

Three new species of Arcturidae from the lower abyssal zone of Lorie and South Sandwich Trenches, West Antarctic (Crustacea: Isopoda: Valvifera)

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New arcturid species *Neoarcturus vinogradovae* sp. n. and *Acantharcturus longipleon* sp. n. from the Lorie Trench and *Neoarcturus cochlearicornis* sp. n. from the South Sandwich Trench are described and illustrated. Both species of *Neoarcturus* are eyeless, *Acantharcturus longipleon* has small eyes without dark pigment.

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Introduction

This paper is the third of series of papers on Antarctic deep-sea arcturids collected by the research vessel "Akademik Kurchatov" in 1971. In two previous papers six hadal species of the family Arcturidae from depths exceeding 6000 meters were described (Kussakin & Vasina 1994, 1995). In this paper the authors deal with arcturids collected from low abyssal depths between 4680 and 5480 m. Two species, *Neoarcturus vinogradovae* sp. n. and *Acantharcturus longipleon* sp. n., were sampled by trawl from depths 5450-5480 m in the Scotia Sea north of South Orkney Islands (Lorie Trench). The fauna dominated by holothurians *Elpidia* spp. and contains various species of Demospongia, Actinaria, Solenogastres, Gastropoda, polychaets (*Macellicephala*, *Kesun*, Terebellidae), crustaceans Cumacea and Amphipoda, echinoderms Brisingidae and Ophiuroidea, ascidians and liparid fishes *Careproctus* (Vinogradova & al., 1974). The third species, *Neoarcturus cochlearicornis* sp. n., is described from a single male collected in the South Sandwich Trench at depth 4680-4704 m. The abundant fauna is dominated by holothurians Elaspoda and echinoids Pourtalesiidae (Vinogradova & al., 1974). Unfortunately, all species are represented only by single or few partly damaged specimens.

The types have been deposited in the Zoological Institute, Russian Academy of Sciences, St.Petersburg.

Neoarcturus vinogradovae sp. n. (Figs 1-14)

Holotype. ♂, No. 1/69412, 11.5 mm long, R/V "Akad. Kurchatov", Sta. 909, 29.XI.1971, 60° 12' 9" S, 43° 59' W - 60° 13' 5" S, 44° 00' W, 5450-5480 m depth, trawl.

Paratypes. 2 ♀, No. 2/69413, 2/69414, 11.2 and 10.3 mm long.

Description of holotype. Body (Fig. 1) sub-cylindrical, its length 5.1 times body width across pereonite 2. Dorsal surface of body finely granular, covered with short, stout, conical, blunt spines. Cephalothorax without eyes; frontal margin evenly concave; anterolateral angles right; lateral margins with small conical tubercles; dorsal surface with 2 pairs of short dorsomedial spines and 1 pair of small dorsolateral tubercles. Pereonite 1 fused with cephalothorax, but distinctly marked by wide transverse groove; anterolateral angles slightly produced and pointed. Pereonites 1-3 subequal; pereonite 4 about 1.2 times as long as pereonite 3; pereonites 6 and 7 shortest. Dorsal surface of pereonites 1-4, 6 and 7 with 2 pairs, pereonite 5 with 3 pairs of short blunt conical tubercles arranged in transverse rows. All pleonites fused with pleotelson, but pleonite 1 separated by distinct suture, pleonite 2 by dis-

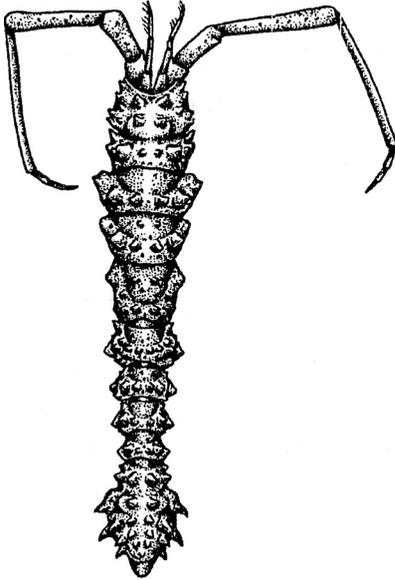
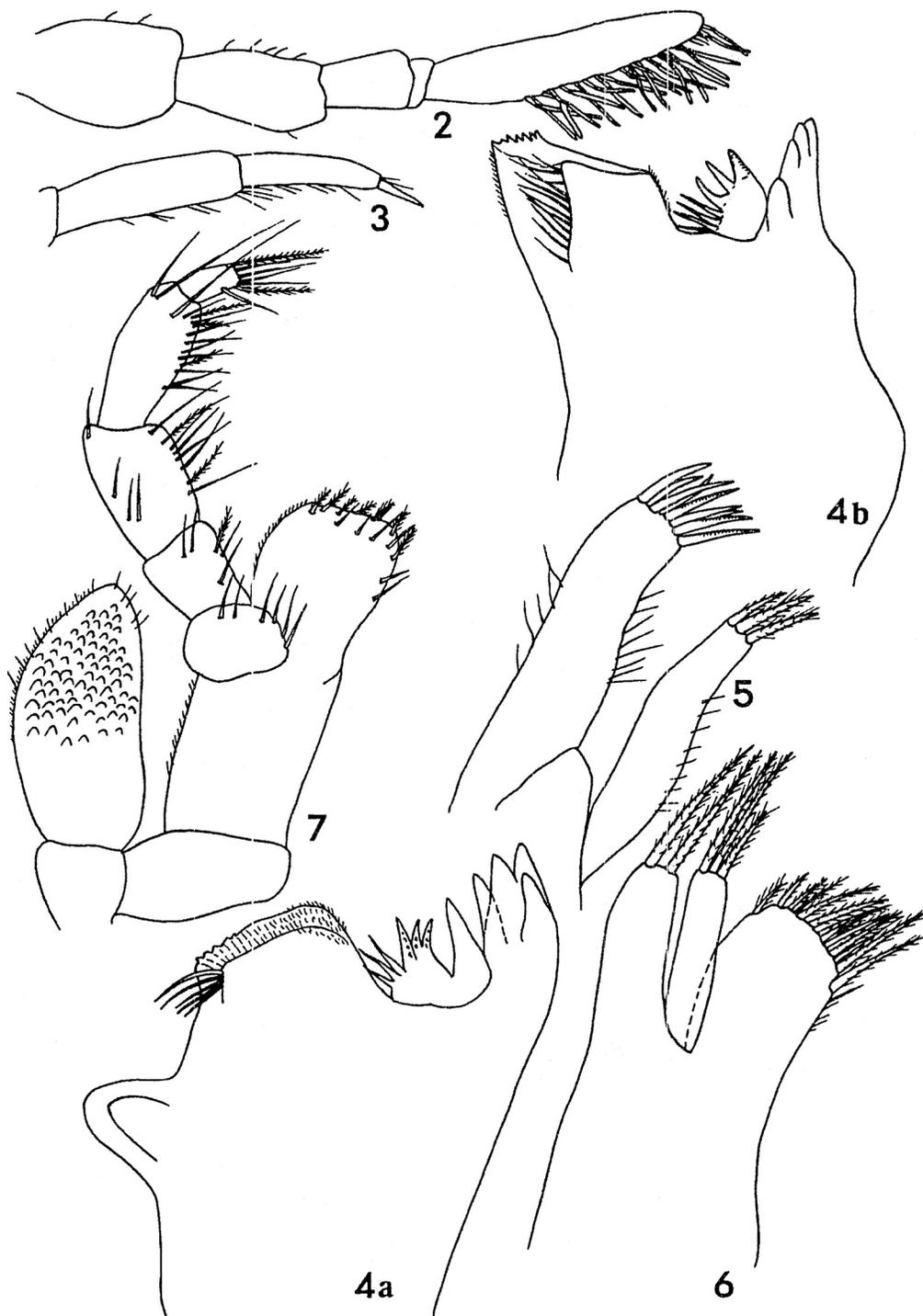


