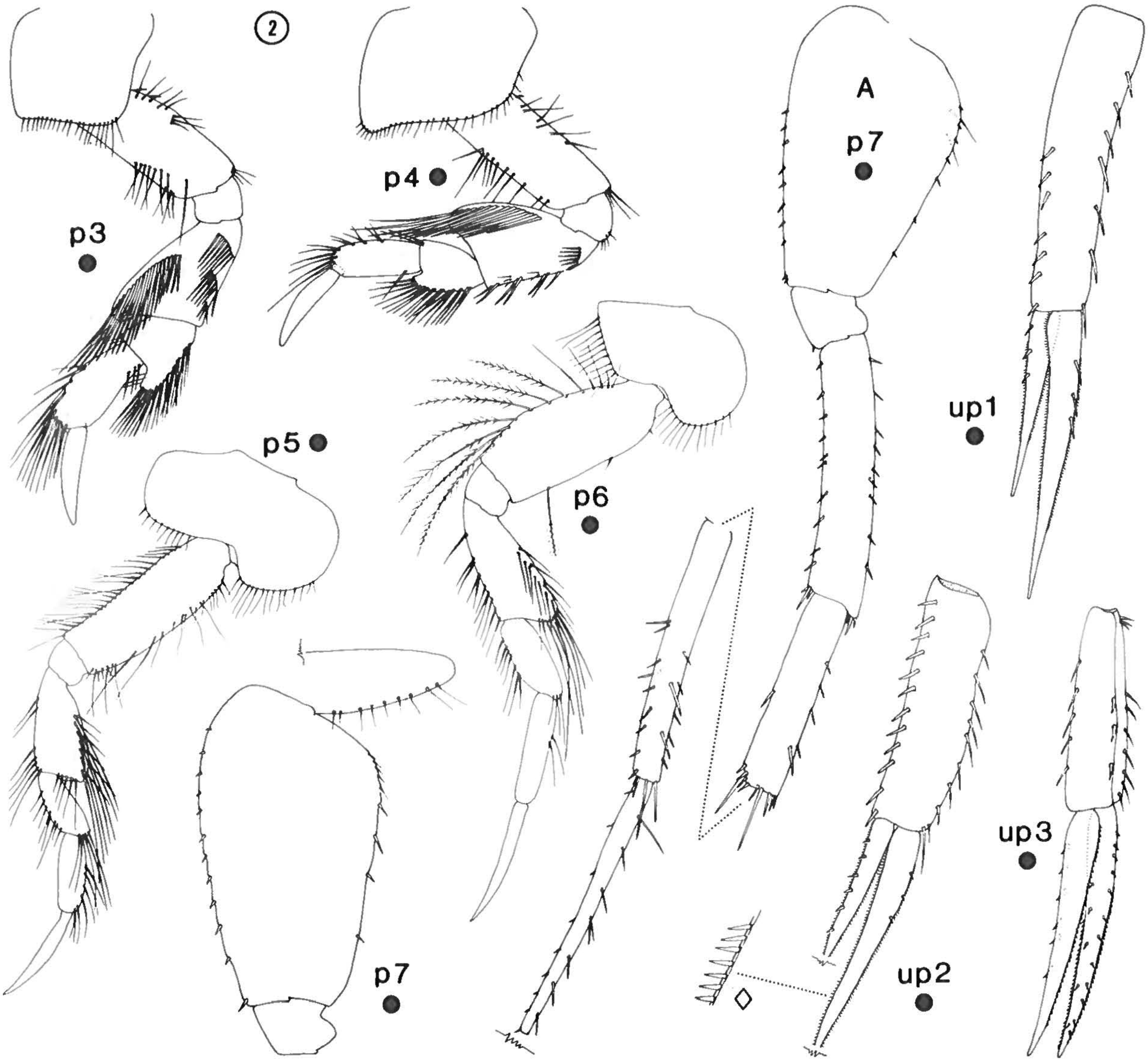


Fig. 22. *Aceroides goesi* nov. sp. Holotype male (see Fig. 21) except A: male of 11.5 mm, St. 26.

ramus 2/3 the length of inner ramus; uropod 3 with rami of equal length. Peduncles of all three uropods strongly spinose; rami with scattered, short spines and microspinulose margins.

Telson as broad as long, with shallow apical emargination; distal lobes with a single spine and three plumose setae.

Distrubution: Thule area: 34–200 m. Spitzbergen.

Remarks on affinity: *A. goesi* nov. sp. is closely related to the other two Arctic species of the genus (*A. latipes* G. O. Sars, 1892, and *A. sedovi* Gurjanova, 1946) on account of the structure of pereopods 1 and 2 (see Barnard, 1967, for a discussion of *Aceroides* and a key to species). *A. goesi* differs in many respects from *A. latipes,* notably in the length of the antennae in adult males, the slenderness of pereopods, the shape of the posterodistal lobe in article 5 of pereopods 1 and 2, the weakly spinose uropodal rami, and several details of the mouthparts.

Gurjanova's description and figures of *A. sedovi* (1946, 1951 no new information) are inadequate for a full comparison with *A. goesi.* Gurjanova describes and figures only the details in which *A. sedovi* differs most obviously from *A. latipes* (peduncle of antenna 1, pereopods 1–2, pereopods 3–4, telson). In several of these features *A. goesi* differs distinctly from *A. sedovi*: 1) In *sedovi* the peduncle of antenna 1 has article 3 longer than 2, while in *goesi* article 3 is half the length of 2. 2) The cutting edge of pereopods 1–2 is conspicuously serrate in *goesi.* 3) Pereopod 3 in *sedovi*

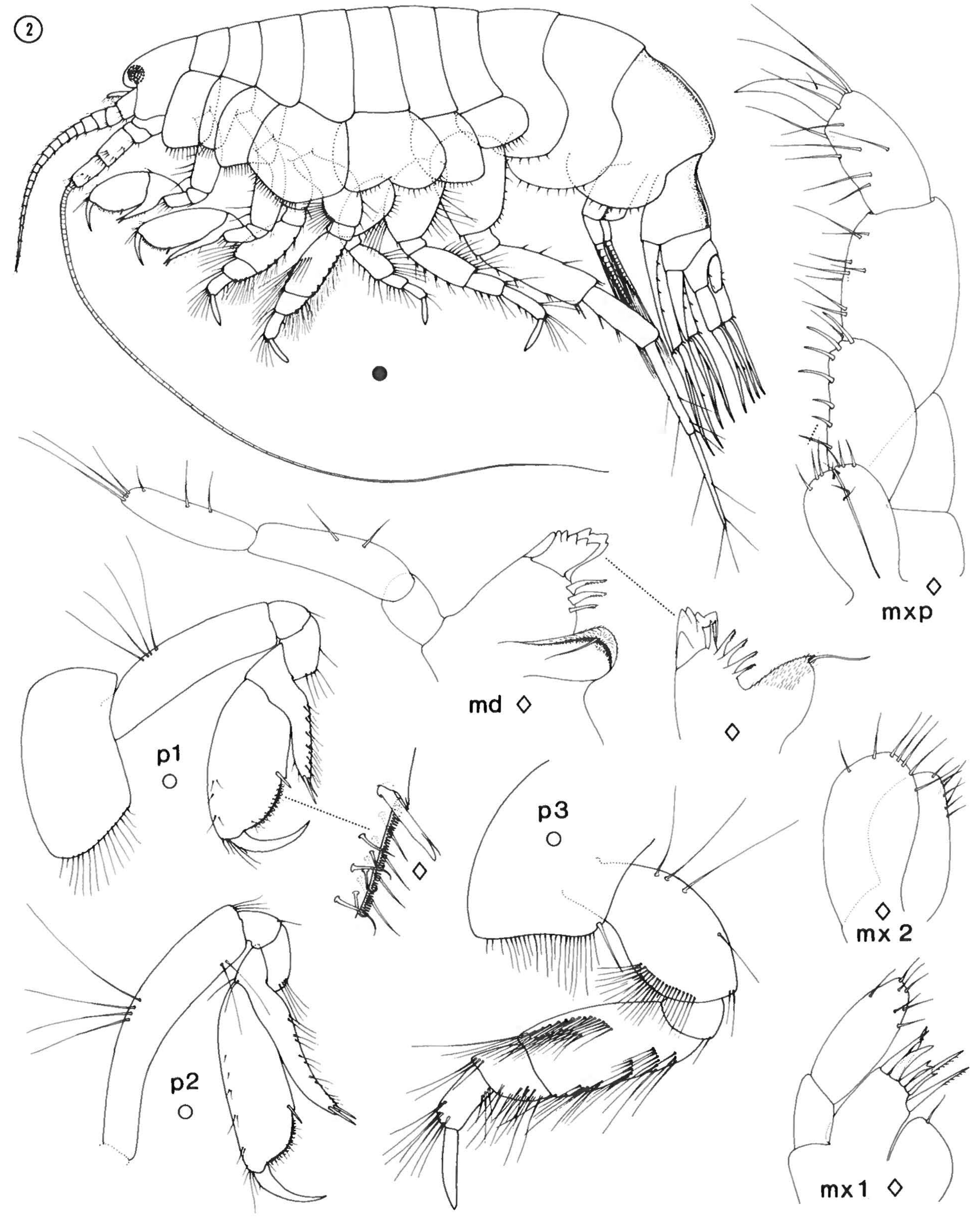


Fig. 23. *Arrhinopsis longicornis* Stappers, 1911. Adult male of 4.7 mm, St. 15–1.

lacks setae on the posterior margin of article 4, while setae are present in *goesi*. Pereopod 4 in *sedovi* has three transverse rows of setae near the posterior margin of article 4, while *goesi* has one transverse row proximally and four groups of stout setae (spines) more distally. In *goesi* article 5 of pereopod 4 is as heavily beset with setae as article 5 of pereopod 3, while in *sedovi* article 5 of pereopod 4 has only "a few" setae in contrast to the long row of setae in article 5 of pereopod 3. In *sedovi* the dactylus of pereopod 4 is shorter than article 6, while in *goesi* the two articles are of equal length.

In addition, Gurjanova describes *sedovi* as a very broad, robust species comparable in body shape to the broad, short-legged form of *A. latipes*, (*A. l. robusta*, Gurjanova, 1933), while *goesi* is very slender, even compared with *A. l. latipes*.

Arrhinopsis Stappers, 1911
Arrhinopsis longicornis Stappers, 1911 (Figs 23–24)

This species was described from a single specimen collected off the south coast of Novaja Semlja. Since then it has been recorded by Oldevig (1959, King Karls Land, Spitzbergen, 1 specimen) and Brunel (1961, 1970, Baie des Chaleurs, Gulf of St. Lawrence). The species is also present in Frobisher Bay, Baffin Island (pers. comm. Dr. J. W. Wacasey, Mr. Ali Mohamed).

Stappers' drawings of the mouthparts are quite accurate (1911, pl. 1, figs 17–30; pl. 2, figs 1–6). Specimens examined by me also have on the outer plate of maxilla 1 seven spines, two of which are apically bifid. The rest of Stappers' figures are somewhat schematic and do not include a habitus drawing.

Stappers states that his single specimen is a female. In spite of his representation (pl. 2, fig. 1) of what he thought was a not fully developed marsupial plate, the long antenna 1 suggests that his specimen was a male. In the present material adult and subadult females invariably have the antennae of subequal length and strength, whereas antenna 2 in males grows longer and longer with approaching maturity and finally reaches a length equalling that of the entire body (a sexual dimorphism of common occurrence in the Oedicerotidae).

Stappers' specimen did not show any trace of eyes, The same is true for most of the present material. A few specimens, however, show that the species does in fact possess a single, spherical compound eye situated in the obtusely rounded rostral projection. The entire eye normally retracts completely from its *in vivo* position during preservation of the animal.

Bathymedon G. O. Sars, 1892
Bathymedon antennarius nov. sp. (Figs 25, 26, 27A)

Holotype: Ovigerous female of 3.8 mm. Bylot Sund, off Narssarssuk, 11 m, clay, *Desmarestia*, detritus dredge, 17 Aug. 1968, Thule Exped., Just & Vibe, St. 40–2+3. – ZMUC. – Allotype: Male of 3.6 mm, same data as holotype.

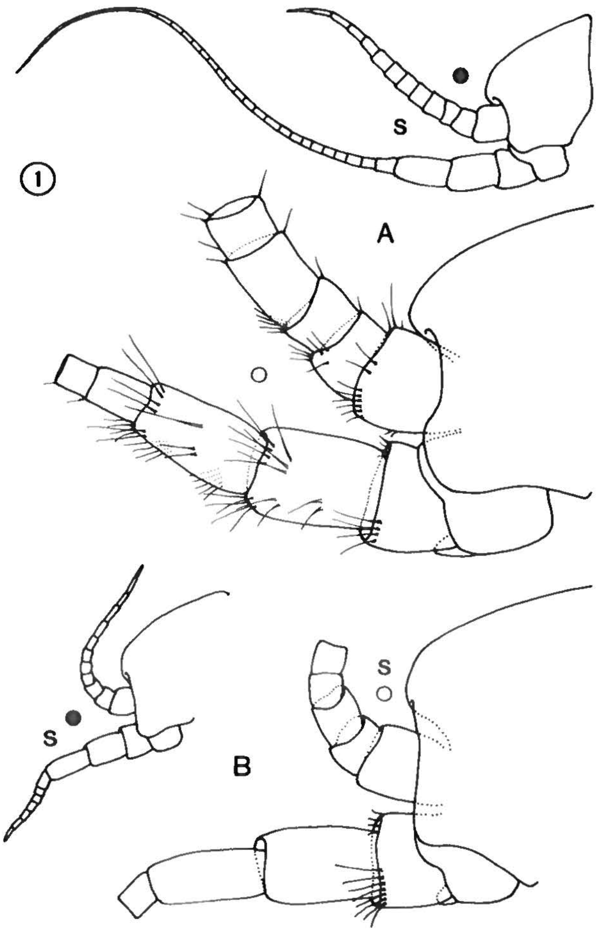


Fig. 24. *Arrhinopsis longicornis* Stappers, 1911. A: Subadult male, St. 19–1. B: Adult (setiferous oostegites) female, St. 14–2.

Additional material: 25 specimens (see Tab. 2).

Description (female holotype): Cephalon as long as first two pereonites combined; rostrum short, blunt in lateral view, extending 1/3 along peduncular article 1 of antenna 1. Lateral lobe of cephalon without projections or angles, curving evenly into the inferior margin. Eye present (but withdrawn and deformed in all specimens, presumably round, at base of rostrum).

Coxal plate 1 rectangular with apical corners rounded; coxal plates 1–3 with a slender spine in posterior margin. Pleonal sideplate 1 with posterodistal corner nearly right angled, blunt, distal part of posterior margin straight; plates 2 and 3 with posterior and inferior margins forming an even curve.

Antennae 1 and 2 of equal length. Antenna 1 as long as cephalon and first $1^1/_2$ pereonites combined; peduncular articles 2 and 3 combined as long as 1, article 3 slightly shorter than 2; flagellum $1^1/_2$ times longer than peduncle. Antenna 2 with peduncular articles 4 and 5 of

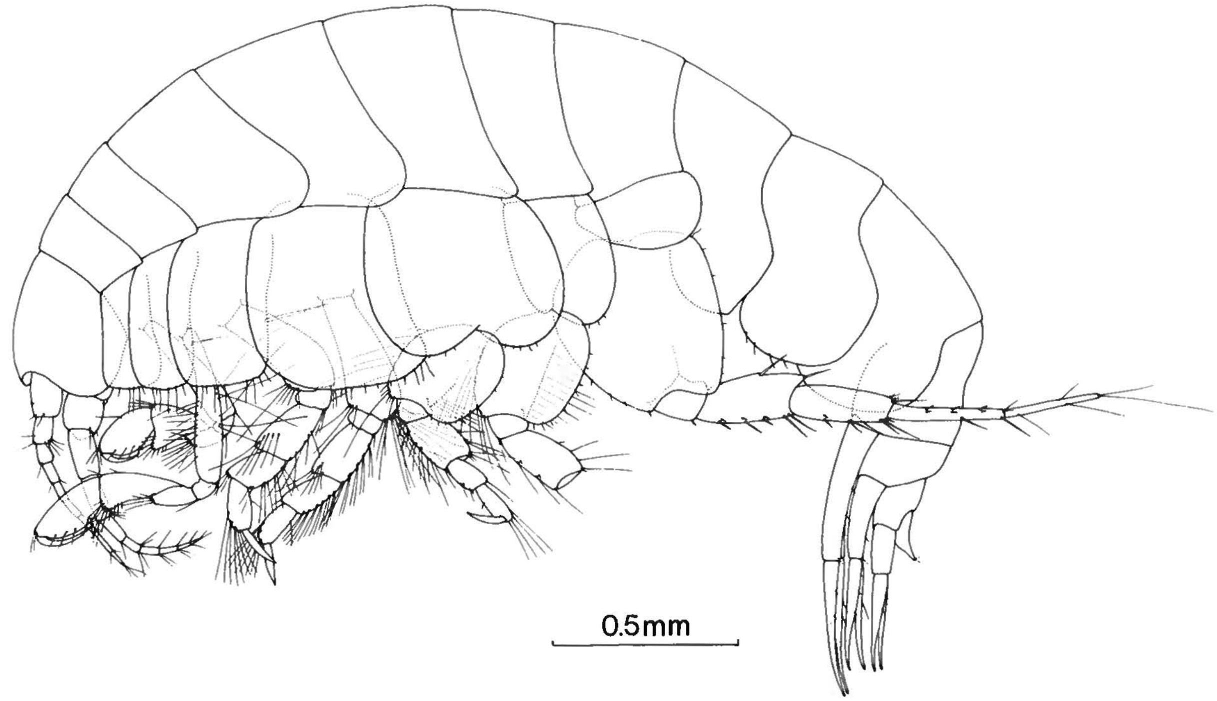


Fig. 25. *Bathymedon antennarius* nov. sp. Holotype, ovigerous female of 3.8 mm, St. 40–2+3.

equal length, combined length subequal to that of flagellum.

Pereopod 1 with article 6 stout, oval, as long as article 5 measured along anterior curvature; cutting edge slightly longer than rest of hind margin, defined proximally by a spine of about half the length of cutting edge; article 5 with triangular, apically rounded lobe equalling the length of non-cutting part of hind margin of article 6. Pereopod 2 with article 6 slender, oval, as long as article 5 measured along anterior curvature; cutting edge twice as long as rest of hind margin, defining spine 2/5 the length of cutting edge; anterior lobe of article 5 short, broad, apically rounded.

Pereopods 5 and 6 of equal size and shape, with article 2 broadly expanded, nearly as broad as long, broadly rounded posterodistally. Pereopod 7 with article 2 much larger than in pereopods 5 and 6, nearly as broad as long, tapering towards bluntly triangular posterodistal projection.

Rami of uropod 1 extending beyond uropods 2 and 3 by 1/4 the length of rami of uropod 2; rami of uropod 2 reaching to the tip of rami of uropod 3. Inner and outer ramus of all three uropods of equal length.

Telson 1/3 longer than broad, tapering towards truncate apex, with lateroapical corners roundedly produced; apical margin with two spines in the middle and two lateral setae.

Male: Differing from female with regard to antenna 1: peduncular articles somewhat longer, but with the same interarticular ratios; flagellum 2½ times longer than peduncle, with distal articles more than twice as long as proximal ones.

Distribution: 11 m to 200 m; not known from outside present area.

Remarks on affinity: *Bathymedon antennarius* nov. sp. is quite similar to *B. obtusifrons* (Hansen, 1887b), (see G. O. Sars, 1892, pl. 118; Shoemaker, 1930, figs 26–27), but differs from it in the following points: *B. obtusifrons* has a distinct angle in the middle of the lateral lobe of cephalon (Fig. 27B), coxal plate 1 is somewhat more expanded distally and has an obliquely truncate apex; article 6 of pereopods 1 and 2 is distinctly longer than article 5 measured along anterior curvature (Fig. 27B); article 2 of pereopods 5–7 is much less expanded than in *B. antennarius.* Antenna 2 in female *B. obtusifrons* is about 1/5 longer than 1, and the *obtusifrons* male has a short, stout antenna 1, and the flagellum of antenna 2 is slender and much elongated (Fig. 27B). The telson in *B. obtusifrons* is as long as broad or only very slightly longer.

B. antennarius is also close to *B. nanseni* Gurjanova, 1946, which, however, has a distally expanded coxal plate 1, a more strongly lobed article 5 of pereopod 2, and a narrow article 2 with almost parallel sides in at least pereopod 5 (pereopods 6 and 7 not figured).

B. obtusifrons and *B. nanseni* are both larger (6 mm and 9 mm respectively) than *B. antennarius,* which is less than 4 mm.

