

*F. D. POR*     *Deep-Sea Cerviniidae*  
*(Copepoda: Harpacticoida)*  
*from the Western*  
*Indian Ocean,*  
*Collected with R/V*  
*Anton Bruun in 1964*

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## ABSTRACT

Por, F. D. Deep-Sea Cerviniidae (Copepoda: Harpacticoida) from the Western Indian Ocean, Collected with R/V Anton Bruun, in 1964. *Smithsonian Contributions to Zoology*, 29:1-60. 1969.—The Cerviniidae found in abyssal and bathyal catches of Cruise 8 of R/V *Anton Bruun* are discussed. In eight stations off the East African Coast 15 species of Cerviniidae have been found. The genus *Pontostratiotes* Brady is represented by six new species, by specimens which belong probably to the three previously known species of the genus, and an as yet uncertain species. A new genus is established for *Ameliotes malagassicus*, new genus, new species. Two other new species belong to the genera *Cerviniella* Smirnov and *Cerviniopsis* Sars. Two other species found in the collections of *Vityaz* from the Pacific abyssal are found also in this material. The genus *Pontostratiotes* is discussed, and a new diagnosis of the genus is given.

Adequate gear yielded rich collections of abyssal Harpacticoids of which the present material is only a small part. A few general conclusions about this fauna are advanced.

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**Introduction**

Present knowledge of the abyssal Harpacticoida is based on occasional captures made with inadequate gear. In fact, no more than a score of specimens have been reported as yet, and these are almost exclusively cerviniids, large-sized animals which can be brought up also by wide-meshed trawls. The first two papers dealing exclusively with abyssal fauna are by the late V. A. Brodskaya (1959, 1963) and are based on collections made by the Russian research vessel *Vityaz*.

The author had the opportunity to take part in the American Program of the International Indian Ocean Expedition and to sample deep-sea Harpacticoida on Cruise 8 of *Anton Bruun* along the eastern shores of Africa. Sampling with the "Menziess trawl" (Figure 169) proved to be extremely successful. Tens of species and hundreds of specimens were found in eight deep-sea samples. Only the 15 species of Cerviniidae are discussed in the present paper. A list of the sampling stations is given in Table 1. The specimens have been deposited in the Department of Zoology, Hebrew University, Jerusalem (HUJ) and in the Division of Crustacea, Smithsonian Institution (USNM). Measurements of

body length given under each species include the caudal furcae.

TABLE 1.—*List of stations, Anton Bruun Cruise 8*<sup>a</sup>

<i>Station number</i>	<i>Date (1964)</i>	<i>Position</i>	<i>Depth (in m)</i>	<i>Temperature</i>
399 A	1 Oct.	22°33'S, 36°10'E	925	5.55°C (985) <sup>b</sup>
400 A	2 Oct.	22°30'S, 36°10'E	1530	3.54°C (1438)
407 A	13 Oct.	18°24'S, 42°11'E	2125	2.51°C (2096)
407 D	13 Oct.	17°32'S, 43°05'E	1360	—
410 A	20 Oct.	15°07'S, 44°21'E	3100	2.22°C (2565)
418 A	3 Nov.	05°11'S, 41°38'E	3050	2.13°C (2484)
418 F	4 Nov.	04°14'S, 40°89'E	1550	—
419 A	5 Nov.	03°33'S, 40°54'E	950	4.05°C (1518)

<sup>a</sup> All collections made with Menziess Trawl.

<sup>b</sup> The depth of the deepest thermometer of the respective hydroline is indicated in parentheses.

**Acknowledgments**

I am much indebted to the American Program of the International Indian Ocean Expedition for making my research trip possible. My indebtedness is extended to Dr. Stewart Springer, the chief scientist of Cruise 8 of *Anton Bruun* and many colleagues and seamen on board this research vessel who helped me in the sampling. Mrs. I. Itzkowitz and L. Abram-

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owitz are gratefully acknowledged for the sorting of the samples and Miss S. Halbreich for her draftmanship.

### Genus *Pontostratiotes* Brady, 1883

Until now this genus contained three species, each described from a single specimen: *Pontostratiotes abyssicola* Brady, 1883 (1 ♂); *Pontostratiotes scotti* Brodskaya, 1959 (1 ♀); and *Pontostratiotes horrida* Brodskaya, 1959 (1 ♀).

Scott (1910) considered his specimen as belonging to *P. abyssicola*, but Brodskaya (1959) was possibly right when she considered it to represent a new species, *P. scotti*. *P. abyssicola* is no doubt a good species, although incompletely and perhaps also incorrectly described. *P. scotti* is incompletely described also. The description of *P. horrida* is based on a female and not, as Brodskaya believed, on a male. The *Anton Bruun* material contained a female of *P. horrida* as well as many specimens of *P. scotti* and possibly also one of *P. abyssicola*.

Thirty-eight specimens of the present material have been assigned to six new species, and one male is described but not assigned to a species. Thus it has become possible to compose an emended and more detailed diagnosis of the genus, based upon ten species.

**DIAGNOSIS.**—Body size as a rule greater than 2 mm, first thoracic segment free but of reduced size. Genital segment of female divided only dorsally and never ventrally. Last abdominal segment pyriform. Furcal branches coalescent, excessively long, very thin, and often with tips unequal in length.

Cephalon and thoracic segments 2, 3, and 4 with lateral spiniform processes. First thoracic segment without such processes. Retinacula present at bases of thoracic spines, articulated to spines above them. Dorsal armature variable.

Antennula of female 8-jointed; peduncle 3-jointed, 2.5–3 times longer than flagellum. Relative lengths of joints very constant throughout the genus. Joints of peduncle progressively decreasing in length; 2nd joint as a rule with spiniform terminal process. In the flagellum 5th and 8th joints are the longest and are subequal. Sensorial seta present on 3rd joint (and sometimes on 8th?). Male antennula only slightly modified, with sensorial cylinders on 2nd, 3rd, 4th, and 8th joints, and with modified spines on some joints.

Antenna 3-jointed, exopodite 4-jointed; 2nd and 3rd exopodite joints very short.

Mandibular palp with unarticulate, long, and narrow endopodite and 4-jointed exopodite. Distal 3 exopodite joints very short. Basis bears 4 setae.

Maxillula without exopodite. Endopodite reduced to knoblike structure. Epipodite with 1 seta.

Maxilla without separation between precoxa and coxa. Body with 4 endites: a prominent and platelike basal endite, a barely protruding 2nd endite, and 2 elongate distal endites. Endopodite triarticulate.

Maxilliped with 2 basal joints and 2-jointed endopodite. Setae on basal joints rather uniform in thickness.

Branches of all legs triarticulate. First leg (PI) slightly modified for prehension; distal 2 joints of both branches usually shortened. Armature of legs slightly variable, but that of PIII and especially the peculiar one of PIV exopodite is constant throughout the genus.

PV biarticulate, sometimes with additional basal articulation. First (or 2nd) joint as a rule with external distal seta. Distal joint with 3 external spines, 2 terminal spines with a seta between them. Male PV with 2 additional spines (or a spine and a seta) also on internal margin.

PVI always present, sometimes well developed, bearing from 1 to 3 setae. Male PVI different, but not larger than female PVI.

No egg sacs have been observed.

The structure of the appendages is remarkably uniform in *Pontostratiotes*. Even the numbers of setae on the different mouthparts seem to be constant throughout the genus. The variability at the species level is expressed chiefly in the armature of the thoracic segments and of the first 2 antennular joints.

The genus is known from depths between 925 and 4365 m; it has been reported from all three oceans.

### *Pontostratiotes scotti* Brodskaya, 1959

FIGURES 1–12, 170

*Pontostratiotes abyssicola* G. S. Brady—Scott, 1910, pp. 53–54, pls. 2–3.

*Pontostratiotes scotti* Brodskaya, 1959, p. 1787.

Eight ♀♀ and 2 juvenile specimens, in samples 399A, 400A, and 410A.

Body length including furca, 2.44 mm; length of furca, 0.81 mm. Cephalon inflated and slightly quadrate.

Rostrum round with 2 median spherical inflations (statoblasts?). Cephalon with posterolateral angles forming a triangular serrulate denticle; posterior margin serrulate; dorsal spines slightly divergent, short, serrulate, only slightly exceeding posterior edge of 3rd thoracic segment. First thoracic segment narrow and hidden under cephalon. Lateral spines of the 3 thoracic segments short and curved, minutely serrulate. Dorsal posterior margins of segments serrulate; 2nd segment with 2 strong dorsal spines; 3rd and 4th segments with 4 less prominent spines. Proximolateral retinacula of the segments rounded, with serrulations only on external edges. Dorsally, small and round surface tubercles are present on cephalon (3 pairs): 1 central tubercle on 2nd segment; 1 pair on 3rd and 4th segments. Tubercles are found also at about mid-lengths of lateral spines. Abdominal segments with uniformly denticulate posterior edges. Genital segment and last abdominal segment slightly pubescent. Pubescence found also on furcal branches.

Antennular joints with the following proportionate lengths: 31:24:17:3.5:9:4:3:7. First joint with denticulate surface and with pubescence on external edge. Proximal spine bears 2 groups of denticles, one of which points backward. Distal edge of 1st joint slightly protruding at both angles. Second joint with 4 processes: 1st and 3rd blunt, 2nd and 4th prominent. Antennal exopodite relatively well developed. Mandibular palp with elongated basis and very long and narrow endopodite bent backward parallel to basis. Maxilliped relatively slender.

First endopodite joint of PI only slightly longer than 2nd and 3rd combined.

Setal formula as follows:

	<i>exopodite</i>	<i>endopodite</i>
PI	1. 1. 222	1. 1. 221
PII	1. 1. 223	1. 1. 221
PIII	1. 1. 223	1. 2. 321
PIV	1. 1. 323	1. 1. 221

Swimming legs with normal setae and relatively narrow joints.

PV clearly 3-jointed. Length-width ratio of distal joint: 26/6; spines long, setiform; distal seta of 2nd joint long and slender.

PVI long and narrow, with 3 setae; medial seta short.

DISCUSSION.—*Pontostratiotes scotti* Brodskaya has been found in the gizzard of a deep sea squid *Stauroltheuthis hippocrepium*, in the Antarctic. T. Scott (1910), who described the only female, identified it as *P.*

*abyssicola* Brady. This decision has been correctly questioned by Brodskaya although her revision has been based only on the very incomplete original description and on the comparison of a male with a female. As far as can be determined without at least topotypes, our specimens seem to belong to *P. scotti*. Our specimens differ very much from *P. abyssicola* in the thoracic armature. Study of our rich material of *Pontostratiotes* has convinced us that the features of the armature are reliable specific characters and also that they show no sexual dimorphism. If the identification of the following species with *P. abyssicola* is correct, then other differences between the two species may be added.

#### *Pontostratiotes abyssicola* Brady, 1883

FIGURES 13-18

*Pontostratiotes abyssicola* Brady, 1883, pp. 105-106, pl. 44.—  
Brodskaya, 1959, pp. 1786-1787.

One ♀ from station 418A.

Body length 3.70 mm, furcal length 1.80 mm. Cephalon inflated and nearly spherical with laterally protruding corners; posterolateral corners produced into smooth retinacular points; posterior edge serrulate, extending into 2 very long serrate spines between the bases of which is a rounded prominence bearing 4 pairs of dimples. A tuberculum is found above the posterolateral retinacular point.

Second thoracic segment with strong beaklike retinaculum with a few apical hairs and external serrulations. Posterolateral spines very long with heavy serrulation. The posterior edge of the segment bears 4 denticles. Third and 4th thoracic segments with the same type of lateral spines, but with less pronounced retinacula. Dorsal posterior edges with irregular denticulation; a pair of tubercles lies anterior to the edge on the 3rd and 4th segments.

Fifth thoracic and 1st and 2nd abdominal segments with the same irregular denticulation of the edges on the dorsal side. Abdominal segments 3 and 4 each with 2 prominent tubercles on dorsal posterior edge.

Genital segment much broader than long, lateral intersegmental suture slightly denticulate. Abdominal segments without ventral armature.

Furcal branches with scattered external row of spinulae.

Rostrum round, without prominent point. Pro-

portionate lengths of antennular segments as follows: 32:38:20:3.5:10:4:3:8. First joint with very pronounced and irregular tubercles on internal edge and a large tubercle with 4 backward-pointing denticles on external edge. External edge shows also a broad prominence and a distal, rounded point. Second joint covered with irregular small chitinous tubercles; external edge with 2 similar-sized blunt joints and a very long and pointed distal 3rd joint with a small seta in the middle. Fourth joint bears 3 tubercles on its distal edge.

Antenna 4-jointed, 2 distal joints long and slender. Exopodite 4-jointed, shorter than last endopodite joint. Mandibular palp elongate quadrangular, with long and slender branches. Maxillula with 3 exopodital and 1 epipodital seta. Maxilla with 4 endites, upper spine of basal endite very strong and fused to endite body. Maxilliped could not be seen clearly.

PI characterized by elongate basal joint of endopodite, 2.5 times longer than last 2 joints combined.

Swimming legs characterized by the rodlike setae on the distal endopodite joints and by the very short and swollen spines of the exopodites.

Setal formula as follows:

	<i>Exopodite</i>	<i>Endopodite</i>
PI	1. 1. 222	1. 1. 221
PII	1. 1. 223	1. 2. 221
PIII	1. 1. 223	1. 2. 321
PIV	1. 1. 323	1. 1. 221

PV formed of 3 joints; distal joint nearly 5 times longer than broad. Second joint with long pennate seta on distal internal corner. Spines of last joint short, much shorter than joint itself.

PVI long and narrow, with 2 nearly equal apical setae.

DISCUSSION.—There is of course much uncertainty in relating our female specimen to the male found by Brady. No doubt also, there are many errors in Brady's description of *P. abyssicola*. The lateral spines shown by Brady on the cephalon probably belong to the 2nd thoracic segment; this is evident from the illustration which shows a retinaculum at the base of these spines. It seems most probable that Brady's specimen had lateral spines on 3 thoracic segments (the 2nd to 4th). These spines as well as the dorsal spines of the cephalon are of the same type as in our specimen. The problem of the 2 anterolateral spines of the cephalon is an open question. Should specimens be found in the future which show these spines, *P. abyssicola* will occupy a quite distinct place within the

genus and our specimen will have to be considered a different species.

If compared with *P. scotti* as described earlier, we find also other differences beside the thoracic armature, such as shape of PI endopodite, armature of the 2nd endopodite joint of PII, the presence of rodlike setae on the endopodites, and shape and armature of PV.

### *Pontostratiotes glaber*, new species

FIGURES 19–33, and 171

Nine ♀♀, 3 ♂♂, and 3 juvenile specimens in stations 400A, 407A, and 418F.

Syntypes: HUI, COP 73 and USNM 125811.

Female. Length 3.12 mm, furca 1.45 mm.

Cephalothorax relatively short, rostrum with prominent triangular point. Lateral edges flattened and broadened, ending in prominent rounded retinacula. Posterior edge smooth, dorsal spines short and smooth, each with tubercle at base extending only slightly beyond posterior edge of 2nd thoracic segment which bears 2 tubercles.

First thoracic segment relatively well developed, unarmed. Second, 3rd, and 4th thoracic segments with short, divergent, posterolateral spines which tend to be laterally concave; lateral spines bear a dorsal row of very small spinulae which do not project beyond edges of spines. Retinacula of 2nd thoracic segment rounded, setiferous; retinaculae of following 2 segments similar but of diminishing size, apparently without setation. Second to 5th thoracic segments with pairs of spines above posterior edges; these spines become progressively smaller posteriorly.

Genital segment about 1.5 times broader than long. Furcal branches asymmetrically coalescent, right branch sometimes longer than left. The branches are still separated in the proximal tenth of their length.

Antennula joints with following proportionate lengths: 33:19:17:3.5:6.5:4.5:37. Thus the antennula of this species is characterized by the relatively long 1st joint and the short 6th. First joint with distinct proximointernal corner; internal edge smooth except for the slightly produced and pointed distal corner. External edge bears a prominence with 4 denticles directed backward and a single spur at midlength pointing distally; distal corner produced into an erect and slightly curved spine. Second antennular joint with 1 small, unarmed tubercle,



followed by a setiferous tubercle and an unarmed tubercle; distal spur long, more than half the length of joint.

Antenna 3-jointed; exopodite much shorter than last antennal joint. Mandibular palp with quadrangular basis and fairly short exopodites and endopodites. Maxillula as in Figure 24. Maxillar body relatively short and stout; proximal endite with 6 setae; endopodite more reduced and narrower than in other species of the genus. Maxilliped with only 6 setae on basal joint.

PI characterized by the pronounced elongation of 1st endopodite joint which is about twice as long as following 2 joints combined. Swimming legs with rodlike setae. Setal formula as in *P. abyssicola*.

PV 3-jointed, second joint with relatively short and slender distal seta. Last joint about 4 times longer than broad with 5 relatively short stout spines and 1 apical seta. PVI slender and long, with 3 setae, one of which is rudimentary.

Male. Dimensions similar to those of the females. The males obviously belong to this species. Antennula slightly prehensile, with first 2 joints sensibly more equal than in the female. Sensorial setae are found on joints 2, 3, and 4 and probably also on last joint. There are 2 short tuberculiform spines on joint 4, 1 on joint 5, and 2 on joint 6.

PV is subdivided and appears tetra-articulate, with 2nd and 3rd joints bearing a seta and a spine, respectively. Last joint bears 1 inner spine and an inner seta.

The specific name refers to the reduced spinulation of the dorsal process.

DISCUSSION.—*Pontostratiotes glaber* is characterized by the short and smooth thoracic spines, the broad and rounded cephalic retinaculum, the pairs of median spines on the thoracic segments, and the armature of the 1st antennular joint. The specific identity of the male cannot be doubted.

#### *Pontostratiotes pubescens*, new species

FIGURES 34-48, and 172

Three ♀♀ and 1 ♂ in samples 407A and 418A.

Syntypes: HUJ, COP 74 and USNM 125814.

Female. Body length 3.11 mm, furcal length 1.14 mm.

Cephalothorax laterally broadened, but with reduced retinacular angles. Posterior edges slightly uneven, posterior spines very short and blunt, barely

reaching middle of 2nd thoracic segment. Rostrum pointed.

First thoracic segment well developed with slightly protracted retinacular angles. Second thoracic segment with very prominent rounded and pubescent retinacula diverging from the body at an angle of 45°; lateral spines moderately long and straight; posterior segmental edge irregularly denticulate with 2 central denticles slightly larger than the others. Lateral spines of following 2 segments are more or less like 1st pair of lateral spines, with prominent lateral tubercle in proximal third. Retinacula of segment 3 round, those of segment 4 slightly pointed. Posterior edges of thoracic segments bear irregular denticles, with a central group of 4 or 6 denticles more developed.

Abdominal segments with denticulate posterior edges. Width to length of genital segment 1.3:1. Furcal branches less than half body length.

Antennular joints with following proportionate lengths: 34:31:18:5:7:3.5:3:8. First joint with pubescent surface; proximointernal corner prominent; internal edge smooth; external edge with 1 spurlike smooth spine; distal corner only slightly produced. Second joint, relatively long, with 3 external teeth and a blunt apical spur.

Antenna 3-jointed, like all the following appendages with a more or less thick pubescence. Exopodite only slightly shorter than last antennal joint; 1st joint swollen.

Exopodite and endopodite of mandible relatively short and thick. Proximal endite of maxilla with 4 setae. Maxillar body relatively slender. Maxilliped also slender, basal joint with only 6 setae.

First endopodite of PI with spiniform distal corners, less than twice as long as last 2 joints together. Distal edges of first 2 exopodite joints denticulate.

Joints of swimming legs relatively short and stout, with pubescent surfaces. Distal external corner of 1st joint and to a lesser degree that of 2nd joint of endopodite form prominent curved spines. Internal spines of exopodites relatively short. Endopodites bear rodlike setae. Armature of legs is as follows:

	<i>Exopodite</i>	<i>Endopodite</i>
PI	1. 1. 222	1. 1. 221
PII	1. 1. 223	1. 2. 221
PIII	1. 1. 223	1. 2. 321
PIV	1. 1. 323	1. 1. 221

PV 3-jointed, 2nd joint with short hairs and distal external long seta. Third joint almost 5 times longer

than broad with 5 relatively short spines and a seta. PVI very long and slender, with 2 well developed setae.

Male. Body length 3.39 mm, furcal length 1.60 mm. Antennula 7-jointed. First and 2nd joints as in female. Sensorial setae on 2nd, 3rd, 4th, and last joints. Fourth joint bears a short inflated spiniform seta and 2 tuberculiform setae bearing verticils of hair. Another tuberculiform seta is found on 5th joint.

PV 3-jointed, 3rd joint with 3 external, 2 apical, 1 internal spine, and 1 internal seta. External setae and outer apical seta short, blunt, and rodlike. Genital operculum characteristically developed; PVI has form of 2 tubercles bearing very unequal setae.

The specific name refers to the hairy joints of the swimming legs.

DISCUSSION.—*Pontostratiotes pubescens* is characterized by its peculiar armature of the legs. *P. pubescens* is no doubt closely related to *P. glaber*. The differences between the 2 species are especially evident in the dimorphic armature of the male antennulae.