Fig. 1. *Neoarcturus vinogradovae* sp. n., male, holotype dorsal view.

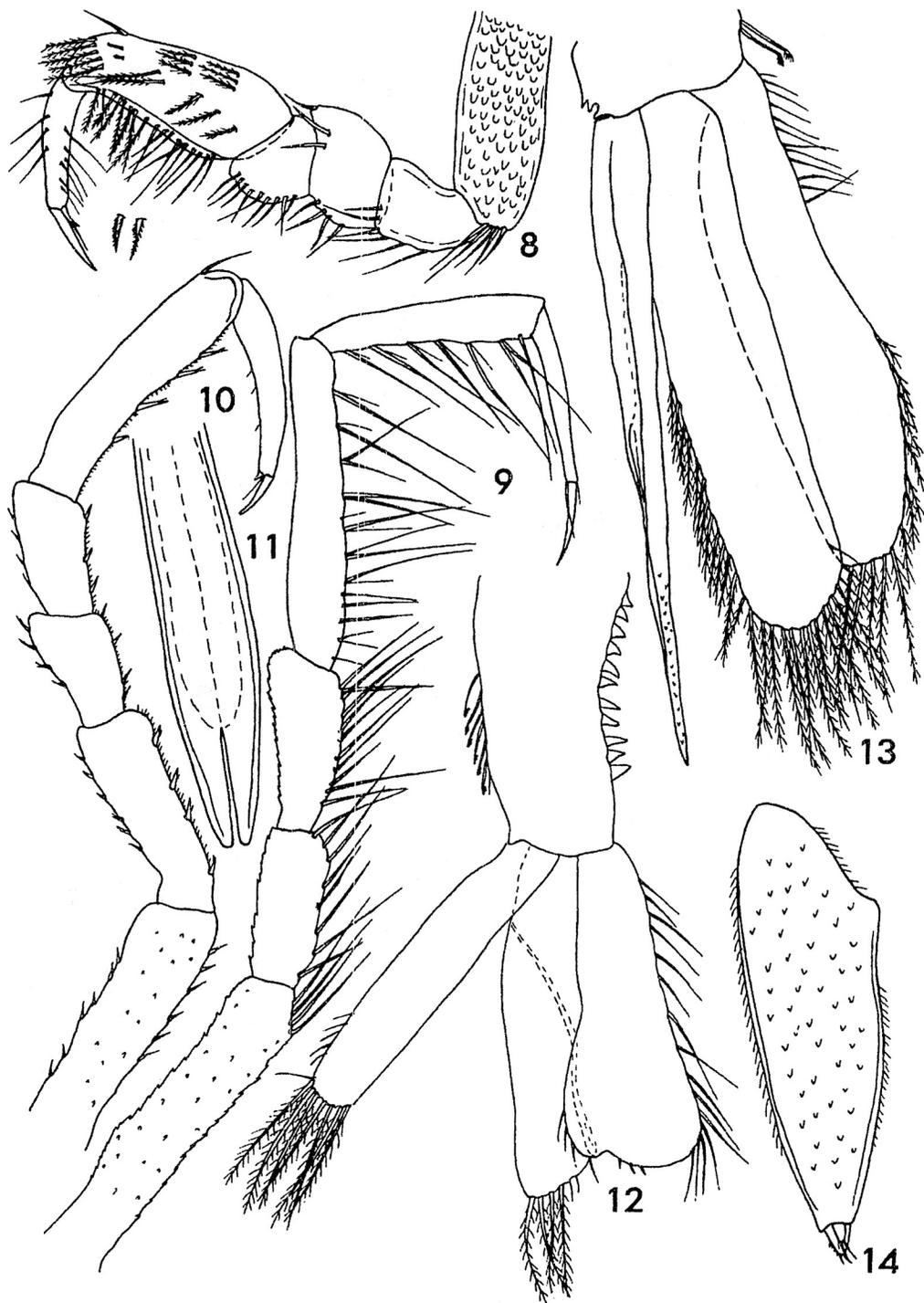
tinct groove, pleonite 3 by shallow transverse groove. Dorsal surface of anterior three pleonites each with 4 small tubercles arranged in a transverse row. Third pleonite bearing 2 relatively large lateral spines. The rest of caudal part of pleotelson short, about equal in length to pleonites 1-3 combined, with a pair of stout short spines; apex narrowly rounded; dorsal surface covered with tubercles. Antenna 1 (Fig. 2) exceeding distal margin of third peduncular article of antenna 2; peduncle a little longer than flagellum; second peduncular article longest, slightly longer than first article and twice longer than third peduncular article. First flagellar article very short, in form of oblique ring; last article long, with 11 groups of 2 aesthetascs and 2 simple setae; antennular tip with 3 simple setae. Antenna 2 shorter than body; peduncular articles 4 and 5 long and slender; fifth article longest, 1.2 times longer than fourth article; fourth article twice as long as third article. Surface of peduncular articles 2-4 densely covered with minute acute scales. Flagellum (Fig. 3) with 3 articles; first article longest. Mandible (Fig. 4) pars incisiva with 4 chitinized teeth; molar process with broad grinding surface and with a few simple setae on mediolateral margin. Lacinia mobilis of right mandible (Fig. 4b) smaller than pars incisiva, with 3 thin teeth of similar size and row of 5 thick