Remarks on classification: The long antenna 1 in the male of *B. antennarius* nov. sp. has raised some doubt as

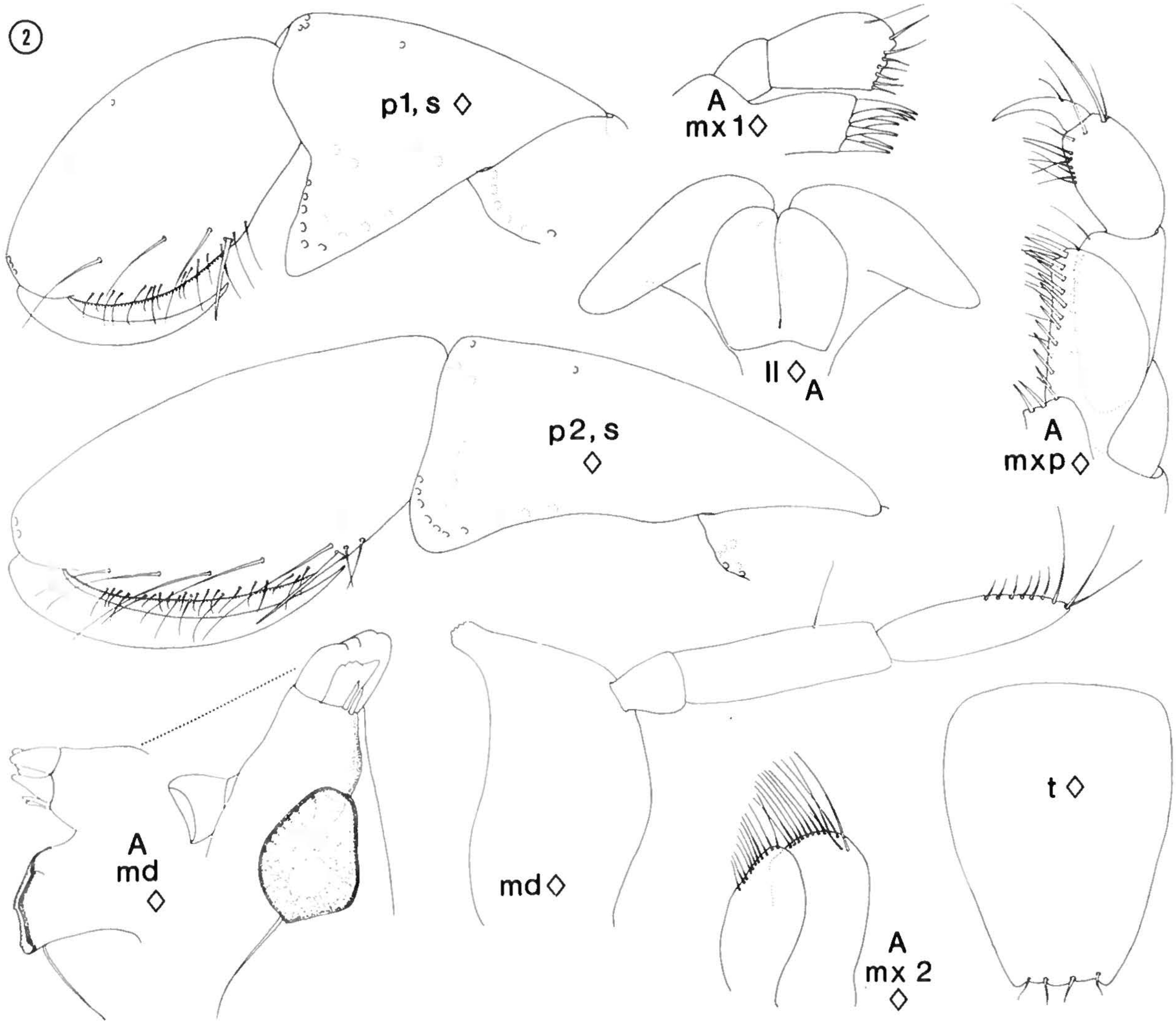


Fig. 26. *Bathymedon antennarius* nov. sp. Holotype female (see Fig. 25), except A: male of 3.3 mm, St. 40–2+3.

to its generic affinity. Of the more than 20 species of *Bathymedon* presently known, males have been described in less than half. *B. longimanus* (Boeck, 1871), type species of the genus (G. O. Sars, 1892, pl. 117), and *B. obtusifrons* both have a short antenna 1 and a much elongated flagellum of antenna 2 in males. In male *B. saussurei* (Boeck, 1871), antenna 1, although rather long and slender, is distinctly shorter than antenna 2 (present investigation). Males of *B. roquedo* Barnard, 1962b, and *B. vulpeculus* Barnard, 1971, have antenna 2 longer than 1, and, although descriptions and figures are not unequivocal on this point, this also seems to be the case in *B. ivanovi* Bulytscheva, 1952, *B. pumilis* Barnard, 1962b, and *B. covilhani* Barnard, 1961 (see Barnard, 1966).

Until the antennal arrangement in more terminal males of *Bathymedon* has been described, the taxonomical significance of the long antenna 1 versus the long antenna 2 cannot be discussed.

Barnard (1969a) defines *Bathymedon* as having a smooth molar cutting edge. *B. antennarius* has a dentate molar cutting edge, and this is also the case in recently moulted specimens of *B. longimanus* (type species). The small denticles are, however, soon worn down to form an obtuse, simple cutting edge.

Monoculodes Stimpson, 1853

Monoculodes longirostris (Goes, 1865) (Fig. 28)

Dunbar (1954) reported a single mature female of *M. longirostris* from Ungava Bay to deviate towards *M. hanseni* Stebbing, 1894. In my study of Canadian Arctic Oedicerotidae (unpublished) I have found a number of strikingly distinctive forms of *Monoculodes* clustering

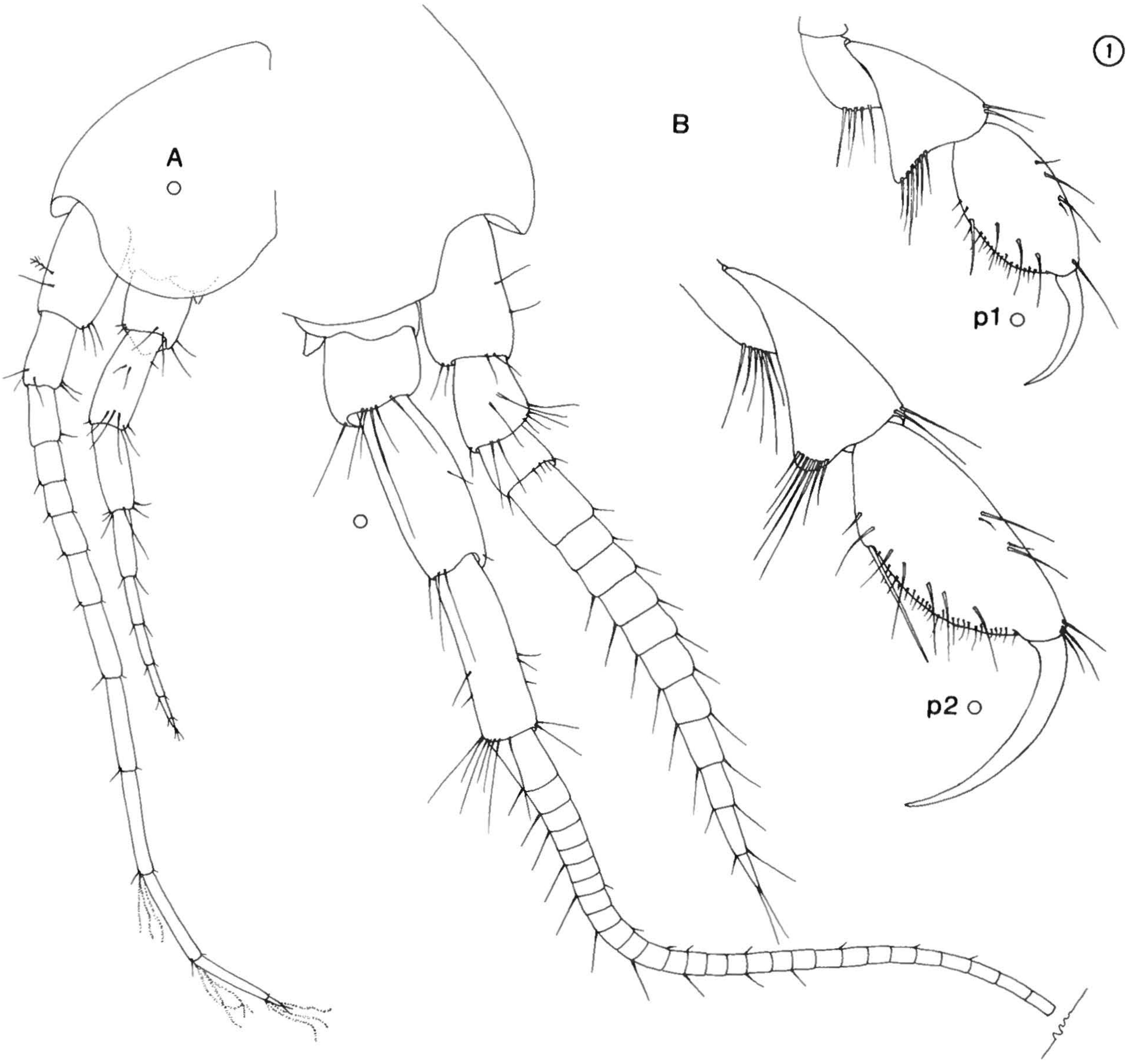


Fig. 27. A: *Bathymedon antennarius* nov. sp., allotype male, 3.6 mm, St. 40–2+3. B: *Bathymedon obtusifrons* (Hansen, 1887), male of 5.6 mm, St. 16–1.

around *M. kröyeri* Boeck, 1871, *M. longirostris* (Goes, 1865), and *M. hanseni* Stebbing, 1894. A complete circumpolar revision of these species is necessary before specimens of this group can safely be referred to species.

This is the first record of *M. longirostris* from W Greenland, but the material is in full agreement with material from E Greenland (ZMUC; also discussed by Dunbar, 1954), and apparently it does not differ from that of Goes (1865, tab. 39, fig. 20). I therefore find it reasonable to tentatively refer the Thule specimens to *M. longirostris.*

Monoculodes intermedius Shoemaker, 1930 (Fig. 29A)

Shoemaker (1930) described and figured an adult male. Bousfield (1973) also figured a male. The present material consists of one ovigerous ♀ of 7.6 mm, one recently spent female of 7.2 mm, and three juveniles. They agree in detail with Shoemaker's description and drawings, including the arrangement of spines on the pleonal sideplates, with a single exception: in the two adult females the long setae on the posterior margin of articles 6 and 7 of pereopod 7 are simple (Fig. 29A), not plumose as shown in Shoemaker's male. As this difference may well be a case of sexual dimorphism I do not

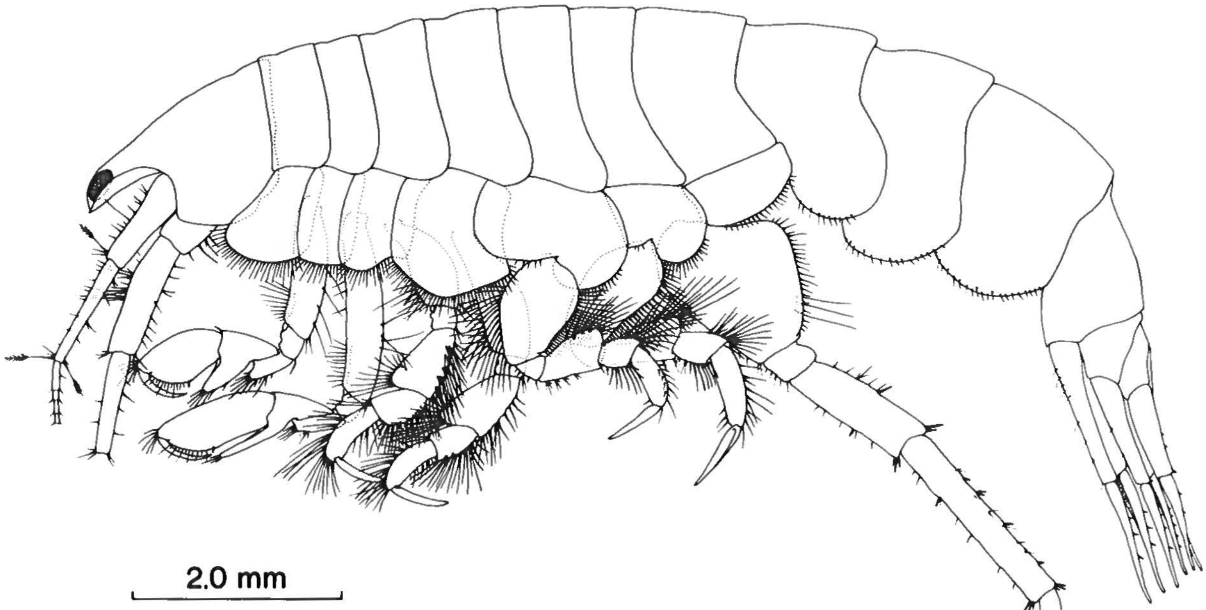


Fig. 28. *Monoculodes longirostris* (Goes, 1865). Subadult female, 12.9 mm, St. 19–1.

hesitate to refer the present specimens to *M. intermedius*.

Monoculodes packardi Boeck, 1871 (Fig. 29)

The four specimens secured are all immature females. They have been compared with material from northern Norway (Finnmark; G. O. Sars det.; ZMUC), with which they agree closely, except for article 2 of antenna 1 being slightly shorter than article 1 in the Thule specimens (Fig. 29) rather than longer (see also G. O. Sars, 1892, pl. 109, fig. 1). The Norwegian material, however, shows that this is an allometric relation, in which the latter condition is reached in subadults and adults. The variations in the curvature of the rostrum found here (Fig. 29) are also present in the Norwegian material.

The present four specimens correspond with Enequist's (1949) ♀♀ juv. II. Enequist places *M. tenuirostratus* Boeck, 1871, in synonymy of *M. packardi*, a move which has not been generally accepted (Barnard, 1958, 1969a).

Monoculodes vibei nov. sp. (Figs 30, 31, 32, 33B)

Holotype: Male of 10.6 mm. Bylot Sund, off Narssarssuk, 3 m, sand, clay, empty shells, Ockelmann dredge, 17 Aug. 1968, Thule Exped., Just & Vibe St. 40–5. – ZMUC. – Allotype: Female of 9.6 mm; same data as holotype.

Additional material: 33 specimens of present collection (see Table 2): 32 from depths of 2.3–3.0 m, one from 22–25 m. – One male, Resolute, 74°37.5′N, 94°12.0′W, 0–5 m, 31 July 1962, St. 62–4003, P.70, Fish. Res.Bd. Canada (Arctic Biological Station, St. Anne de Bellevue).

Description (male holotype): Cephalon as long as first $3^1/_3$ pereonites combined; rostrum projecting just beyond peduncular article 1 of antenna 1, with nearly straight ventral keel; apex of rostrum in front of eyes with a distinct deflexion in lateral view (Fig. 33, arrow). Eyes apical, completely confluent and broadly oval in dorsal view.

Lateral lobes of cephalon with rounded apex; inferior cephalic margin evenly curved.

Coxal plate 1 strongly expanded distally, ax-shaped. Pleonal sideplate 3 posterodistally rounded.

Antenna 1 stout, peduncular article 3 half as long as 2, combined length of articles 2 and 3 two thirds the length of article 1; flagellum 1 1/4 the length of peduncle. Antenna 2 one and a half times the length of 1, peduncular articles 4 and 5 of subequal length; flagellum more slender than in antenna 1, as long as peduncular articles 3–5 combined.

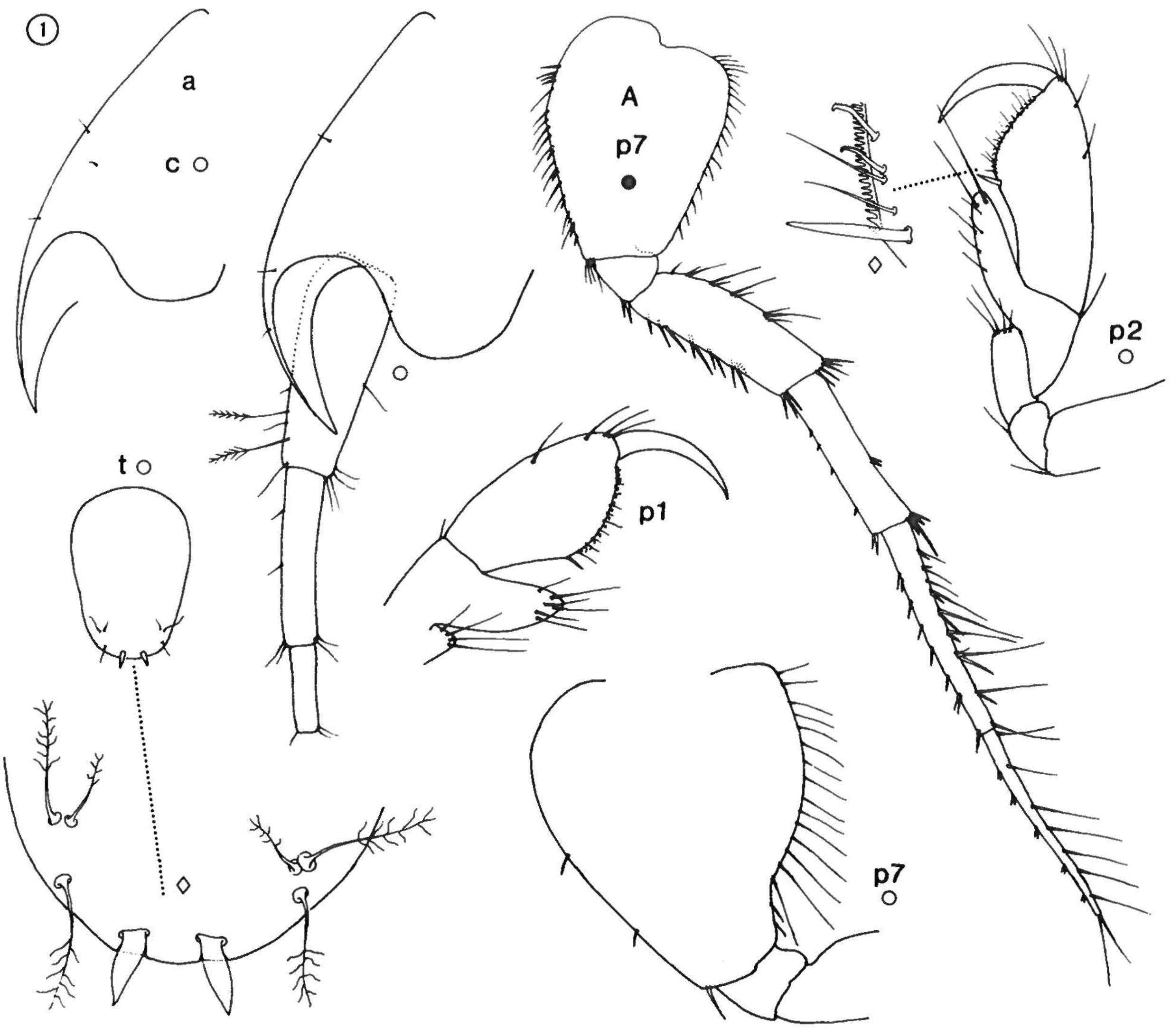


Fig. 29. A: *Monoculodes intermedius* Shoemaker, 1930. Recently spent female of 7.2 mm, St. 30–2. All others: *Monoculodes packardi* Boeck, 1871, young female of 3.6 mm, St. 30–1, except a: young female of 3.5 mm, St. 14–2.

Pereopod 1 with article 6 broadly oval, cutting edge convex, twice as long as rest of hind margin; posterodistal lobe of article 5 with broadly rounded apex reaching to defining spine of cutting edge of article 6. Pereopod 2 more slender than 1; article 6 with posterior and anterior margins parallel, nearly three times as long as broad, cutting edge convex, 2/3 the length of the rest of the hind margin; article 6 two and a half times longer than article 5 (measured along anterior margins); posterodistal lobe of article 5 slender, with an acute apical tooth which reaches the defining spine of the cutting edge of article 6.

Pereopod 7 with article 2 distally tapering, without posteroapical projection, posterior margin with slight concavity in distal third.

Telson 1 1/4 as long as greatest width, faintly tapering towards truncate, nearly straight apex; lateral corners rounded, each with one spine and three plumose setae.

Female: Differing from subadult and adult males in length and interarticular proportions of the antennae: peduncle of antenna 1 with article 2 longer and more slender than in male, 3/5 the length of article 1; articles 2 and 3 combined only slightly shorter than 1. Antenna 2 with flagellum not exceeding the combined length of peduncular articles 4 and 5.

Distribution: 2.3 m to 25 m; present area and Resolute, Arctic Canada.

Remarks on affinity: This species is close to *M. borealis* Boeck, 1871. Adult and subadult specimens of *M. borealis,* which attain about twice the size of *M. vibei* nov. sp., are easily distinguished from the latter by the different shape of the rostrum and the different interar-

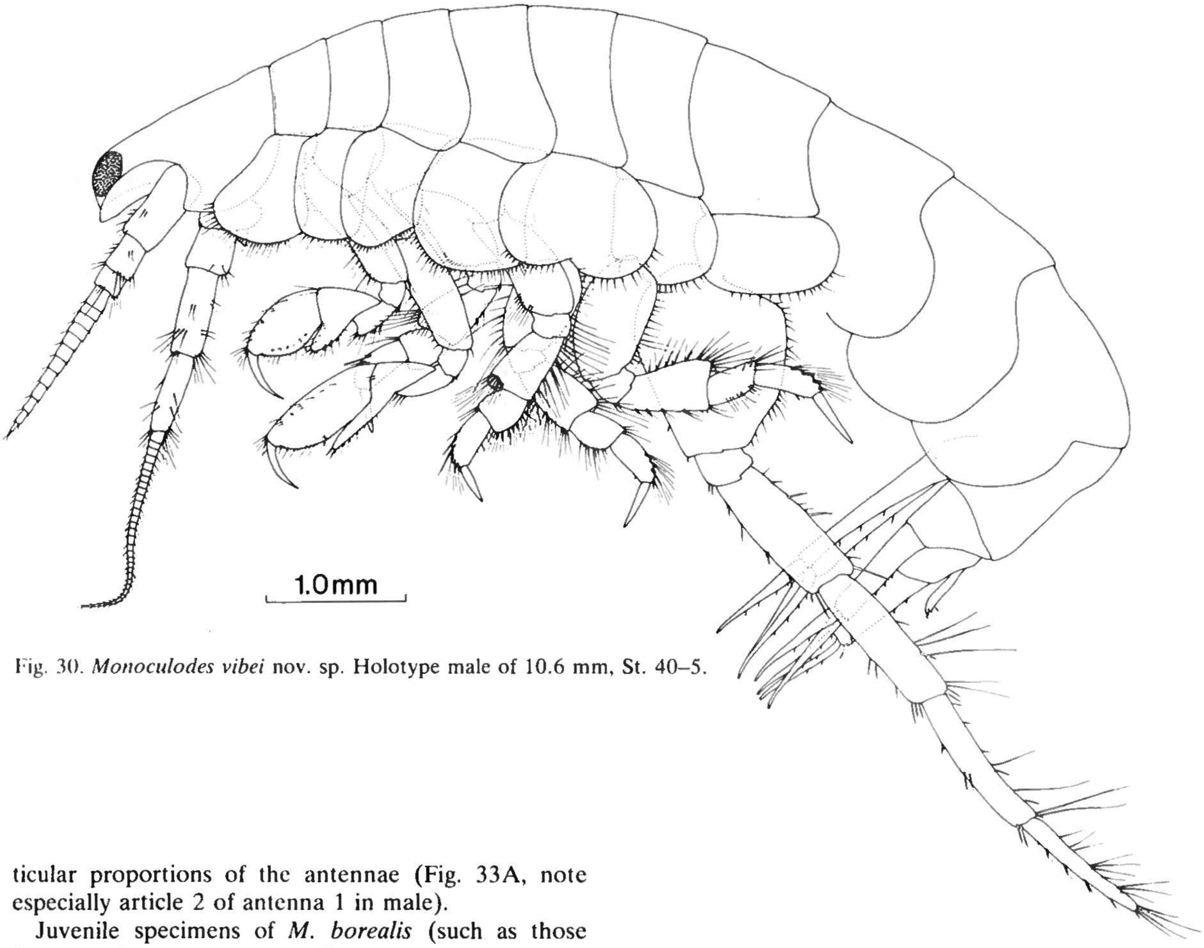


Fig. 30. *Monoculodes vibei* nov. sp. Holotype male of 10.6 mm, St. 40–5.

ticular proportions of the antennae (Fig. 33A, note especially article 2 of antenna 1 in male).