#### *Pontostratiotes alatus*, new species

FIGURES 49–59, 173 and 174

Three ♀♀ in sample 418A.

Syntypes: HUI, COP 75 and USNM 125810.

Female. Body length 1.12 mm, furcal branches about half the body length.

Body relatively small, broadened, and dorsolaterally flattened.

Rostrum not prominent. Retinacula of cephalothorax well developed and pointed.

Posterior edge of cephalothorax irregularly denticulate. Dorsal spines with denticulate bases, short, nearly parallel, reaching only slightly beyond proximal edge of 2nd thoracic segment.

First thoracic segment smooth and unarmed. Second to 4th thoracic segments with lateral spines modified into winglike structures, each of them secondarily divided by notches into 3 lobes. Wings smooth except for the notches. Retinaculum of 2nd thoracic segment broadly triangular, those of following 2 segments rounded. Posterior edges of the thoracic segments evenly denticulate.

Genital segment one-third broader than long with a few ventral hairs. The abdominal segments, the last excluded, have denticulate posterior edges. Last abdominal segment with a few hairs on ventral sur-

face. Furcal branches pubescent, about 0.60 mm long.

Antennular joints with following proportionate lengths: 18:16:13:2.5:7:3:3:7. First 3 joints covered with tubercles. The internal edge of 1st joint smooth except for slightly produced distal corner; external edge with row of prominent tubercles, distal corner slightly curved. Second joint with 3 barely developed outgrowths; 2 distal corners produced into long spines, the internal one almost perpendicular to antennular body. Sensorial cylinders present on 3rd and last joints, the latter cylinder small and apical. Antenna 3-jointed. Basal joint not broader than following 2. Last joint covered with hairs. Exopodite 4-jointed, only slightly shorter than last antennal joint.

Exopodite of mandibular palp much narrower than endopodite, length equal to that of basis. Basal endite of maxilla with 5 setae and a few surface hairs. Surface hairs found also on basal joint of the maxilliped that bears 6 setae.

First endopodite joint of PI twice as long as 2nd and 3rd joints combined, inner seta especially long. Distal inner corners of 1st and 2nd joints spiniform.

Inner corners of the 1st endopodite joints of PII to PIV also spiniform, especially that of 2nd endopodite joint of PII, which reaches much beyond middle of 3rd endopodite joint. There are short rows of hair on the endopodite joints. Endopodite setae slightly modified into the rodlike type. Setation formula corresponds to that of *P. abyssicola* but with an additional seta on last endopodite joint of PII. Apical setae of PIII endopodite very short.

PV 3-jointed. Second joint with a few long hairs and short distal seta. Distal joint more than four times longer than broad. PVI with very narrow proximal part and much broadened distal part bearing 2 setae.

The specific name refers to the winglike expansions of the thoracic process.

DISCUSSION.—*Pontostratiotes alatus* is characterized by its peculiar winglike spines. The antennula and especially the 2 apical spines of the 2nd joint are characteristic. The very long and peculiar spiniform corner process on the 2nd endopodite joint of PII is especially characteristic.

#### *Pontostratiotes*, species incerta ♂

FIGURES 60–65

Two ♂♂ in stations 400A and 4100A. HUI, COP 83.

Male. Body length 2.41 mm, furcal length 1.00 mm. Cephalothorax laterally broadened but without

posterior retinacula; dorsal face with several fairly prominent spines. Rostrum very prominent and rod-shaped. Posterior edge of the cephalothorax coarsely denticulate, dorsal spines straight, reaching middle of 2nd thoracic segment; no denticulation between dorsal spines.

First thoracic segment smooth. Second, 3rd, and 4th segments bear broadened lateral spines, with prominent retinacula. Posterior edges of these segments bear slightly converging pairs of dorsal spines reaching at least middle of following segment and a pair of dorsolateral spines. Between the median dorsal spines of 2nd segment are some irregular teeth. Only the 2nd segment has well-developed retinacula.

Fifth thoracic segment and 1st and 2nd abdominal segments have a pair of dorsal and a pair of dorsolateral short spines. Ventral edges of abdominal segments serrate; this serration extends also to dorsal side of 4th and 5th abdominal segment. Surface of abdomen slightly pubescent.

Antennula 8-jointed. First joint pubescent with apical corner only slightly produced. Second joint with 4 pointed spines and a strong and slightly curved spical spur. Sensorial setae born on 2nd, 3rd, 4th, and last joints. Sixth joint bears a nearly horizontal long and inflated modified spine. Seventh joint with 2 small setae with very much inflated bases.

The mouthparts have not been studied in detail but they show no specific features, especially if compared with *Pontostratiotes alatus*. Only the maxilla is illustrated.

First endopodite joint of PI equal in length to 2nd and 3rd joints combined.

PII to PIV similar to those of *P. alatus*. First and especially 2nd endopodite joint of PII produced into long spines, quite similar to those of *P. alatus*.

PV 3-jointed with 2 inner setae. External spine of 2nd joint strong. PVI with 3 setae, the internal and external are spiniform, the apical one long and setiform.

**DISCUSSION.**—There is not much doubt that the 2 males described above belong to a species of their own. It seems also that the sexual dimorphism in the genus *Pontostratiotes* is very reduced—the specific thoracic armature of the 2 males, therefore, cannot be only a sexual dimorphism of one of the 9 species known till now.

The affinities of the 2 males appear to be closest to *Pontostratiotes alatus* and *Pontostratiotes sixtorum* (vide infra).

### *Pontostratiotes inermis*, new species

FIGURES 66–75

One ♀ in sample 407A.

Holotype: HUU, COP 76.

Female. Body length 2.84 mm, furcal length 1.20 mm.

Cephalothorax quadrate with smooth edges. Dorsal spines converging forceps-like, reaching only slightly beyond middle of 2nd thoracic segment. Cephalothorax without lateral retinacula. Rostrum shield-like, with small point.

First thoracic segment very visible since short cephalothorax covers it only slightly.

Second, 3rd, and 4th thoracic segments with very short lateral expansions, that of 2nd segment slightly curved and the shortest of all. Dorsal posterior edges of all thoracic segments slightly denticulate.

Width to length relation of genital segment 3.4:2.5. Posterior edges of the abdominal segments smooth, segments relatively short. Furcal branches smooth.

Antennular joints with following proportionate lengths: 21:22:16:3:5:4:3:6. First joint with 2 divergent denticles, the proximal like a pointed and curved spur; the distal one straight, triangular with some secondary denticulation. Second joint bears besides the apical straight spur only 1 pointed process at about the middle of its length. Distal edge of short 4th joint bears a crown of 5 strong triangular teeth. The setae of the antennula were not preserved; there is, however, an additional sensorial seta on the last joint.

Antenna with smooth joints; articulation between base and 1st endopodite joint not clear. Exopodite slightly shorter than last endopodite joint.

Mandibular palp with short and almost quadrate basis, sparsely pubescent, with 3 of its external setae short and stout. Exopodite and endopodite nearly equal in length. Maxillula without peculiar features. Maxilla with the usual shape for the genus, the 4 endites well developed. Maxilliped fairly broad with differentiated appendices. Unlike other species of *Pontostratiotes*, but rather as in other Cerviniidae genera, the first 2 maxilliped joints bear distinct spines and setae; there are 5 such spines and 4 setae.

PI also peculiar in structure with 1st joints of both branches broad and short. First endopodite much shorter than the 2 following joints combined; last endopodite joint twice as long as 2nd joint.

PII to PIV with normal armature; endopodite of

PIV with rod-shaped setae. Armature formula similar to that of *P. abyssicola*.

PV with inconspicuous basal joint; 2 other distal joints, especially 3rd joint, very much elongate. Last joint more than 5 times longer than broad, almost reaching posterior end of abdomen; its 5 spines and 1 seta not especially long. PVI short, distally broadened, and bearing 2 setae.

The specific name refers to the reduced thoracic processes.

**DISCUSSION.**—*Pontostratiotes inermis* is one of the most specialized species in this homogeneous genus. The scanty and short spinulation of the thorax, the denticulation on the 4th antennular joint, the aberrant structure of PI, the armature of the swimming legs, and the very long and narrow PV are among the most characteristic features. In the future it may even be possible to separate *P. inermis* as a separate genus. The specialized armature of the maxilliped especially supports this opinion. More specimens, including males, however, will be necessary to reach such a decision.

***Pontostratiotes sixtorum*, new species**

FIGURES 76–86, 175, 178, 179

Three ♀♀ in sample 407A.

Syntypes: HUI, COP 77 and USNM 125813.

Female. Body length 2.44 mm, furcal length 1.10 mm.

Cephalothorax rounded, with very long and pointed triangular rostrum. Edges of cephalothorax smooth, posterolateral corners produced into smooth and blunt triangular retinaculum. Dorsal spines of cephalothorax straight, parallel and very short, barely exceeding proximal edge of 2nd thoracic segment.

First thoracic segment smooth. Lateral expansions of the 2nd, 3rd, and 4th thoracic segments broad and winglike with 3-stepped external edges. Retinacula of 2nd thoracic segment barely pronounced, bearing a border of long setae. Retinacula of 3rd and 4th segments well developed. Posterior edges of 2nd to 4th thoracic segments minutely denticulate. Dorsal side of each segment with 2 widely separated tubercles. Fifth thoracic segment with angular lateral edges.

Width-length ratio of genital segment 3.4:2.5. Dorsal edges of abdominal segments denticulate, ventral edges smooth. Last abdominal segment with 2 pairs of ventral tubercles. Furcal branches bear an internal seta in proximal tenth of their length.

Antennular joints with following proportionate

lengths: 26:13:12:2.5:5:2.5:8. First joint relatively long with distal curved spur on internal edge and short setigerous process on distal corner of external side. Second joint bears 2 triangular broad processes and a strong and fairly straight apical spur. Antenna with indistinctly divided basis bearing a long seta. Exopodite longer than last endopodite joint.

Mandibular palp with rectangular basis bearing 3 normal and an especially inflated 4th seta. Maxillula and maxilla show nothing peculiar. Two basal joints of maxilliped bear 3 spines and 6 weaker setiform appendages.

First endopodite joint of PI equal to combined length of following 2 joints. Last 2 joints nearly equal in length, both with elongate shape, nearly twice as long as broad.

PII to PIV bear rodlike setae; armature as in *P. abyssicola*.

PV about 4 times as long as broad, reaching to middle of 3rd abdominal segment. Three external spines slightly inflated apically. PVI only slightly expanded distally and bears 3 setae.

This species is dedicated to the events of the "Six Day War" of June 1967 which found this material in the middle of being studied and sent the specimens into evacuation from which they luckily returned unharmed.

**DISCUSSION.**—*Pontostratiotes sixtorum* is especially characterized by its peculiar pointed rostrum and the internal curved spur on the much elongated 1st antennular segment. This relatively small species seems to be closely related in these characters to another small species of the genus, *Pontostratiotes horrida* Brodskaya.

***Pontostratiotes microserrulatus*, new species**

FIGURES 87–98, 176

Three ♀♀ in sample 419A.

Syntypes: HUI, COP 78 and USNM 125812.

Female. Body length 2.62 mm, furcal length 1.14 mm.

Cephalothorax rounded, without prominent rostrum. Lateral and posterior edges minutely serrulate. Posterolateral retinaculum of cephalothorax barely developed and serrulate. Above posterior edge of cephalothorax is a broad median tubercle and 2 prominent setigerous lateral tubercles. Posterior edge proper has 2 short serrulate dorsal spines which barely extend beyond anterior edge of 2nd thoracic segment.

First thoracic segment smooth. Second segment with winglike lateral expansions, much rounded in anterior part and spinelike and straight-triangular in posterior part. Edge of spine serrulate except on setigerous rounded anterior part. Serrulation of internal edge slightly dorsolateral, continuous with somewhat uneven serrulation of posterior edge of segment. Second thoracic segment without separate retinacula; rounded anterior edge of spine may perhaps act as such.

Lateral spines of 3rd and 4th segments progressively shorter; both segments bear retinacula. Posterior edges of segments evenly serrulate.

Posterior edges of 5th thoracic and abdominal segments serrulate on both dorsal and ventral sides.

Dorsal distal corners of the 1st abdominal segment produced into triangular wings. Genital segment is divided only dorsally and laterally. All abdominal segments covered with a more or less dense pubescence.

Furcal branches with well-preserved setation comprising an external seta in distal two-fifths, a fairly long distal corner seta and a long apical one.

Antennular joints with following proportionate lengths: 30:21:18:3.5:8:3:2.5:6. First 2 joints characterized by very reduced protuberances. First joint with a very blunt and broad, slightly uneven external tubercle and slightly produced distal corners; inner edge minutely serrulate. Second joint with 2 proximal closely set blunt tubercles, a 3rd one beyond the midlength; distal spur relatively short. Third joint shows also a number of smooth or setigerous tubercles.

Antenna is clearly 3-jointed, exopodite shorter than 3rd joint. Mandibular palp quadrate, endopodite very slender and long, inserted far from exopodite, at opposite corner of basis. Maxillula without particular features. Maxilla with 4 endites, second proximal one reduced to a slight bulge. Maxilliped very slender; setae of 2 basal joints more or less equal in thickness.

Branches of PI identical in length relations of their joints, 1st joint being longer than 2nd and 3rd combined.

Connective plate of PII characterized by a pair of semicircular protuberances bearing 6 broad and spear-bladelike setae. Nothing similar is found in the other legs or in any other species of the genus. Only PII bears characteristic rodlike setae.

Armature of swimming legs, as in most species of the genus, identical with that of *P. abyssicola*.

PV relatively broad and quadrate with short

pointed spines. There is apparently no seta on 2nd joint. PVI broadening apically, with 2 very unequal apical setae.

The specific name refers to the minute serrulations on the posterior edges of the body segments.

DISCUSSION.—Among the species of such a homogeneous genus as *Pontostratiotes*, *P. microserrulatus* is amply characterized by the armature of the segments and the shape of the tubercles on the antennulae, but especially by the winglike expansions on the 1st abdominal segment and by the peculiar armature on the connective plate of PII.

### *Pontostratiotes horrida* Brodskaya

FIGURES 99–109, 177

*Pontostratiotes horrida* Brodskaya, 1959, pp. 1787–1789, fig. 2.

One ♀ in sample 407A.

Female. Body length 2.00 mm, furcal length 0.98 mm.

The species was described by Brodskaya (1959) from a single female, which she incorrectly considered to be a male.

Our specimen most probably belongs to this species, although it has several differences from Brodskaya's specimen and shows some features not observed by Brodskaya.

Rostrum a much more complex structure than in Brodskaya's description. Serrulation almost continuous along external edge and between corner spine and dorsal spine of cephalothorax.

First thoracic segment well separated (not observed by Brodskaya). Dorsal spines of 2nd thoracic segment very long and almost setiform, much longer than in type-specimen, reaching distal edge of 4th thoracic segment. Dorsal process of 3rd thoracic segment and adjacent setiform spines form a structure much more complicated than that described by Brodskaya, although basically similar to it. Third and 4th thoracic segments with well-marked retinacula; 4th segment also with a posterior retinaculum.

Antennula apparently 7-jointed, but an 8th joint, the 4th, is partly hidden within the long 3rd joint. Antenna, and especially the mandible, maxillula, and maxilla, which were not figured by Brodskaya, are illustrated here. Swimming legs without rodlike setae. Setation formula agrees with that of the type description.

PV is also illustrated here, with some corrections as

compared with the type. PVI very short and oriented transversally, with only 2 setae. Genital field with a very characteristic structure.

#### Genus *Ameliotes*, new genus

With the characters of the type-species, *A. malagassicus*, new species. Gender masculine.

#### *Ameliotes malagassicus*, new species

FIGURES 110-121

One ♂ in station 410A.

Holotype: HUJ, COP 79.

Male. Body length 2.32 mm, furcal length 0.41 mm. Body cyclopoid, cephalothorax longer than free thoracic segments 1-4 combined. Fifth thoracic segment only slightly more than half the width of 4th thoracic segment. First thoracic segment free but almost hidden below edge of cephalothorax. Cephalothorax and all thoracic and abdominal segments smooth, without any spinulation or serrulation. Rostrum broad and blunt. Furcal branches coalescent, relatively strong, as long as last 3 abdominal segments combined. Setae are inserted in proximal two-fifths of furca.

Antennula formed of 9 joints; first joint and especially the almost square 2nd joint, but also the following 3 joints being very broad. Antennular joints bear short serrulate spines: 3 spines on 5th joint, 2 spines on 6th, and 1 on 7th joint. The 3 sensorial setae are situated on joints 2, 3, and 5.

Basal joint of antenna indistinctly divided; joints relatively broad. Exopodite 4-jointed, with 2nd and 3rd joints very short; whole exopodite much longer than last joint of antenna.

Base of mandibular palp broadly triangular with only 3 setae. Endopodite broad and rounded, shorter than exopodite. Basal joint of exopodite also broad. Armature of branches as in *Pontostratiotes*.

Maxillula with fairly well delimited, knoblike exopodite. Maxilla broad and heavy, with the 4 characteristically shaped endites of *Pontostratiotes*. Maxilliped with very broad basal joint bearing 3 thick spines and 3 setae; 2nd joint bears a spine and a seta.

PI very well developed, very much stronger and with broader joints than the other legs. First 2 joints of endopodite elongate, reaching beyond exopodite.

Swimming legs without rodlike setae. Apical setae of endopodite longer than last joint in PII and PIII and as long as this joint in PIV.

PV 3-jointed, with short and broad joints. Last joint only about twice as long as broad. External and apical spines long and slender; distal inner spine is relatively stronger, proximal inner spine short with triangular tip and no secondary pinnation. PVI with 2 very long external setae and 1 short internal spine.

Spermatophores have an ovoidal shape (slightly curved).

The new genus is named in honor of Mrs. Amelia Marcus, Museum of Natural History "Grigore Antipa," Bucarest. The specific name refers to the locality where the specimen was collected, Madagascar.

DISCUSSION.—*Ameliotes malagassicus* is very closely related to *Pontostratiotes*. There is, however, no doubt that its independent generic status is justified by the structure of the cephalothorax and the thoracic segments which are unarmed, the short furcal branches, and the differentiation of the armature of the maxilliped. Nevertheless it should be emphasized that full understanding of the status of *Ameliotes* must await the description of the female.

#### Genus *Cerviniella* Smirnov

#### *Cerviniella brodskayae*, new species

FIGURES 122-132

Two ♀♀ and 1 juvenile in station 400A.

Syntypes: HUJ, COP 80.

Body length 1.85 mm. First thoracic segment fused to cephalon. Rostrum bluntly triangular. Abdominal segments denticulate on both dorsal and ventral sides. Genital segment divided only dorsally, with 2 strong lateral spines on 1st segment. Anal operculum coarsely serrulate with 16 denticles. Last abdominal segment with dorsal and lateral denticulation only. Furcal branches slightly diverging and broadening distally, shorter than last 2 abdominal segments combined, bearing a very small lateral seta at very base, a larger one in basal quarter and a large seta at the midlength. A 4th lateral seta is subapical. Inner apical seta short and spiniform.

Antennula 7-jointed, 3 basal joints broadened, 4th, 5th, and 6th joints much broader than long. Three strong serrulate spines occur on 2nd joint and 2 more

such spines on 3rd and 4th joints. Fourth to 6th joints each bears a single, more slender and spinulate spine. Third joint with one short sensorial seta. Antenna has a very long allobasis with a pad of chitinous tubercles at base of exopodite. Exopodite 4-jointed.

Mandibular palp with elongate quadrate base and large, unarticulate endopodite. Exopodite smaller than endopodite and 3-jointed. Maxillula with 3 exopodital setae on a slightly raised base. The number of exopodital setae could not be determined. Maxilla with 4 endites, 1st or distal one very long and narrow, 2nd and 4th of equal, quadrate shape, with 3 setae each. Third endite barely developed. Basal joints of maxilliped fused bearing 2 endopodital joints. Fused basal part bears 3 spines and 5 setae.

PI with unarticulate and overcrossed branches. Exopodite slightly more than twice as long as endopodite with 4 external, 2 apical and 3 internal setae, the distal one very short. Endopodite with 2 very short and reduced apical setae and a very long basal seta.

PII with the strong unarticulate exopodite characteristic of the genus. Exopodite with 4 lateral, serrate spines, alternately short and long, prominent basal spurs, and 2 apical spines and 5 slender internal setae. Endopodite unarticulate with 3 short apical setae and 5 internal setae.

PIII with long unarticulate exopodite, more than 3 times longer than broad, bearing 4 internal setae, 2 apical spines, and 5 lateral spines. Endopodite is also unarticulate with 2 apical and 1 internal seta.

PIV is relatively well developed compared with the other 2 species of the genus, with transversally elongate basis. Exopodite unarticulate and long (more than 4 times longer than broad), with 5 external spines, 1 apical spine, and 1 apical spiniform seta. Internal setae 5 in number, distal one spiniform. Endopodite clearly articulated, knoblike, with 1 long seta.