setae; lacinia mobilis of left mandible (Fig. 4a) with 1 strong tooth, 3 thin teeth and a row of 3 spine-like setae. Lateral endite of maxilla 1 (Fig. 5) distally curved medially; apex with 9 strong chitinized curved spines; medial endite smooth, with 3 long setulated setae. Inner endite of maxilla 2 (Fig. 6) broad, with round distal margin bearing apically and along distal half of medial margin about 14 long setae, covered with long setules all around; medial endite with 3 long setae, outer endite with 5 setae.

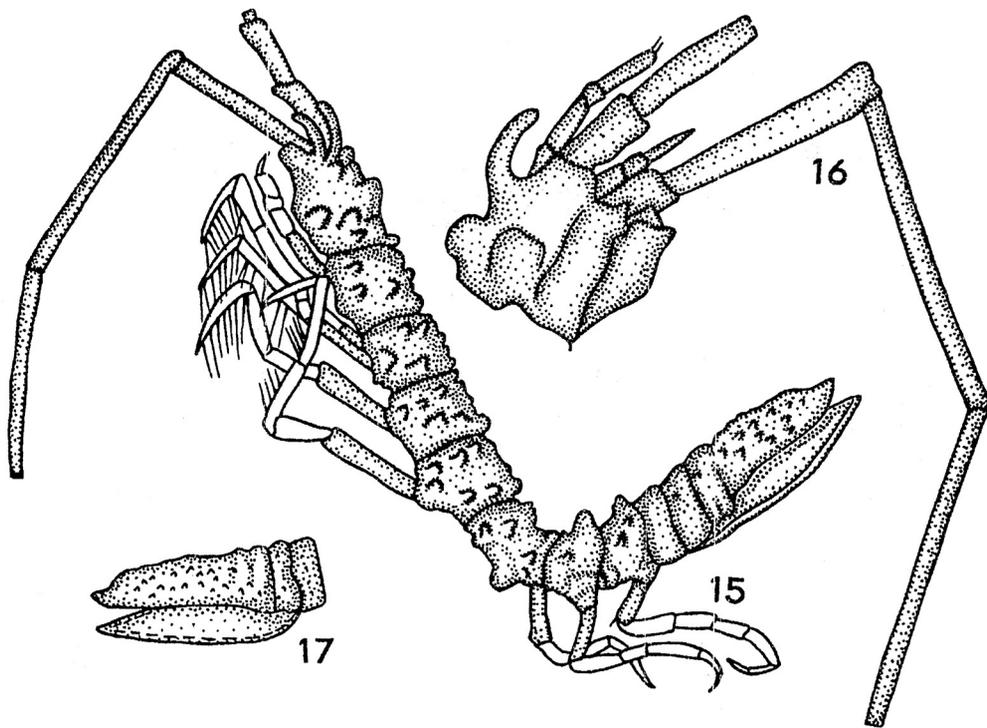
Maxilliped (Fig. 6) epipodite oblong-oval, its surface densely covered with small scales. Endite broad, bearing distal row of about 10 spine-like setae and 4 setae below this row; coupling hooks absent. Third and fourth palpal articles longest, equal in length; second article 1.5 times last article length; all palpal articles with long setae, mostly covered with small setules in upper part. Pereopod 1 (Fig. 8) far shorter than pereopods 2-7; basis longest, with 3 distal long setae, its proximal half covered with minute scales; carpus shortest, trapezoidal; propodus oval, subchelate, as long as ischium and merus combined and slightly shorter than basis; dactylus slightly shorter than propodus, with 2 claws and 1 seta in between. Ventral surface of propodus with few setae, most on medial part; mediadorsal side of propodus forming a slightly concave "spoon"; curved dorsolateral surface with long feather-like setae arranged in 5 transverse rows. Pereopods 2-4 (Fig. 9) similar, long. Pereopod 4 longest, basis longest, 1.1 times linear carpus length; ischium shortest, 0.5 carpus length; merus slightly longer than ischium; propodus and dactylus equal in length, each 1.5 times longer than ischium; dorsal claw slender, about 0.3 times of total dactylus length. Surface of basis-carpus of pereopods 2-4 covered with minute scales, posteromedial margins of these articles with long filter spines; dactylus without long spines or setae; anterolateral margin of propodus with 1-2 long simple setae. Pereopods 5-7 shorter and a little stronger than pereopods 2-4; basis longest; anterior surface of ischium, merus, carpus and propodus edged with thin setae; anterolateral margins of propodus and carpus with 3 long spines. Basis of pereopod 6 (Fig. 10) slightly longer than propodus; ischium as long as dactylus; merus shortest, slightly shorter than carpus; dorsal claw short, nearly 0.23 of total dactylus length. Sympodite of pleopod 1 (Fig. 12) long, with lateral row of 11 comparatively long pointed



Figs 2-7. *Neoarcturus vinogradovae* sp. n., male, holotype. 2, antenna 1; 3, flagellum of antenna 2; 4a, left mandible; 4b, right mandible; 5, maxilla 1; 6, maxilla 2; 7, maxilliped.



Figs 8-14. *Neoarcturus vinogradovae* sp. n., male, holotype. 8, pereopod 1; 9, pereopod 4; 10, pereopod 6; 11, penis; 12, pleopod 1; 13, pleopod 2; 14, uropod.