Juvenile specimens of *M. borealis* (such as those found in the present material) equalling subadult and adult *M. vibei* in size are far more similar to *M. vibei*, as the cephalic and antennal characteristics have not yet reached their full expression. Subadult and adult males of *M. vibei* are immediately recognizable on their characteristic antenna 1, but although antennal differences exist between all other *M. vibei* and equal-sized juveniles of *M. borealis* the two species can most readily be separated by the rostrum being strongly deflected ventrally below the eyes in *M. borealis*, whereas in *M. vibei* the ventral margin of the rostrum is nearly straight to faintly but evenly concave.

The species is named after Dr. Chr. Vibe, Zoological Museum, Copenhagen.

Monoculodes sp., Just (1970)

A single immature specimen from St. 29–2 deviates from *M. packardi* in the same way as did a mature female from Peary Land, N Greenland (Just, 1970), viz., in having a low dorsal carina running from the middle of the cephalon across the eye(s) almost to the tip of the rostrum. As the present specimen is immature and damaged I still cannot give an adequate diagnosis of this apparently undescribed species.

Oediceros Kröyer, 1842
Oediceros sp. (Fig. 34)

The single specimen, presumably a male (no trace of even rudimentary oostegites), is strongly mutilated and everything posterior to pereonite 5 is missing. It is close to *O. borealis* Boeck, 1871 (Fig. 35), but differs in the shape of the rostrum and the lateral cephalic lobes, in having article 2 of the peduncle of antenna 2 longer than article 3 (shorter in *O. borealis*), in the shape of pereopods 1 and 2 and the degree of serration of the cutting edge, and in being densely hirsute on the surface of the antennal peduncles, the cephalon, body, and coxal plates.

The specimen represents an undescribed species and differs even more from the remaining three species of the genus (*O. saginatus* Kröyer, 1842; *O. minor* Gurjanova, 1929; *O. moigni* Lagardère, 1968).

Paroediceros G. O. Sars, 1892
Paroediceros lynceus (M. Sars, 1858), (Figs 36, 37, 38, 39)

The present material of *P. lynceus* falls into three distinct forms here designated forms A, B, and C. Forms A

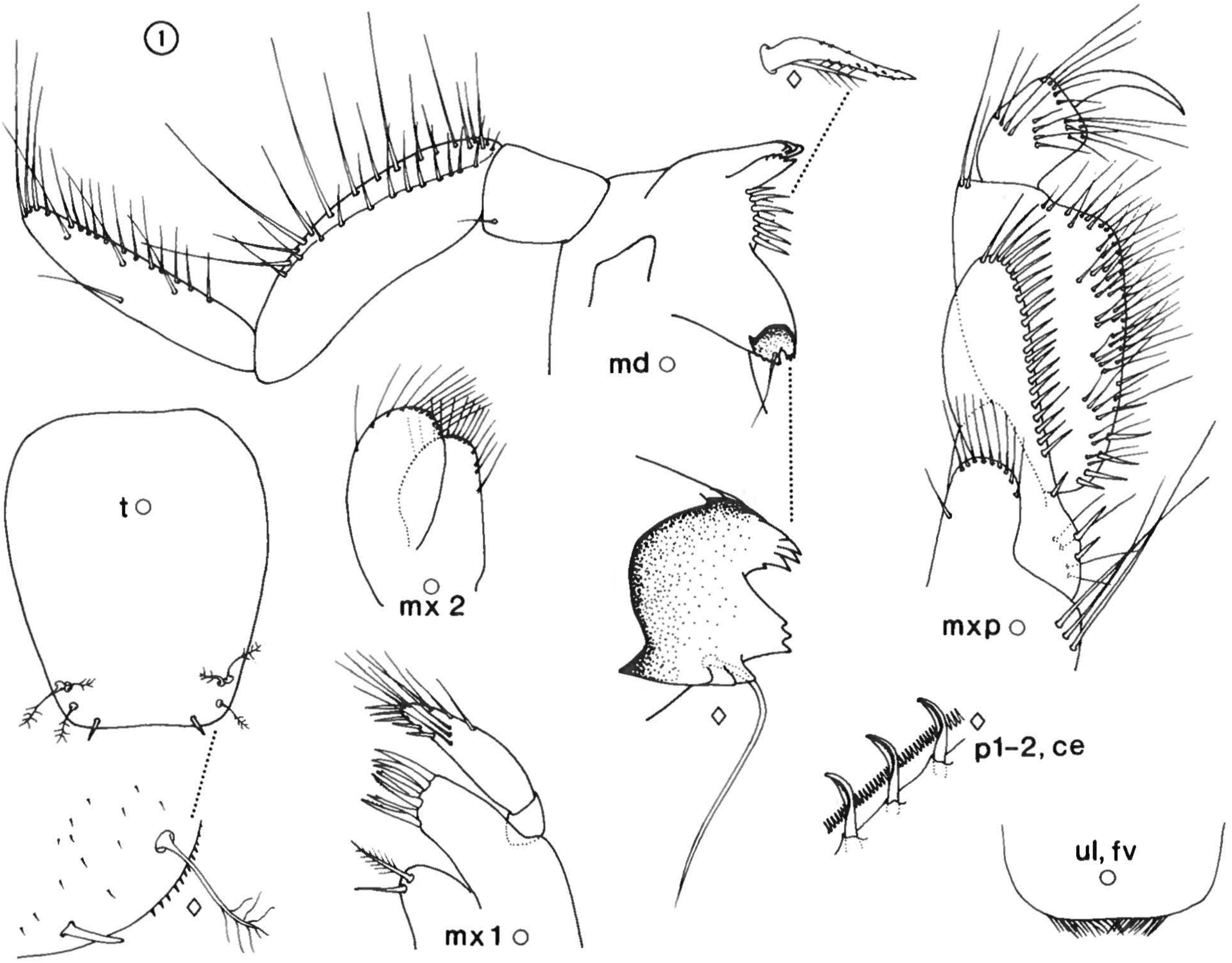


Fig. 31. *Monoculodes vibei* nov. sp. Holotype male (see Fig. 30).

and C differ markedly from each other particularly in the shape of the cephalon, while form B, although distinct, is morphologically in between A and C.

Form A (Fig. 37) is characterized by a nearly straight rostrum with parallel dorsal and ventral margins, and only the faintest outline of a cephalic carina dorsally; the dorsal and ventral margins of the rostrum join terminally without forming a "beak". The lateral surfaces of the cephalon are moderately depressed. In dorsal view the length of the eyes is less than 1/5 the length of the entire cephalon.

Form B (Fig. 36) has a slightly downward-curving rostrum with dorsal and ventral margins running nearly parallel, without forming a terminal "beak". A narrow but distinct carina runs from the rostral apex across the eyes and terminates immediately behind the eyes; the eyes are narrowly oval and in dorsal view slightly less than 1/3 the length of the cephalon. The lateral surfaces of the cephalon are moderately depressed.

Form C (Fig. 38) has a straight rostrum, but the ocular part is inflated compared with forms A and B. The ventral margin of the rostrum is convex in distal half, concave in the proximal half. Dorsal and ventral margins form a short forward-pointing "beak" terminally. A broad, strong carina runs from the rostral apex across the eyes terminating about one eye-length behind the eyes. The lateral sides of the cephalon are strongly depressed, which gives the cephalon of form C a far more sculptured appearance than in forms A and B.

In order to evaluate the taxonomical significance of these three forms I have made a brief survey of material of *P. lynceus* from the rest of Greenland, the Gulf of St. Lawrence, Arctic Canada, Iceland, Spitzbergen, and northern Norway. This survey has shown that variability within *P. lynceus* is a highly complex matter, which it is outside the scope of the present work to untangle. However, the following preliminary remarks can be made:

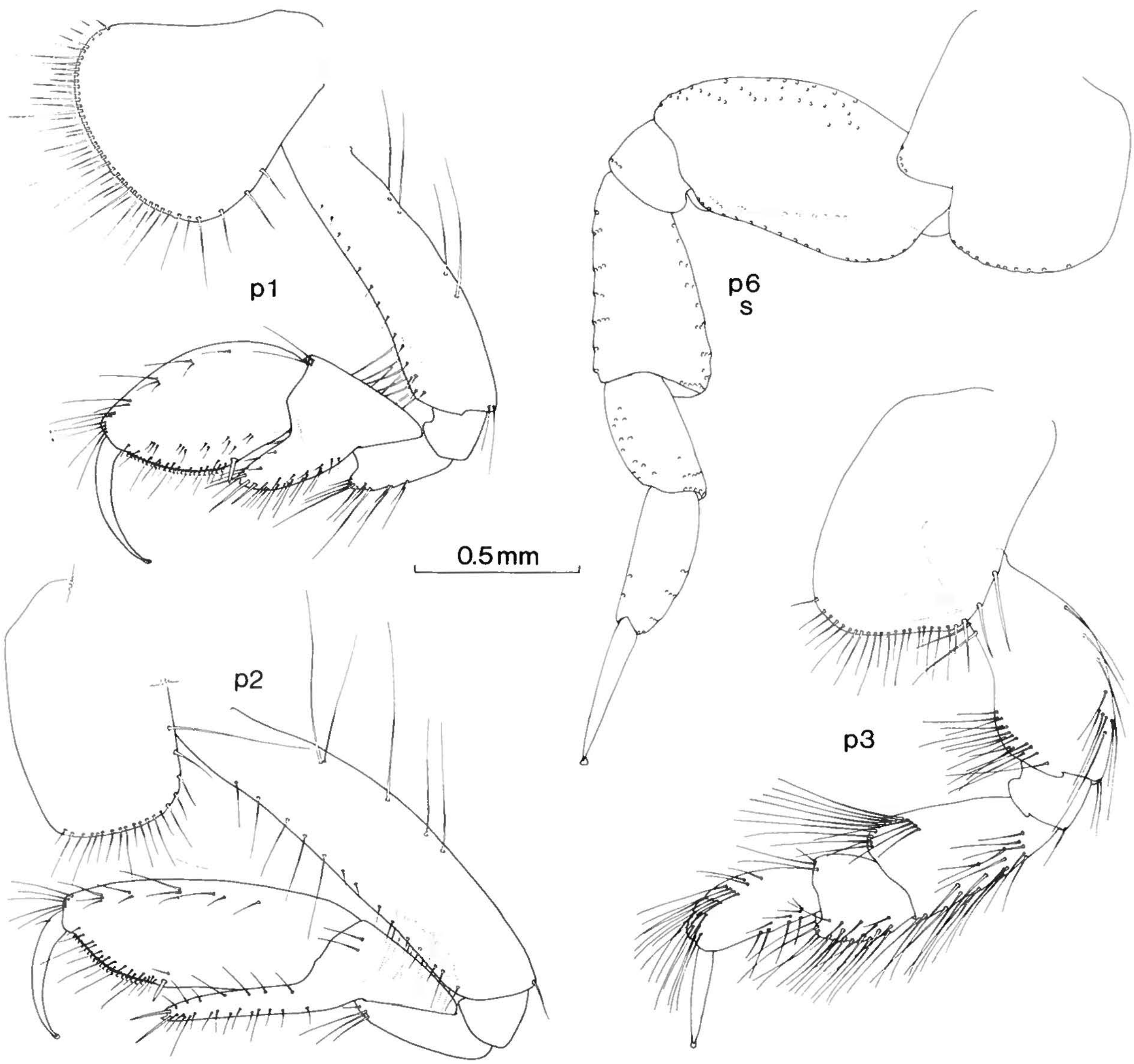


Fig. 32. *Monoculodes vibei* nov. sp. Holotype male (see Fig. 30).

1) The differences outlined above do not appear to be allomorphic in nature, as even quite small specimens can be referred to one or the other form (Fig. 39).

2) In most of W Greenland and in the Canadian Arctic forms A, B, and C are normally well separated spatially, although in some cases I have found more than one form in a sample (one case in the present material).

3) The frequency with which the three forms occur differs drastically from area to area. Form A is the most common form in W Greenland including the Thule area and in the eastern parts of the Canadian Arctic. Form B is rare in W Greenland and in Arctic Canada, but seems to occur more frequently in E Greenland and further eastwards. Form C is the dominating form in the northern and western parts of the Canadian Arctic; it becomes less and less frequent southwards along W Greenland.

4) Specimens from E Greenland, Spitzbergen, Iceland, and Norway do not normally fall clearly into one of the three forms considered above. They represent slightly different forms and intermediates, although in most respects Norwegian, Icelandic, and E Greenland material is close to form B.

5) There is no correlation between depth and form.

6) Apart from the outlined differences in the cephalon, there appear to be small differences in coxal plate 1, pereopod 1, pereopods 6–7, and the telson. No attempt has been made here to go into detail with these differences.

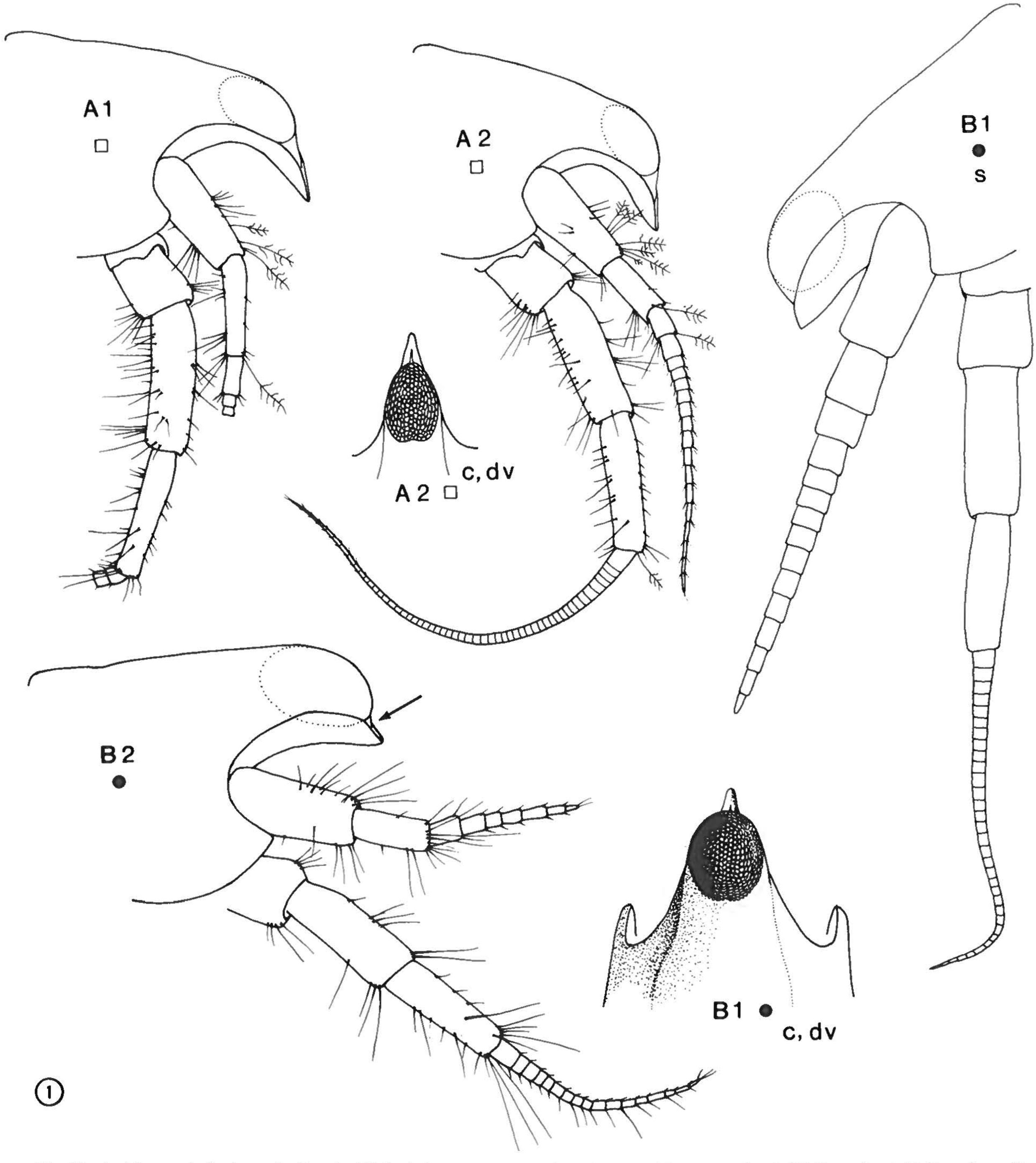


Fig. 33. A: *Monoculodes borealis* Boeck, 1871. A 1: Subadult female, 19.3 mm, Lindenowsfjord, SE Greenland, E. Bertelsen, St. 18–II, 1935. A2: Male of 15.7 mm, same data as A1. B: *Monoculodes vibei* nov. sp. B1: Holotype male (see Fig. 30). B2: Allotype female of 9.6 mm, St. 40–5.

Westwoodilla Bate, 1862
Westwoodilla caecula (Bate, 1856)

The concept of *W. caecula* (Bate, 1856) and *W. megalops* (G. O. Sars, 1882) has been radically changed by Enequist (1949), who placed *W. acutifrons* (G. O. Sars, 1892) in synonymy of *W. caecula,* and by Dunbar (1954), who placed *W. caecula* (*sensu* Enequist, 1949) in synonymy of *W. megalops.* This complex situation was further discussed by Mills (1962), who noted that Bate's name should take priority. Gurjanova (1951) and Barnard (1958) kept *caecula, megalops,* and

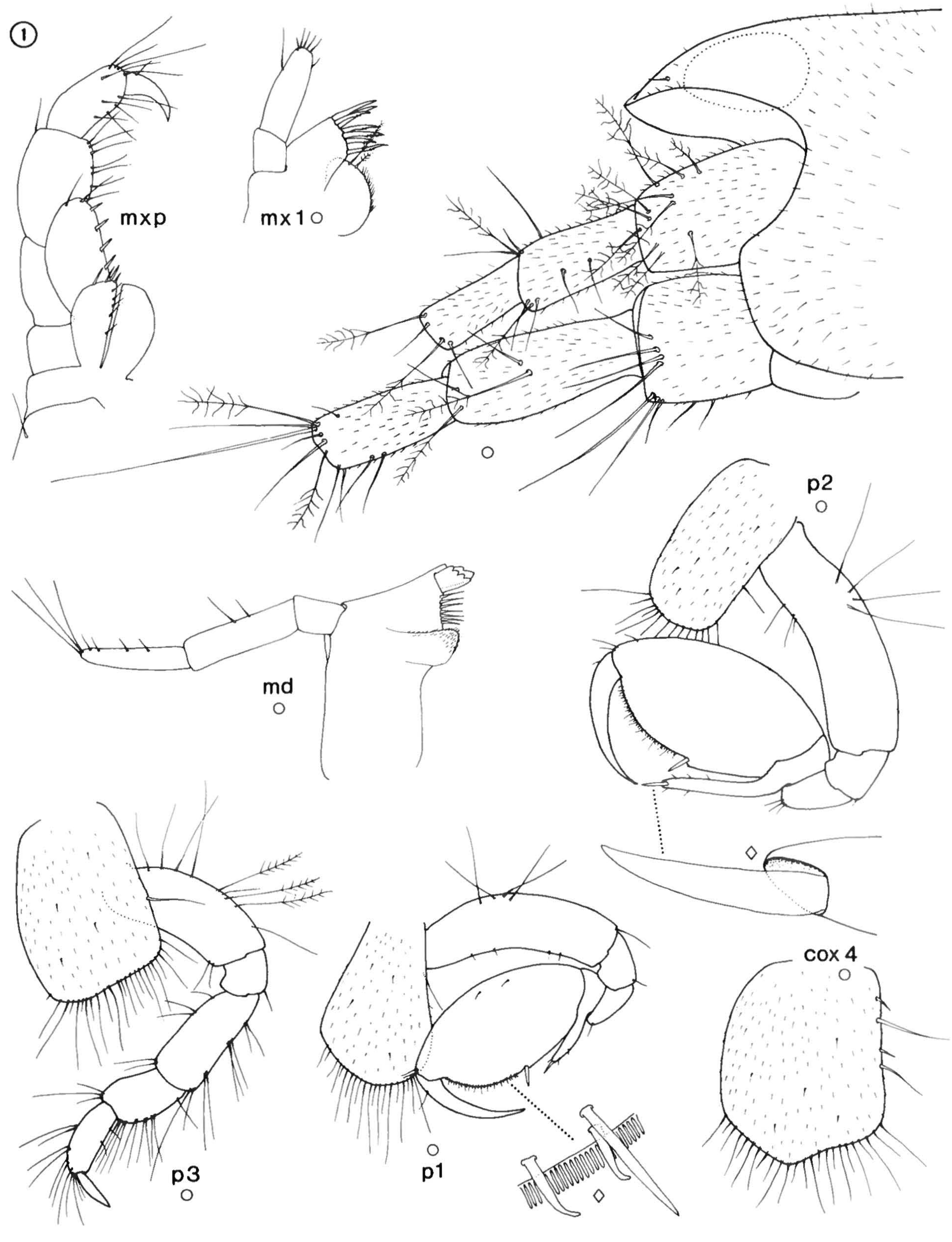


Fig. 34. *Oediceros* sp. ?Male, St. 18–2.