PV reduced, fused to thorax; exopodite fused to basiendopodite. Basiendopodite part with 1 external seta; exopodite part about twice as long as wide, bearing 3 setae. PVI reduced to 2 setae. Genital field shown in figure 122.

The species is named after the late V. A. Brodskaya.

DISCUSSION.—The genus *Cerviniella* was established by Smirnov in 1946 for *Cerviniella mirabilipes*. In 1964, the present author described the new genus *Askalonia* for a levantine species, *Askalonia talpa* Por. There is no doubt that *Askalonia* is a junior synonym of

*Cerviniella*. This genus therefore contains at present 2 species, *Cerviniella mirabilipes* Smirnov and *Cerviniella talpa* (Por), in addition to the new species described above.

*Cerviniella brodskayae* is characterized by the unarticulate condition of the endopodites of PII and PIII. On the other hand, the exopodite of PIV is relatively strong, and the PIV endopodite is also still evident and articulated. PV is less developed than in *C. mirabilipes* and *C. talpa*. There seems to be no considerable difference in the structure of the mouthparts of the 3 species. Smirnov's indication that the mandibular exopodite is 2-jointed and not 3-jointed is probably erroneous.

Reference should be made to the peculiar distribution of the genus *Cerviniella*, which is presently known from the high arctic (*C. mirabilipes*, 76°59' N, 157°14' E at 65 m), from the Israel shores of the Eastern Mediterranean (*C. talpa*, below 75 fathoms) and the tropical Indian Ocean (*C. brodskayae*, 22°30' N, 36°10' E at 1530 m). Temperatures at the shallow arctic and deep-sea Indian Ocean stations are roughly similar, but the temperatures of the Mediterranean stations are at least 10° higher.

## Genus *Cervinia* Brady

### *Cervinia tenuiseta* Brodskaya

FIGURES 133–144

*Cervinia tenuiseta* Brodskaya, 1963, pp. 1790–1791, fig. 3.

Four ♀♀ in station 407A.

Female. Our specimens conform quite well with the type-specimen of Brodskaya. This is especially evident in such minute and yet symptomatic features as the armature of the basal joints of the maxilla.

It seems, however, that Brodskaya's specimen which had "curved setae" on the swimming legs was either abnormal in this respect or more likely slightly desiccated. The setae of our specimens are quite normal. It seems, however, that the external spines of the exopodites of the swimming legs and especially those of PIII are very short. The external corner spines of the basipodite and first exopodite joint of PII are also very strong.

The strong, spiny prominence on the connecting plate of PII should also be pointed out.

PV is also slightly different from that of the type-specimen.

Genus *Cerviniopsis* G. O. Sars*Cerviniopsis obtusirostris* Brodskaya

FIGURES 145-156, 180, 181

*Cerviniopsis obtusirostris* Brodskaya, 1963, pp. 1796-1797, fig. 6.

One ♀ in station 410A.

Our specimen conforms to the type description. Curiously, in Brodskaya's figures some details have been labelled as belonging to the male although Brodskaya had only a female. This mistake may perhaps have resulted from the posthumous editing of Brodskaya's paper.

A highly peculiar feature, illustrated by Brodskaya but not mentioned explicitly, is the peculiar ampulla-like appendix on the 3rd antennular joint. This appendix, filled up with highly diffracting contents, is probably a peculiar sense organ (see photograph in figures 180, 181). A nerve is seen penetrating the organ, very much as in statocysts of different animals. I suggest that it represents a new sensory organ of the copepods, which I propose to call "Brodskaya's organ" and which is probably similar to a statocyst.

To Brodskaya's description it should be added that the 2nd joint of PV bears 2 setae, one long and strong and one weak and short.

*Cerviniopsis smirnovi*, new species

FIGURES 157-168

One ♀ in station 399A.

Holotype: HUJ, COP 81.

Female. Body length 1.82 mm. Cephalothorax with broadened and rounded lateral edges. Rostrum triangular, separated from lateral parts of cephalothorax by deep incisions. First thoracic segment separated from cephalothorax.

Second to 5th thoracic segments as well as abdominal segments with serrulate edges. Second, 3rd, and 4th thoracic segments with lateral dorsoventrally oriented epimeral expansions with pointed posterior angles. Fifth thoracic segment and 1st abdominal segment with lateral spiniform expansions. Genital segment divided dorsally as well as laterally.

Furcal branches coalescent, as long as 4 abdominal segments, with a scattered cover of rigid hairs, and very weak lateral setae in proximal 3rd.

Antennula of the plump form characteristic of the genus, formed of 5 joints; 3rd joint especially short.

Antenna 2-jointed, with 4-jointed exopodite. Mandibular palp with 1-jointed endopodite with steplike outcut inner edge. Exopodite 4-jointed with 3 terminal joints very short; distal edge of basal joint with peculiar crown of long and rigid setae. Maxillular palp with rudimentary exopodite bearing 3 setae, and with 1 epipodital seta. Maxilla with 4 endites, the basal one being characterized by its sickle-like structure resulting from fusion of spinelike upper seta to endite body. Exopodite small and 2-jointed. Maxilliped narrow and 4-jointed; 2 basal joints with a total of 7 spiniform setae and 2 slender setae.

PI with more or less equal joints in both endopodite and exopodite. Endopodite exceeds exopodite by about half the length of its last joint. Surface of both branches as well as coxal plate with rows of long and rigid surface hairs. Proximal part of inner edge of 1st exopodite joint with a deep outcut which corresponds in a retinacular way to spine of basis.

Retinacular outcut is present and even much more pronounced in PII-PIV. Legs without surface setae and with following armature:

	<i>Exopodite</i>	<i>Endopodite</i>
PI	1. 1. 122	1. 1. 121
PII	1. 1. 223	1. 1. 221
PIII	1. 1. 223	1. 2. 321
PIV	1. 1. 223	1. 2. 221

The very small size of the second (external) apical seta of the last endopodite joint of PIV has to be emphasized.

PV 2-jointed with 2nd joint long and narrow (6 times longer than wide) reaching nearly to middle of 2nd abdominal segment. Basal joint of PV with long pubescent seta; terminal joint with scattered hair cover and 3 short and rather spiniform setae. PVI very narrow and long with 2 apical setae.

The specific name is in honor of S. Smirnov.

DISCUSSION.—Our new species is most nearly related to *Cerviniopsis clavicornis* Sars. The differences are, however, quite numerous: the furca of our species is relatively longer, the rostrum is longer and narrower, the segmental edges are serrated, PV is longer and narrower, different limbs bear surface hairs, and the basal endite of the maxilla is falciform. I refrain from putting emphasis on the retinacular outcuts of the basal exopodite joints.

## General Conclusions

It is much too early to use the limited knowledge of the abyssal Harpacticoids in order to take sides with



the different views on zoogeography or relative antiquity of the abyssal fauna. The Cerviniidae are indeed a very primitive family of the order, but in our as yet unpublished abyssal material are also many representatives of evolutionarily advanced families. Since, however, the Cerviniidae are the only family in which there exists some earlier knowledge, some general conclusions can already be drawn.

*Pontostratiotes* Brady with 10 species is, as it presently appears, the characteristic genus of the abyssal fauna. It has been found in the three oceans. *Pontostratiotes scotti* and *P. abyssicola* in both the southern Atlantic (Scott, 1910) and in the Indian Ocean; *Pontostratiotes horrida* in the Pacific (Brodskaia, 1959) and in the Indian Ocean. *Cerviniopsis obtusirostris* and *Cervinia tenuiseta* are also found in the Pacific (Brodskaia, 1963) and Indian Oceans. An interesting distributional feature is shown by the genus *Cerviniella* Smirnov which is found in the Arctic Ocean (Smirnov, 1946), in the Bay of Biscay (Bodin, personal communication), in the Eastern Mediterranean (Por, 1964), and in the Indian Ocean. In the Mediterranean, *Cerviniella talpa* has been found at bathyal depths (see map, Figure 182).

It should be emphasized that several species of *Pontostratiotes* may be found in the same sample. In station 407A there are 5 species of the genus, in 418A 4 species. Something similar is reported by Ivanov (1963) for the species of Pogonophora.

The genus *Pontostratiotes*, as probably the other deep-sea Cerviniidae, may be found at both bathyal and abyssal depths. It seems that *Pontostratiotes scotti* may be found at 925 m (station 399A) and 4365 m (T. Scott, 1910). *Cervinia tenuiseta* has been found at 925 m (station 399A) and at 5690 m (Brodskaia, 1963).

Mention should be made also of the fact that the deep bottoms off the East African shore yielded also many new species of Pogonophora, 5 of which are of the genus *Siboglinum* (Ivanov, 1963).

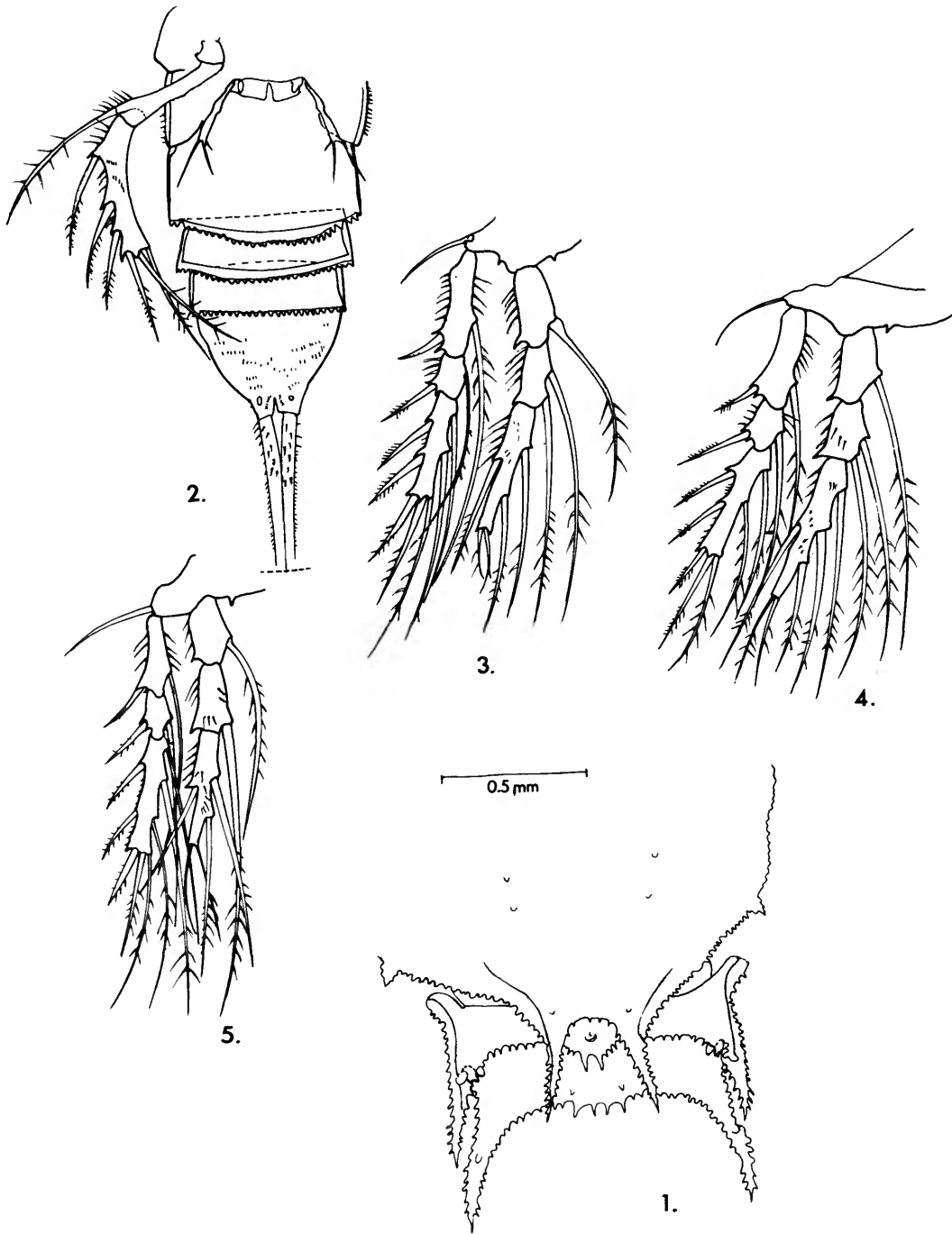
Until now the deep-sea Cerviniidae have always been found only as isolated specimens and all the species have been described from a single specimen. The present material contained for the first time several specimens of a species, in two instances even females and males of the same species.

This fact, added to the large number of Cerviniidae species and the many tens of species belonging to other Harpacticoid families which compose the present material, amply emphasizes the important role probably played by these Crustaceans on the abyssal bottoms. As correctly foreseen by Dahl (1954), use of appropriate sampling gear will lead to the discovery of a rich abyssal fauna of Harpacticoida.

Among the tens of females collected, none had egg sacs, although attached spermatophores have been found. Mention should be made also of the very large sizes of some *Pontostratiotes* which, exceeding 3 mm, are by far the largest known harpacticoids.

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FIGURES 1-5.—*Pontostriates scotti* Brodskaya, female: 1, cephalon and first three thoracic segments  
2, abdomen in ventral view and PV; 3, PII; 4, PIV; 5, PV.



FIGURES 6-12.—*Pontostratiotes scotti* Brodskaya, female: 6, antennula; 7, antenna; 8, mandible; 9, maxillula; 10, maxilla; 11, maxillipede; 12, PI.

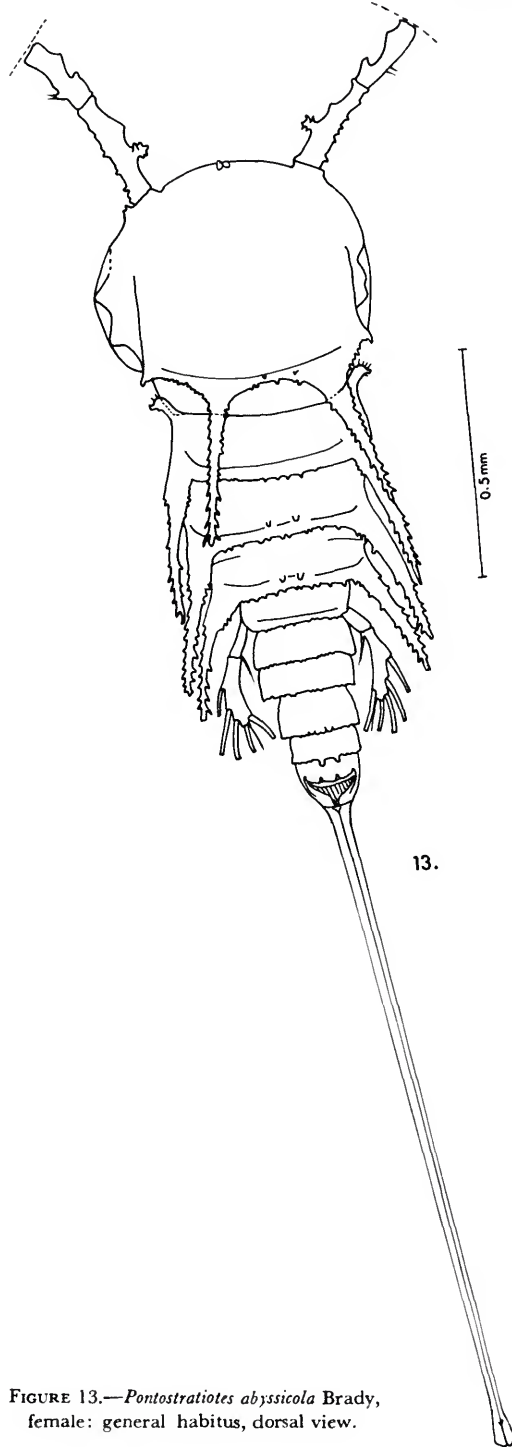
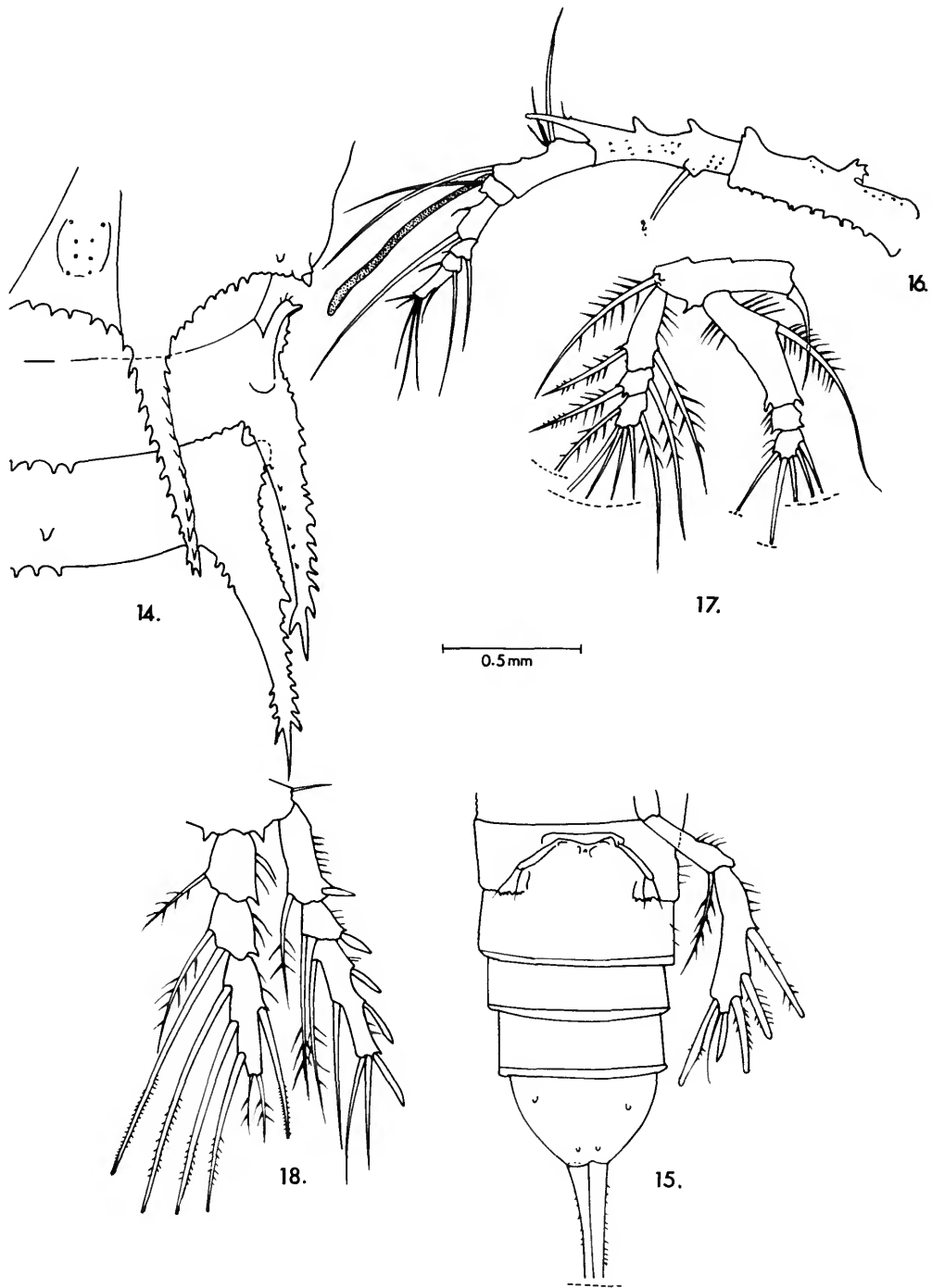
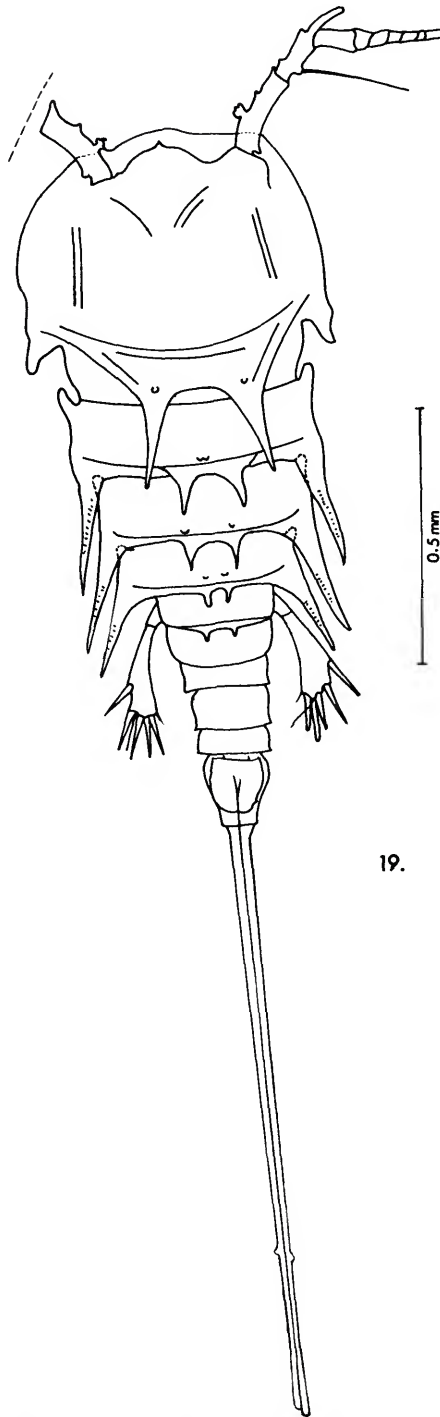


FIGURE 13.—*Pontostratiotes abyssicola* Brady,  
female: general habitus, dorsal view.