Figs 15-17. *Neoarcturus cochlearicornis* sp. n., male, holotype. 15, lateral view; 16, head, dorsolateral view; 17, pleon, lateral view.

teeth, on opposite side row of 6 coupling setae. Exopodite broad, with large broad distolateral lobe, ridge and lateral row of long setae; distomedial lobe with 5 long setae; endopodite narrow, with 7 long and 2 short marginal setae. Sympodite of pleopod 2 (Fig. 13) rather short, endopodite with long, stiletto-like appendix masculina. Uropod (Fig. 14) densely covered with small tubercles; shorter ramus with 3 small setae.

Description of paratypes. Female. Dorsal ornamentation much as in male, but pereonites 2-4 broader.

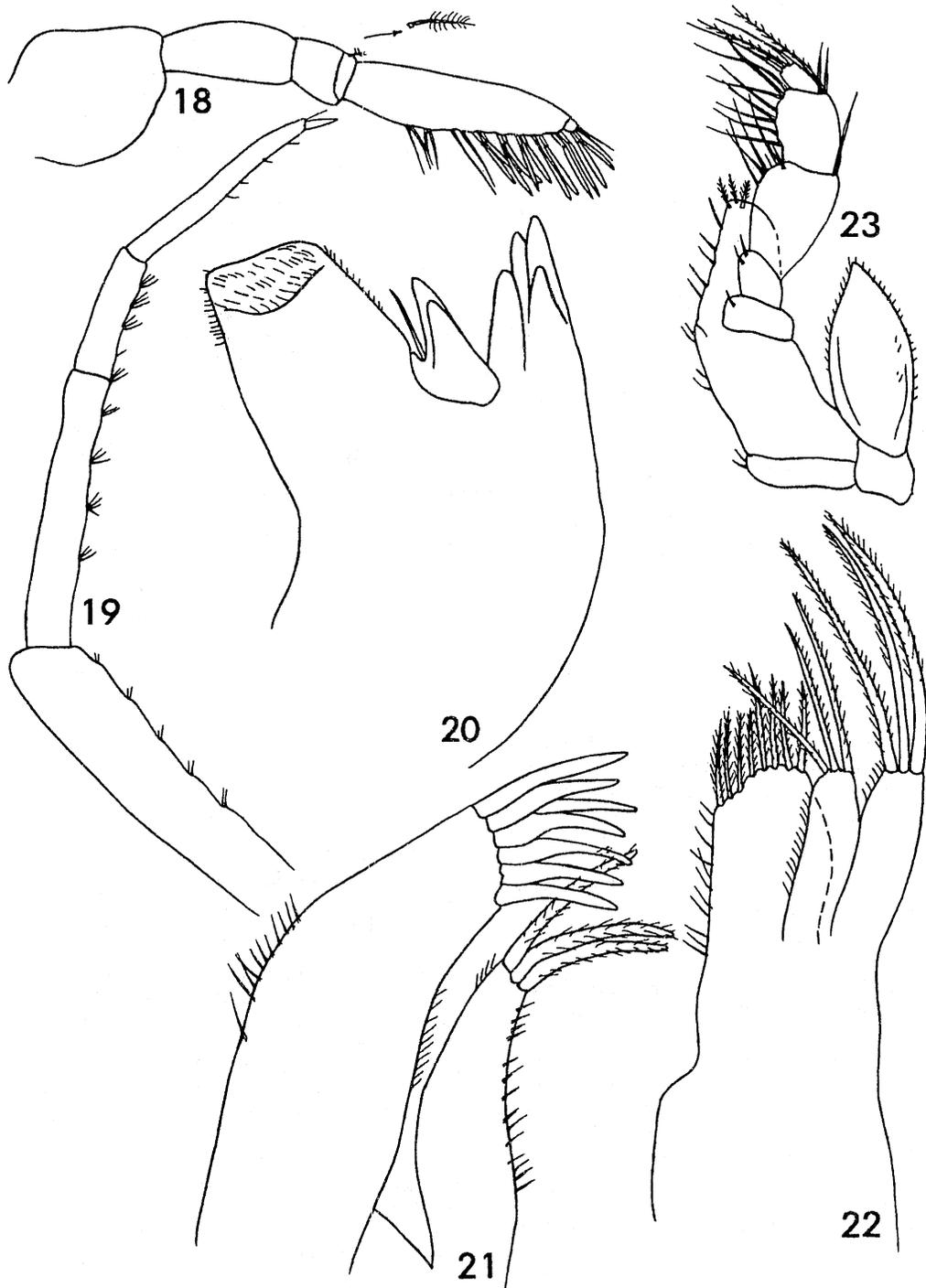
Etymology. This species is named in honour of Dr. Nina Vinogradova (Institute of Oceanology, Moscow) who has contributed much to the knowledge of deep-sea fauna and participated in collecting of this material.

Remarks. *N. vinogradovae* differs markedly from the most antarctic species of *Neoarcturus* in having much smaller subterminal dorsolateral spines of pleotelson. From *N. patagonicus* (Ohlin) and African species, *N. vinogradovae* can be distinguished by the presence of two pairs of strong acute spines on the lateral margins of pleotelson in front of subterminal spines.