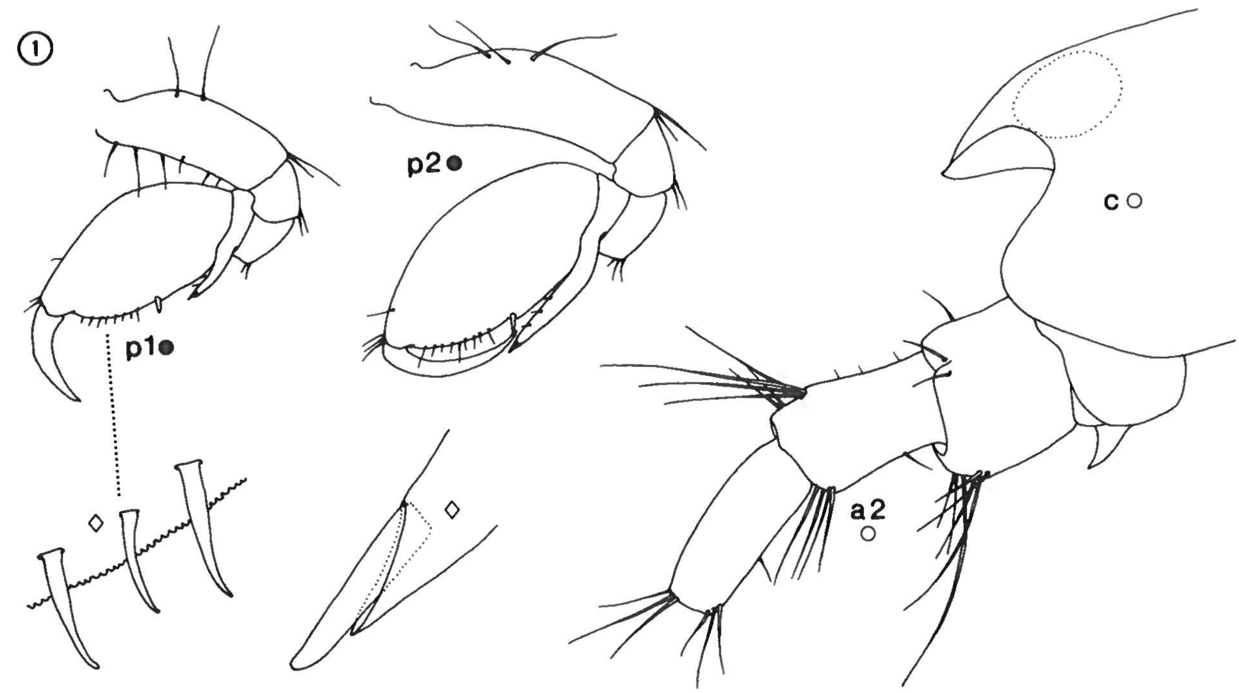


Fig. 35. *Oediceros borealis* Boeck, 1871. ?Male of 5.8 mm. Saunders Island, 40 m, 31 July 1939, Chr. Vibe coll.

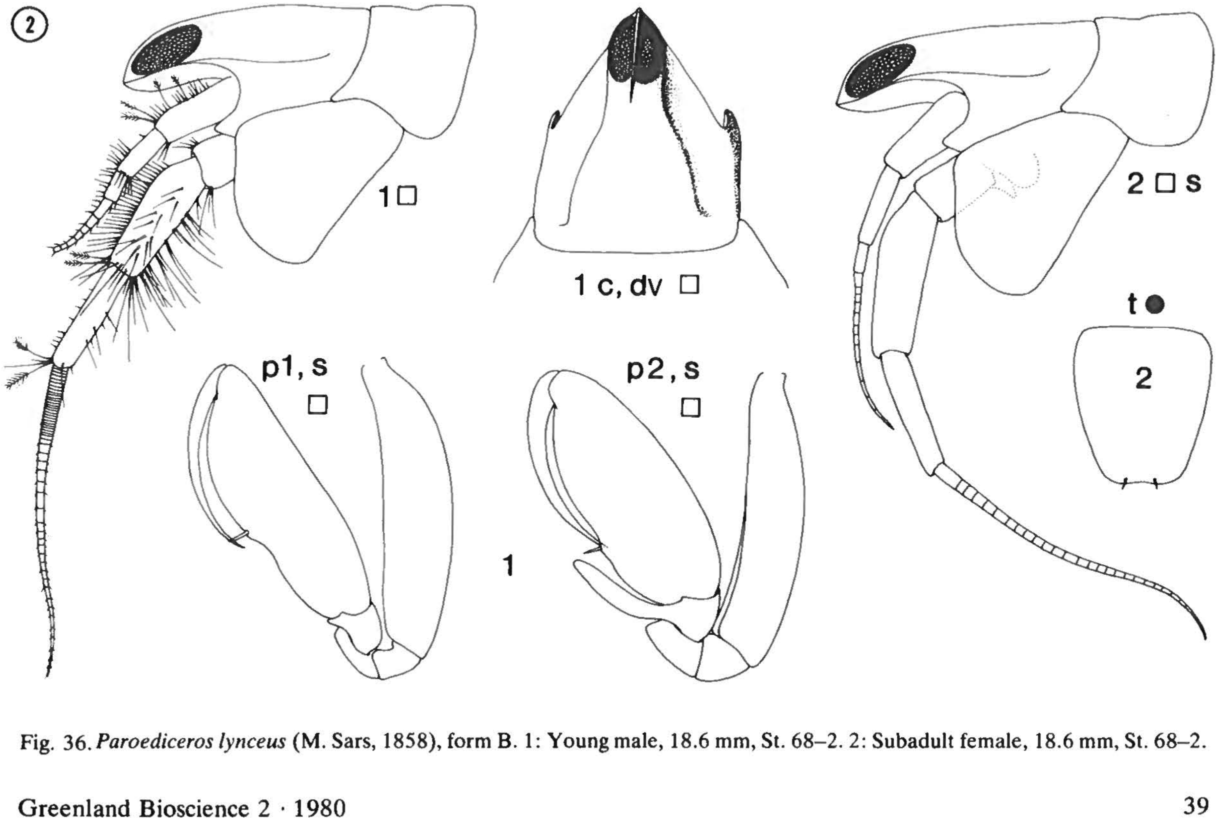


Fig. 36. *Paroediceros lynceus* (M. Sars, 1858), form B. 1: Young male, 18.6 mm, St. 68–2. 2: Subadult female, 18.6 mm, St. 68–2.

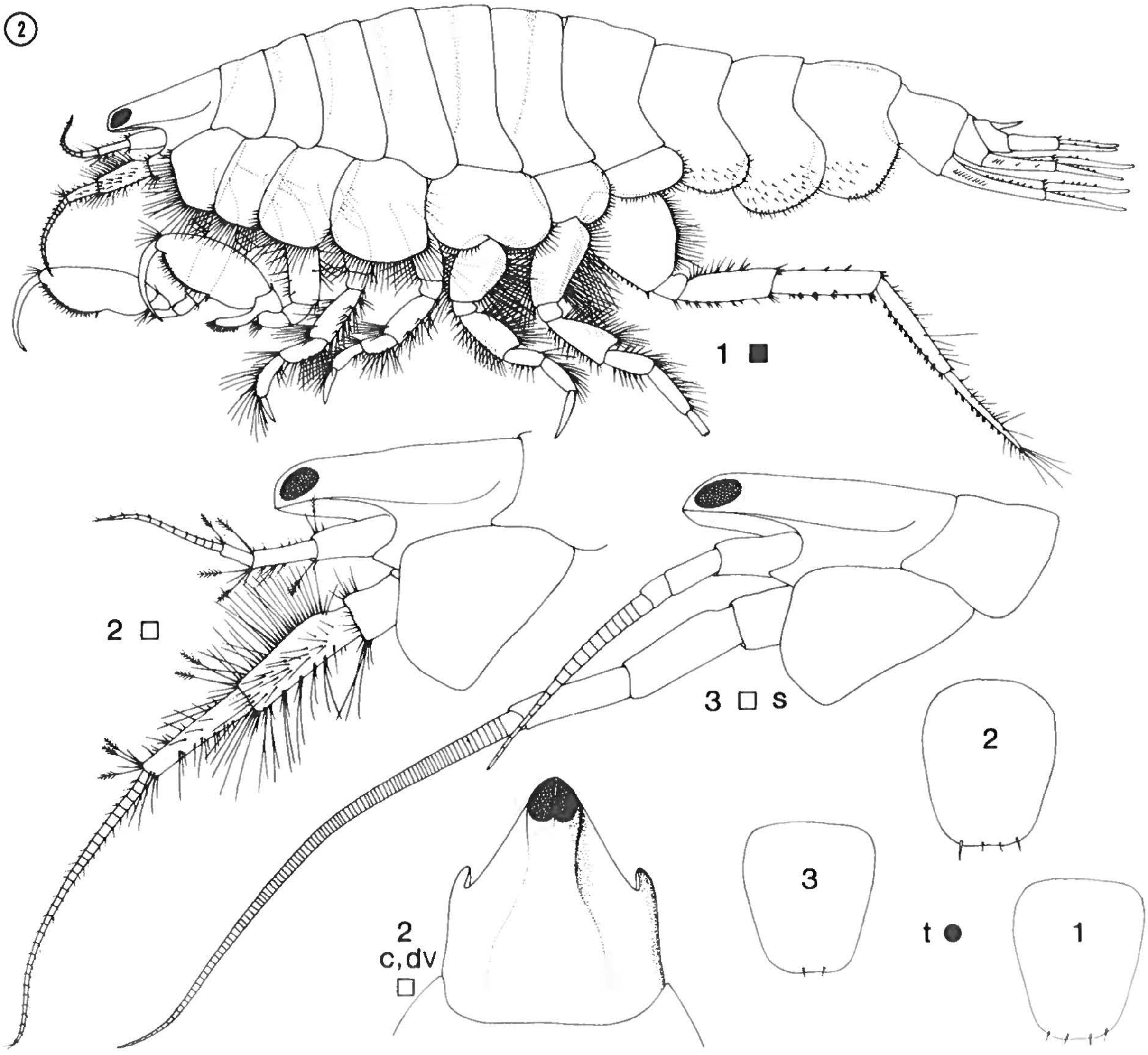


Fig. 37. *Paroediceros lynceus* (M. Sars, 1858), form A. 1: Subadult female, 17.9 mm, St. 40–4. 2: Subadult female, 21.4 mm, St. 27. 3: Adult male, 20.0 mm, St. 27.

acutifrons separate, while Barnard (1969a) kept at least *caecula* and *acutifrons* apart. In no case, however, did the two last-mentioned authors discuss their departure from Enequist and Dunbar.

The present material is as much a mixture of *caecula, megalops,* and *acutifrons* as that reported by Enequist (1949) and Dunbar (1954). The only variant absent from the Thule area appears to be the "classical" *acutifrons* (*sensu* G. O. Sars, 1892, pl. 116, fig. 1), a form which is apparently restricted to NW European waters as it was not reported from Ungava Bay by Dunbar.

Paramphithoidae

Paramphithoe Bruzelius, 1859
Paramphithoe hystrix (J. C. Ross, 1835)

The present material has been identified according to Gurjanova (1972). Gurjanova, however, gives as author of this species "(Owen in: Ross, 1835)". Analogous with my comments (Just, 1978: 127) on *Acanthonotozoma cristatum,* described in the same manner in the same work, Ross alone should be quoted as author of *P. hystrix,* as done by Barnard (1969a).

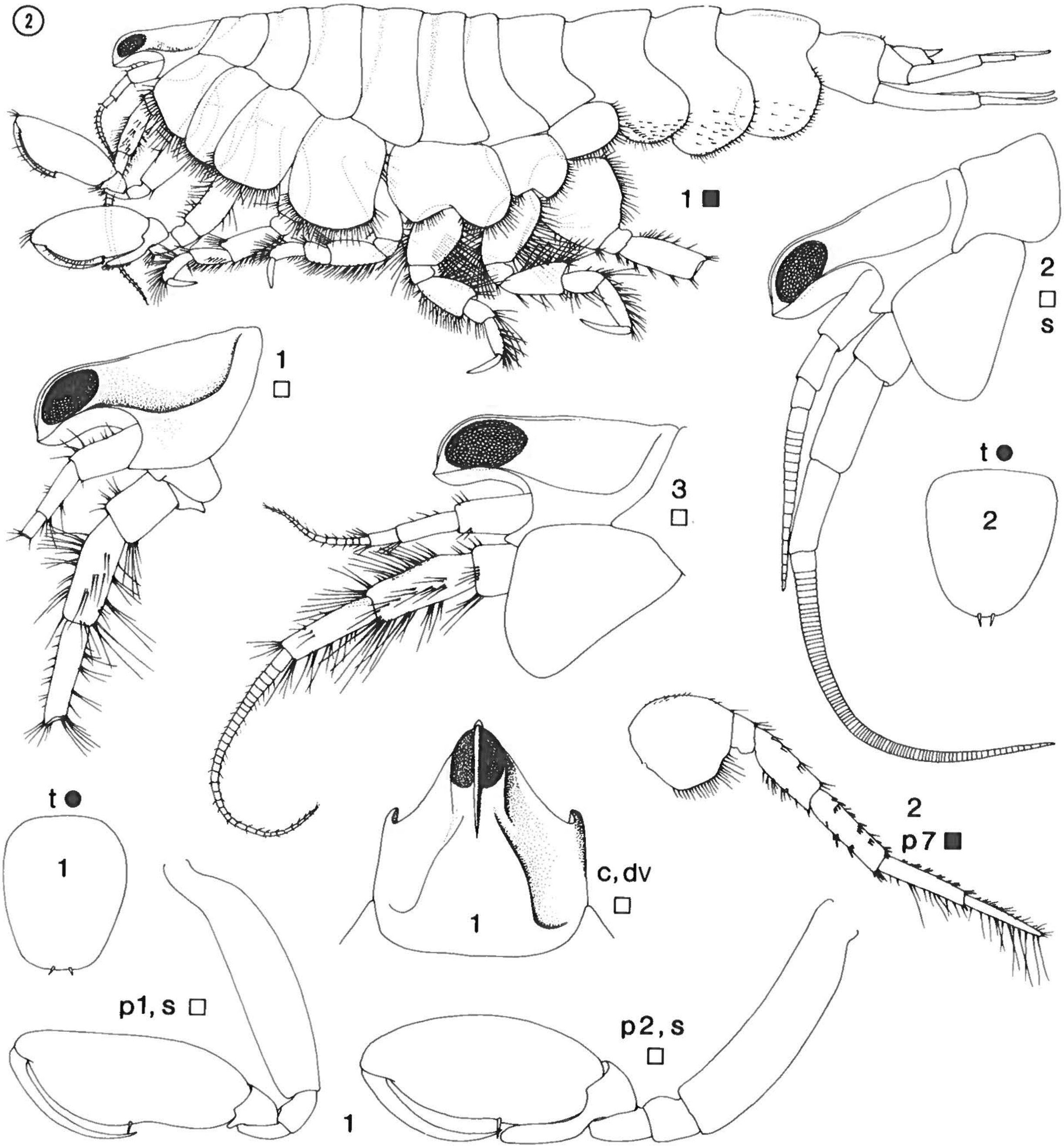


Fig. 38. *Paroediceros lynceus* (M. Sars, 1858), form C. 1: Subadult female, 19.3 mm, St. 40–5. 2: Adult male, 20.0 mm, Resolute, Canada, Fisheries Research Board, Canada, No. B-39, St. 62–4018. 3: Subadult female, 19.3 mm, same data as 2.

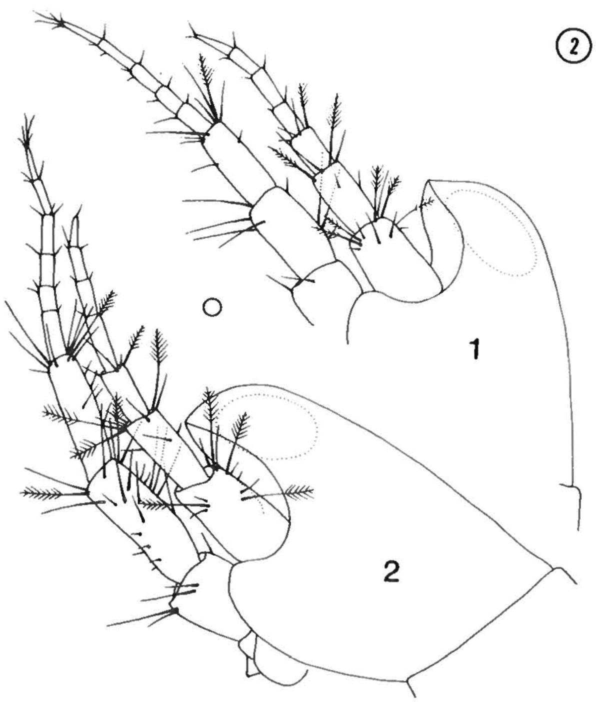


Fig. 39. *Paroediceros lynceus* (M. Sars, 1858). 1: Form C, juvenile, 8.7 mm, St. 40–5. 2: Form A, juvenile, 10.7 mm, St. 40–5.

Paramphithoe sp.

The single specimen from St. 12–2 is a juvenile of 8.6 mm. It is close to *P. c. cuspidata* (Lepechin) as figured by Gurjanova (1972, fig. 31B), but critical identification of this small specimen must await a full revision of *Paramphithoe* from Greenland and Arctic North America.

Pleustidae

Arctopleustes Gurjanova, 1972
Arctopleustes glabricauda (Dunbar, 1954) (Fig. 40)

The present two specimens are the first to be found since Dunbar's original description of the species from Ungava Bay. With a single exception the specimens agree with Dunbar's description and drawings. Dunbar states that the species has " . . . poorly armed uropods". (his fig. 26 shows uropod 3 with a single small spine on the inner ramus.) As can be seen from Fig. 40 all three uropods bear strong spines on both rami, while uropods 1 and 2 have long spines on their peduncle. I have examined the holotype (Redpath Museum, McGill University, Montreal) as well as all six paratypes (designated co-types by Dunbar), and have found that they are all like the Thule specimens with regard to the uropods.

In Dunbar's fig. 26 the second article of the mandibular palp can be interpreted as having a strong distomedial spine. Examination of the holotype shows that this "spine" is in fact two normal setae adhering to each other at the tips; the same is the case with what looks like a terminal spine on the third article of the palp. The mandible is otherwise in good agreement with that figured by Dunbar, except that he did not mention the presence of a broad multiserrate lacinia mobilis (Fig. 40).

The species was originally referred to *Parapleustes* by Dunbar. In Barnard & Given's (1960) tentative rearrangement of northern hemisphere pleustids the species was transferred to *Neopleustes* on account of the untriturative molar and the terminally produced article 3 of the maxillipedal palp.

Gurjanova (1951) described *N. rasmyslovi* on the basis of two specimens from the Kara Sea, but later (1972) made the species type species (by monotypy) of the new genus *Arctopleustes.* To judge from Gurjanova's drawings, *glabricauda* and *rasmyslovi* are morphologically very similar, differing in the following points: pereopod 1 in *rasmyslovi* is more slender and the cutting edge of article 6 is concave instead of convex as in *glabricauda*; coxal plate 4 appears to be deeper and somewhat more tapering in *rasmyslovi*; article 2 of pereopods 5–7 is broader in *glabricauda* and distinctly more produced posteroproximally. The mouthparts and the characteristic pereopods 1 and 2 are otherwise so closely similar that I have transferred *glabricauda* to *Arctopleustes.*

Pleusymtes Barnard, 1969a
Pleusymtes glabroides (Dunbar, 1954) (Fig. 41)

Like the preceding species, *P. glabroides* has not been found since it was described from Ungava Bay and E Greenland (Dunbar, 1954). The present material deviates from Dunbar's description and drawings in the following points: the acute apex of the interantennal lobes is less produced and the sinus below the interantennal lobe is somewhat smaller than in Dunbar's fig. 30; the posterodistal hook of coxal plates 1–3 is less strongly developed in the Thule specimens; article 6 of pereopods 1 and 2 is more slender in the Thule specimens, and the same is the case with pereopods 3–7.

In other respects, *viz.,* antennae, eyes, mouthparts, pleonal sideplate 3, arrangement of spines and setae on the pereopods, the present material agrees with that described by Dunbar.

I have examined Dunbar's material and have found that with regard to the cephalon the characteristics outlined above vary with size: the holotype (Redpath Museum, McGill University, Montreal) and a large nearly mature female paratype (ZMUC; designated co-type by Dunbar) of 7.1 mm have the strongly produced apex of the interantennal lobes and the large sinus below the interantennal lobes. In smaller

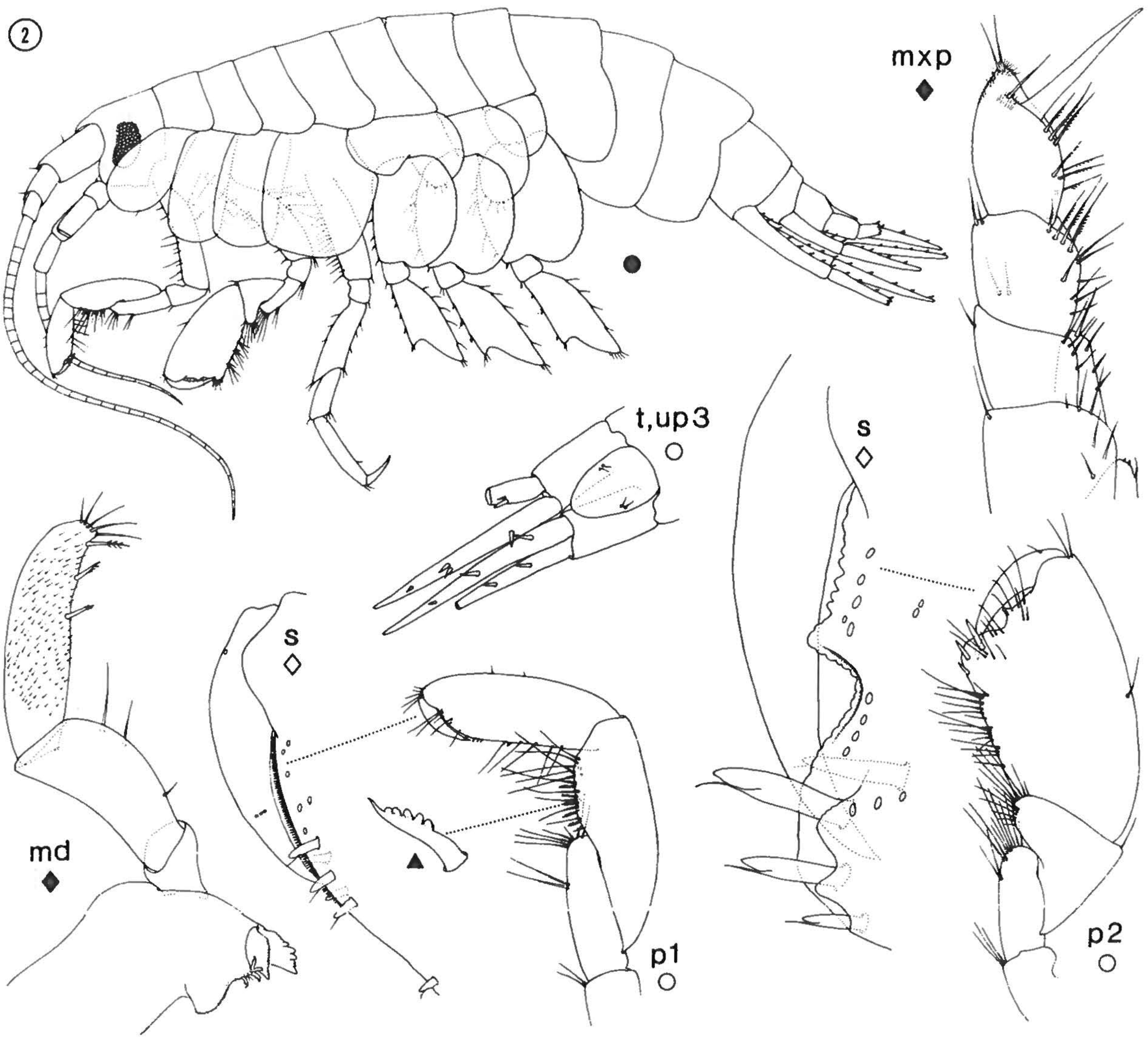


Fig. 40. *Arctopleustes glabricauda* (Dunbar, 1954). ?Adult male of 4.2 mm, St. 47.

paratypes the situation is like that in the Thule material. The hook on coxal plates 1–3 is generally stronger in Dunbar's material, although varying with the size of the animal. Article 6 of pereopods 1 and 2 of the holotype is more slender than shown by Dunbar and comes close to that of the present material; in some paratypes (other paratypes lack pereopods 1 and 2) pereopods 1 and 2 are exactly like those of the Thule specimens. The type material generally has pereopods 3–7 more robust than in the present material, but not to the extent shown by Dunbar. The six specimens from Tasiussak, E Greenland, referred by Dunbar to *glabroides,* are all in close agreement with the Thule specimens.