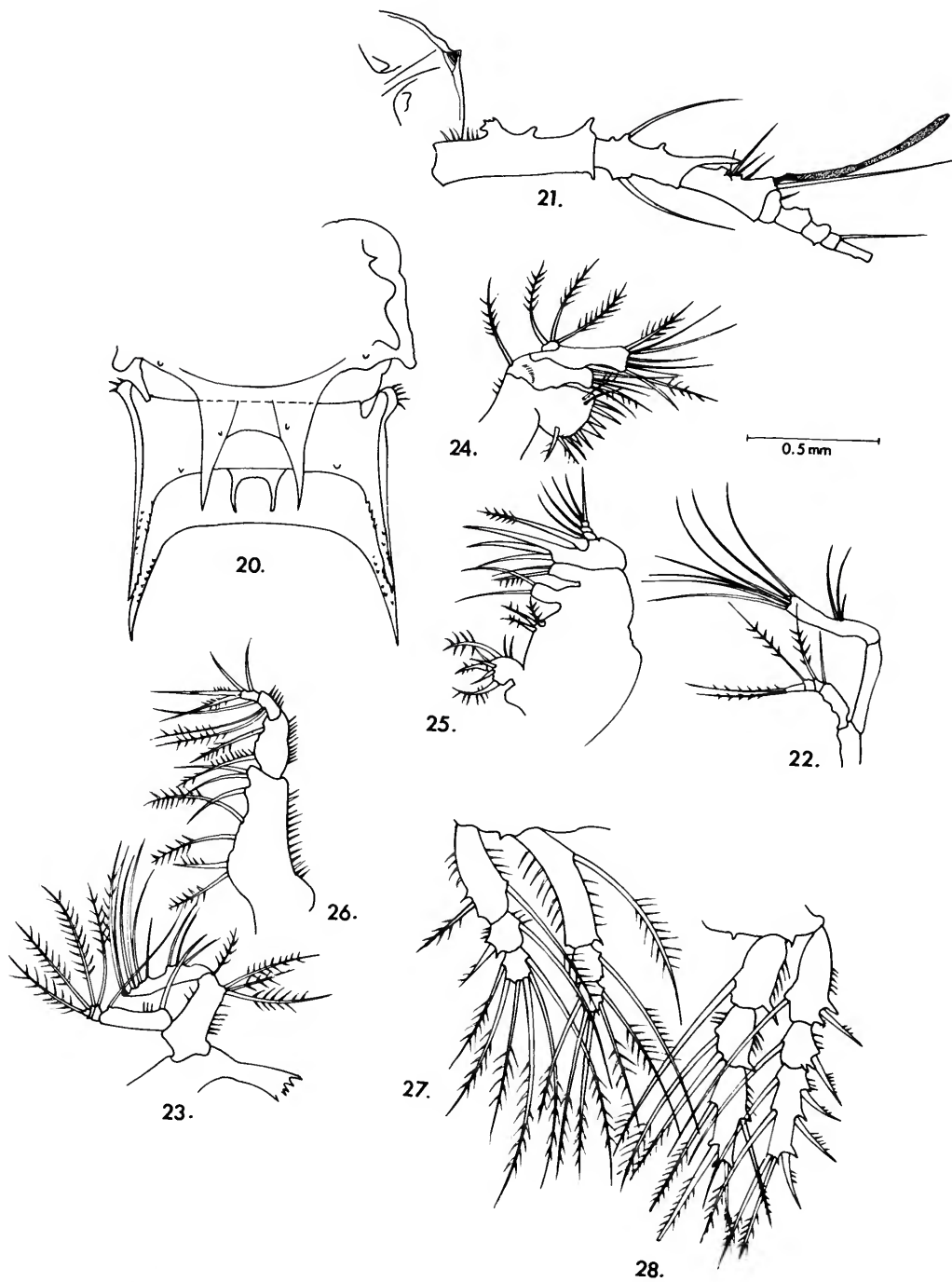


FIGURES 14-18.—*Pontostratiotes abyssicola* Brady, female: 14, posterior edge of cephalon and first three thoracic segments; 15, abdomen ventral view and PV; 16, antenna; 17, PI; 18, PIII.

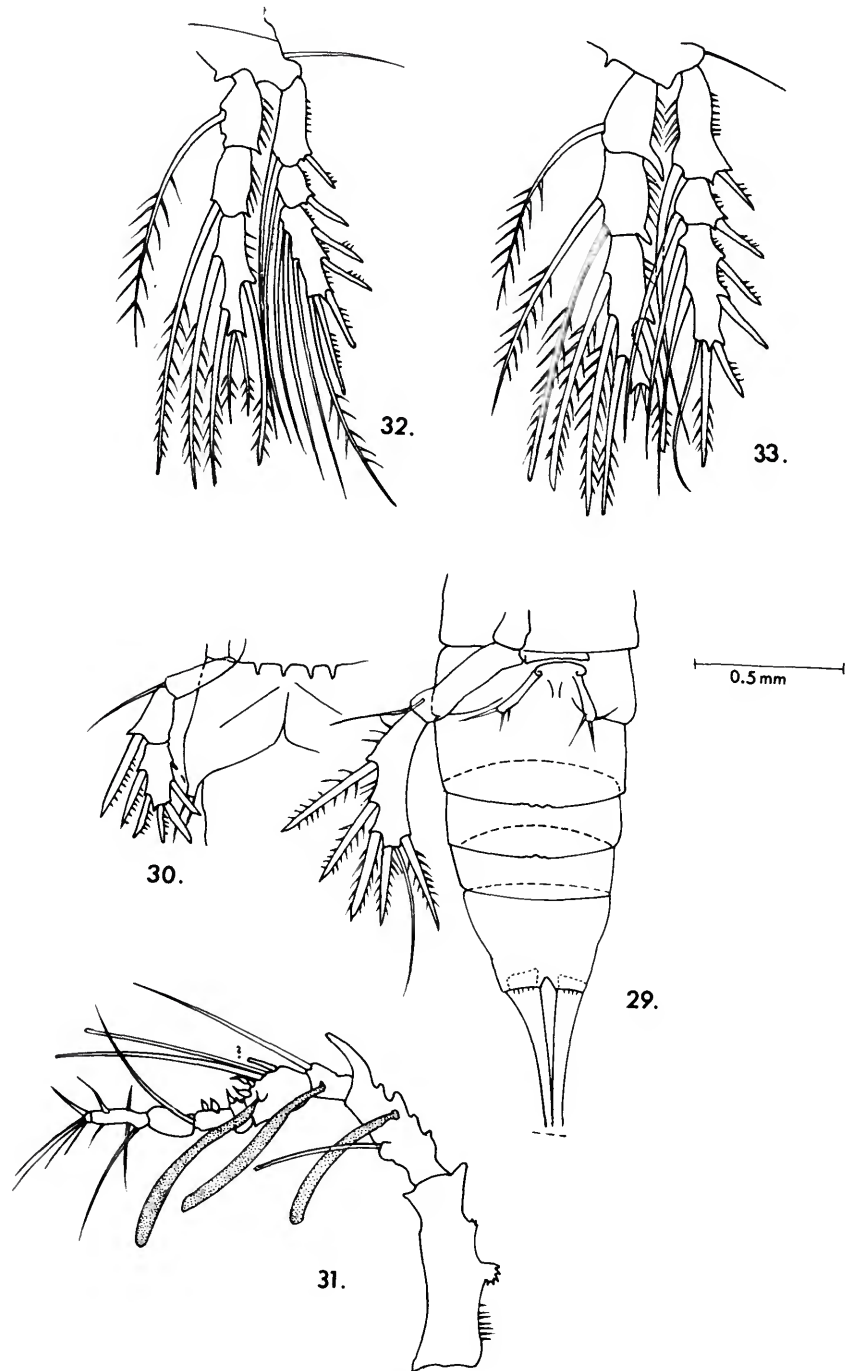


19.

FIGURE 19.—*Pontostratiotes glaber*, new species, female: general habitus, dorsal view.



FIGURES 20-28.—*Pontosratiotes glaber*, new species, female: 20, cephalon and first three thoracic segments; 21, antennula; 22, antenna; 23, mandible; 24, maxillula; 25, maxilla; 26, maxillipede; 27, PI; 28, PII.



FIGURES 29-33.—*Pontostratotes glaber*, new species: 29, abdomen and PV of female; 30, PV and PVI of male; 31, antennula, male; 32, PIV, female, 33, PIII, female.



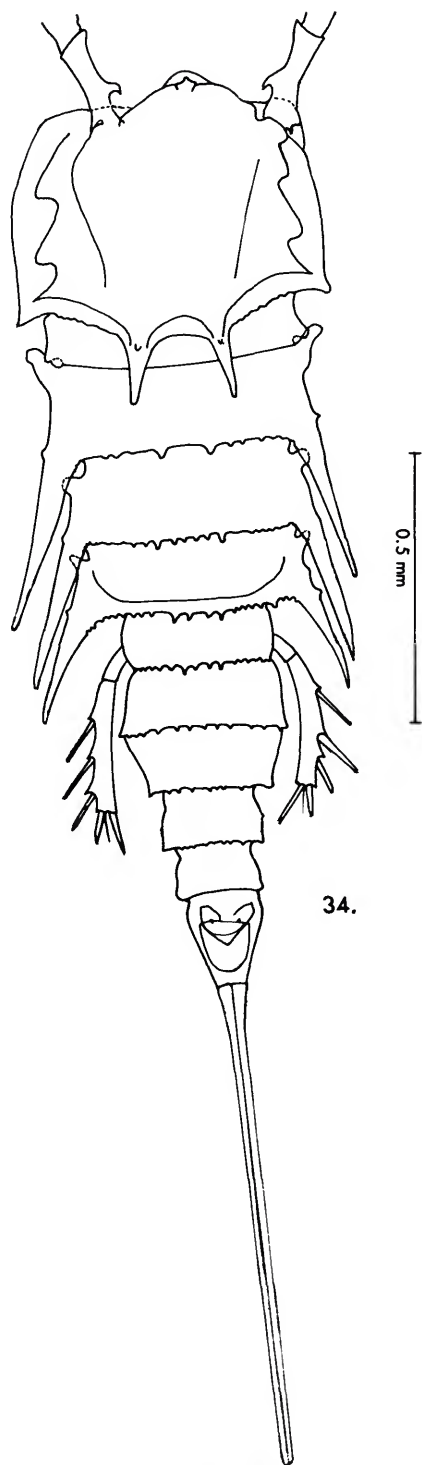
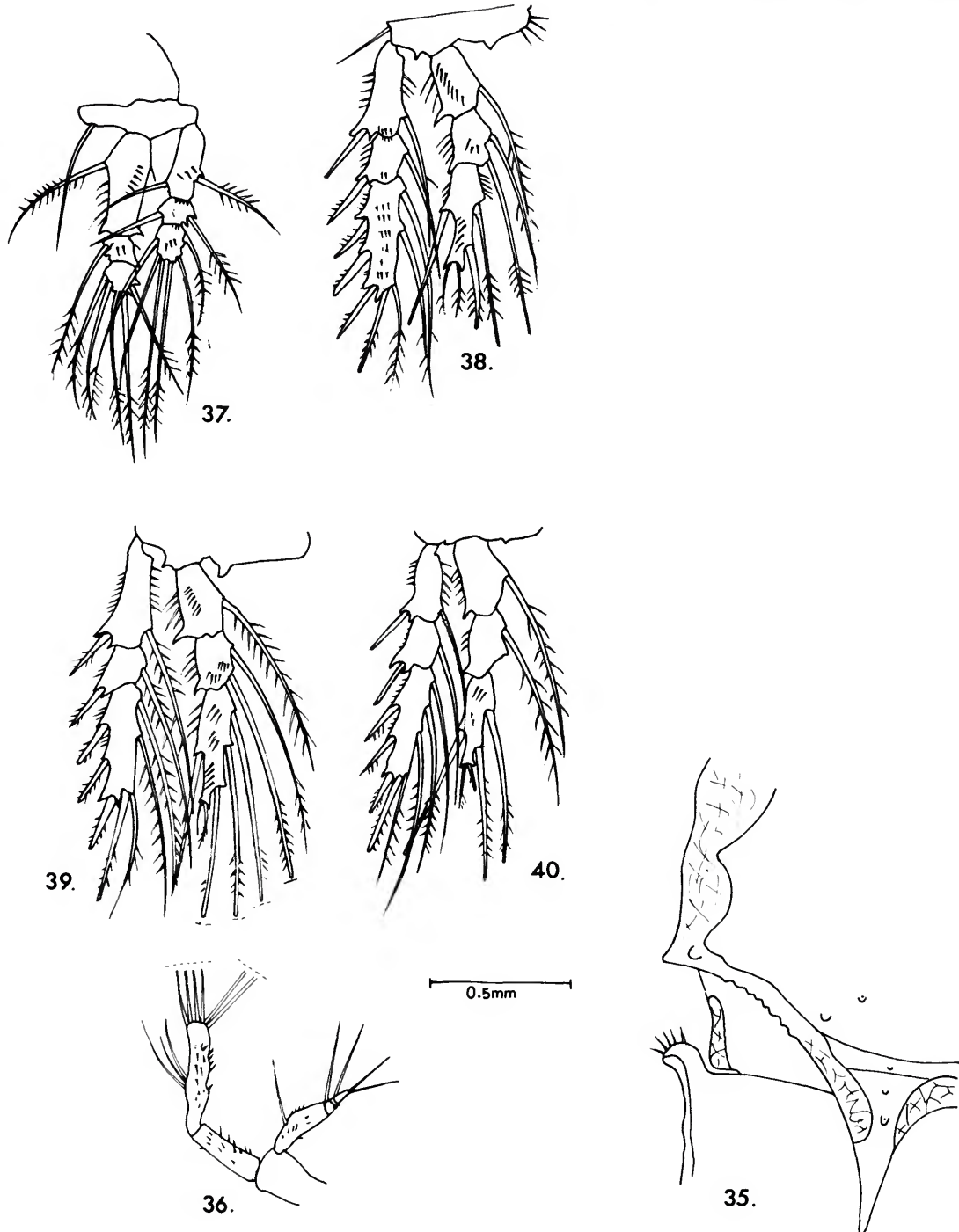
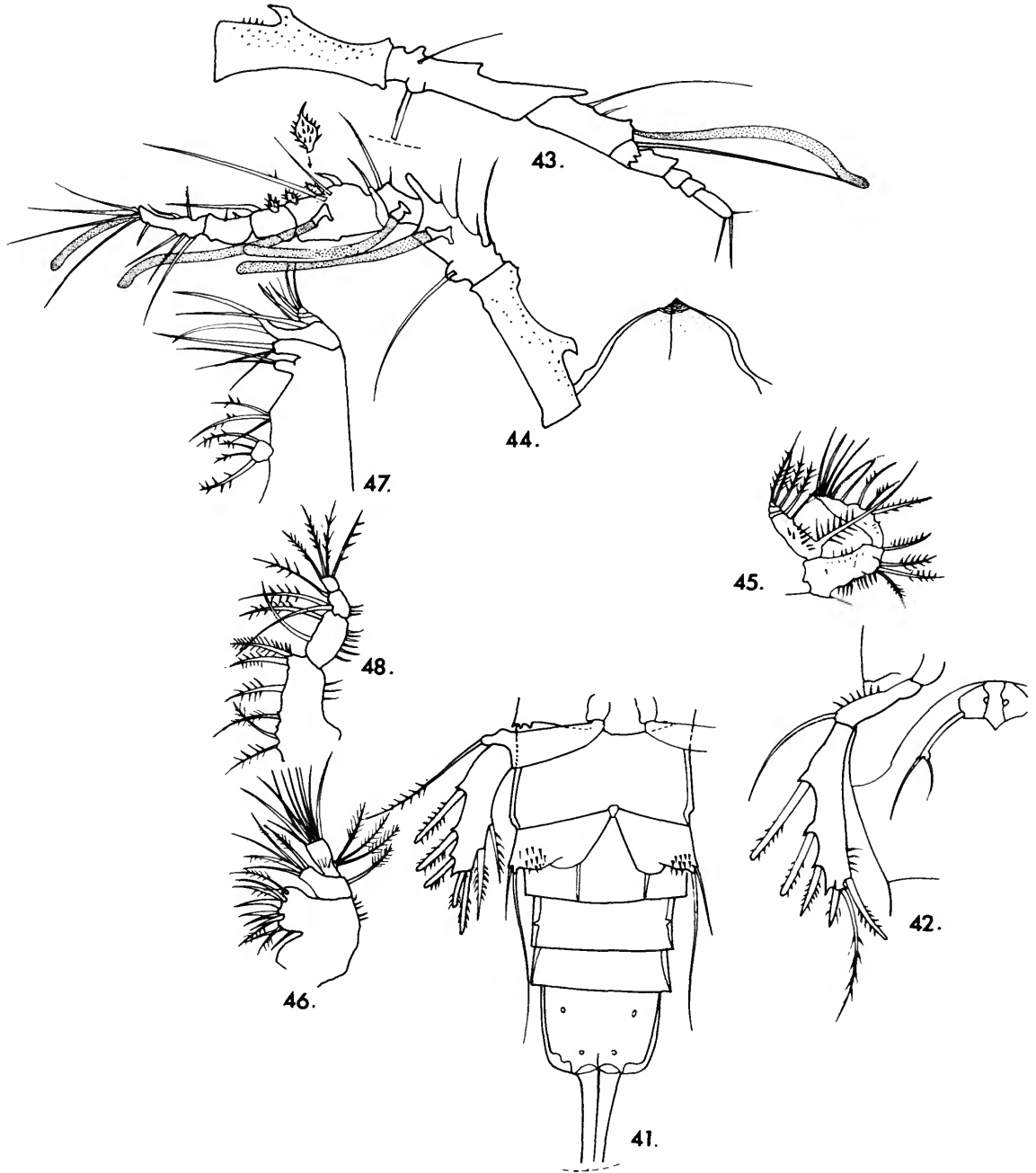


FIGURE 34.—*Pontostratiotes pubescens*, new species, female: general habitus, dorsal view.



FIGURES 35-40.—*Pontostratiotes pubescens*, new species, female: 35, posterior edge of cephalon and first and second thoracic segments; 36, antenna; 37, P1; 38, P2; 39, P3; 40, P4.



FIGURES 41-48.—*Pontostratiotes pubescens*, new species; 41, abdomen of male with PV and PVI; 42, PV, female; 43, antennula, female; 44, antennula, male; 45, mandible, female; 46, maxillula, female; 47, maxilla, female; 48, maxilliped, female.