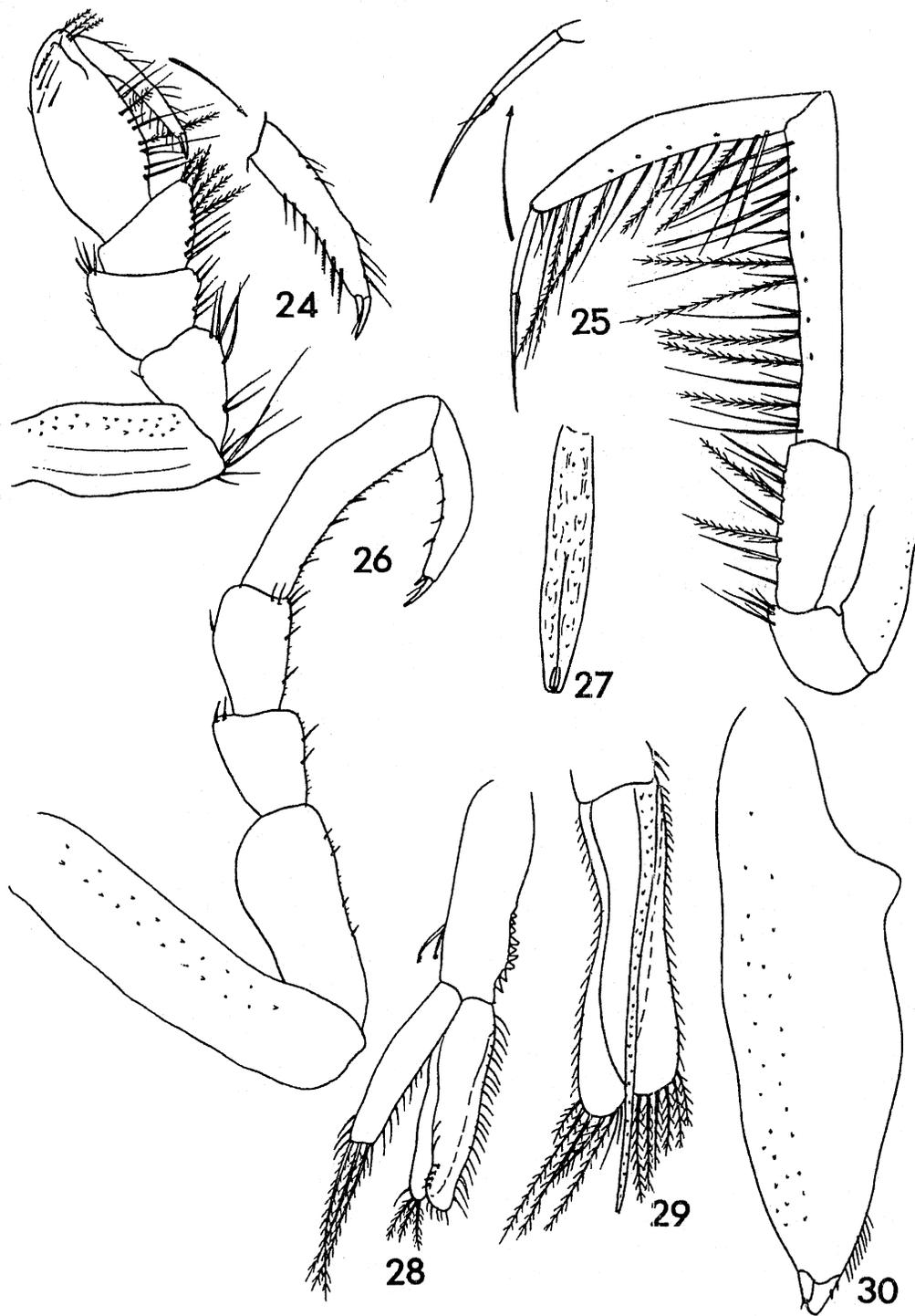
***Neoarcturus cochlearicornis* sp. n.**
(Figs 15-30)

Holotype. ♂, No. 1/69415, 12.0 mm long, R/V "Akad. Kurchatov", Sta. 870, 29.XI.1971, 55° 07' 3" - 55° 08' S, 25° 02' 9" - 25° 01' W; 4704-4680 m, trawl.

Description of holotype. Body (Fig. 15) slender, elongate, nearly cylindrical; its length about 6 times body width across pereonite 2. Dorsal surface of body covered with tubercles, without dorsal spines, except a pair of anterior, "supraocular" spines in form of broad, flat, anteriorly curved, frontally dilated protuberances with concave interior surface (Fig. 16). Dorsal medial part of cephalothorax behind anterior protuberances strongly convex, elevated, with a pair of tubercles. Frontal margin concave, with straight medial part; anterolateral corners rounded. Eyes absent. Pereonite 1 fused with cephalothorax, but distinctly separated by deep transverse groove and short lateral incision; anterolateral margins with a pair of short points. All pereonites with broad tuberculose posterior transverse ridge. Pereonites 1-4 each with 1 pair of anterior submedial tubercles. Pereonites 2-7 with broad supracoxal elevations. Pereonites 2-5 about



Figs 18-23. *Neoarcturus cochlearicornis* sp. n., male, holotype. 18, antenna 1; 19, flagellum of antenna 2; 20, right mandible; 21, maxilla 1; 22, maxilla 2; 23, maxilliped.



Figs 24-30. *Neoarcturus cochlearicornis* sp. n., male, holotype. 24, pereopod 1; 25, pereopod 4; 26, pereopod 6; 27, penis; 28, pleopod 1; 29, pleopod 2; 30, uropod.

equal in length; pereonites 6 and 7 slightly shorter. Pleon about 0.31 times as long as body. First pleonite separated from remainder of pleotelson by distinct suture; pleonites 2 and 3 fused with pleotelson, marked only by grooves. Pleonites 1 and 2 narrower than last pereonite and pleonite 3. The rest of caudal part of pleotelson nearly 1.26 times longer than pleonites 1-3 combined and slightly narrower than pleonite 3. Dorsal surface of pleotelson (Fig. 17) covered with numerous small tubercles. Caudal margin of pleotelson narrowly rounded, without latero-caudal spines. Antenna 1 (Fig. 18) slightly surpassing middle of third article of antenna 2; peduncle 1.4 times as long as flagellum; first peduncular article slightly longer and nearly 2.5 times broader than second article; third article shortest, about 3 times shorter than second article. First flagellar article forming very short ring; distal article longer than peduncular articles 2 and 3 combined. Antenna 2 shorter than body; peduncular articles increasing in length from 1 to 5; articles 4 and 5 slender, article 5 nearly 1.2 times longer than article 4 and 2.3 times longer than article 3. 3-articled flagellum (Fig. 19) nearly twice shorter than distal peduncular article; article 1 longest, article 2 shortest; all flagellar articles laterally with short simple bristles. Pars incisiva of right mandible (Fig. 20) with 4 chitinized teeth; lacinia mobilis much smaller than pars incisiva, with 2 distal teeth and 1 long seta. Molar process with broad grinding surface, acute distomedial tooth and several mediolateral simple setae. Lacinia mobilis of left mandible with 2 distal teeth and a row of 3 proximal setae. Lateral endite of maxilla 1 (Fig. 21) distinctly curved medially in distal part, apex with 7 strong chitinized curved spines; medial endite with 3 long setulated setae. Inner endite of maxilla 2 (Fig. 22) broad, with 8 long setulated setae; medial and outer endites each with 3 long setae.