Dunbar referred the species to *Sympleustes* Stebbing, 1899, but Barnard & Given (1960) showed *Sympleustes* to be a junior synonym of *Stenopleustes* G. O. Sars, 1893. For species referred to *"Sympleustes"* by Barnard & Given (1960), Barnard (1969a) proposed the new generic name *Pleusymtes.*

Stenopleustes G. O. Sars, 1893
Stenopleustes olriki (Hansen, 1887) (Figs 42–43)

This is the first record from Greenland since Hansen (1887b) described the species from two specimens from Pröven, W Greenland. The species is included in Stephensen (1913), but in his later compilations of Greenland amphipods (1933, 1944a) *S. olriki* is omitted without explanation. As the species has never been thoroughly figured since Hansen, and as Gurjanova's drawings (1951, fig. 452) of the species leave some doubt as to certain critical details of the mouthparts (particularly the mandibular molar), new drawings of the species are given in the present paper.

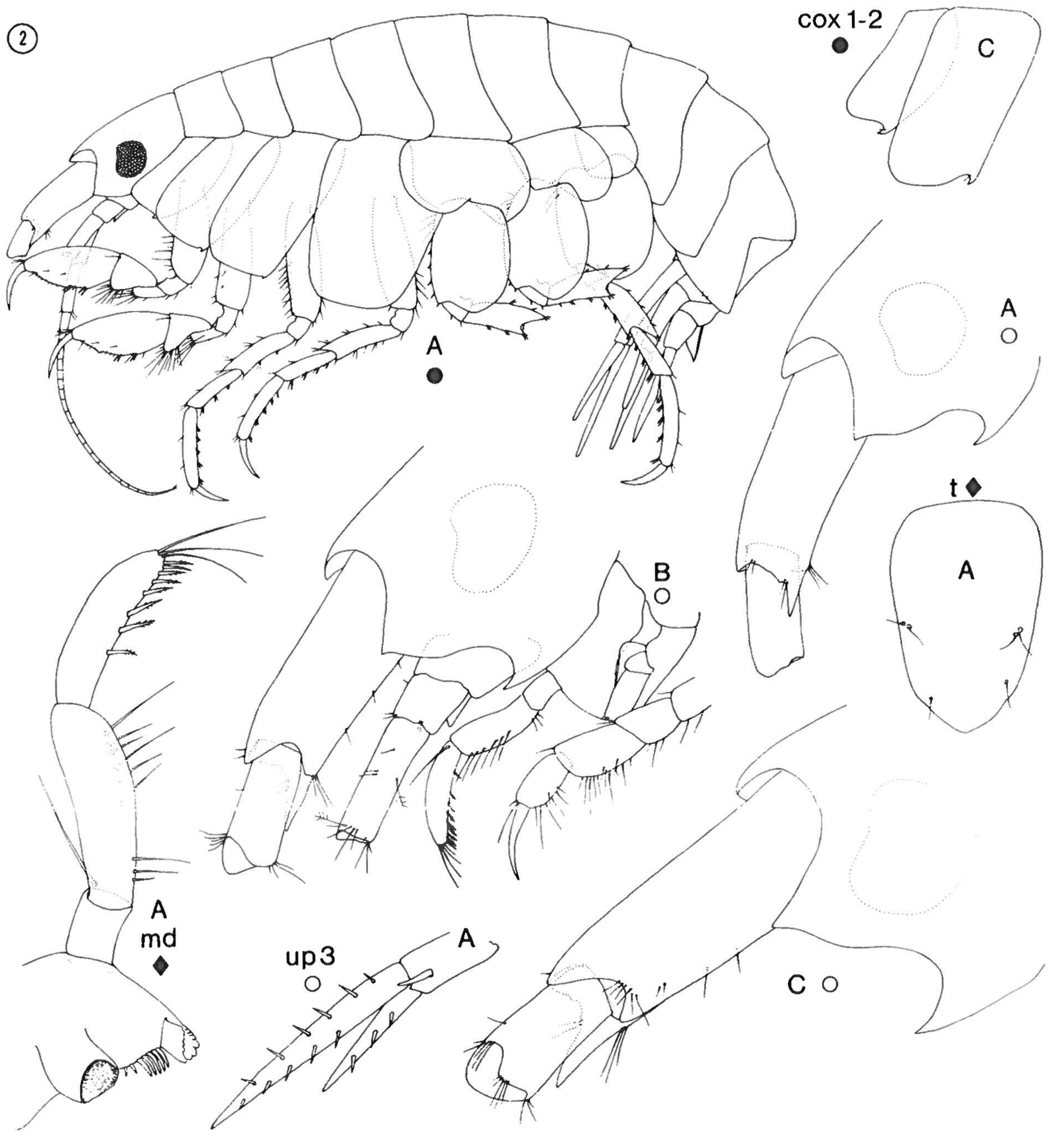


Fig. 41. *Pleusymtes glabroides* (Dunbar, 1954). A: Adult female (setiferous oostegites), 4.3 mm, St. 40–2+3. B: Male, St. 40–2+3. C: Largest paratype (ZMUC), adult female, 7.1 mm.

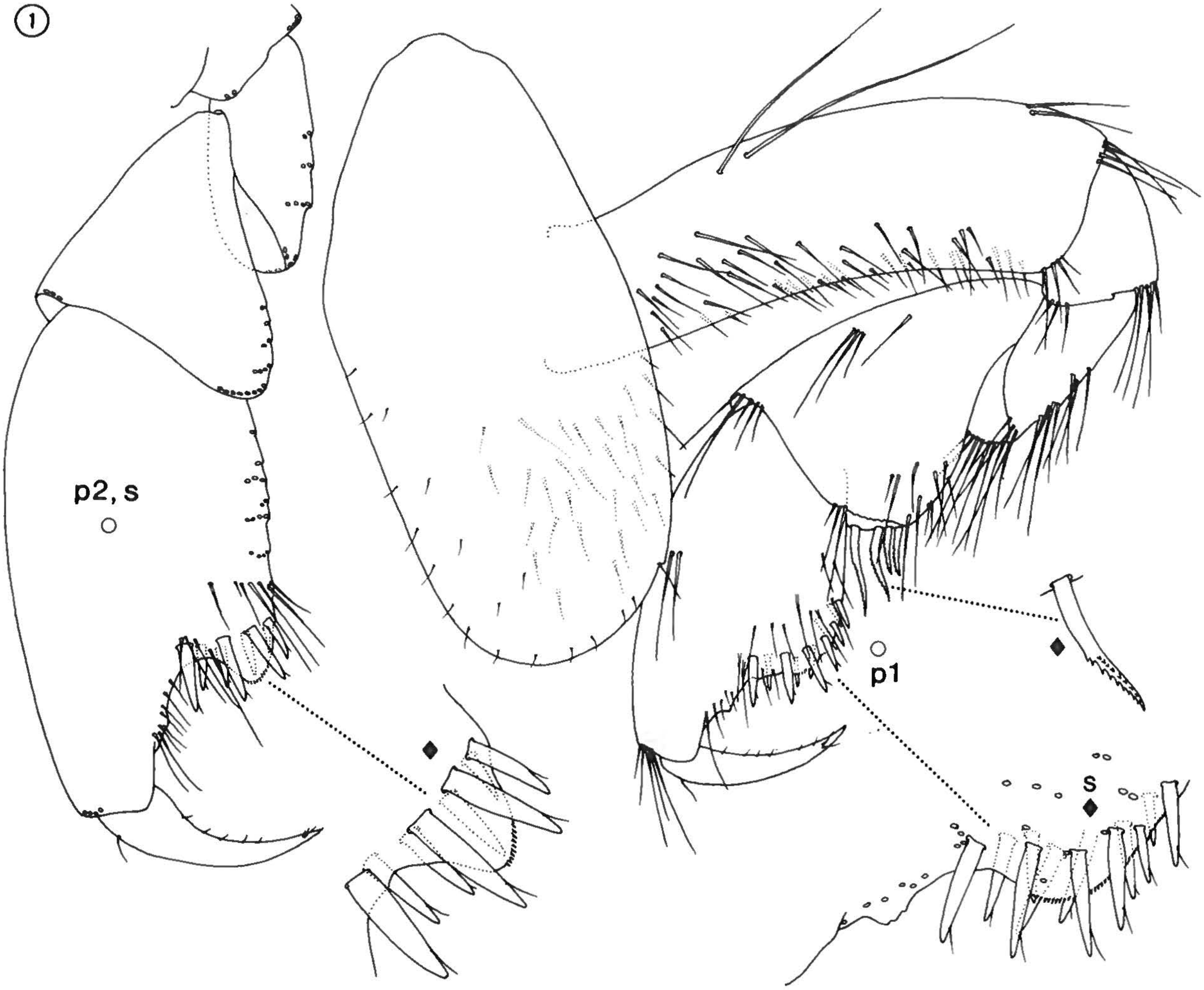


Fig. 42. *Stenopleustes olriki* (Hansen, 1877). Same specimen as in Fig. 43.

Based on the presence of a triturative molar and an apically produced article 3 of the maxillipedal palp Barnard & Given (1960) transferred the species to *Stenopleustes,* a move which was accepted by Gurjanova (1972).

Podoceridae

Dulichia Kröyer, 1845
Dulichia wolffi Laubitz, 1977

This species was described by Laubitz (1977) on four specimens from the Bredefjord, SW Greenland. Laubitz (map 2) shows the locality to be in the vicinity of the Disko Bay, but the Bredefjord is in fact situated some 800 kilometers further south.

I have compared the present ten specimens with the holotype, the allotype, and the two paratypes recorded by Laubitz (ZMUC). I have found that one of the characters used by Laubitz in her description of the species and her key to species of *Dulichia* (pp. 944–945, couplet 3) cannot be used to separate *wolffi* from the other species of the genus. The character in question is the shape of the cephalic front margin in dorsal view. Laubitz describes the species as having the cephalon pointed anteriorly, but the holotype, the allotype, one paratype, and all the Thule specimens have the cephalon anteriorly rounded. Only the paratype female (the other paratype is a male) has a somewhat pointed cephalon, but not to the extent shown by Laubitz (fig. 5 B).

The species can, however, be safely identified by the following combination of characters: article 6 of pereopod 2 in females has 4 slender spines on the posterior margin, the proximal spine being shorter than the

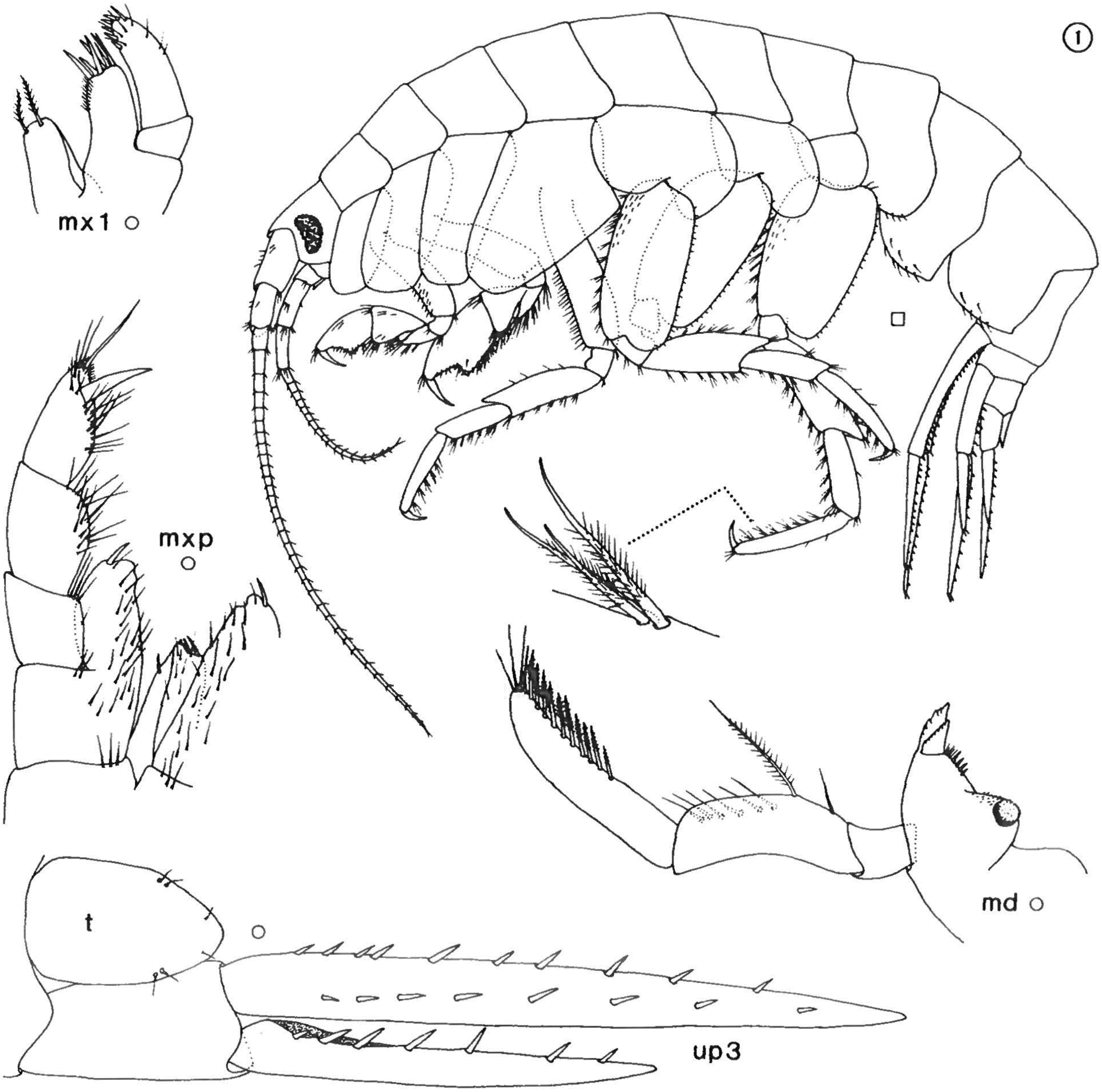


Fig. 43. *Stenopleustes olriki* (Hansen, 1887). Female of 9.0 mm (with adult choniostomatid parasite (Copepoda) in fully developed marsupium), St. 29–2.

other three, (Laubitz says several spines, but all the Thule females as well as the holotype female and the paratype female have four); the peduncle of uropod 2 is less than half the length of peduncle of uropod 1; the peduncle of uropod 1 lacks dorsolateral and dorsomedial spines.

The uropodal characteristics apply also to males, but whether or not the pereopod 2 figured by Laubitz (fig. 5 G) and also found in the present material (broader than in female and more rectangular, with four spines on posterior margin of article 6) is representative of terminal males is an open question.

Stenothoidae

In dealing with this family I have followed the concepts of Gurjanova (1938), Shoemaker (1955), and Barnard (1969a) with one exception: the genera *Metopa* Boeck, 1871, and *Prometopa* Schellenberg, 1926, are separated by Shoemaker as well as by Barnard by the presence (*Prometopa*) or absence (*Metopa*) of a rudimentary 1-articulate accessory flagellum in antenna 1. *M. clypeata* (Kröyer, 1842; type species) possesses a tiny 1-articulate accessory flagellum (unpublished observation on Kröyer's syntypes, ZMUC), as do the six

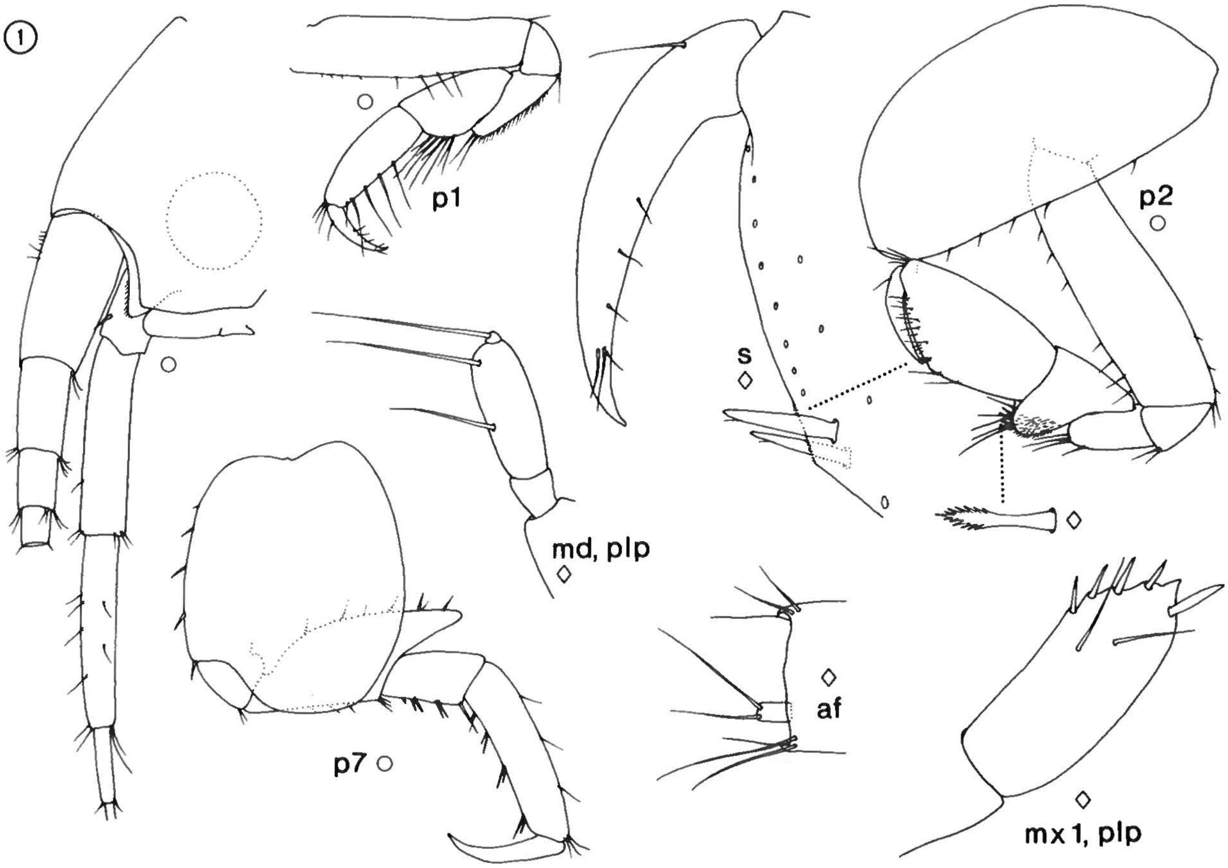


Fig. 44. *Metopa bruzeli* (Goes, 1865). Ovigerous female, 2.7 mm, St. 26.

species of *Metopa* in the present material. Antarctic *Prometopa* (monotypic: *P. tuberculata*) should be reexamined (Schellenberg does not give enough information to solve the question) in order to either fuse this genus with *Metopa* as done by Barnard (1958, 1969a: with comments and some reservation) or to delimit new characteristics of generic value.

Barnard (1962a) established a new name, *Stenula,* to receive species hitherto referred to *Metopa* but differing from the type species of *Metopa* in having the mandibular palp 1-article instead of 2- og 3-articulate. One species in the present material, *Metopa nordmanni* Stephensen, 1931, is transferred to *Stenula* together with a species of uncertain affinity.

For all the 12 stenothoid taxa in the present material I have described and figured the epistome and median cephalic front margin complex. It appears to be species specific, but has hitherto received little attention at least with regard to the numerous North Atlantic and arctic species. In order to facilitate identification, comparison, and future revisionary work I have further added new drawings of various appendages.

Metopa Boeck, 1871
Metopa bruzeli (Goes, 1865) (Fig. 44)

Produced epistome tapering towards rounded apex; lower half of median cephalic front margin produced, narrowly tapering towards rounded apex, setulose on upper surface, reaching the apex of epistome.

Metopa glacialis Kröyer (1842) (Fig. 45)

The present material is in complete agreement with the holotype (ZMUC), which is very large (mature ♀, 6.3 mm) and has pereopod 2 exactly as shown by Dunbar (1954, fig. 8; as *Metopa cariana* Gurjanova, 1929). Shoemaker (1955, fig. 5 H) shows *M. glacialis* to have the median cephalic front margin produced into a strong point; the projection extends far beyond the nearly unproduced epistome. The same projection and epistomal shape are found in the holotype and in the present material.