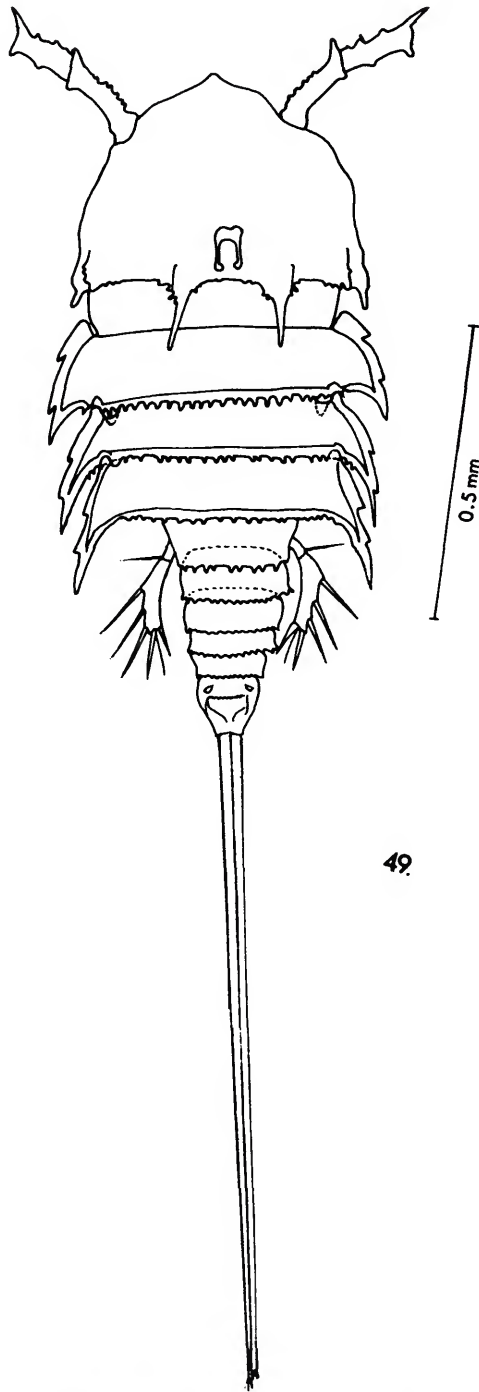
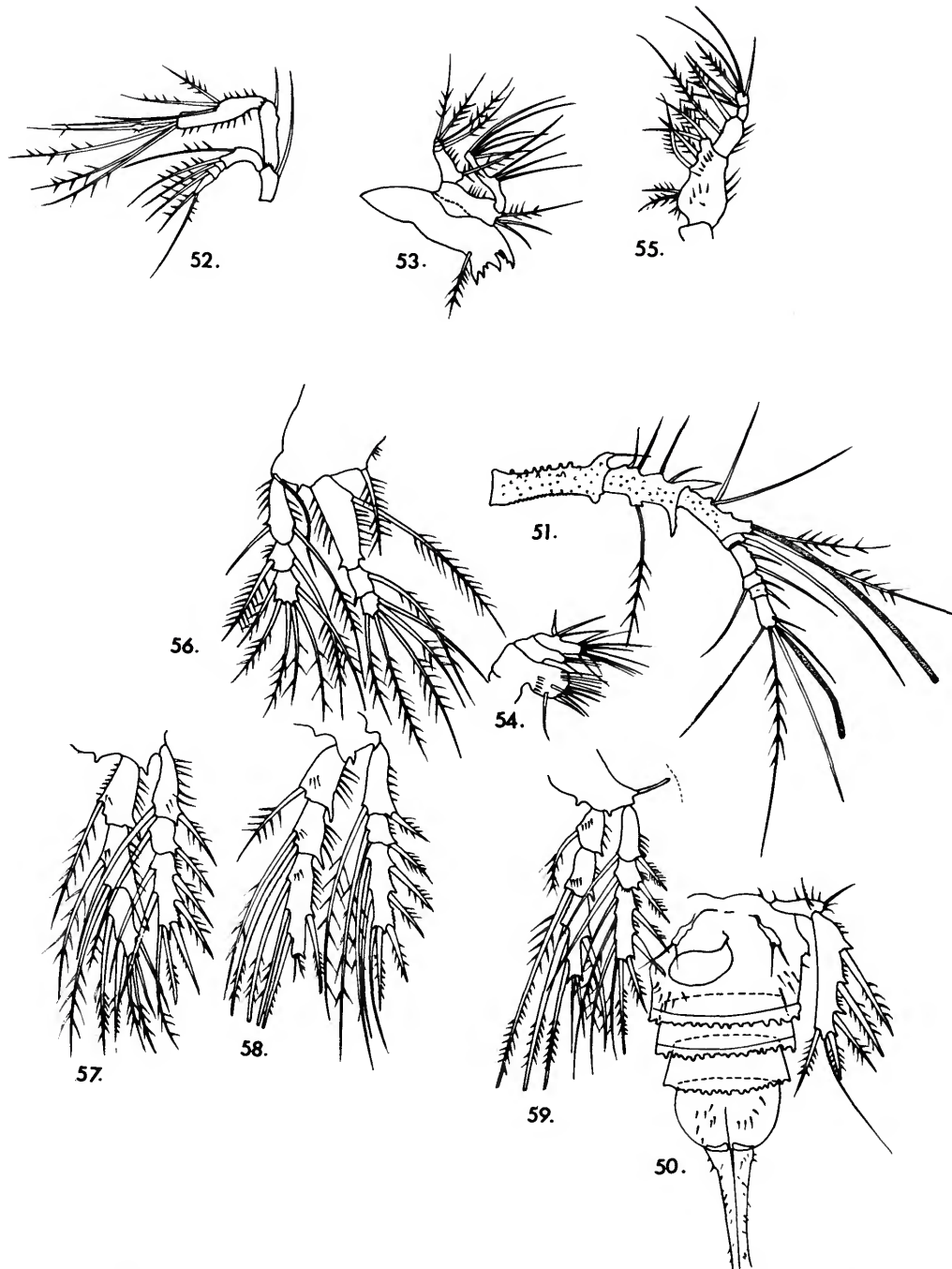


FIGURE 49.—*Pontostratiotes alatus*, new species, female: general habitus, dorsal view.



FIGURES 50-59.—*Pontostratiotes alatus*, new species, female: 50, abdomen, ventral view, with attached spermatophore and PV; 51, antennula; 52, antenna; 53, mandible; 54, maxillula; 55, maxilliped; 56, PI; 57, PII; 58, PIII; 59, PIV.

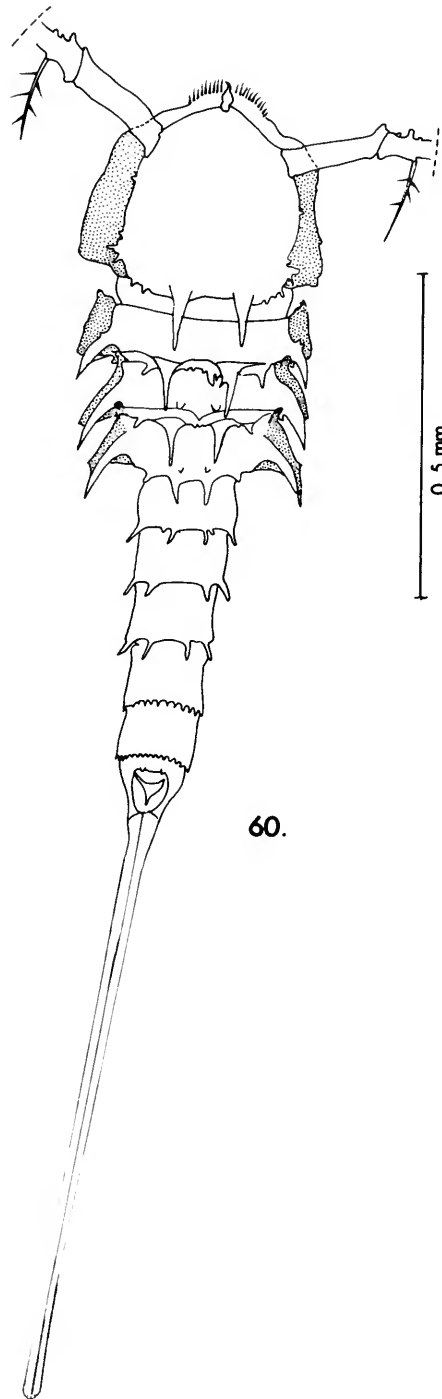
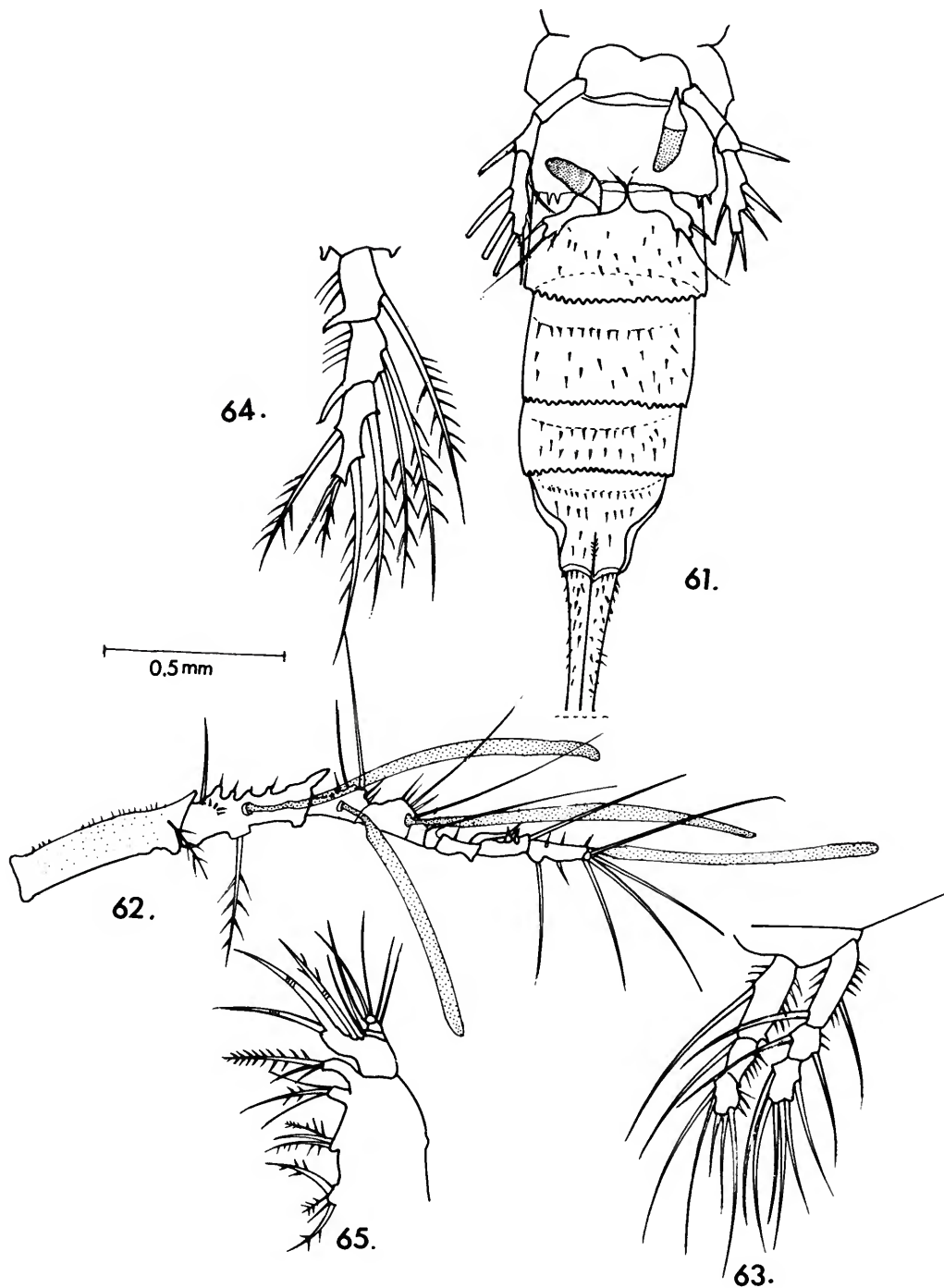


FIGURE 60.—*Pontostratiotes* species, male: general habitus, dorsal view.



FIGURES 61-65.—*Pontostratiotes* species, male: 61, abdomen, ventral view, with PV and PVI; 62, antenna; 63, PI; 64, endopodite of PII; 65, maxilla.

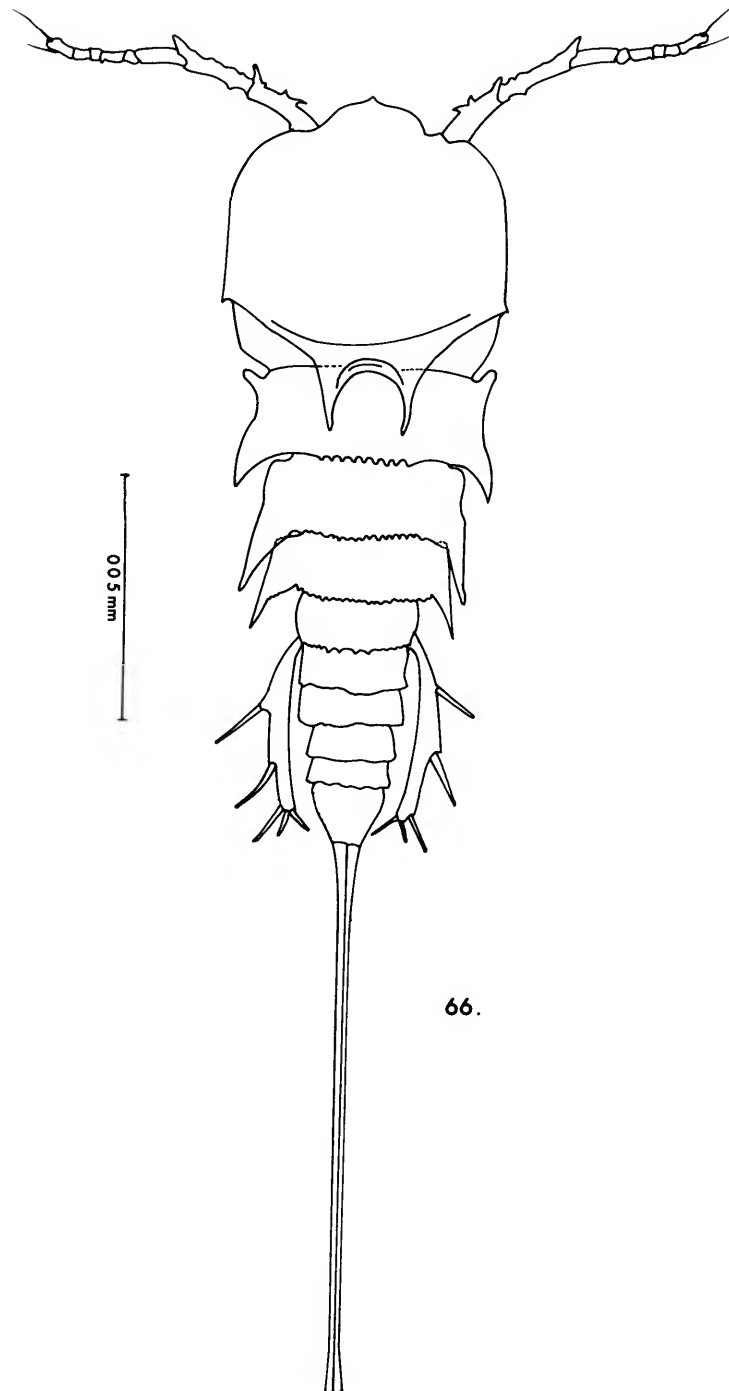
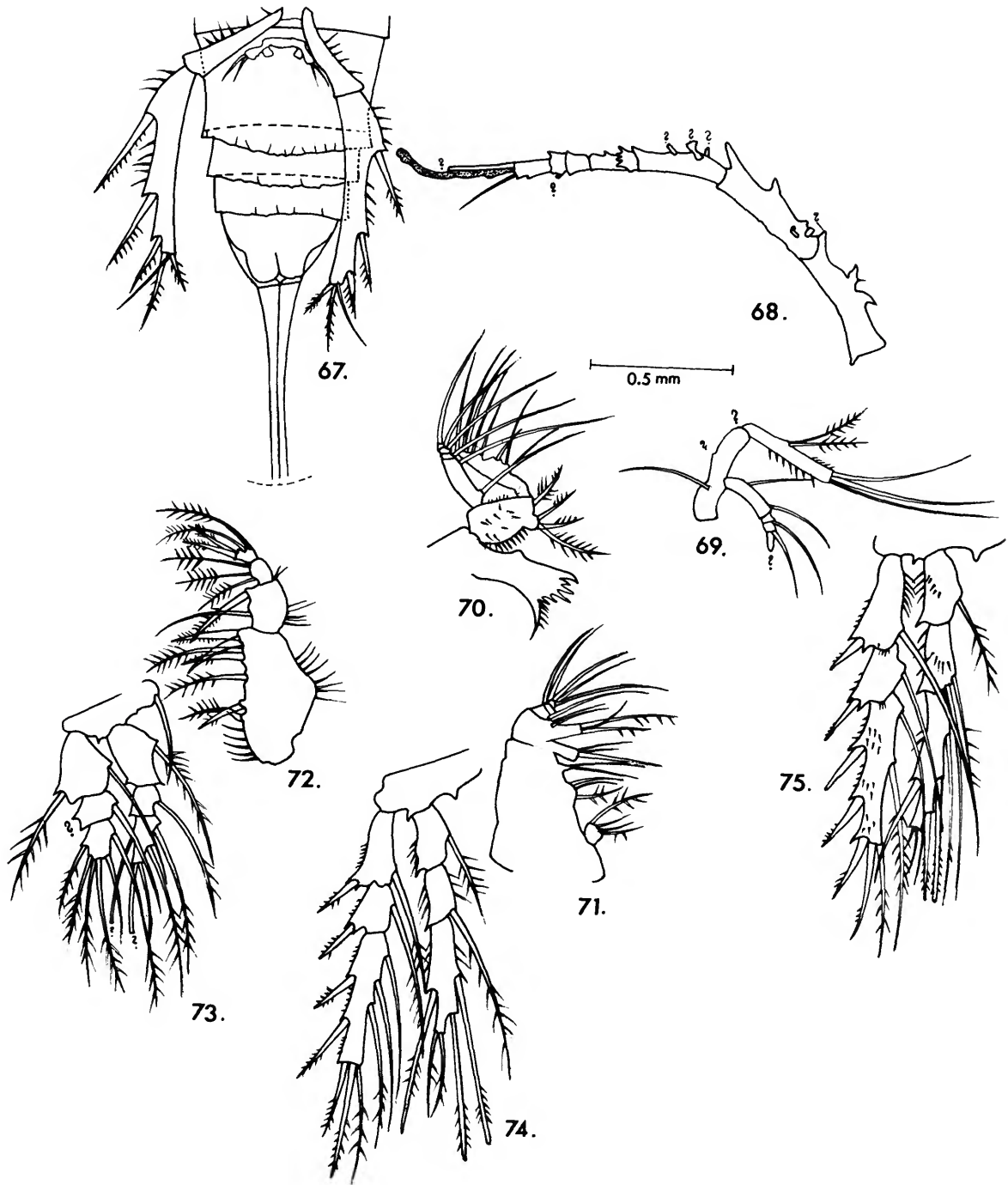


FIGURE 66.—*Pontostratiotes inermis*, new species, female: general habitus, dorsal view.





FIGURES 67-75.—*Pontostratiotes inermis*, new species, female: 67, abdomen, ventral view with PV; 68, antennula; 69, antenna; 70, mandible; 71, maxilla; 72, maxilliped; 73, PI; 74, PIV; 75, PIII.