Maxilliped (Fig. 23) epipodite broadly lanceolate, with numerous short marginal setae; endite broad, bearing 3 setulated distal setae; coupling hooks absent. Third palpal article longest, three distal articles with long setae. Pereopod 1 (Fig. 24) far shorter than pereonites 2-7, with long ventral setae but without spines; basis longest, with several long distoventral setae; carpus subtriangular, shortest, twice shorter than ischium; subchelate propodus oval, 2.2 times as long as wide; propodus slender, shorter than ischium and merus combined, with 2 comparatively short claws and 1 seta in between; dorsal claw 1 0.66 times as long as ventral claw.

Pereopods 2-4 similar, pereopod 4 (Fig. 25) longest; all articles without setae on dorsal side and with long filter spines on ischium, merus, carpus and propodus; dactylus without filter spines; carpus longest, that of second pereopod 1.2 times longer than propodus, 1.3 times longer than dactylus or ischium and merus combined. Dactylus with 2 claws and a seta in between; dorsal claws long, slender, about 46% total length of dactylus, ventral claw short. Pereopods 5-7 (Fig. 26) stronger than pereopods 2-4; basis longest, twice longer than shortest merus or carpus; propodus slender, oblong, slightly shorter than basis, anterior surface with one row of 7 short spines and one anterodistal seta; anterior surface of merus with 2, corpus with 3 spines plus cluster of 5-6 spines. Dactylus about 0.8 times propodus length, with 2 short claws and spine between them. Dorsal surface of propodus and dactylus with several setae. All pleopods similar, with marginal plumose setae. Sympodite of pleopod 1 (Fig. 28) with many small tooth-like structures. Endopodite of pleopod 2 (Fig. 29) with long stiletto-like appendix masculina being far longer than endopodite.

Uropod (Fig. 30) covered with small tubercles; posterior half of medial margin with several long setae; greater and smaller ramus each with 2 small spine-like setae.

Etymology. "Cochlearicornis", adjective, from Latin nouns "cochlear" (spoon) and "cornu" (horn), means "provided with spoon-like cephalic spines".

Remarks. *Neoarcturus cochlearicornis* sp. n. can be easily distinguished from all Antarctic species and the African species *N. biserialis* (Kensley), *N. dayi* (Kensley), *N. halei* (Kensley), *N. longispinis* (Kensley), *N. nordentami* (Kensley), *N. ornatus* (Kensley), *N. oudops* Barnard (type species), *N. quadricornis* (Kensley), *N. similis* (Barnard) and *N. youngi* (Kensley) by the absence of latero-caudal spines or lateral angles of pleotelson. From the African species *N. barnardi* (Kensley), *N. laevis* (Kensley) and female of *N. oudops* devoid of these angles, *N. cochlearicornis* can be discerned by the presence of long cephalic horns.

***Acantharcturus longipleon* sp. n.**

(Figs 31-44)

Holotype. ♂, No. 1/69416, 17 mm long, R/V "Akad. Kurchatov", Sta. 909, 10.XII.1971, 60° 12' 9" S, 43° 59' W - 60° 13' 5" S, 44° 00' W, 5450-5480 m, depth, trawl.

Paratypes. ♂, No. 2/69417, 14 mm long; 2 ♀, 9 and 11 mm long, the same station.

Description of male holotype. Body (Fig. 31) elongate, subcylindrical, but with lateral parts of pereonites dilated and prolonged into stout lateral spines. Body length about 5.5 times its width without spines (length 14.2 mm, width without spines 2.6 mm). Dorsal surface of cephalothorax and pereonites 1-4 with long, thin, acute spines; dorsal surface of pereonites 5-7 and pleotelson only with short spines or conic tubercles. Pereonite 1 fused with cephalothorax, demarcated by short but distinct lateral incision. Eyes lateral, small, round, without dark pigment, their colour pale yellowish-grey, the same as in the rest of the body. Frontal margin deeply concave, with nearly straight median third; anterolateral margin subrectangular, lateral margin nearly straight; one pair of thin supraocular spines curved frontolaterally above eyes; posterior to these spines one pair of low rounded submedial elevations. Anterolateral and posterolateral angles of pereonite 1 with minute spines; dorsal surface with transverse row of 4 spines. Pereonites 2-5 subequal in length; pereonite 6 slightly shorter; pereonite 7 shortest, about 0.65 times as long as pereonite 4. Pereonites 2-4 with transverse row of 4 dorsal thin spines; submedial dorsal spines shorter than dorsolateral ones, especially on pereonite 4 where submedial spines are very short, obsolete. Pereonites 5-6 with small conic tubercles, pereonite 7 with minute elevations instead of dorsolateral spines; mediodorsal spines or tubercles absent. Pleonite 1 fused with pleotelson; pleonites 1-3 demarcated by obvious transverse grooves. Pleotelson length slightly less than two-fifths of body length. Pleonites 1 and 2 with low conic lateral tubercles, pleonite 3 with long stout lateral spines. Dorsal surface of pleonite 3 with wide round elevation, behind this elevation a pair of submedial small rounded elevations. Caudal part of pleotelson tapering to long, pointed terminal process. Antenna 1 (Fig. 32) flagellum longer than peduncle; first peduncular article broadest, nearly 2.4 times broader than article 2, with one lateral feather-like bristle; second peduncular article longest, slightly longer than basal article 1 and 1.5 times longer than third article. First flagellar article forming very short ring; distal half of long distal article with 9 groups of two aes-