Schellenberg's (1935) statement that *Metopa glacialis*

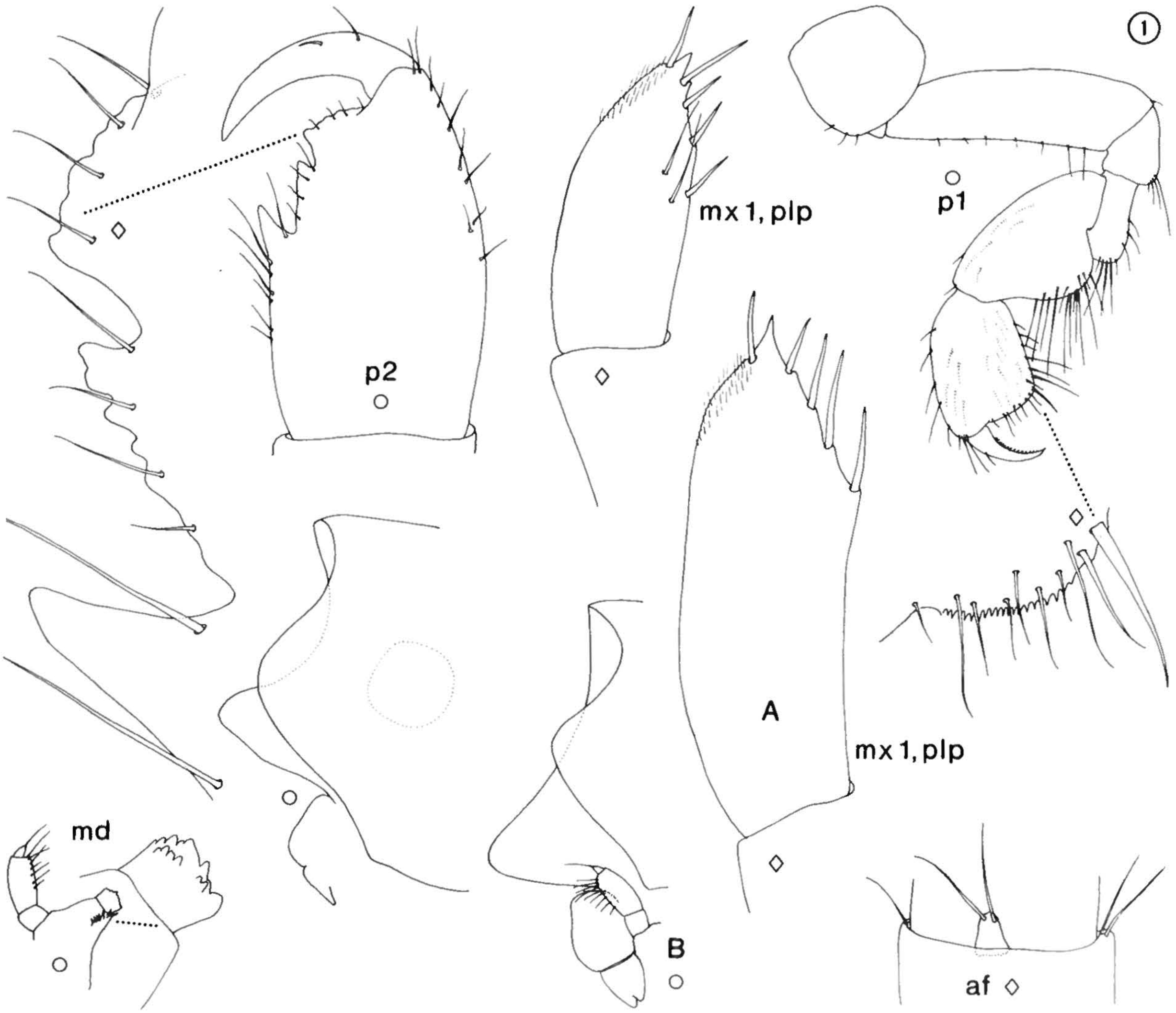


Fig. 45. *Metopa glacialis* Kröyer, 1842. Female, 3.5 mm, St. 26, except A: holotype female, and B: specimen from Kutdlek, SE Greenland, E. Bertelsen, St. 3–2, 1935 (as *M. cariana* Gurjanova, by Stephensen, 1944a).

has the palp of maxilla 1 2-articulate (*Proboloides*), together with the presumed loss of the mouthparts from the holotype (Dunbar, 1954: 729) has cast doubt on the generic affinity of the species. I have located in the ZMUC a permanent slide labelled *"Proboloides glacialis* Kr., Spitzbergen, TYPE, Mx 1–2, Mxp" in Stephensen's handwriting. The palp of Maxilla 1 (Fig. 45A) is composed of one article, which firmly places the species in *Metopa*.

Whether or not *Metopa cariana* Gurjanova, 1929, is synonymous with *M. glacialis* as suggested by Dunbar (1954) and Shoemaker (1955) can be verified only through an examination of Gurjanova's type material. The specimens from E Greenland reported by Schellenberg (1935) and Stephensen (1944a) as *M. cariana,* however, belong to *M. glacialis* (Fig. 45B).

Metopa longicornis Boeck, 1871 (Fig. 46)

Epistome bluntly rectangular in lateral view; lower half of median cephalic front margin projecting, evenly rounded, reaching as far as epistome.

Metopa pusilla G. O. Sars, 1892 (Fig. 47)

The present specimens have been compared with specimens in the ZMUC labelled *"Metopa pusilla* G. O. Sars. Norweg. occident. G. O. Sars ded. 6/92". The agreement is very good.

The species has an evenly rounded epistome; the lower 2/3 of the median cephalic front margin is produced, with an evenly rounded apex reaching as far as the epistome.

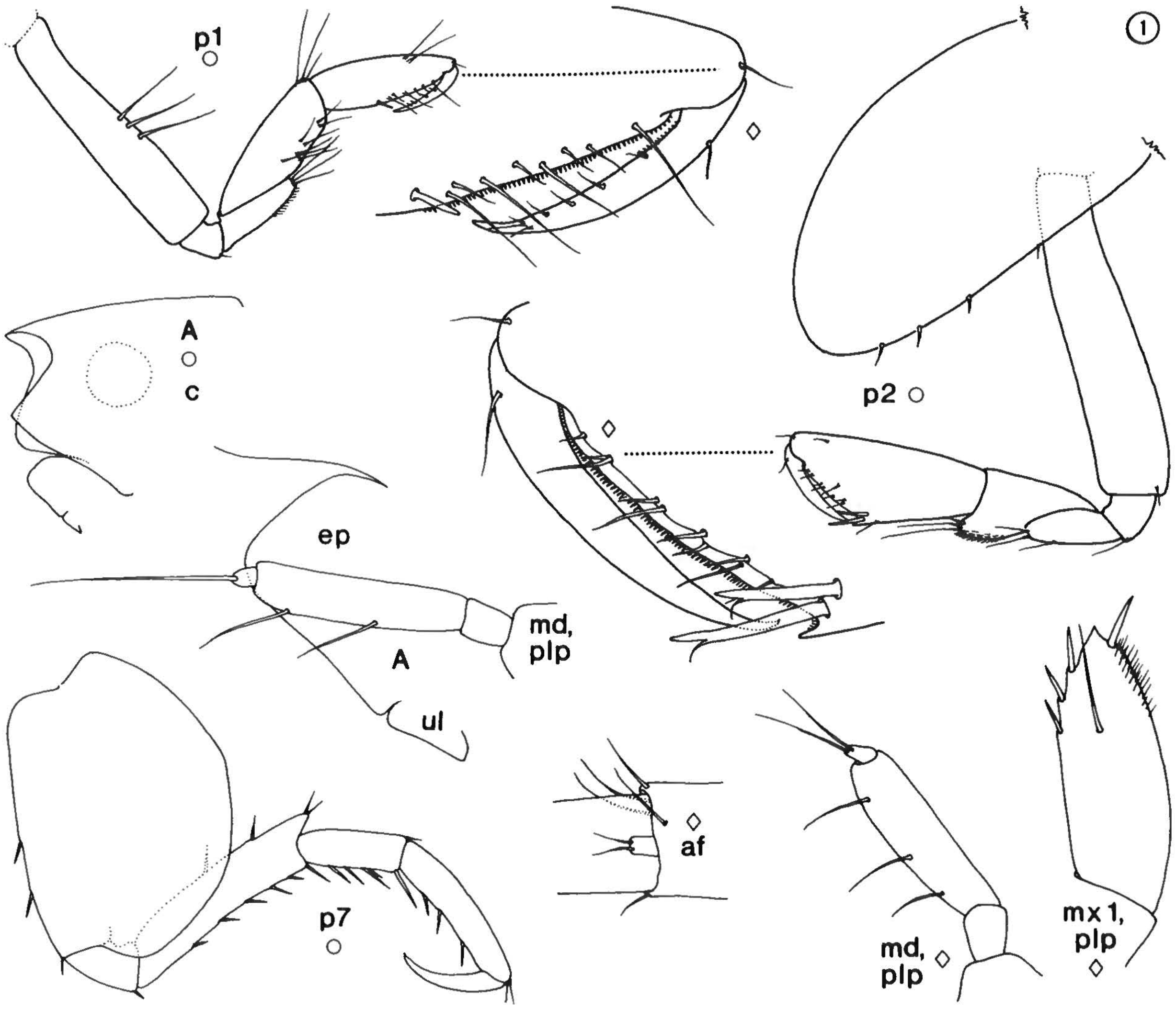


Fig. 46. *Metopa longicornis* Boeck, 1871. Adult female (setiferous oostegites), 2.9 mm, St. 20–3, except A: adult female (setiferous oostegites), 2.5 mm, St. 27.

Metopa tenuimana G. O. Sars, 1892 (Fig. 52)

Epistome large and evenly rounded; lower half of median cephalic front margin produced, broadly triangular, apex blunt, reaching barely to the apex of epistome.

Metopa sp. (Fig. 48)

I cannot at present refer these two specimens to any known species of *Metopa*. They are quite close to *M. bruzeli*, but *bruzeli* has the cutting edge of pereopod 2 completely smooth (Fig. 44), whereas the present specimens have a row of equal-sized rounded knobs along the cutting edge. Furthermore, the cutting edge of pereopod 2 is defined posteriorly by a distinct tooth and sinus, which is absent in *bruzeli*. In this respect the specimens are close to *M. spinicoxa* Shoemaker, 1955, but they differ from *spinicoxa* in lacking the midpalmar tooth in pereopod 2, in having the epistome and the median cephalic front margin less pointed, and in having antenna 1 longer than antenna 2 rather than shorter (*spinicoxa*).

Metopella G. O. Sars, 1892

Metopella carinata Hansen, 1887b (Fig. 49)

Epistome strongly produced, upper edge in adult specimens flattened, apex rounded; lower 2/3 of median cephalic front margin produced, evenly rounded, reaching about halfway along epistome. As already stated by Hansen (1887b) males of this species are distinctly smaller than females, less inflated, article 6 of pereopod 2 (Fig. 49B) being much more slender with nearly parallel margins and without the strong posterior tooth found in females.

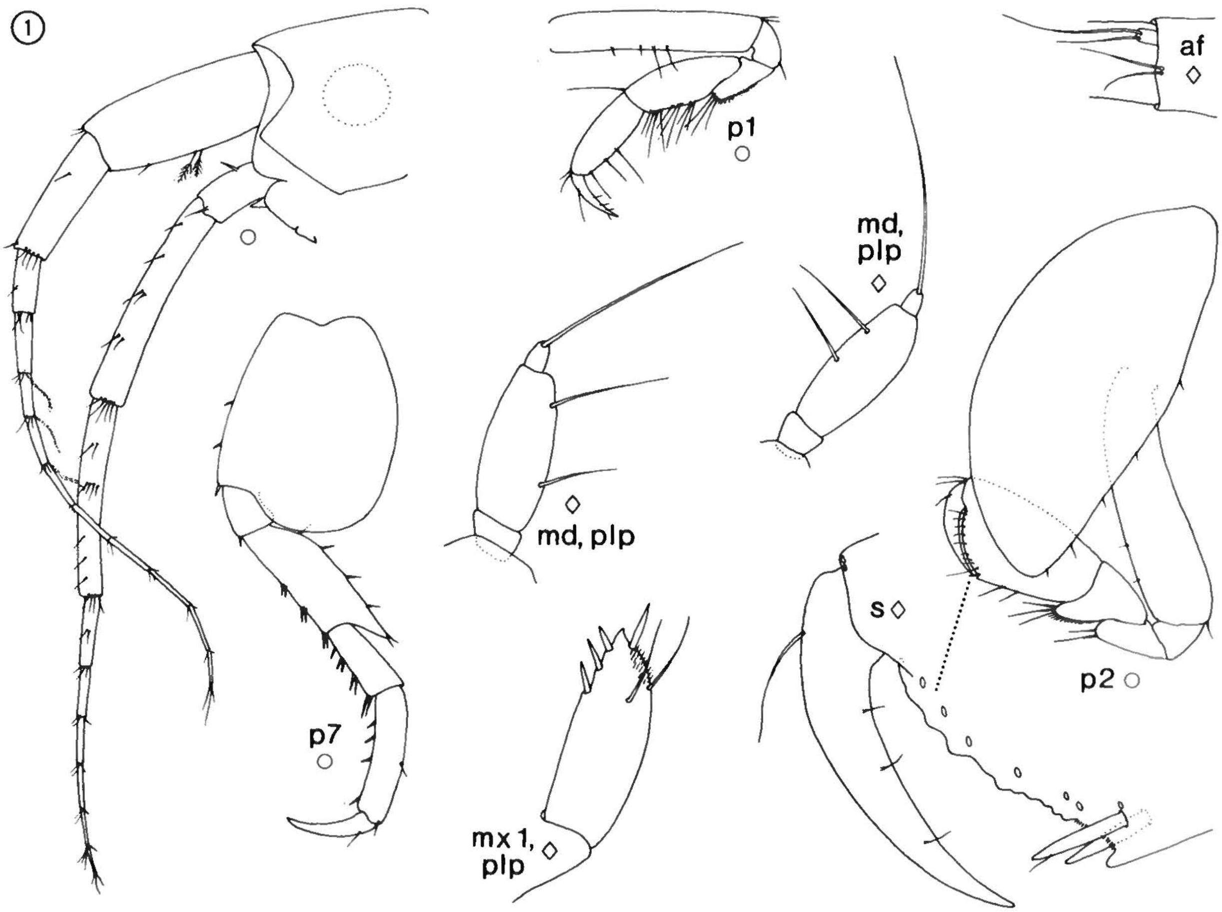


Fig. 47. *Metopa pusilla* G. O. Sars, 1892. Female with recently hatched juveniles, 2.6 mm, St. 26.

Metopella longimana (Boeck, 1871) (Figs 50–51)

Epistome with evenly rounded apex; lower half of median cephalic front margin produced into a strongly compressed narrow triangle, the pointed apex of which reaches to the terminal end of article 3 of antenna 2. The projection is quite transparent and very fragile. The presence of this large projection has been verified in other Greenland, Canadian, Norwegian, and Danish material.

In young specimens the characteristic shape of pereopod 2 (Fig. 50) has not yet been developed (Fig. 51) and there are allometric differences in the antennae and the mandibular palp. Young specimens can, however, be identified by the presence of the above-mentioned projection of the cephalic front margin.

Shoemaker (1955, fig. 7c) shows a 2-articulate mandibular palp in *M. longimana*. Shoemaker may have had an aberrant specimen at hand or may have overlooked the proximal articulation, as a 3-articulate palp has been verified in all specimens examined by me.

Metopella nasuta (Boeck, 1871) (Fig. 53A)

Epistome irregularly rounded with a midfrontal concavity, more prominently produced in lower half; lower half of median cephalic front margin produced, evenly rounded, degree of projection as in upper part of epistome. The present specimens differ from those of Sars (1892) only in having spines on the telson, a character which is due to some variation in the Stenothoidae, although in a case like this it may possibly have some taxonomic significance at the infraspecific level.

Mesometopa Gurjanova, 1938
Mesometopa neglecta (Hansen, 1887b) (Fig. 53B)

Epistome slightly tapering towards evenly rounded apex; lower third of median cephalic front margin produced into a blunt point reaching to the apex of epistome.

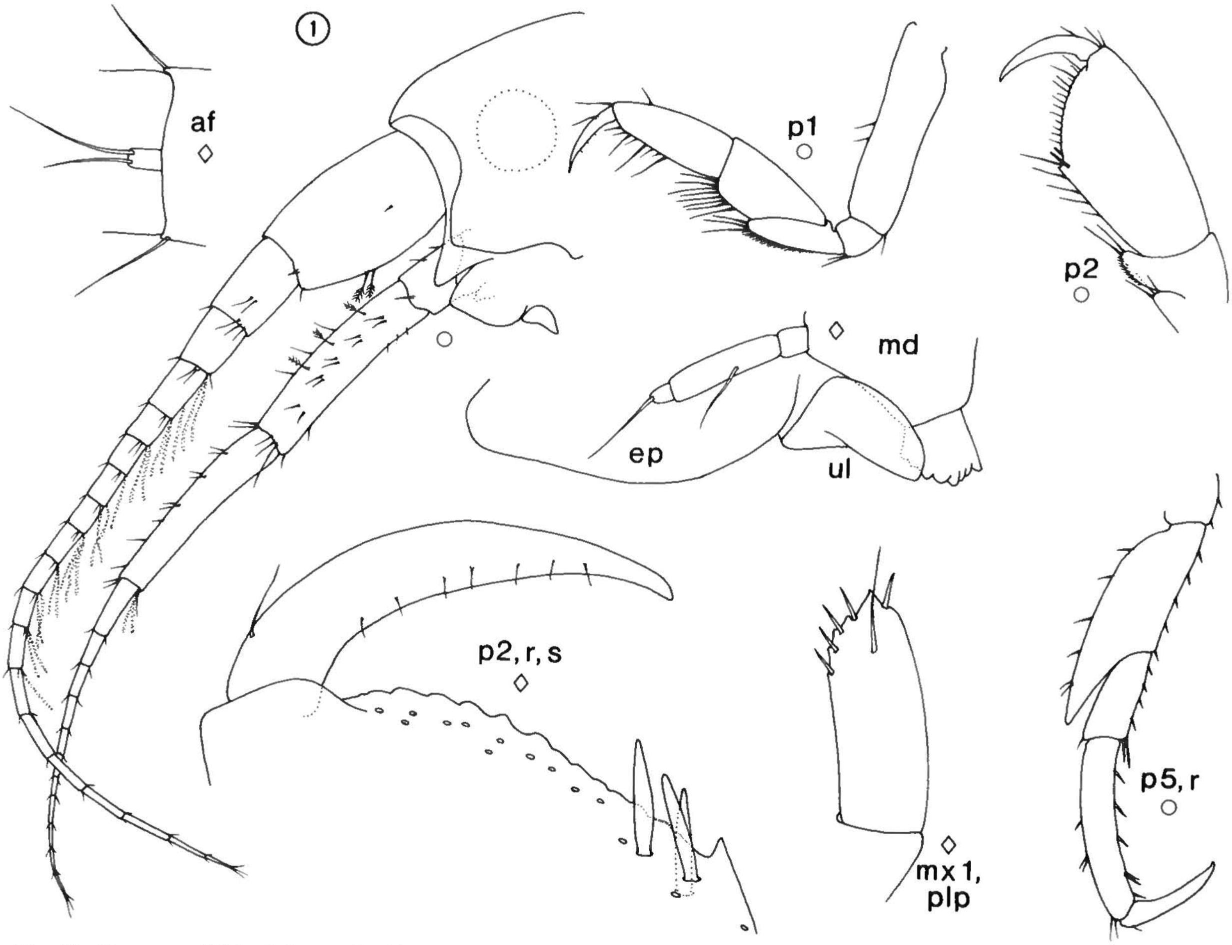


Fig. 48. *Metopa* sp. Male, 2.8 mm, St. 43.

Parametopa Chevreux, 1901
Parametopa crassicornis nov. sp. (Figs 54–55)

Holotype: ?male of 3.2 mm. Bylot Sund, 76°28.65'N, 69°21.8'W, 65 m, stones, gravel, clay, triangular dredge, 11 Aug. 1968, Thule Exped., Just & Vibe, St. 29–1. – ZMUC.

Description (holotype): Cephalon as long as first 2½ body segments combined. Lateral lobes of cephalon moderately produced, rounded; eyes small, diameter equalling distance from eye to lateral cephalic front margin.

Epistome strongly produced, tapering, bluntly pointed; median cephalic front margin not produced, nearly straight. Mandibles without palp. Maxilla 1 with 1-articulate palp. Inner plates of maxillipeds separate.

Antennae of subequal length. Antenna 1 as long as cephalon and first body segment combined; peduncular article 1 strongly inflated, 1½ times longer than broad, as long as the rest of the appendage; peduncular articles 2 and 3 subequal, combined length half that of article 1.

Pereopod 1 stout, simple; article 6 tapering distally, about 1/5 longer than article 5; article 5 triangular, distally broader than base of article 6. Pereopod 2 with transverse, concave palm carrying four rounded knobs along the cutting edge, which is defined by a sharply pointed tooth opposing the tip of the strong, curved dactylus; one lateral and one medial spines are present at the base of the defining tooth; anterior and posterior margins of article 6 parallel, entire article slightly longer than preceding three articles combined. Pereopod 5 with article 2 linear; pereopods 6–7 with article 2 ovally expanded; posterodistal projection of article 4 of pereopods 5–7 covering half of article 5.

Uropods without spines except for a single apical spine on the peduncle of uropod 3; peduncle and rami of uropods 1–2 microserrate dorsally; uropod 3 with proximal article of ramus as long as peduncle, distal article slightly shorter.

Telson unarmed, apically rounded, reaching to the middle of peduncle of uropod 3.