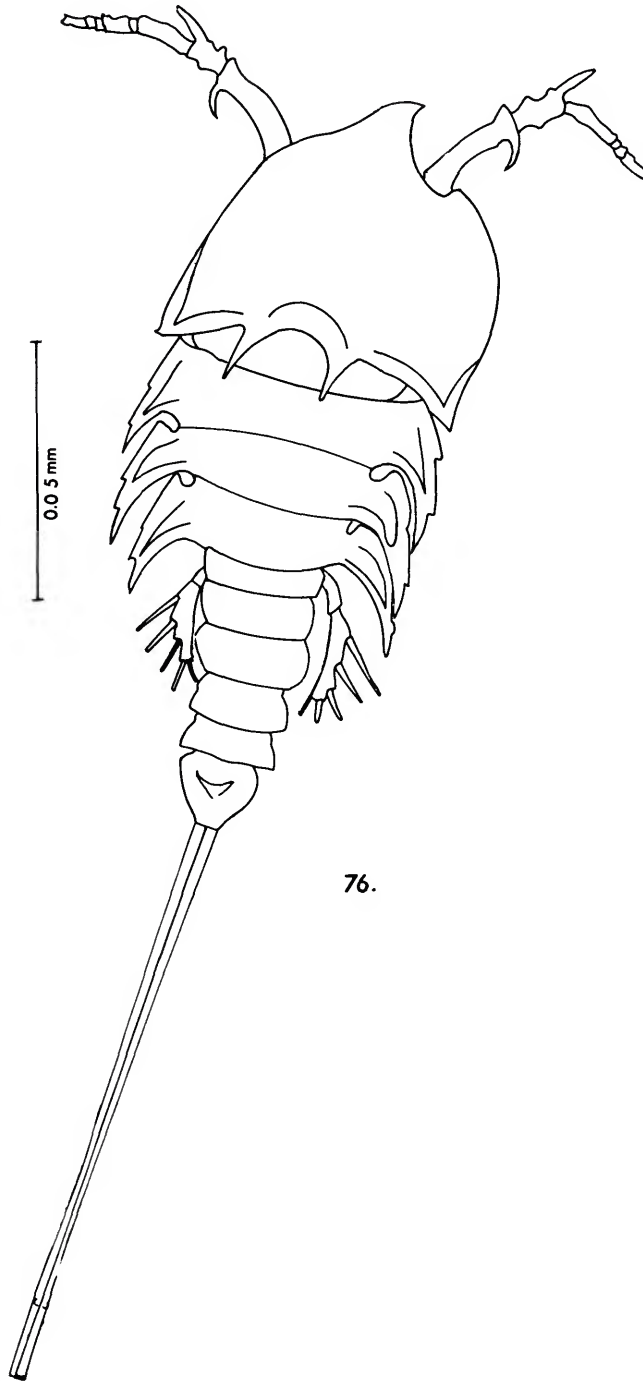
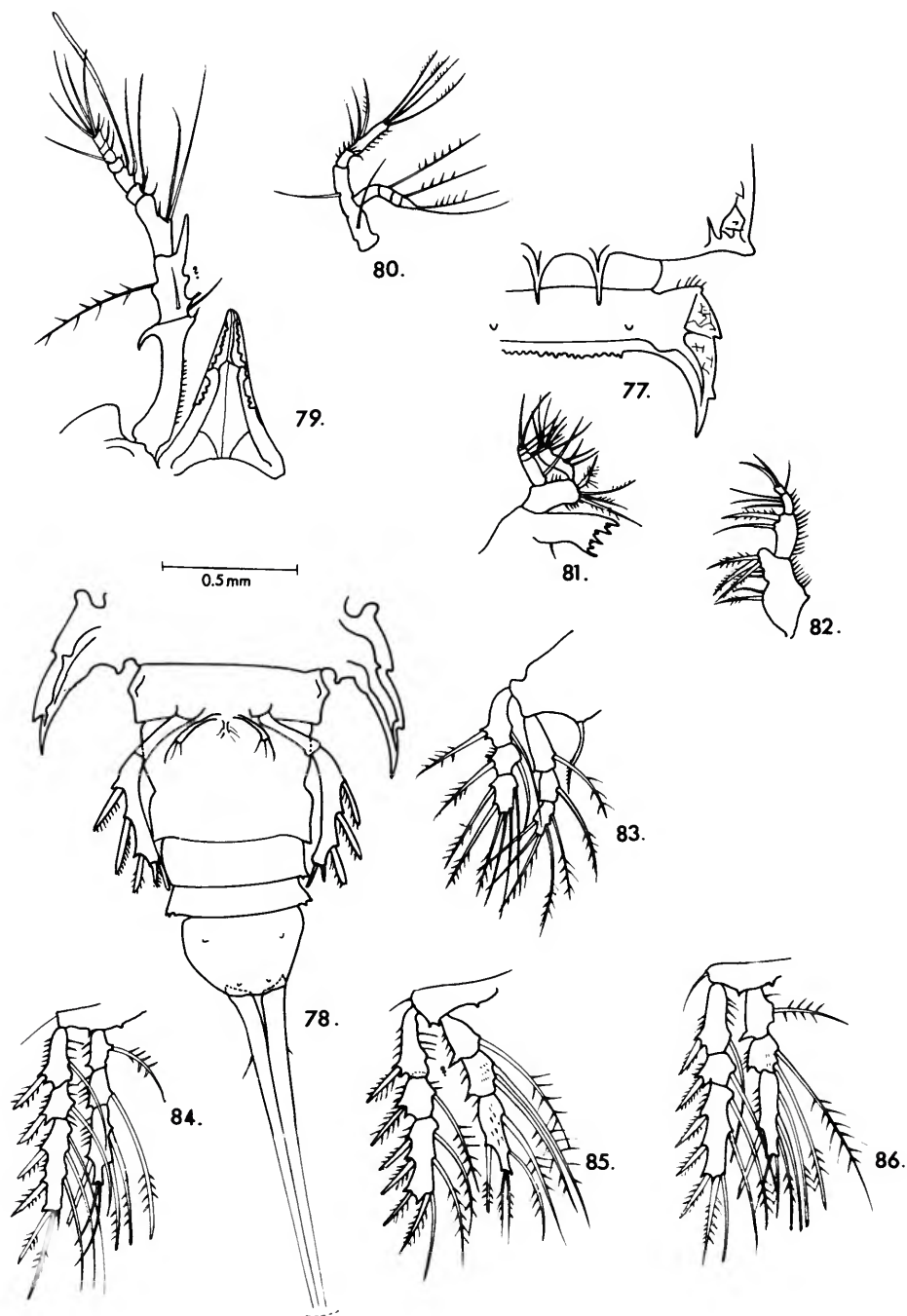
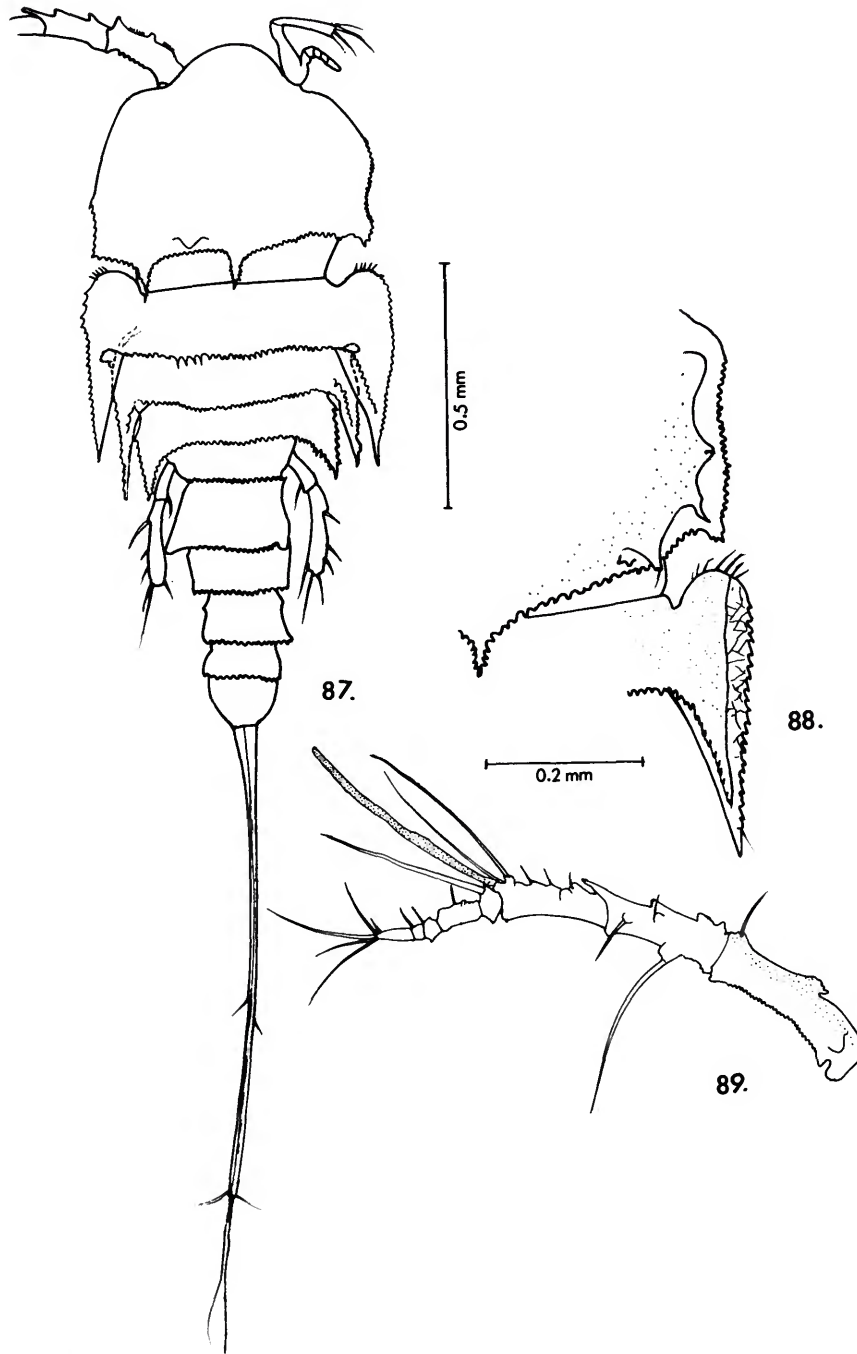


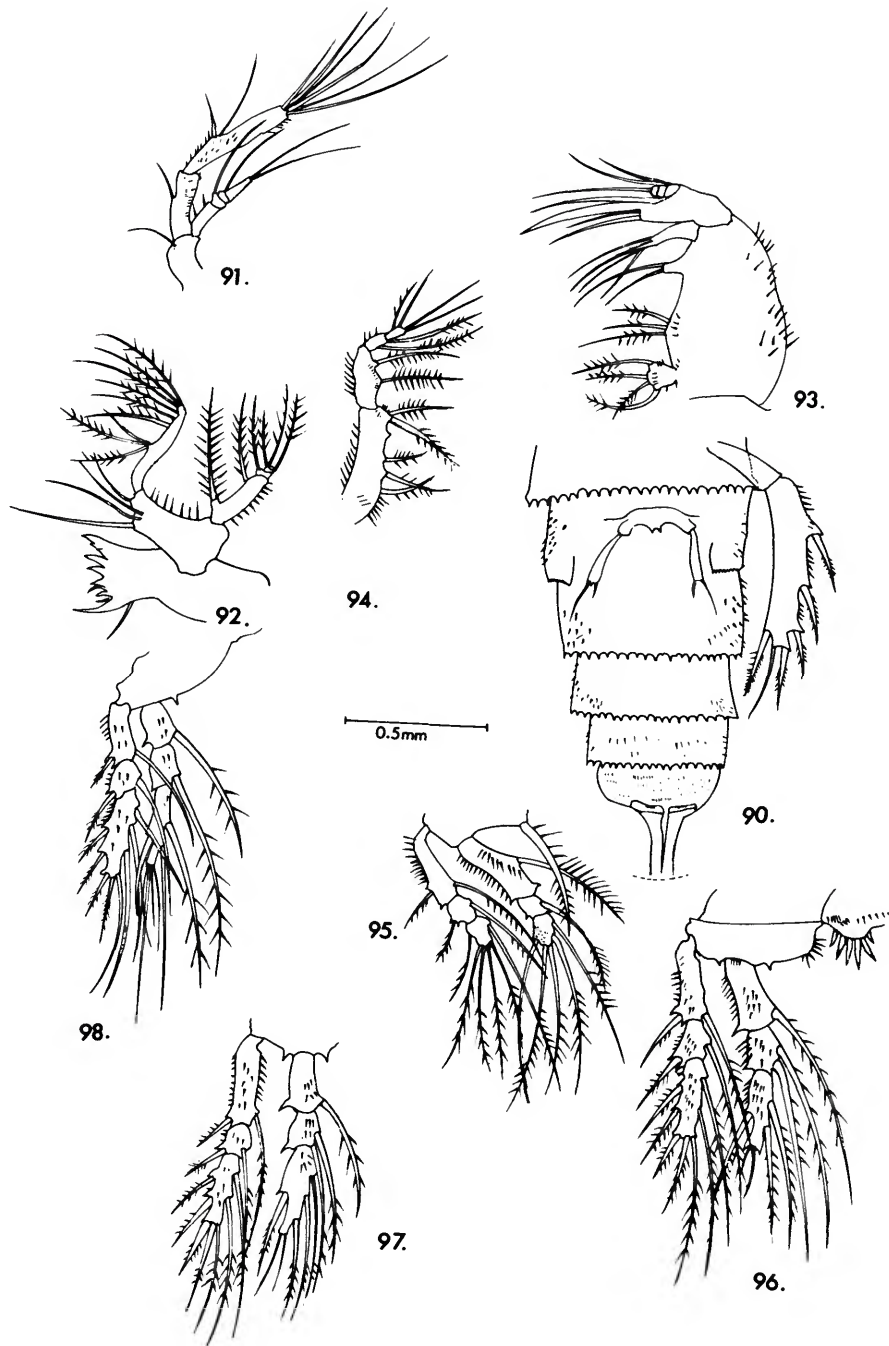
FIGURE 76.—*Pontostratiotes sixtorum*, new species, female: general habitus, dorsal view.



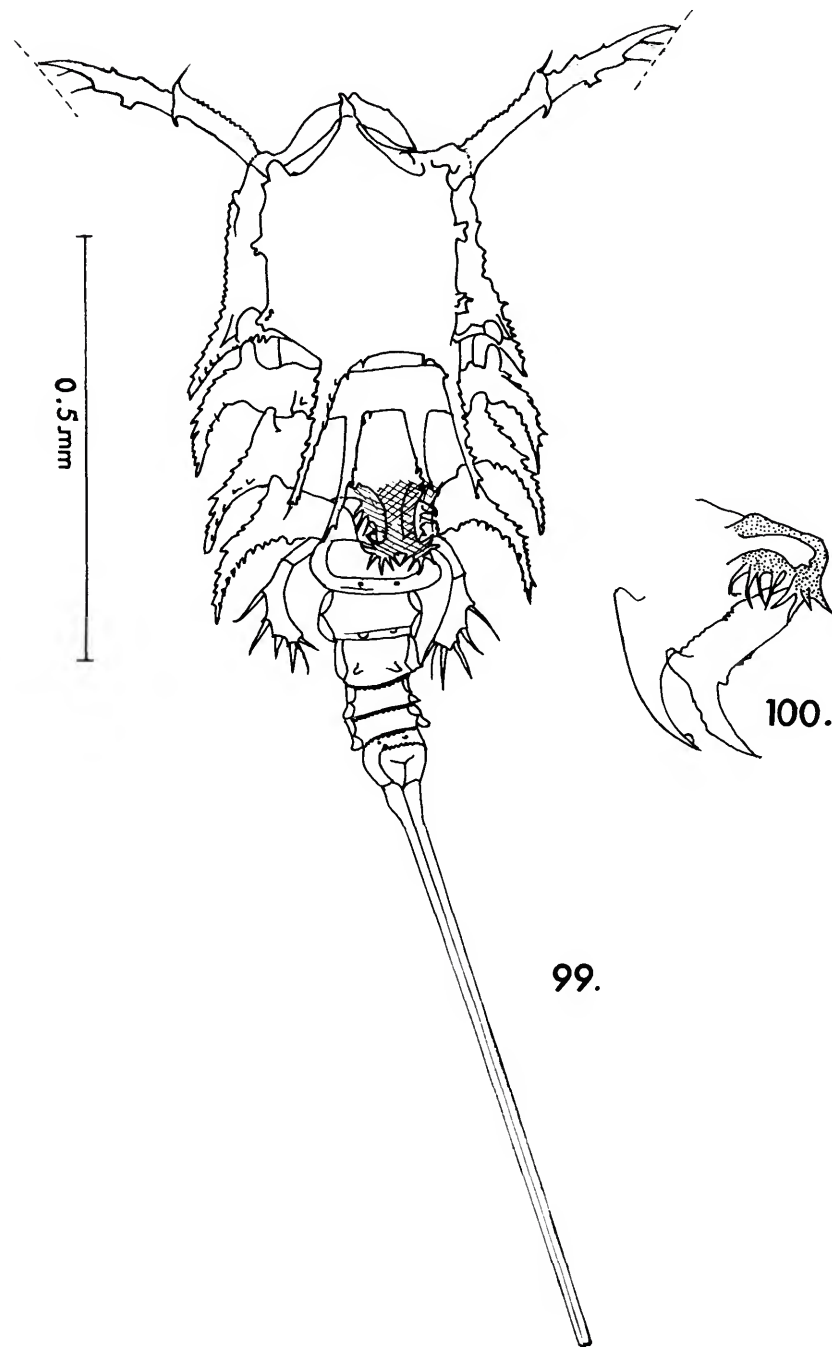
FIGURES 77-86.—*Pontostratiotes sixtorum*, new species, female: 77, posterior edge of cephalon and first two thoracic segments; 78, last thoracic segments and abdomen, ventral view with PV; 79, antennula and rostrum; 80, antenna; 81, mandible; 82, maxilliped; 83, PI; 84, PIV; 85, PII; 86, PIII.



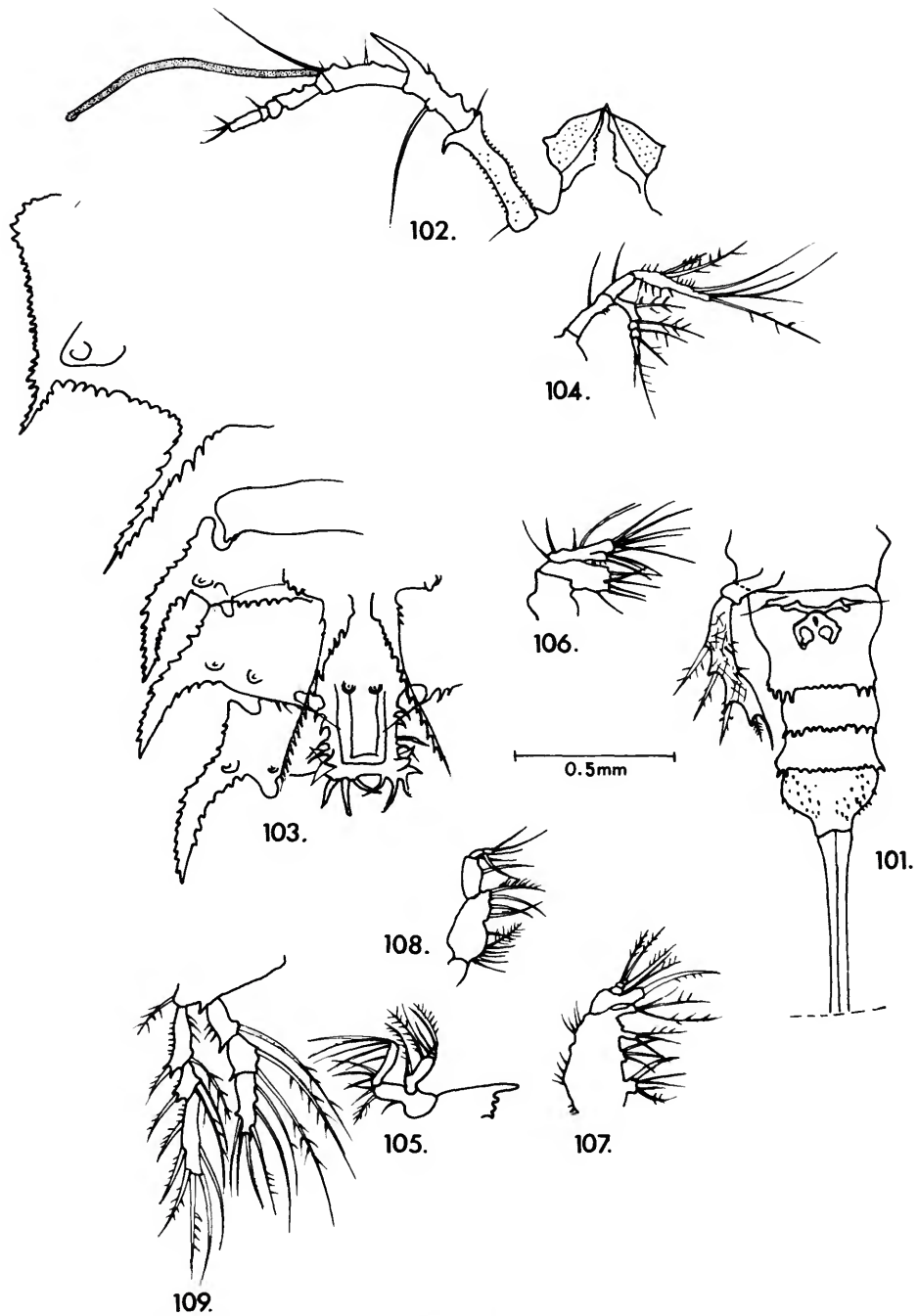
FIGURES 87-89.—*Pontostratiotes microserrulatus*, new species, female: 87, general habitus, dorsal view; 88, posterior edge of cephalon and first two thoracic segments; 89, antenna.



FIGURES 90-98.—*Pontostratiotes microserrulatus*, new species, female: 90, abdomen, ventral view, with PV; 91, antenna; 92, mandible; 93, maxilla; 94, maxilliped; 95, PI; 96, PII; 97, PIII; 98, PIV.



FIGURES 99-100.—*Pontostratiotes horrida* Brodskaya, female: 99, general habitus, dorsal view; 100, third and fourth thoracic segments, lateral view.



FIGURES 101-109.—*Pontostratiotes horrida* Brodskaya, female: 101, abdomen, ventral view with PV; 102, antennula with rostrum; 103, cephalon and thoracic segments; 104, antenna; 105, mandible; 106, maxillula; 107, maxilla; 108, maxilliped; 109, P. III.