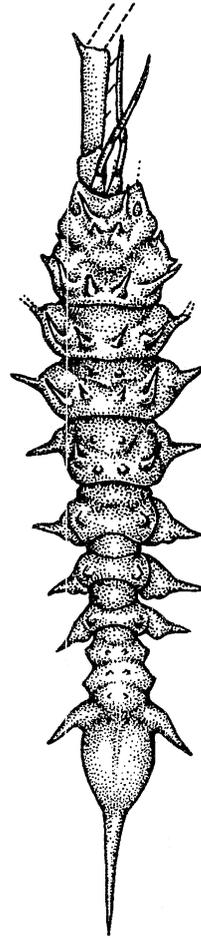
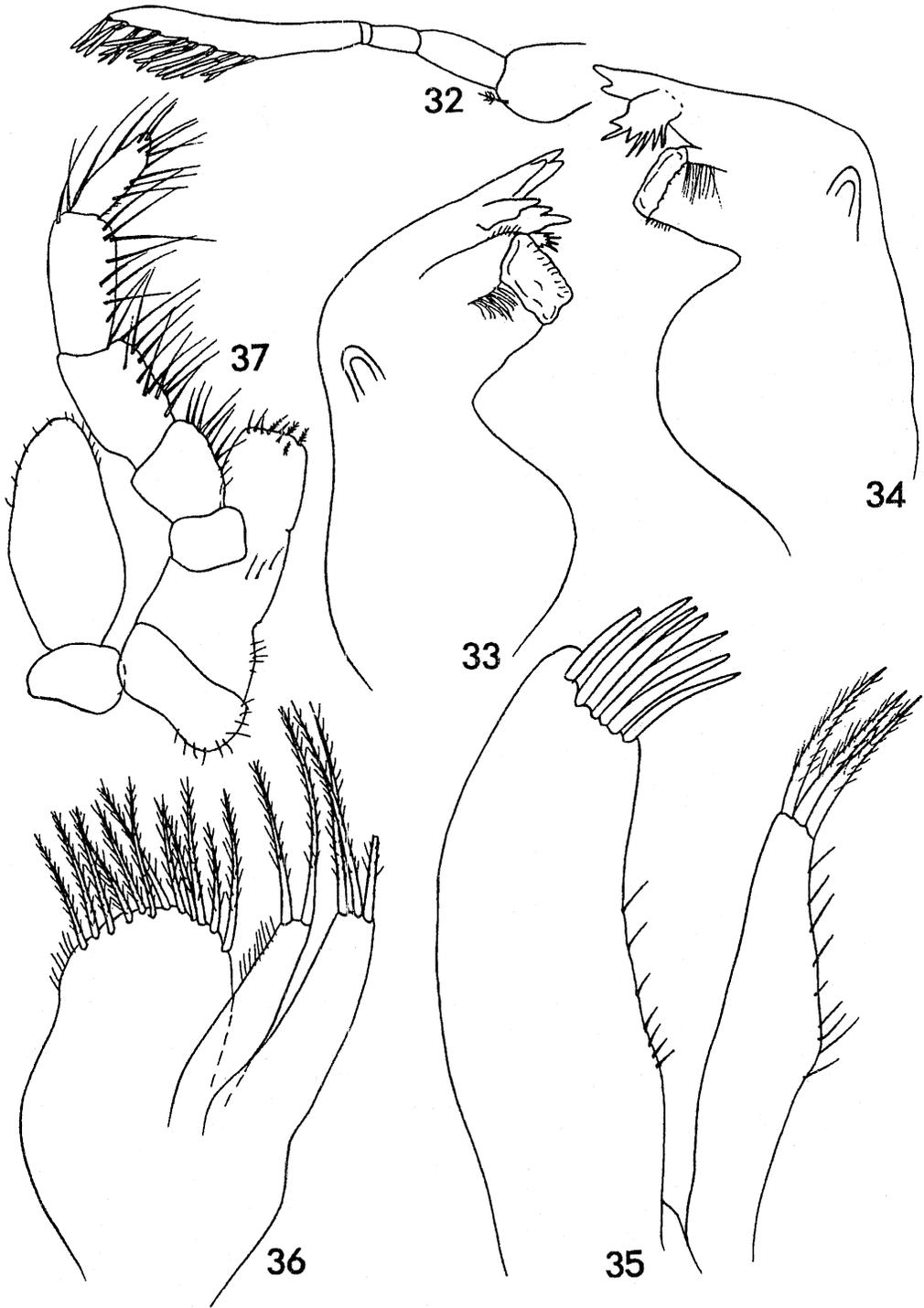
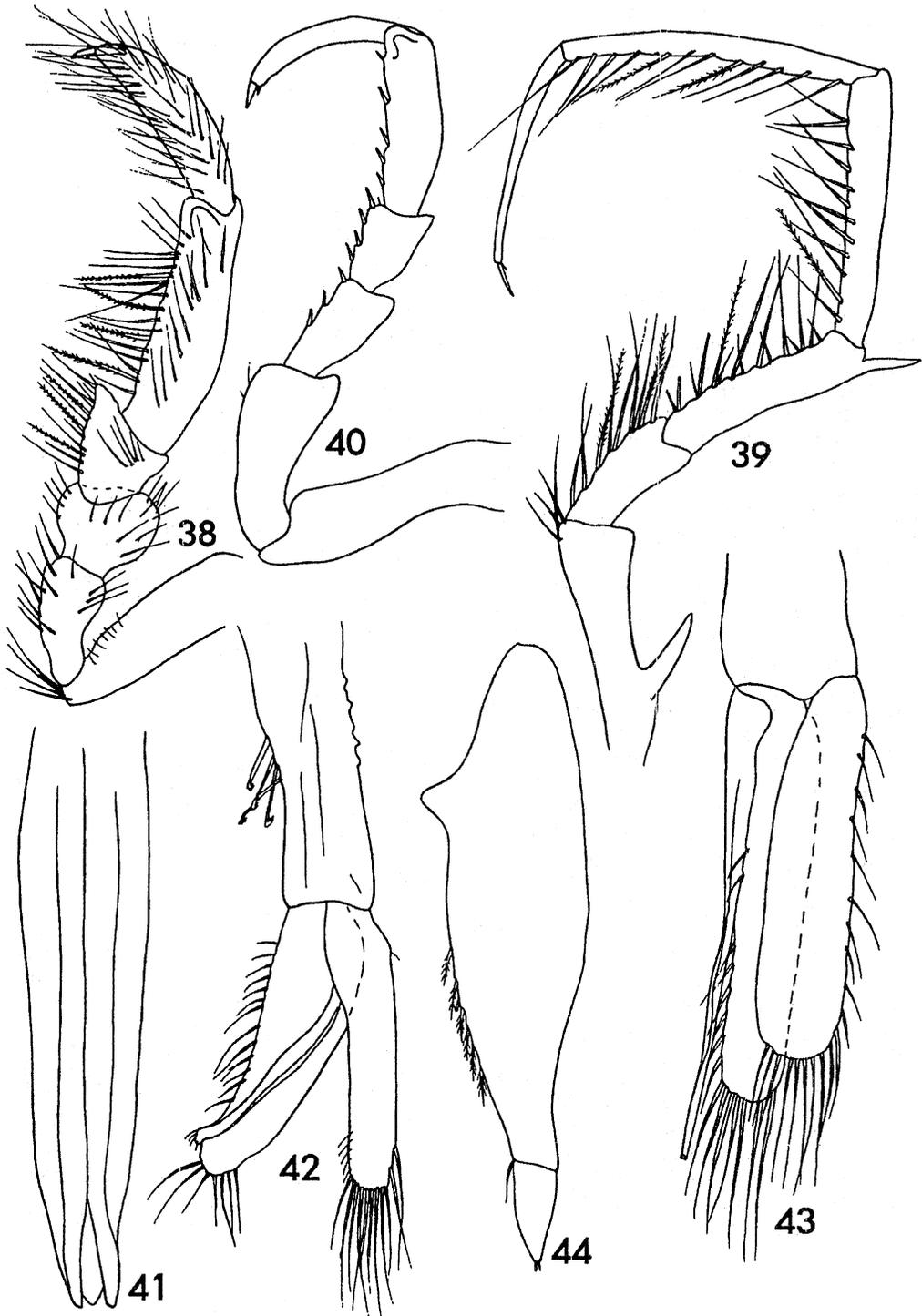