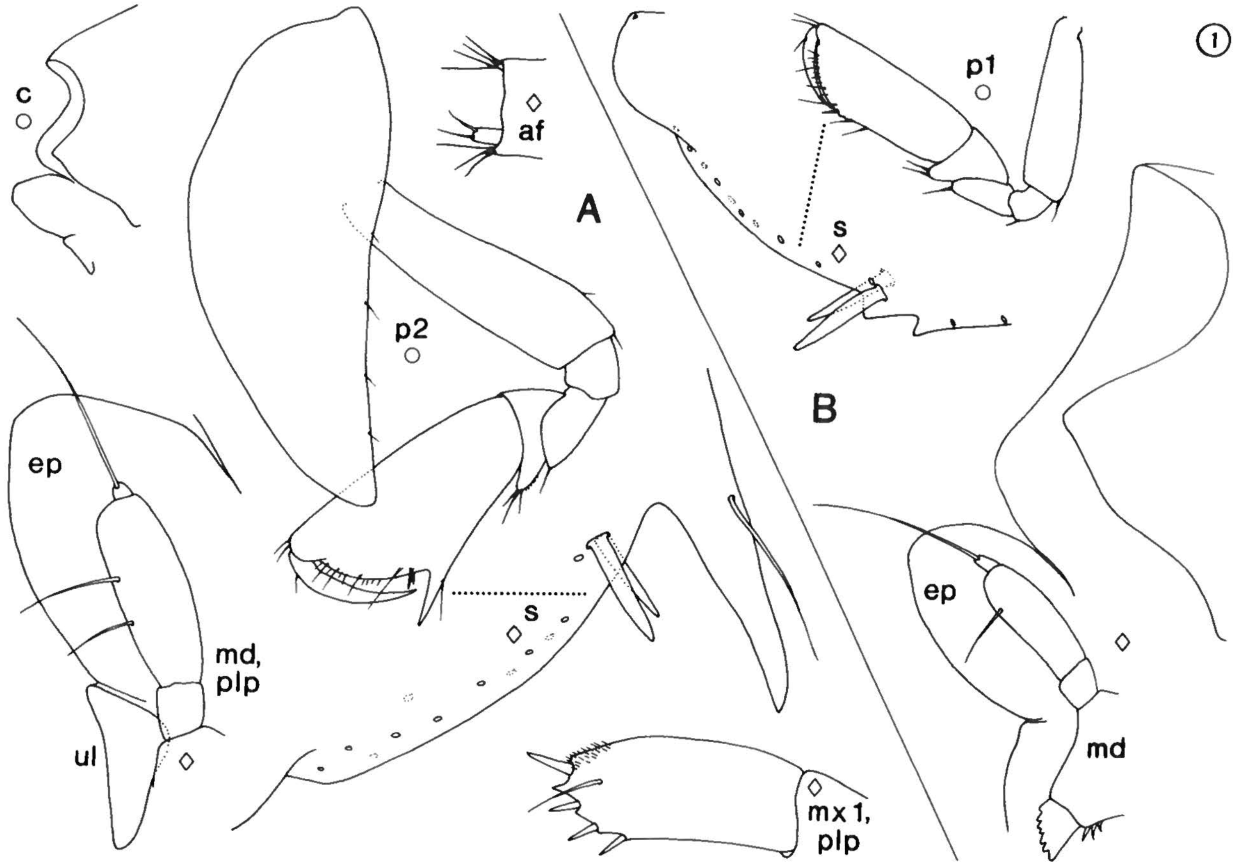


Fig. 49. *Metopella carinata* Hansen, 1887. A: Ovigerous female, St. 40–2+3. B: Male of 1.9 mm, St. 40–2+3.

Remarks on affinity: Four species of *Parametopa* have been recognized so far. *P. grandimana* Griffiths, 1974 (S Africa), differs radically from the present new species in the shape of pereopods 1 and 2 and in having antenna 1 much longer than 2, with peduncular article 1 slender and subequal in length to article 2. *P. alaskensis* (Holmes, 1904) and Gurjanova (1951) has pereopod 1 generally as in *P. crassicornis* nov. sp., but pereopod 2 is very different. Like *P. grandimana, P. alaskensis* has the peduncle of antenna 1 slender, with article 2 as long as 1 (Gurjanova, 1951, fig. 318) or about half as long as 1 (Holmes, 1904, fig. 121); the antennae of *P. alaskensis* appear to be of subequal length.

P. crassicornis is closer to *P. sarniensis* (Normann, 1907; English Channel) and *P. kervillei* Chevreux, 1901 (NW France), both of which have short, rather stout antennae of subequal length and peduncular article 1 of antenna 1 somewhat inflated and at least as long as articles 2 and 3 combined. Pereopod 1 of *P. kervillei* is more slender than in *P. crassicornis*. Pereopod 2 has the palm transverse, but both species lack the concavity and the acute defining tooth found in *P. crassicornis*.

To judge from the original descriptions and drawings, and from Chevreux & Fage (1925), *P. sarniensis* and *P. kervillei* seem so much alike, that a reexamination of the type material for possible synonymy is warranted.

Stenula Barnard, 1962

Stenula nordmanni (Stephensen, 1931) (Fig. 56)

The holotype of *Metopa nordmanni* Stephensen, 1931 (ZMUC), and the present material are in close agreement, including the possession of a 1-articulate mandibular palp and a 1-articulate palp of maxilla 1. The species must thus be transferred to *Stenula* (see p. 47).

The epistome is strongly tapering towards a bluntly pointed apex; the lower half of the median cephalic front margin is produced, evenly rounded, not quite reaching apex of epistome.

Shoemaker (1955) transferred the species to *Proboloides* on account of his Point Barrow specimens having the mandibular palp 3-articulate and the palp of maxilla 1 2-articulate. From his drawings (fig. 10a–j) it is evident, however, that the Point Barrow specimens cannot be referred to *S. nordmanni*. They appear to

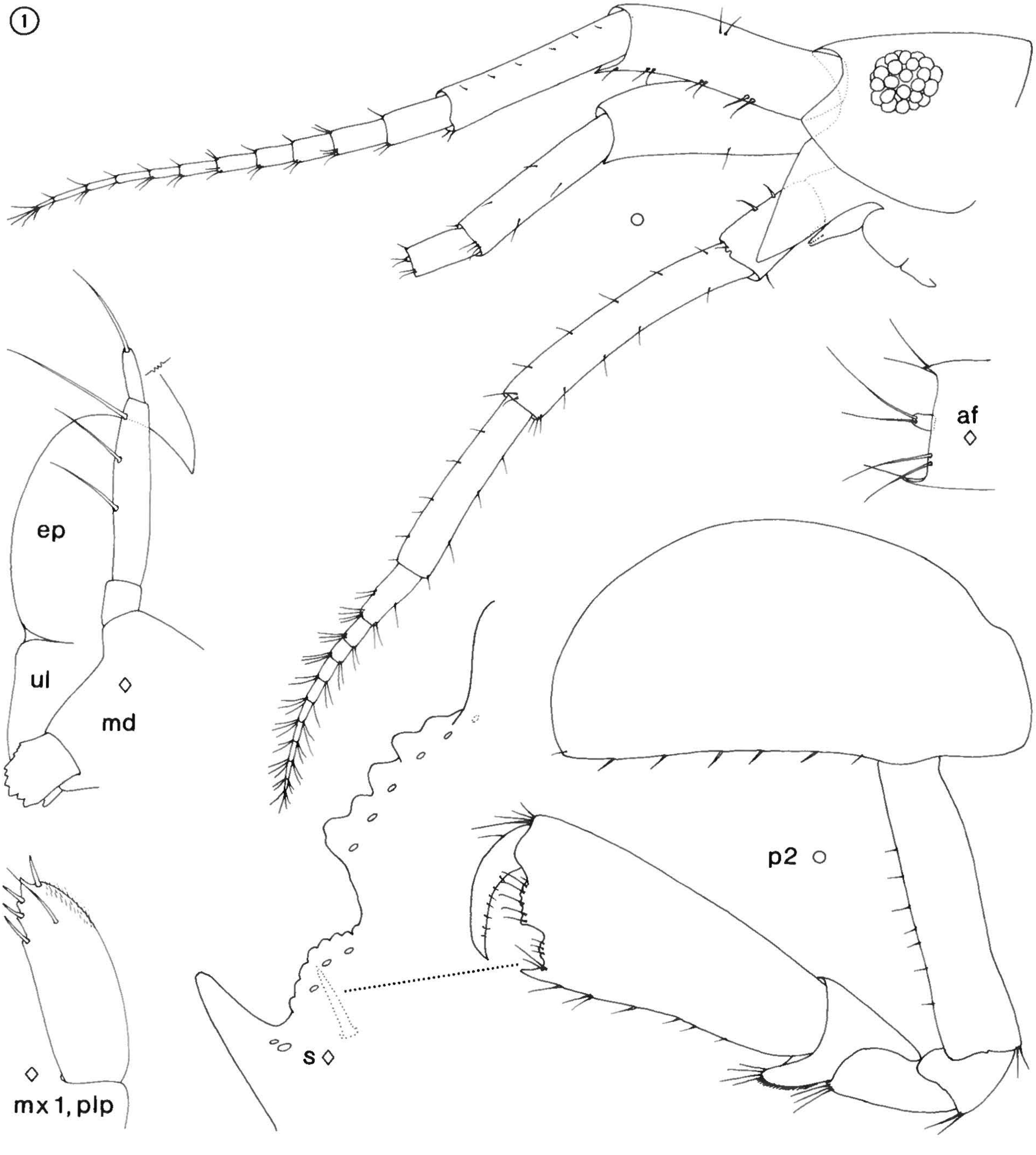


Fig. 50. *Metopella longimana* (Boeck, 1871). Male, 2.9 mm, St. 29–1.

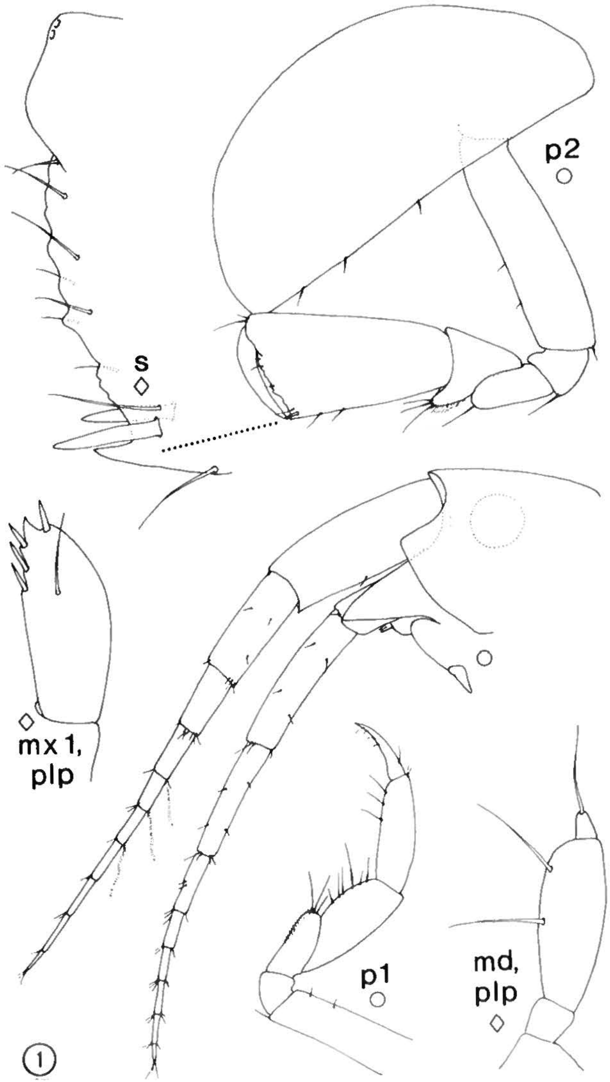


Fig. 51. *Metopella longimana* (Boeck, 1871). Subadult female, 2.3 mm, St. 67.

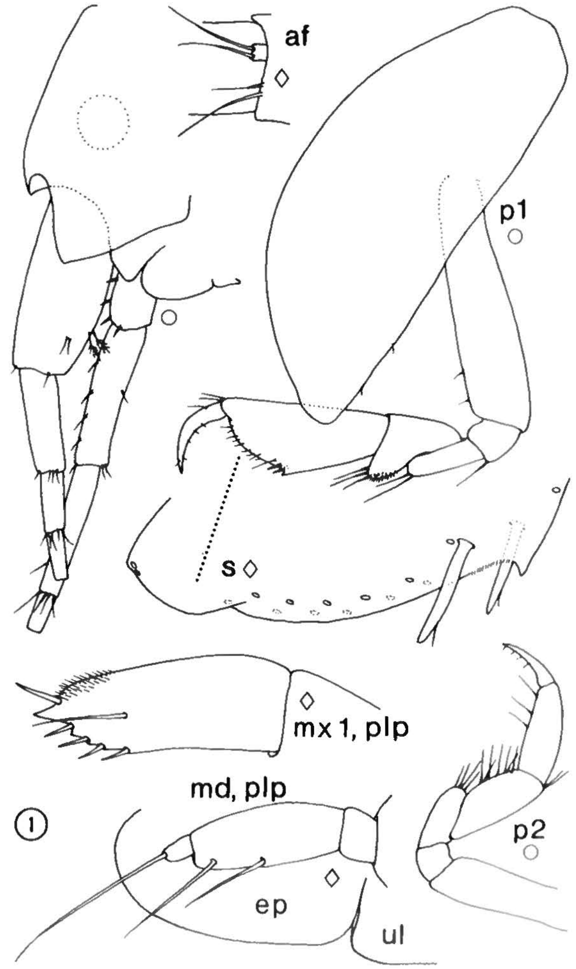


Fig. 52. *Metopa tenuimana* G. O. Sars, 1892. Adult female (setiferous oostegites), 3.0 mm, St. 27.

represent an unnamed species of *Proboloides* or *Metopoides* depending on whether an accessory flagellum of antenna 1 is present (*Metopoides*) or absent (*Proboloides*), if this character is at all reliable at the generic level, see comments p. 46 on *Metopa* versus *Prometopa*.

Shoemaker's drawing (1955, fig. 10k) of a female pereopod 1, from St. Croix River, New Brunswick, is in close agreement with the present material and Stephensen's holotype, and differs distinctly from the Point Barrow specimens with regard to the relative length of articles 4 and 5.

Stenula sp. (Figs 57–58)

The present species is referred to *Stenula* on account of the 1-articulate mandibular palp and the 1-articulate palp of the maxilliped. It exhibits the characteristic sinuate coxal plate 4 of *Metopa sinuata* G. O. Sars, 1892, and *M. propinqua* G. O. Sars, 1892, but for several reasons I prefer not to refer the present material to one or the other of the two species, which have always been difficult to separate anyway (see Dunbar, 1954 and Vader, 1969).

First of all, the type material should be examined with regard to the mouth parts (*Metopa* versus *Stenula*) and the epistome-cephalic front margin complex. The present specimens have the epistome strongly tapering towards a blunt apex; the lower half of the median cephalic front margin is produced, evenly tapering towards a rounded apex, reaching as far as the epistome, with which it is in close contact almost to the apices.

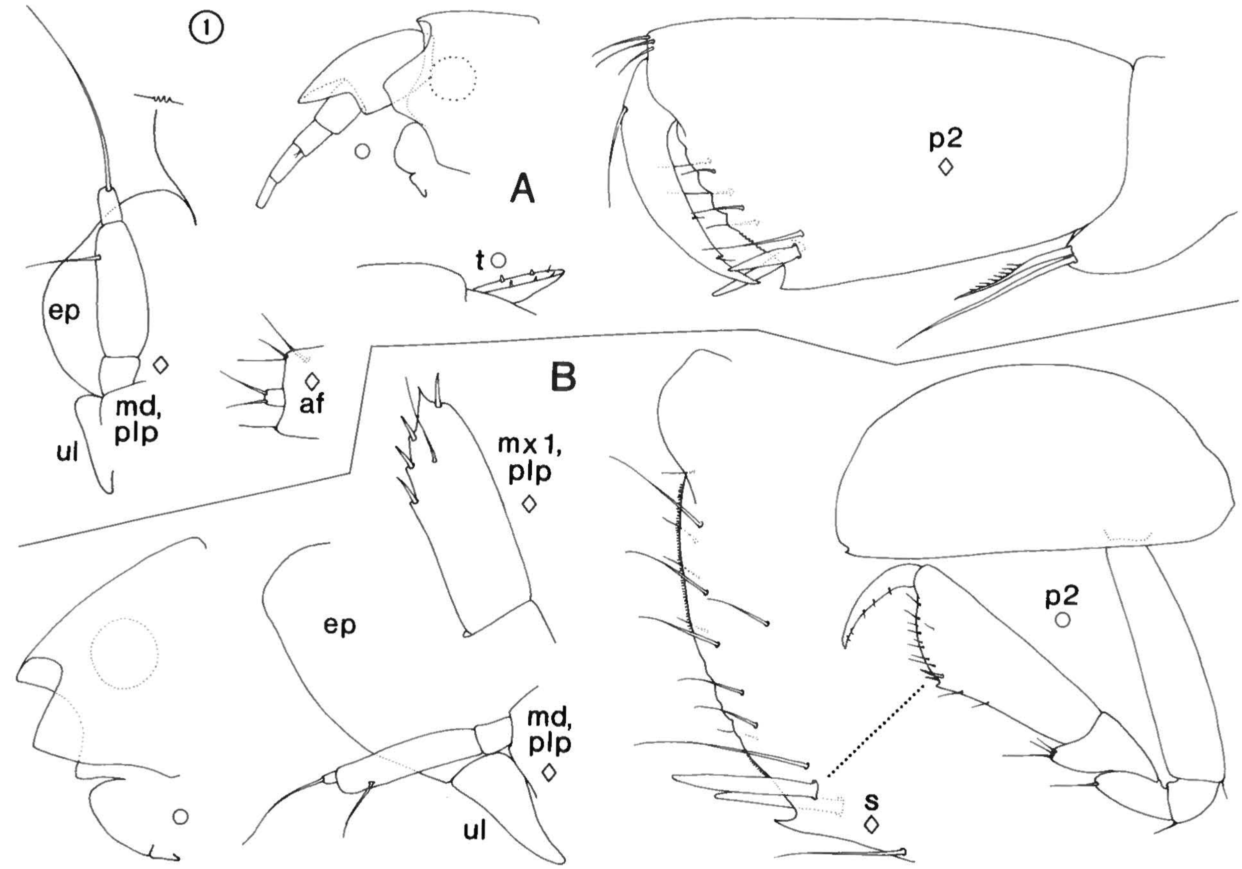


Fig. 53. A: *Metopella nasuta* (Boeck, 1871). Subadult female, 2.0 mm, St. 43–1. B: *Mesometopa neglecta* (Hansen, 1887). Adult female (setiferous oostegites), 2.8 mm, 20–3.

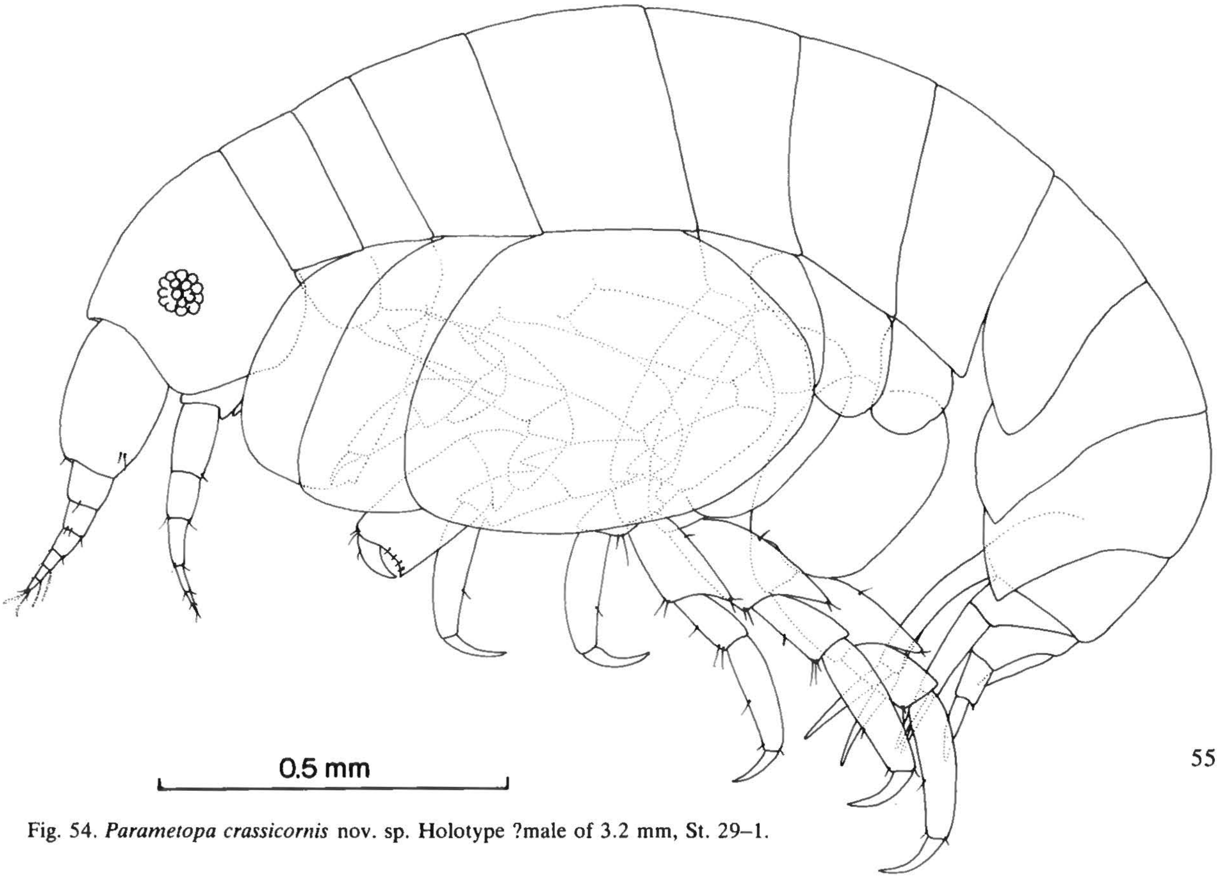


Fig. 54. *Parametopa crassicornis* nov. sp. Holotype ?male of 3.2 mm, St. 29–1.