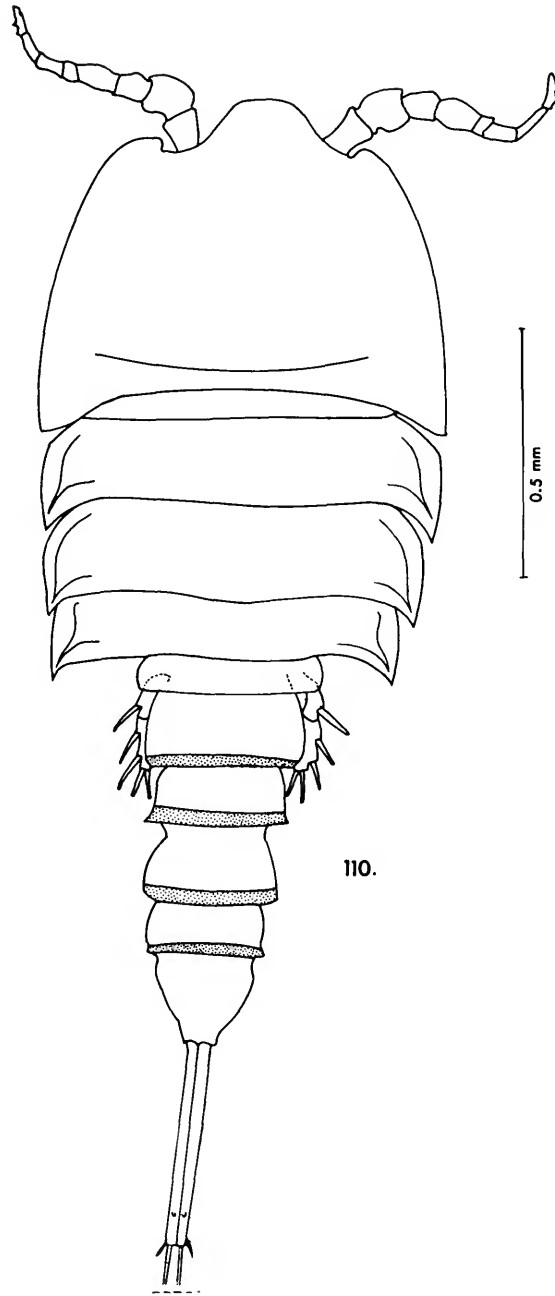
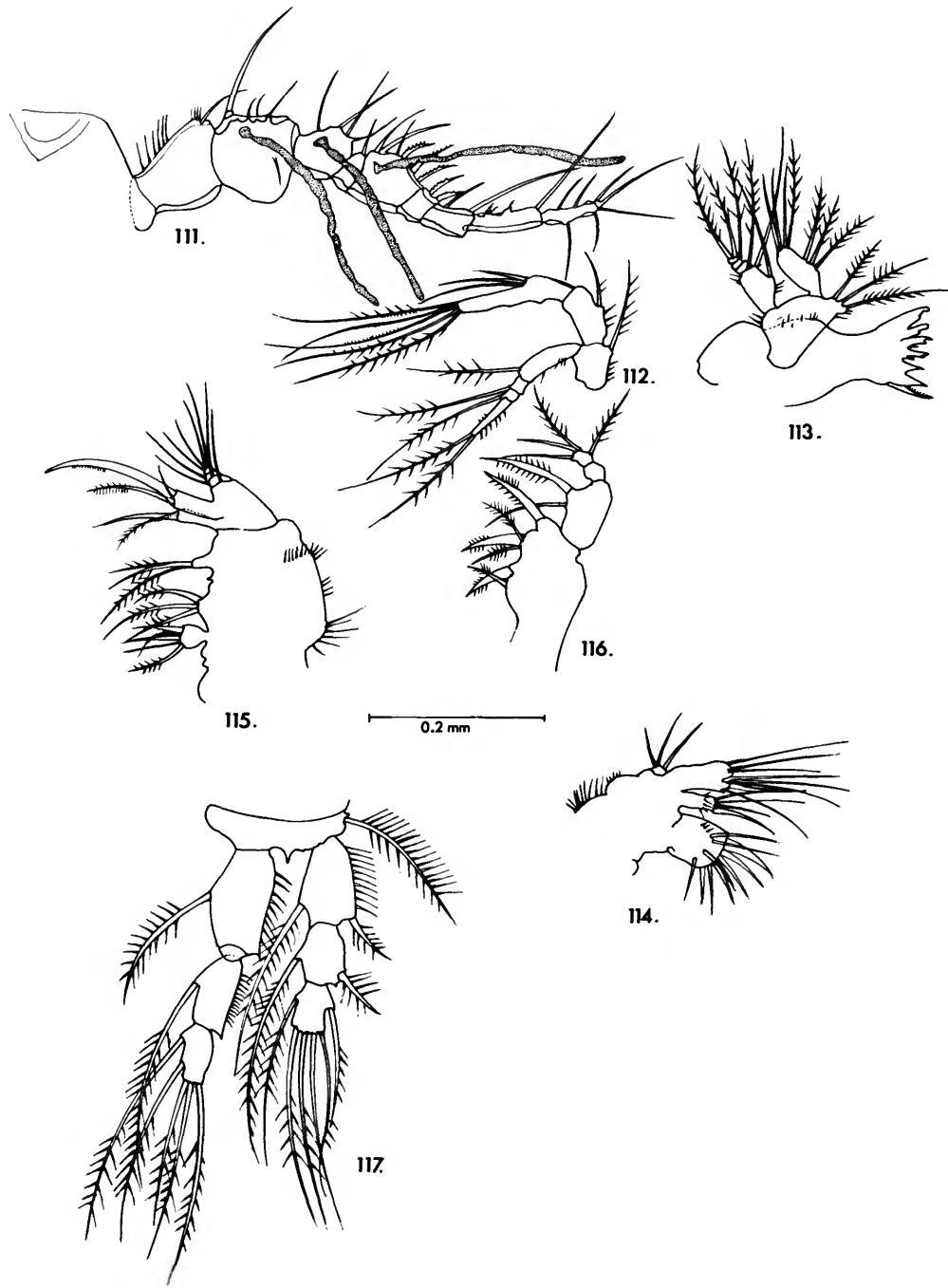
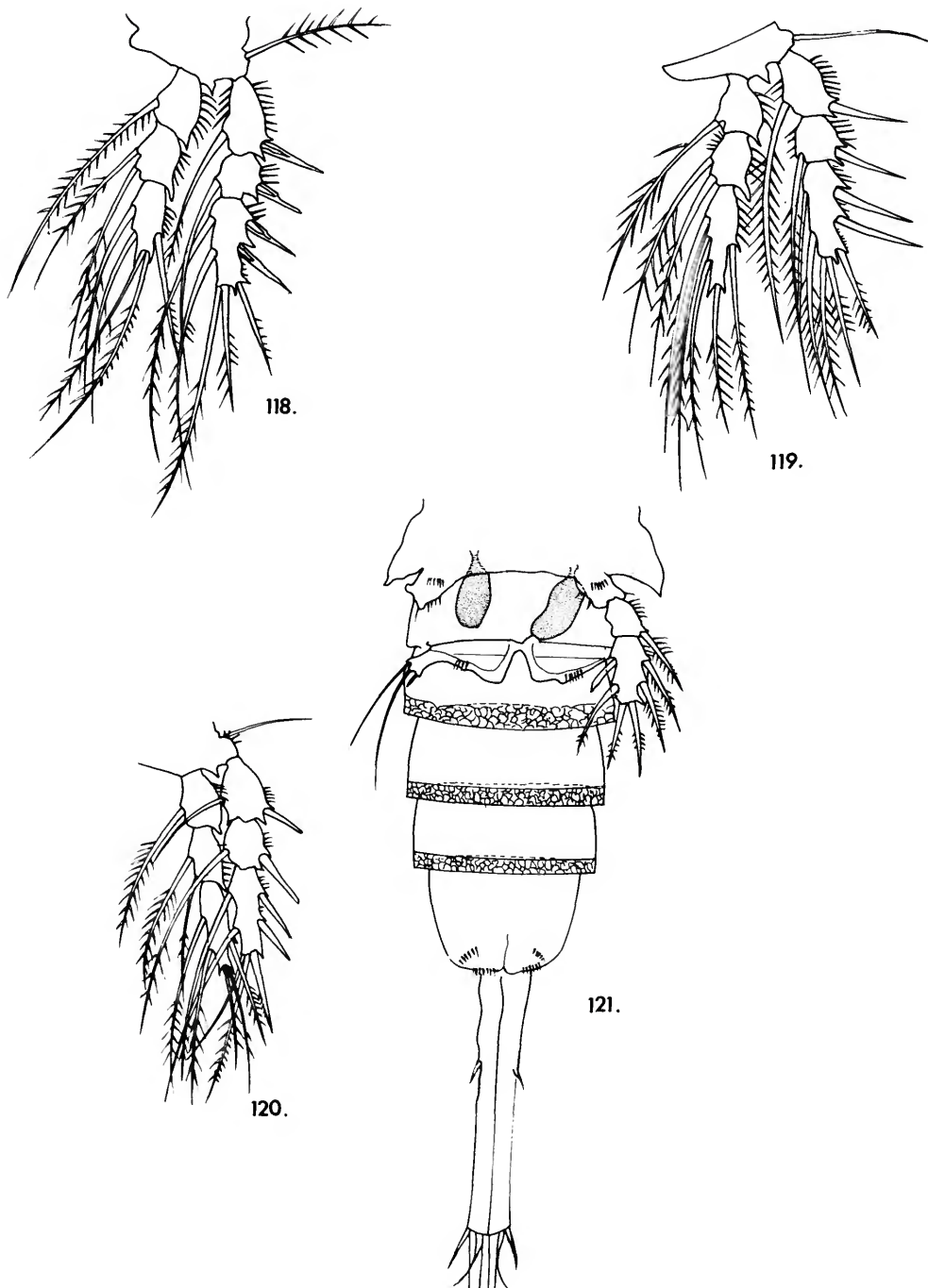


FIGURE 110.—*Ameliotos malagassicus*, new genus, new species, male: general habitus, dorsal view.





FIGURES 111-117.—*Ameliotus malagassicus*, new genus, new species, male: 111, antennula; 112, antenna; 113, mandible; 114, maxillula; 115, maxilla; 116, maxilliped; 117, PI.



FIGURES 118-121.—*Ameliotes malagassicus*, new genus, new species, male: 118, PII; 119, PIII; 120, PIV; 121, abdomen, ventral view with PV and PVI.

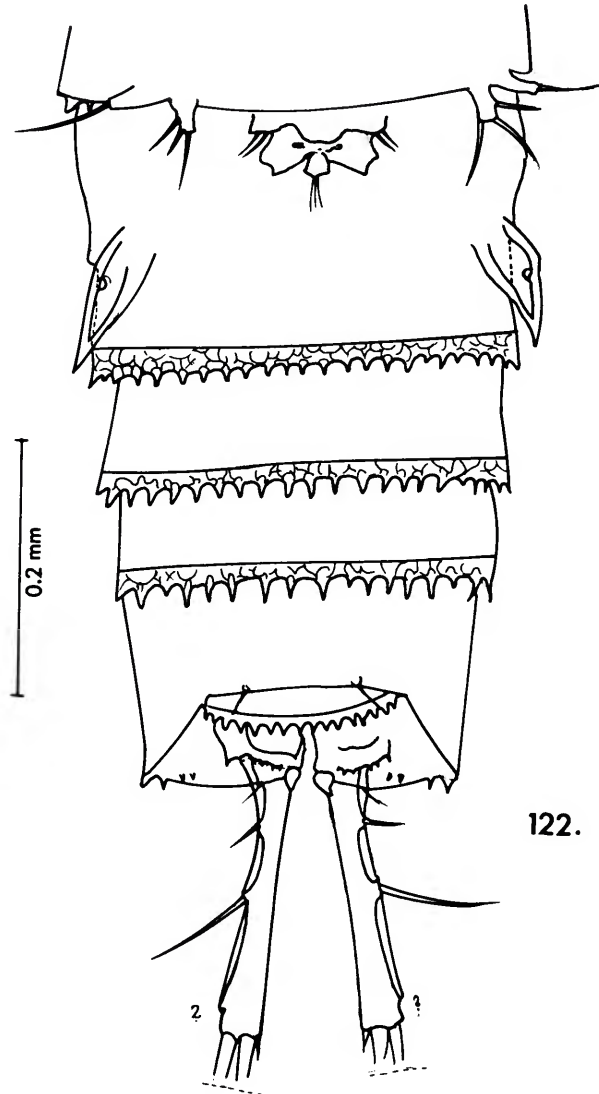
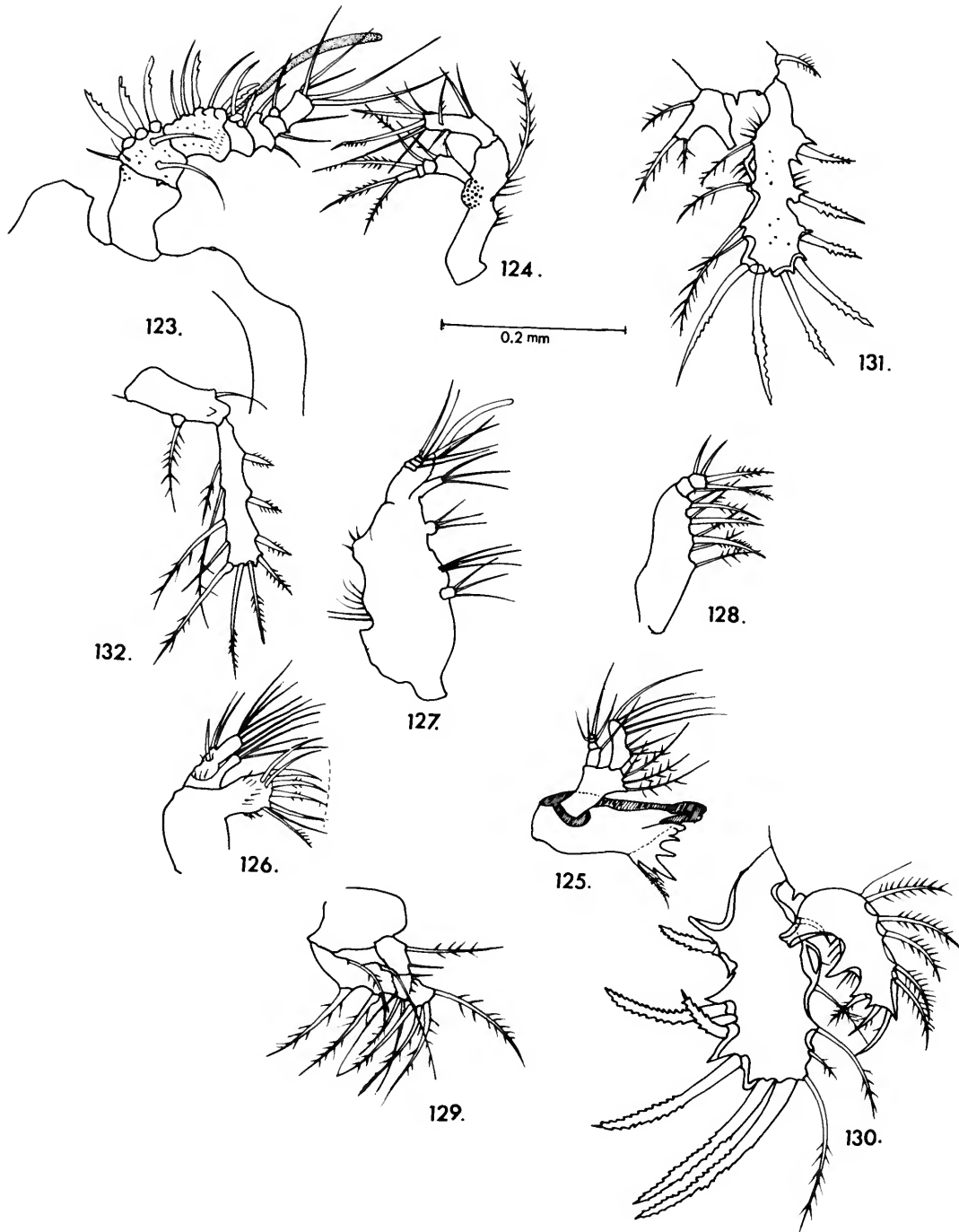
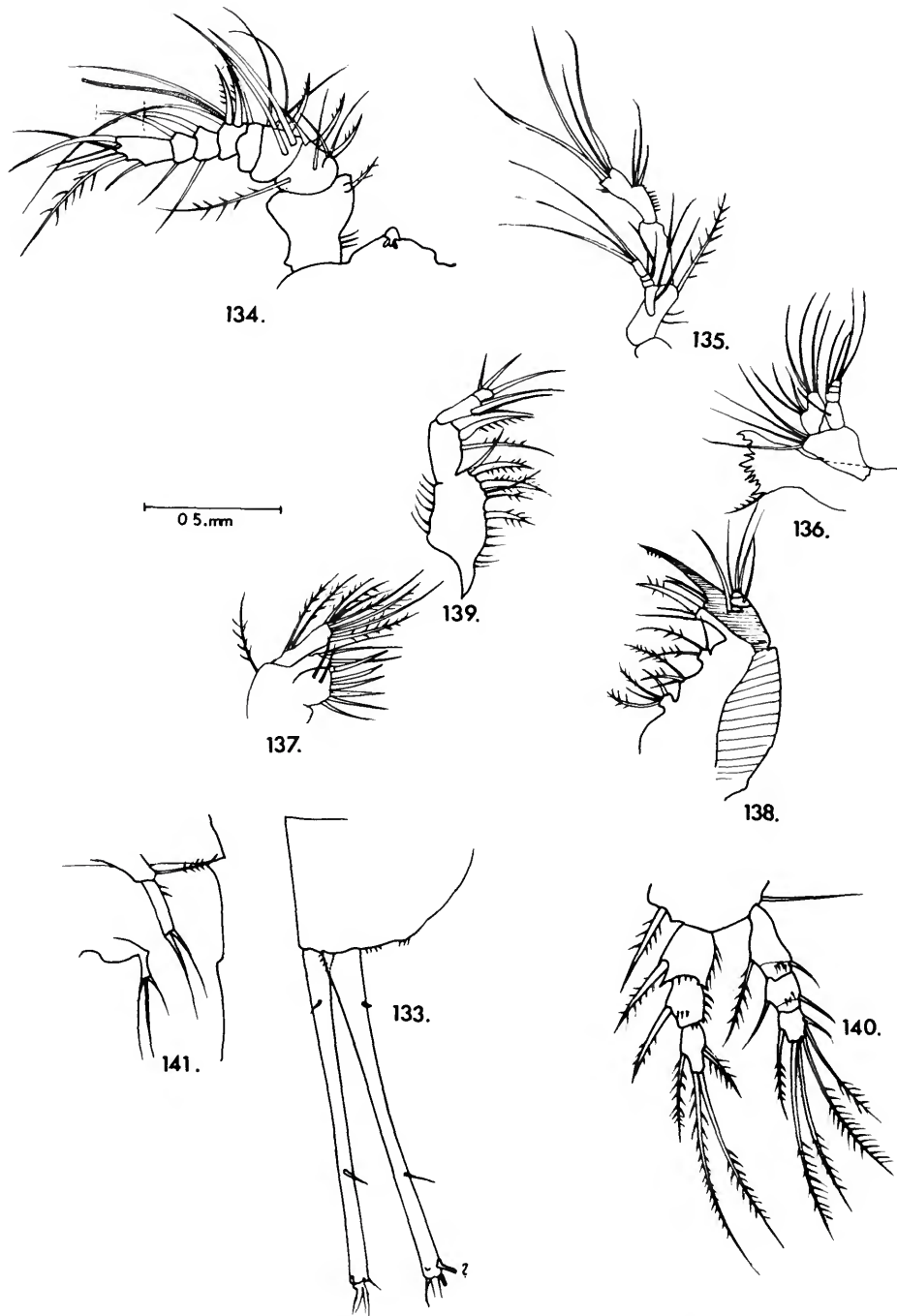


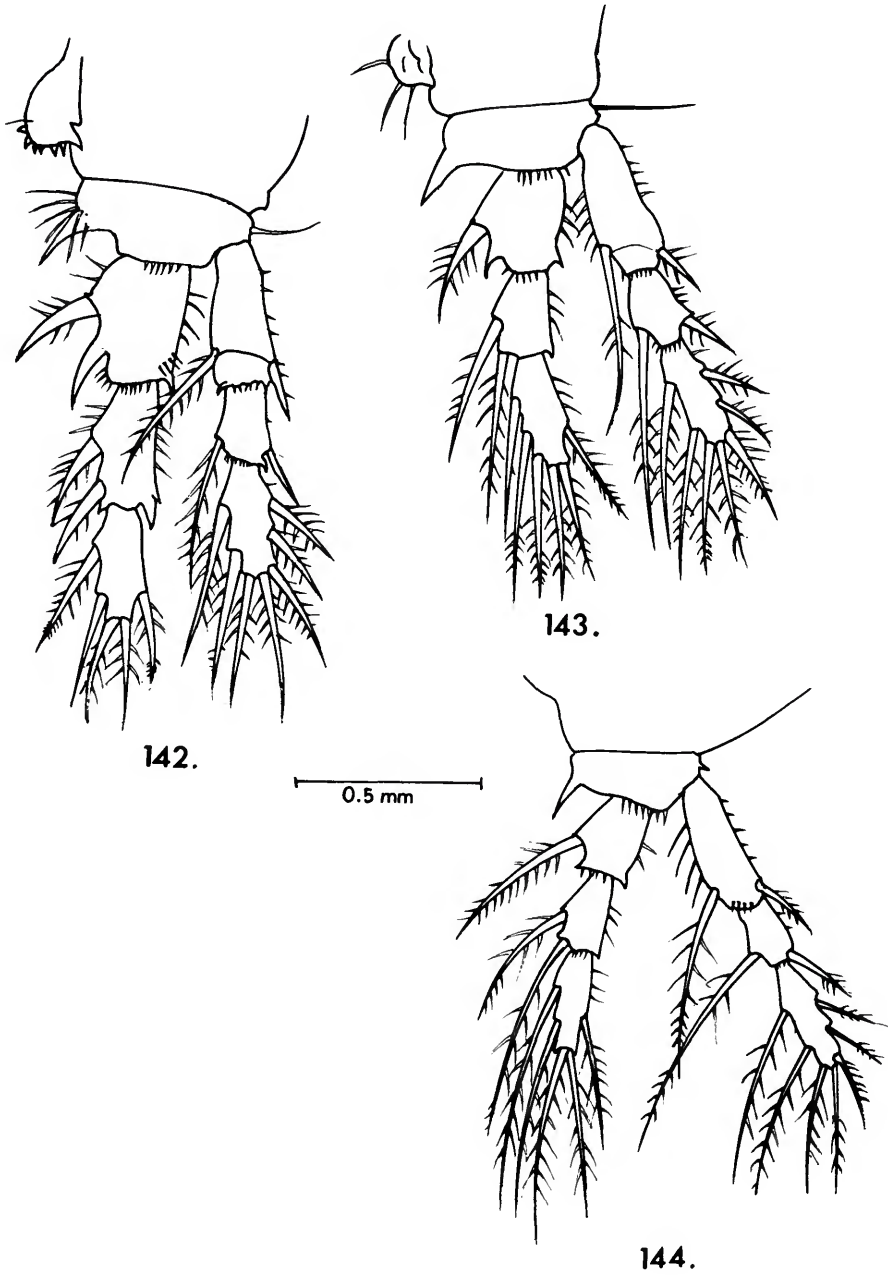
FIGURE 122.—*Cerviniella brodskayae*, new species, female: abdomen ventral view, with PV.