Fig. 31. *Acantharcturus longipleon* sp. n., male, holotype, dorsal view.

thetasks, each bearing two simple setae. Antenna 2 damaged in all specimens. Third peduncular segment nearly 1.4 times longer than fourth segment, both segments with stout distal spine; flagella lost. Left mandible (Fig. 33) pars incisiva with 4 chitinized teeth; lacinia mobilis with 2 teeth and row of 5 thick pointed setae; molar process with broad grinding surface and a few simple setae on mediolateral margin. Lacinia mobilis of right mandible (Fig. 34) with 3 thin teeth and row of 4 spine-like setae. Lateral endite of maxilla 1 (Fig. 35) slightly curved medially, apex with 8 strong chitinized spines; medial endite with 3 strong setulated setae, with inner margin bearing row of simple setae; inner endite of maxilla 2 (Fig. 36) broad, with round distal margin bearing about 12



Figs 32-37. *Acantharcturus longipleon* sp. n., male holotype. 32, antenna 1; 33, left mandible; 34, right mandible; 35, maxilla 1; 36, maxilla 2; 37, maxilliped.



Figs 38-44. *Acantharcturus longipleon* sp. n., male, holotype. 38, pereopod 1; 39, pereopod 4; 40, pereopod 7; 41, penis; 42, pleopod 1; 43, pleopod 2; 44, uropod.

long, setulated apical setae; medial endite with 2 and outer endite with 3 long setae nearly equal in length.

Maxilliped (Fig. 37) with long-oval epipodite slightly exceeding distal margin of palpal article; strong, broad subrectangular endite bearing distally about 9 short spine-like setae arranged in marginal and submarginal rows. Third palpal article longest, slightly longer than fourth article and 1.5 times longer than smallest last article; articles 3-5 covered with brush of long, usually setulated setae. Pereopod 1 (Fig. 38) far shorter than pereopod 2; basis slightly longer than dactylus, without spines, with distoventral wisp of long simple setae. Ischium and merus combined slightly shorter than basis, with few long setae. Merus and carpus dilated; carpus trapezoidal. Carpus, propodus and dactylus covered with numerous long setae, especially along ventral margin. Propodus longest, oblong, weakly dilated, with ventral margin and slightly convex dorsal margin. Dactylus moderately dilated, with straight setose ventral margin and broadly rounded dorsal margin; claws feeble, colourless, short; distal claw about twice longer than ventral claw. Pereopods 2-4 (Fig. 39) similar; pereopod 4 largest. Pereopod 2 merus about 1.5 times as long as ischium; distodorsal angle produced in thick stout spine; carpus long, linear, nearly 1.5 times longer than merus; propodus slightly curved, a little longer than carpus; dactylus slightly shorter than merus, with short thin distal claws. Ischium, merus, carpus and propodus of pereopod 2-4 with comparatively small number of long filter setae near ventral margin; dactylus without filter setae. Pereopods 5-7 (Fig. 40) shorter than pereopods 2-4. Pereopod 7 basis longest, nearly 1.5 times longer than ischium; propodus and dactylus about equal in length; carpus smallest, twice shorter than propodus; merus nearly 1.5 times longer than carpus. Ventral margin of merus and carpus coarsely serrated, with three and propodus with five triangular protrusions of various size, each bearing short stout spine. Sympodite of pleopod 1 (Fig. 42) long, with lateral row of a few serrations and a row of 4 coupling setae on opposite margin. Sympodite of pleopod 2 (Fig. 43) rather short, endopodite with long stiletto-like appendix

masculina much exceeding distal margin of endopodite.

Uropod (Fig. 44) finely granular in central portion of medial surface; distal article comparatively slender and long; smaller ramus not discernible.

Paratype female. Ovigerous female similar in morphology to adult male in all but secondary sexual characters. Pereonites 2-4 dilated; body length fore times body width across pereonite 3 (length 12.8 mm, width 3.2 mm).

Etymology. The specific epithet is from the Latin "longus" (long) and Greek "pleon" (abdomen).

Remarks. Only two species of the genus *Acantharcturus* were known so far: *A. acutipleon* Shultz, 1981 (type species) and *A. acanthurus* (Monod, 1925), both from the West Antarctic (180-857 m depth). From *A. acanthurus*, the new species can be easily distinguished by the acute, not bifurcate tip of pleotelson. In *A. acutipleon*, the dorsal spines are very long and present on all the somites of the body, whereas in *A. longipleon* they are short and absent on the last three pereonites and on the pleon, where instead low conical tubercles are developed.

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