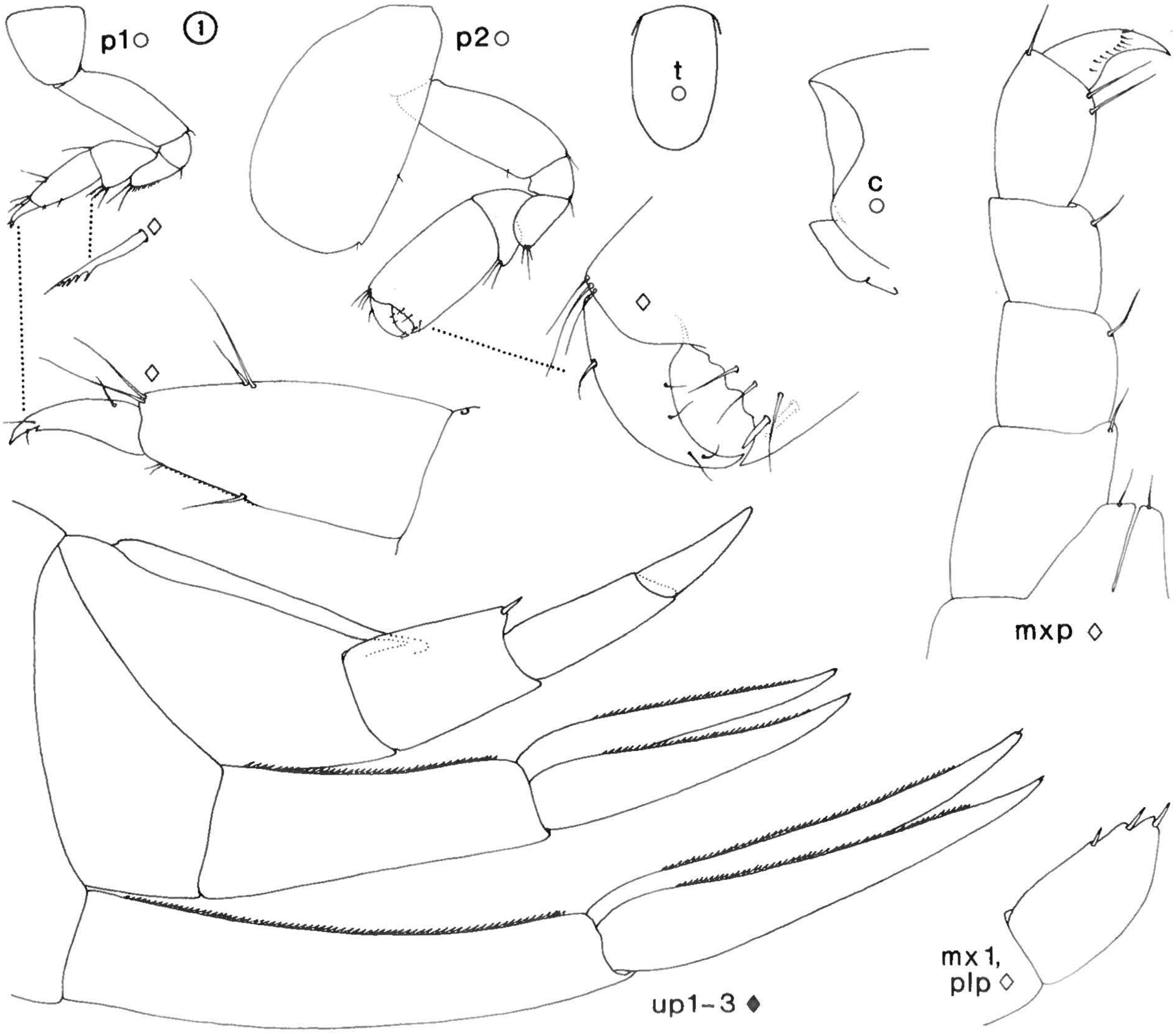


Fig. 55. *Parametopa crassicornis* nov. sp. Holotype ?male (see Fig. 54).

In many of the distinctive characters outlined by Sars (1892), Stebbing (1906), and Dunbar (1954), the Thule specimens are a mixture of *sinuata* and *propinqua,* viz., antennae, lateral lobes of cephalon, and the telson are like those in *sinuata,* while pereopod 1, pereopod 7, and uropod 3 are like those in *propinqua.*

Pereopod 2 of females as well as males differs from that of *sinuata* and *propinqua* in having a row of rounded knobs instead of sharp denticles (less pronounced in *propinqua*) along the cutting edge of article 6. Pereopod 2 of the two Thule females pictured (Fig. 57 A and B) differ from each other with regard to the proximal corner of the cutting edge of article 6. The St. 27 female has a low, acute defining tooth, which is absent in the St. 20 female. The latter condition appears to be an aberration, as the former condition is that normally found in the material examined.

I have compared the Thule material with specimens from W Greenland identified by Sars as *Metopa sinuata*; they are in complete agreement.

The identity of Dunbar's (1954) *Metopa ?propinqua* from Ungava Bay can also be ascertained only in connection with a study of the type material of *propinqua* and *sinuata.*

Acknowledgements

It is a pleasure to thank Dr. Chr. Vibe (Zoological Museum, Copenhagen; Greenland Zootopographical Investigations) for providing me with the opportunity of participating in the Thule expedition, 1968. DAEC,

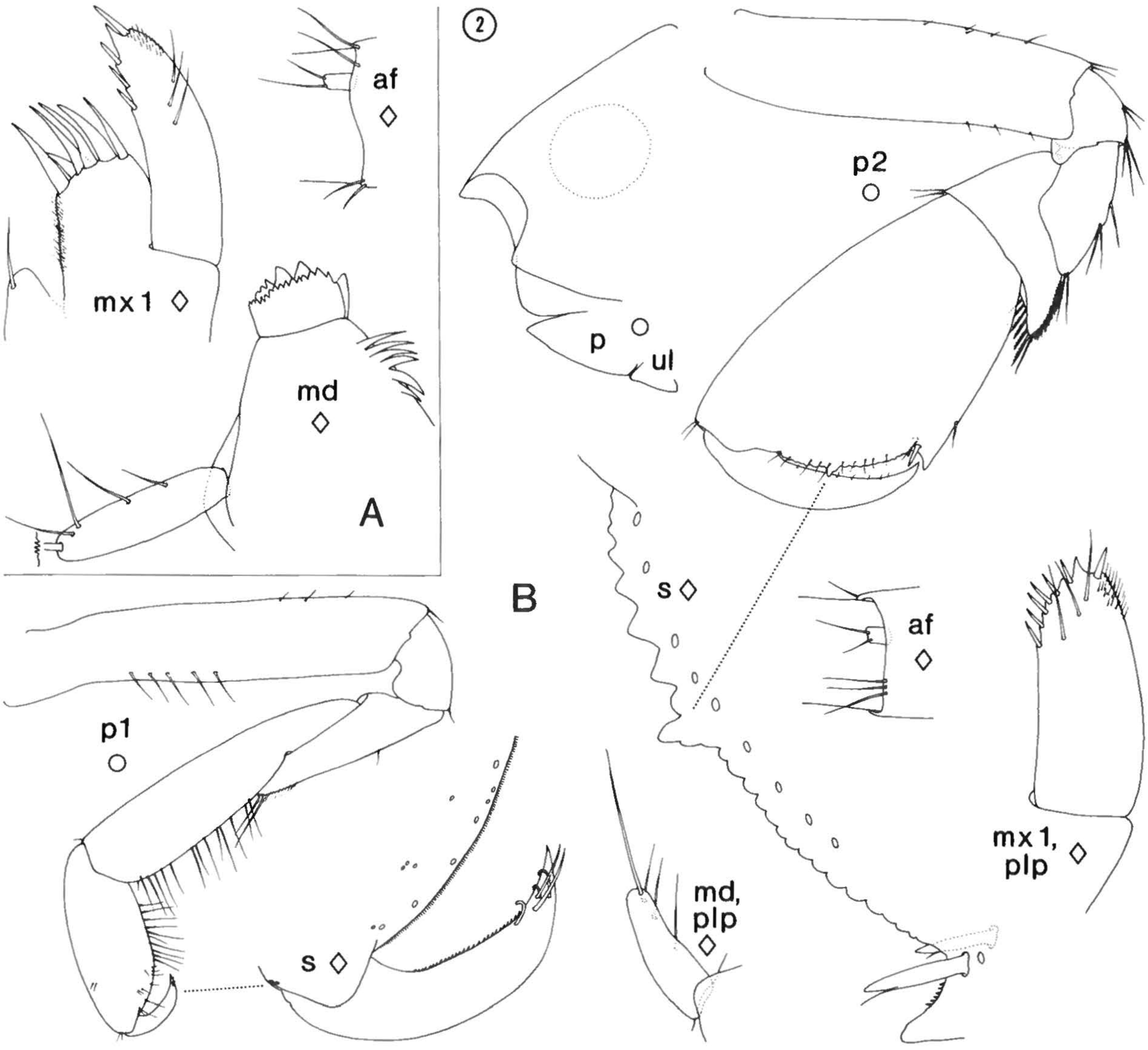


Fig. 56. *Stenula nordmanni* (Stephensen, 1931). A: Holotype male (ZMUC). B: Adult male, 5.3 mm, St. 29–1.

Research Station Risø, provided the economical basis for the expedition. Dr. Vibe and participating scientists and technicians from Risø are thanked for good companionship, as are the skipper and the crew of the expedition's vessel, the "Aglantha".

Study of material in Canadian collections, which has been of invaluable help in interpreting the Thule material, was made possible by two travelling grants from the Danish Natural Sciences Research Council (SNF 511–1588; SNF 511–2938). The major part of the present work was done while holding a research grant from the Beaufort Sea).

I owe my deep thanks to many colleagues and institutions for hospitality and help in making published and particularly unpublished material available to me: Professor M. J. Dunbar (Marine Sciences Center, McGill University, Montreal) arranged my first stay in Canada and Professor J. B. Lewis (the Redpath Museum, McGill University) put up with me for almost six months; Dr. J. W. Wacasey and Mr. Ali Mohammed (Arctic Biological Station, St. Anne de Bellevue, Fisheries Research Board of Canada), Dr. E. L. Bousfield (National Museum of Natural Sciences, Ottawa), Drs. V. Steele and D. H. Steele (Memorial University, St. John's, Newfoundland), Dr. E. L. Mills (Dalhousie University, Nova Scotia) all housed me and lent me material.

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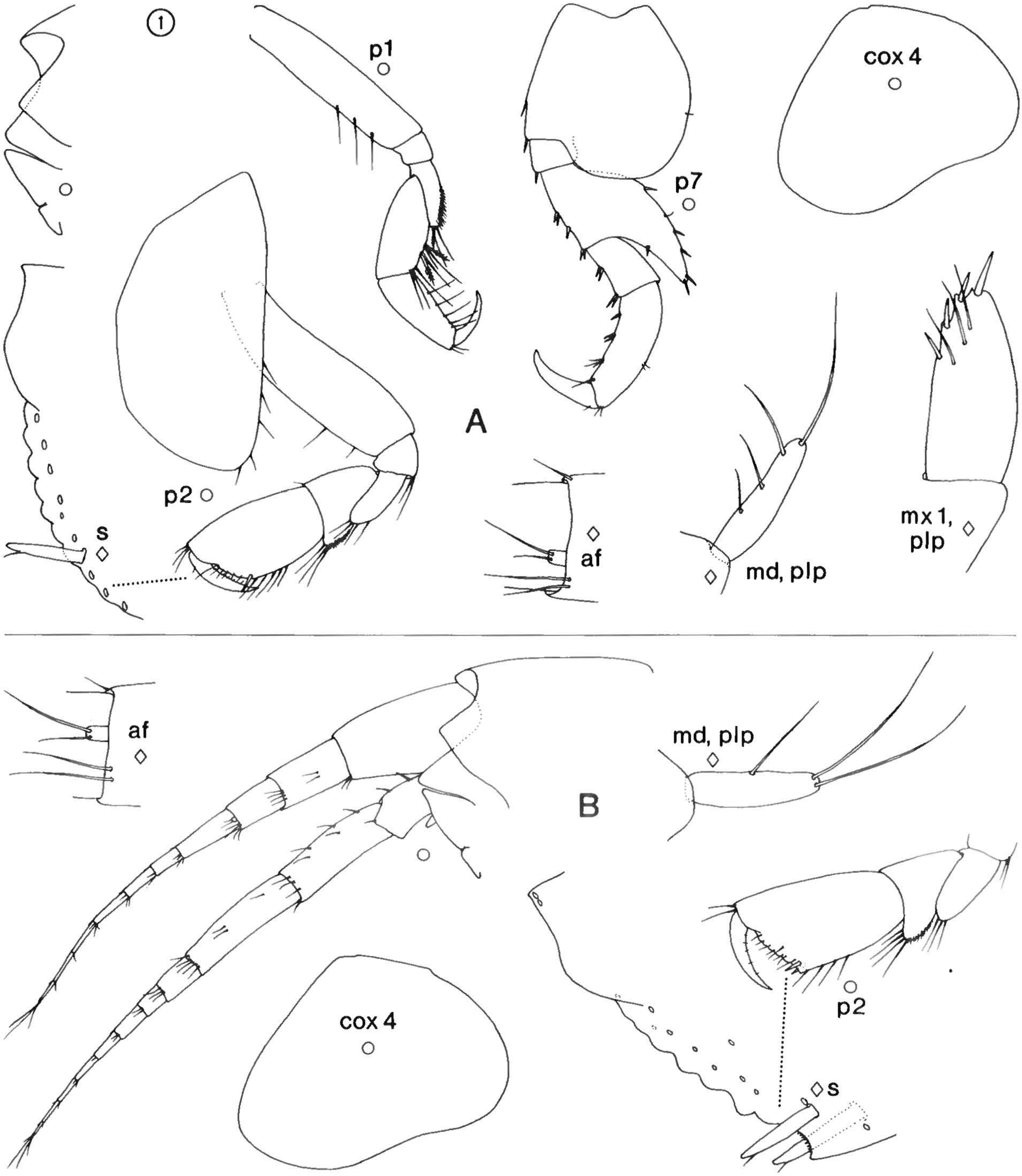

Fig. 57. *Stenula* sp. A: Ovigerous female, 3.2 mm, St. 20–3. B: Ovigerous female, 3.3 mm, St. 27.

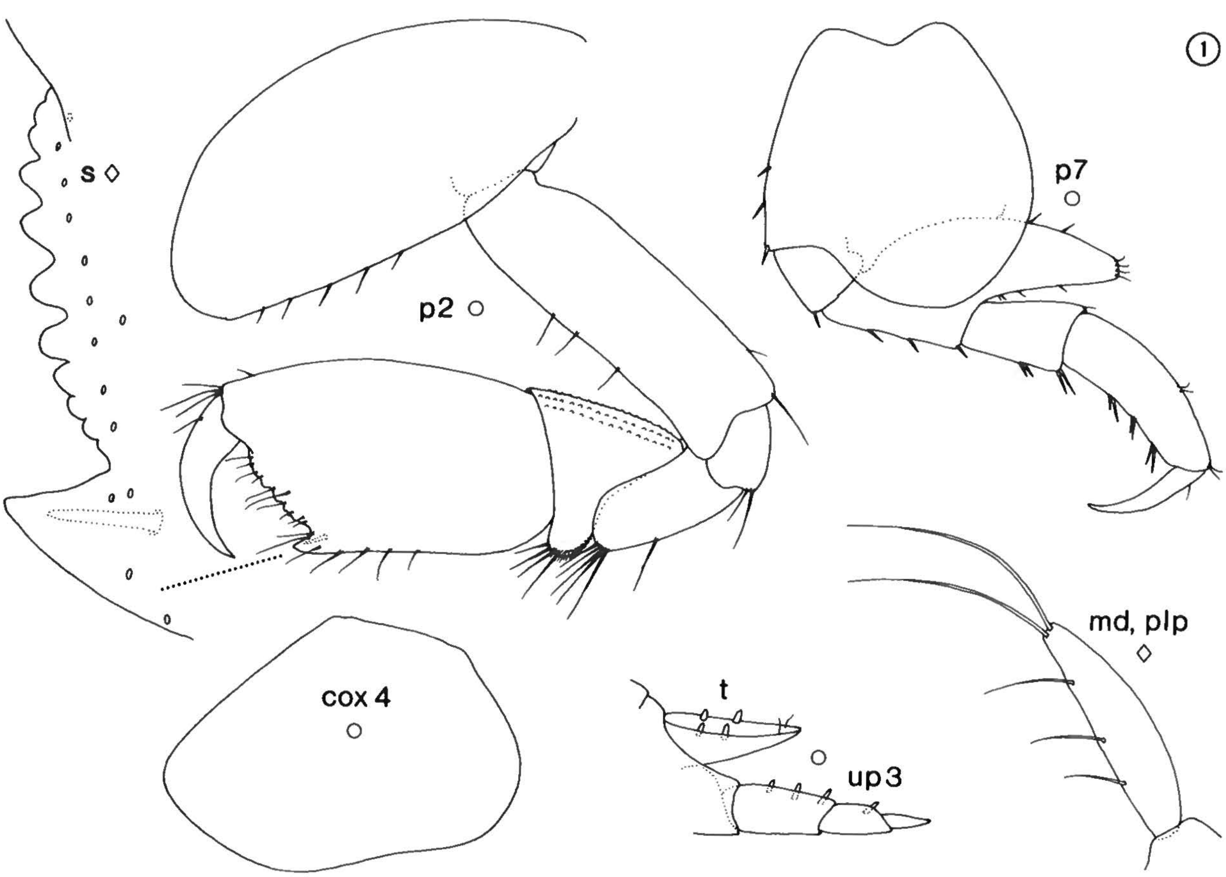

Fig. 58. *Stenula* sp. Adult male, 3.4 mm, St. 20–3.

Holmquist), and Oregon State University, School of Oceanography (Dr. A. C. Carey; unpublished material from the Beaufort Sea).

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Greenland Geoscience

1979. No. 1. C. K. Brooks:
»Geomorphological observations at Kangerdlugssuaq, East Greenland«. 21 pp.

The Kangerdlugssuaq area is mainly comprised of two contrasting rock groups: on the one hand the easily-eroded lavas and sediments of late Mesozoic to early Tertiary age and on the other the highly resistant Precambrian gneisses. Intermediate between these two types in terms of behaviour with respect to erosion are the Tertiary plutonic complexes and the basaltic areas along the coast which have been intruded by intense dyke swarms.

In the late Mesozoic the area was a peneplain, and low relief apparently persisted throughout the volcanic episode as there is good evidence that the lava plateau subsided during its formation. During this period ocean-floor spreading gave rise to the embryonic Danmark Stræde. Shortly after the volcanic episode the Kangerdlugssuaq area became the centre of a massive domal upwarping which has been a dominant feature of the land-forms up to the present day. The original surface of the dome has been reconstructed on the basis of topographic and geological evidence to show that it was elliptical in form with a major axis of at least 300 km in length and a height above present sea-level of about 6.5 km. However, subsequent isostatic effects are not considered in deriving these figures. The updoming is estimated to have occurred about 50 m.y. ago.

Several kilometres thickness of sediments and lavas were eroded off this dome at an early stage exposing the gneissic core, which still stands in alpine peaks up to about 2.7 km altitude in the central part, and dumping ca. 50000 km³ of sediment on the continental shelf. The erosion was effected by a radial, consequent drainage system, relicts of which can still be found. Kangerdlugssuaq itself may owe its origin to a tectonic line of weakness formed in response to doming, but there are also good arguments for its being purely erosional. The erosion of the dome was probably fluviatile but all trace of this stage been obliterated the subsequent glaciation.

In the period between the Eocene and the early Miocene, possibly around 35 m.y. ago, the entire area underwent epeirogenic uplift raising the undeformed parts of the original lava plateau to around 2.5 km above sea-level. A present this plateau is undergoing dissection from the seaward side, but considerable areas are still preserved under thin, horizontal ice-caps.

A brief description of the various types of glaciers, an impermanent, ice-dammed lake and the areas of ice-free land is given. In the Pleistocene, the Kangerdlugssuaq glacier was considerably thicker than at the present time and extended far out over the shelf, excavating a deep channel here. Finally some observations on the coastlines are presented.

1979. No. 2. Sven Karup-Møller and Hans Pauly:
»Galena and associated ore minerals from the cryolite at Ivigtut, South Greenland«. 25 pp.

Silver- and bismuth-rich galena concentrates have been produced for more than 70 years as a byproduct in the dressing of the crude cryolite from Ivigtut, South Greenland.

Concentrates from the years 1937 to 1962 contained from 0.44 % Ag and 0.74 % Bi to 0.94 % Ag and 1.93 % Bi. Conspicuous increases in the content of these elements appeared twice within this time interval, namely in 1955 and in 1960. Thus it seems that crude cryolite from specific areas within the mine carried galena high in silver and bismuth. This promoted a detailed study of the common Ivigtut galena and associated sulphides.

An outline of the geological setting of the deposit is given. The deposit is divided into two main bodies – the cryolite body and the quartz body. Both are subdivided into units characterized by their content of siderite and fluorite. Galena samples from these units and from rock types surrounding the deposit have been studied.

Galena from units characterized by siderite follows the compositional pattern found in the galena concentrated, whereas the sparse galena mineralizations from unirs characterized by fluorite contain much smaller amounts of silver and bismuth, less than 0.2 %. However, within the fluorite-bearing units, two peculiar parageneses reveal high contents of silver and bismuth expressed by the presence of particular minerals such as marildite-aikinite and gustavite.cosalite respectively.

Further trace element studies on selected galena samples emphasize Sn and Te as chemically characteristic of the galena and of the sulphide-carbonate phase of the deposit.

The temperature of formation of the main part of the deposit is placed at 550–400°C, and between 300 and 200°C certain parts of the fluorite cryolite and the fluorite zone.

Greenland Bioscience

1979.

1. Erik L. B. Smidt:

»Annual cycles of primary production and of zooplankton at Southwest Greenland«. 53 pp.

Annual hydrographic observations, measurements of primary production, and sampling of zooplankton were undertaken in Southwest Greenland waters in the 1950s and –60s. In the coastal area and at the entrance to Godthåbsfjord winter cooling normally extends to the bottom, resulting in a vertical mixing of the water and an effective replenishment of nutrients at the surface. The subsequent production rate is, therefore, high with an average annual gross production calculated to about 160 g C m^{-2}. In the inner fjord regions the stratification is normally much more stable with persisting warm bottom water, and the production is, therefore, lower here than in the coastal area. The seasonal variation in the relations between daylight, primary production, phosphate, and quantity of zooplankton is, presumably, representative of the coastal waters at SW Greenland. A maximum in primary production in spring is normally followed by another maximum in late summer. The number of animals in the microplankton samples from the upper 30 m (the productive layer) is at its maximum simultaneously with the second maximum of the primary production, while the maximum of the macroplankton biomass (taken by stramin net) extends until late autumn in the coastal and outer fjord regions.

A maximum of the macroplankton biomass during winter in the deep water layers in the inner Godthåbsfjord, caused by inflow of warm bottom water, stable stratification and cooled outflowing surface water acting as a barrier to the ascent of the animals, is assumed to be normal to the open, non-threshold, W Greenland fjords.

Seasonal vertical migration of the zooplankton is indicated by Hensen net hauls from different depths. There is a concentration of zooplankton in the upper water layers in April–September and a deeper concentration from autumn to spring.

Annual cycles of various animal groups are described for holoplankton and meroplankton, separately. Holoplankters are normally dominant, copepods being the most numerous group. Meroplankters, especially bottom invertebrate larvae, are relatively numerous in the microplankton in spring and summer with *Balanus* nauplii dominant in spring and lamellibranch larvae in the following months. In a special section on fish eggs and larvae it is shown *i.a.* that cod eggs and larvae are normally concentrated in the upper 50 m, where they are much exposed to temperature variations, while eggs and larvae of American plaice occur also in deeper water. This may partly explain why the cod stock is more vulnerable to low temperatures.

It is shown that the epipelagic plankton fauna in the survey area in terms of growth and mode of development is more similar to the arctic than to the boreal fauna. It could therefore be termed subarctic, which also corresponds to the environmental conditions in the area.

1979.

2. Jean Just:

»Amphipoda (Crustacea) of the Thule area, Northwest Greenland: Faunistics and Taxonomy«. 61 pp.

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