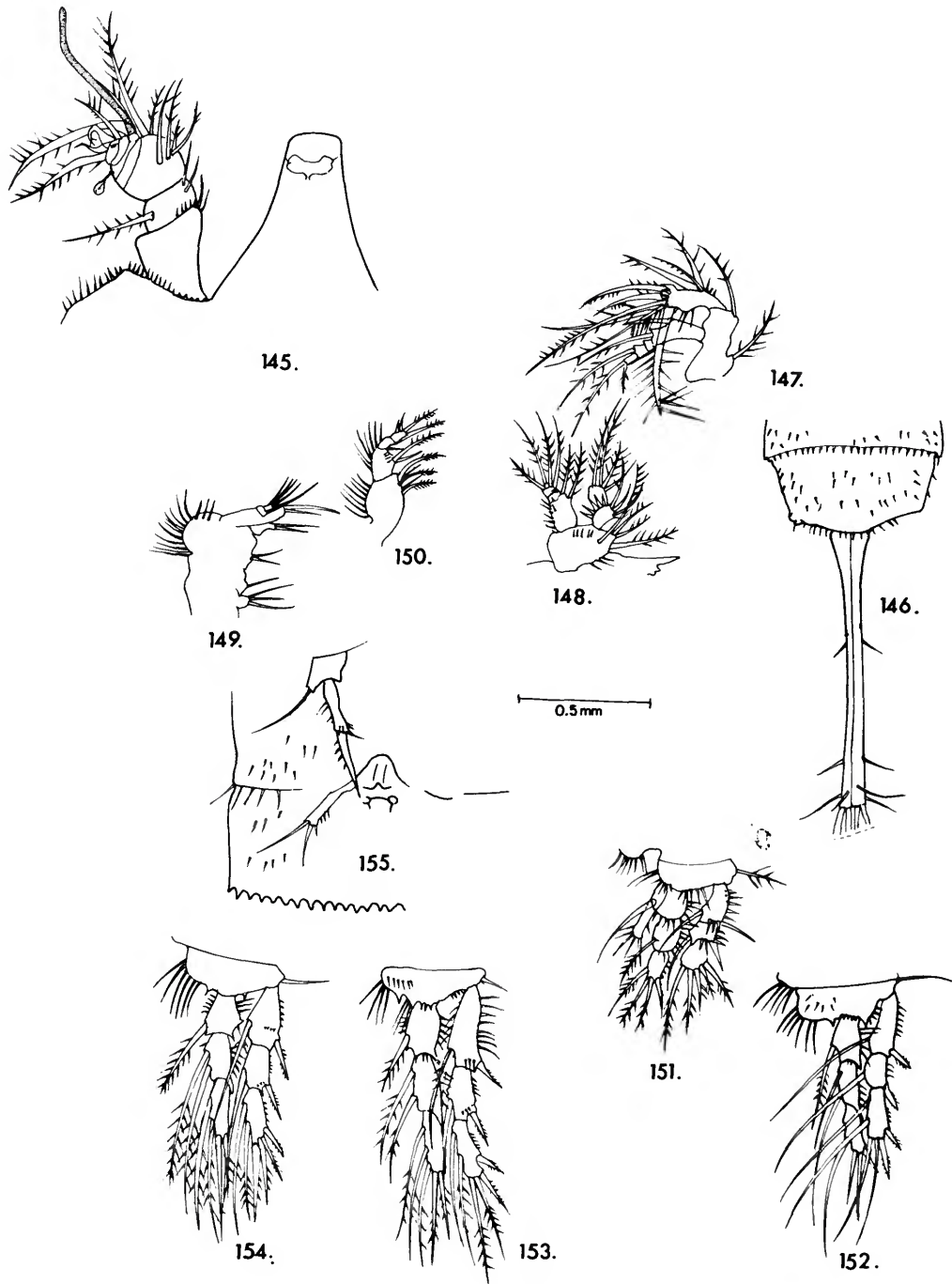
FIGURES 123-132.—*Cerviniella brodskayae*, new species, female: 123, antennula; 124, antenna; 125, mandible; 126, maxillula; 127, maxilla; 128, maxilliped; 129, PI; 130, PII; 131, PIII; 132, PIV.



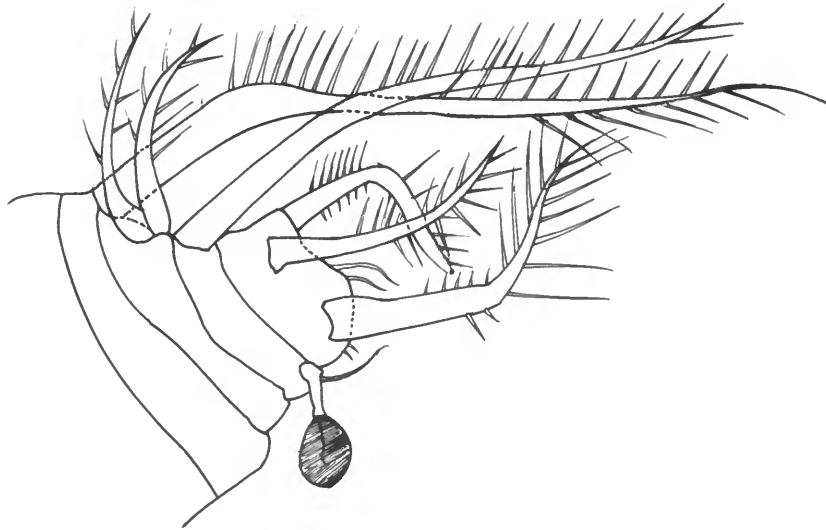
FIGURES 133-141.—*Cervinia tenuiseta* Brodskaya, female: 133, furcal branches, lateral view; 134 antennula and rostrum; 135, antenna; 136, mandible; 137, maxillula; 138, maxilla; 139, maxillipede; 140, PI; 141, PV and genital field.



FIGURES 142-144.—*Cervinia tenuiseta* Brodskaya, female; 142, PII; 143, PIII; 144, PIV.



FIGURES 145-155.—*Cerviniopsis obtusirostris* Brodskaya, female: 145, antennula and rostrum; 146, last abdominal segment and furca; 147, antenna; 148, mandible; 149, maxilla; 150, maxilliped; 151, PI; 152, PII; 153, PIII; 154, PIV; 155, PV and genital field.

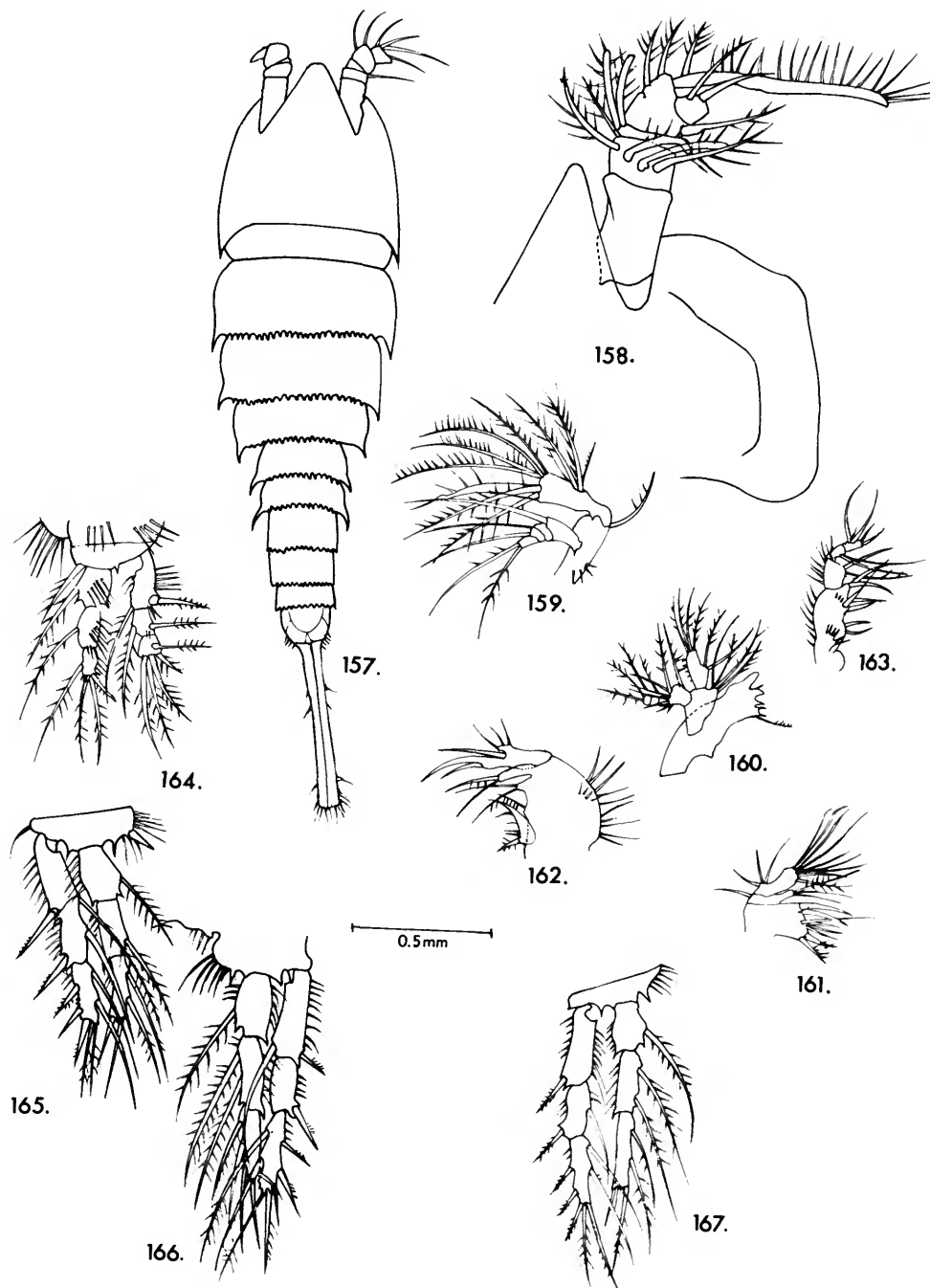


156.

0.05 mm

FIGURE 156.—*Cerviniopsis obtusirostris* Brodskaya, female: enlarged distal part of antennula with "Brodskaya organ."





FIGURES 157-167.—*Cerviniopsis smirnovi*, new species, female: 157, general habitus, dorsal view; 158, antennula, rostrum and cephalon; 159, antenna; 160, mandible; 161, maxillula; 162, maxilla; 163, maxilliped; 164, PI; 165, PII; 166, PIII; 167, PIV.

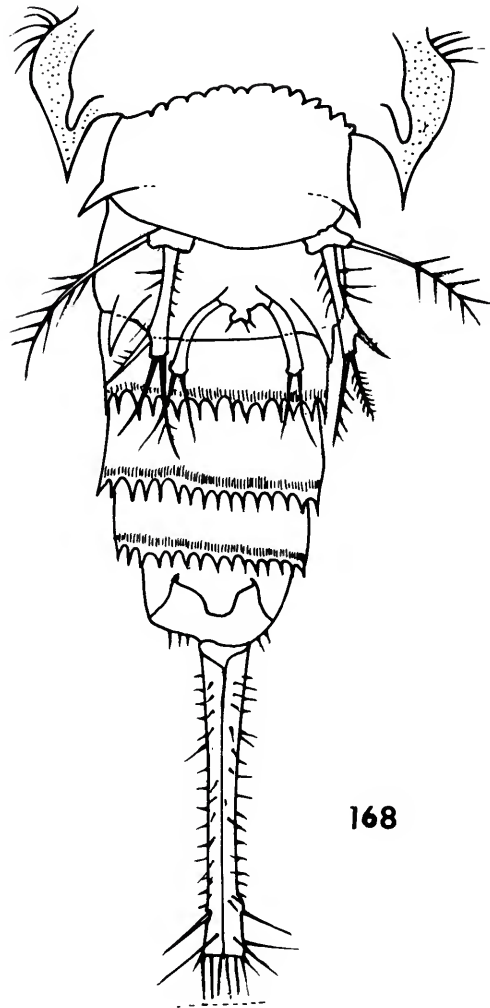


FIGURE 168.—*Cerviniopsis smirnovi*, new species, female: last thoracic segments, and abdomen in ventral view, with PV and genital field.

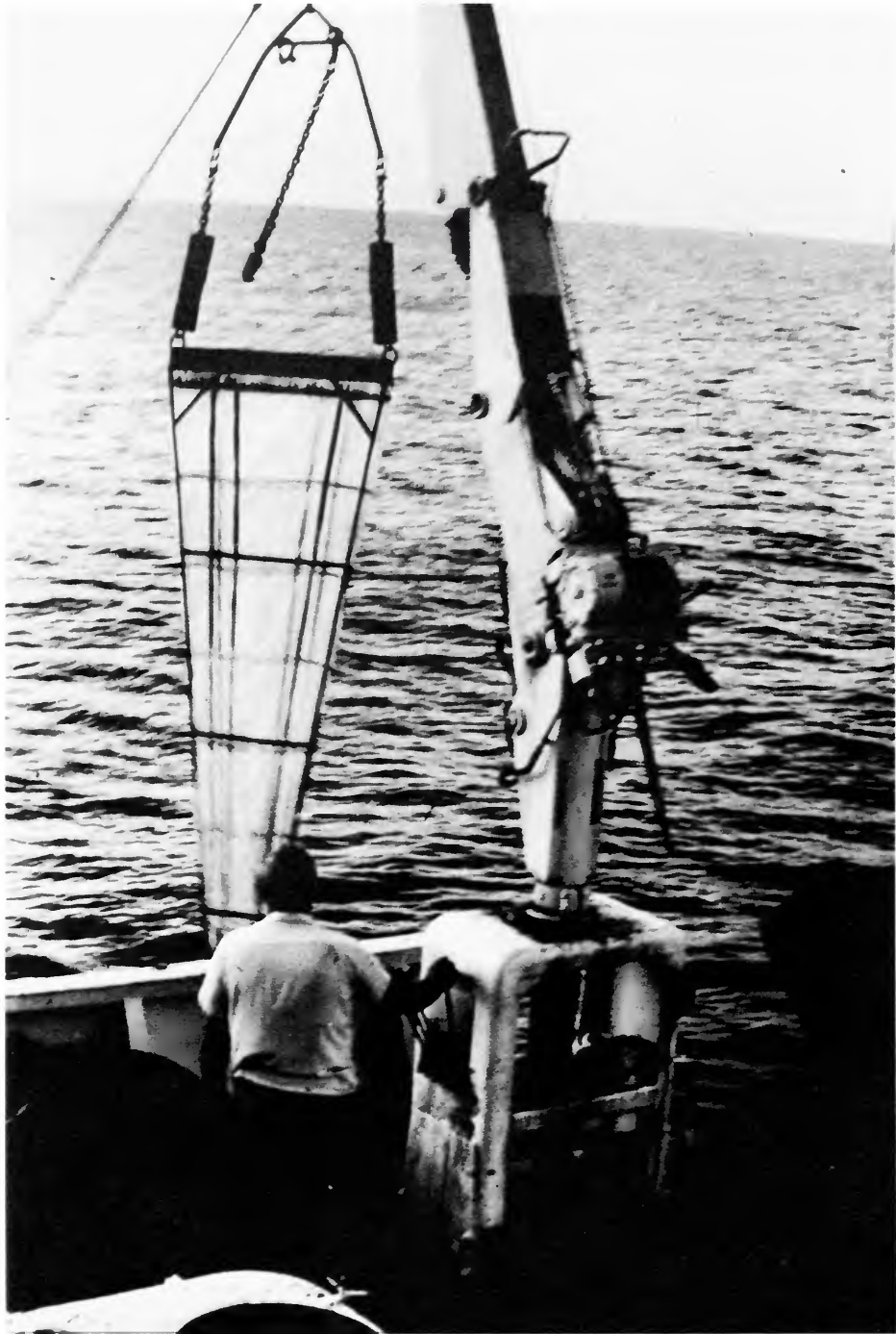


FIGURE 169.—The Menzies trawl being hauled on board *Anton Bruun*.

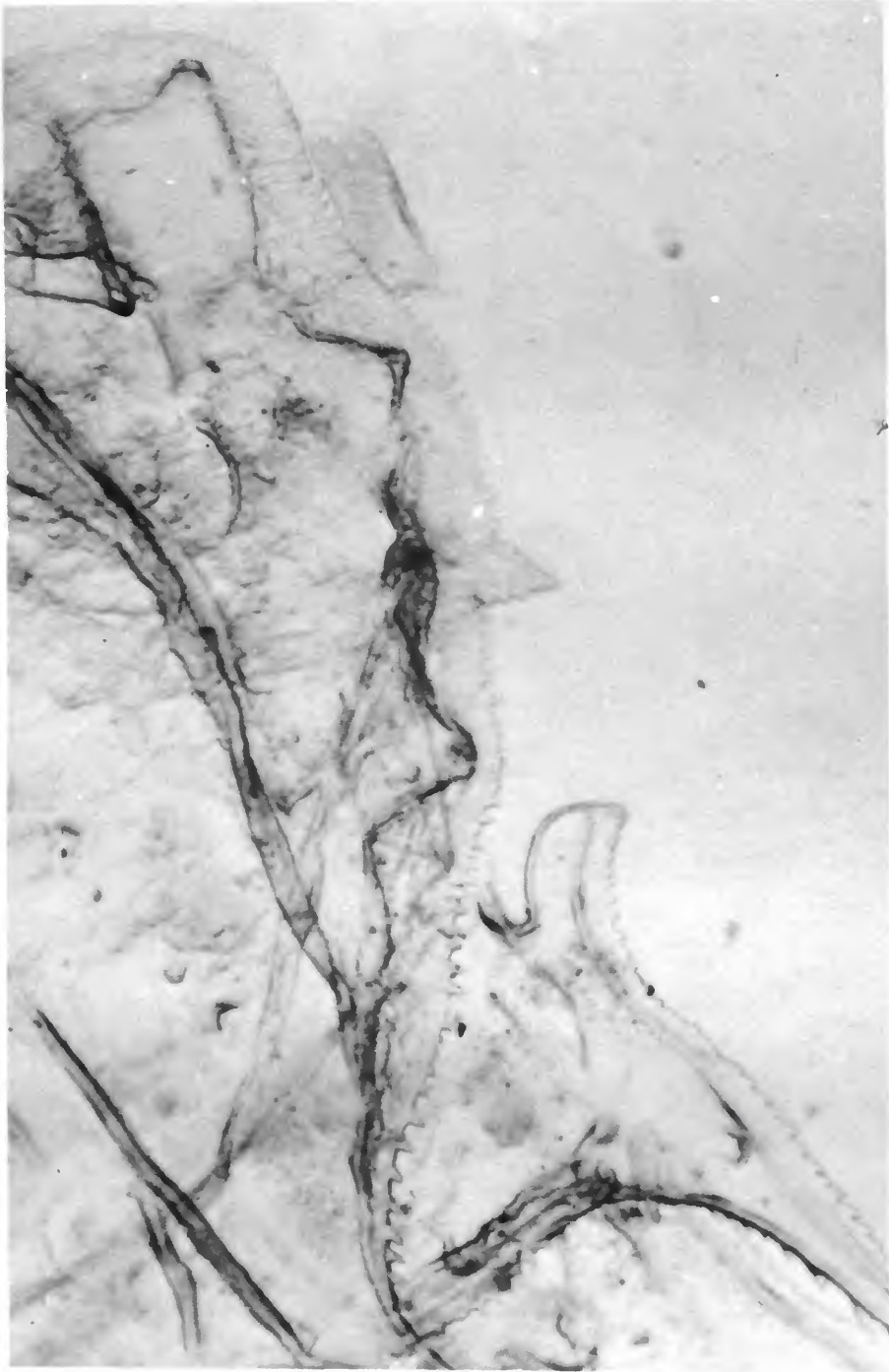


FIGURE 170.—*Pontostratiotes scotti* Brodskaya, retacula of cephalothorax and second thoracic segment.



FIGURE 171.—*Pontostratiotes glaber*, new species, retinacula of cephalothorax and of second thoracic segment.

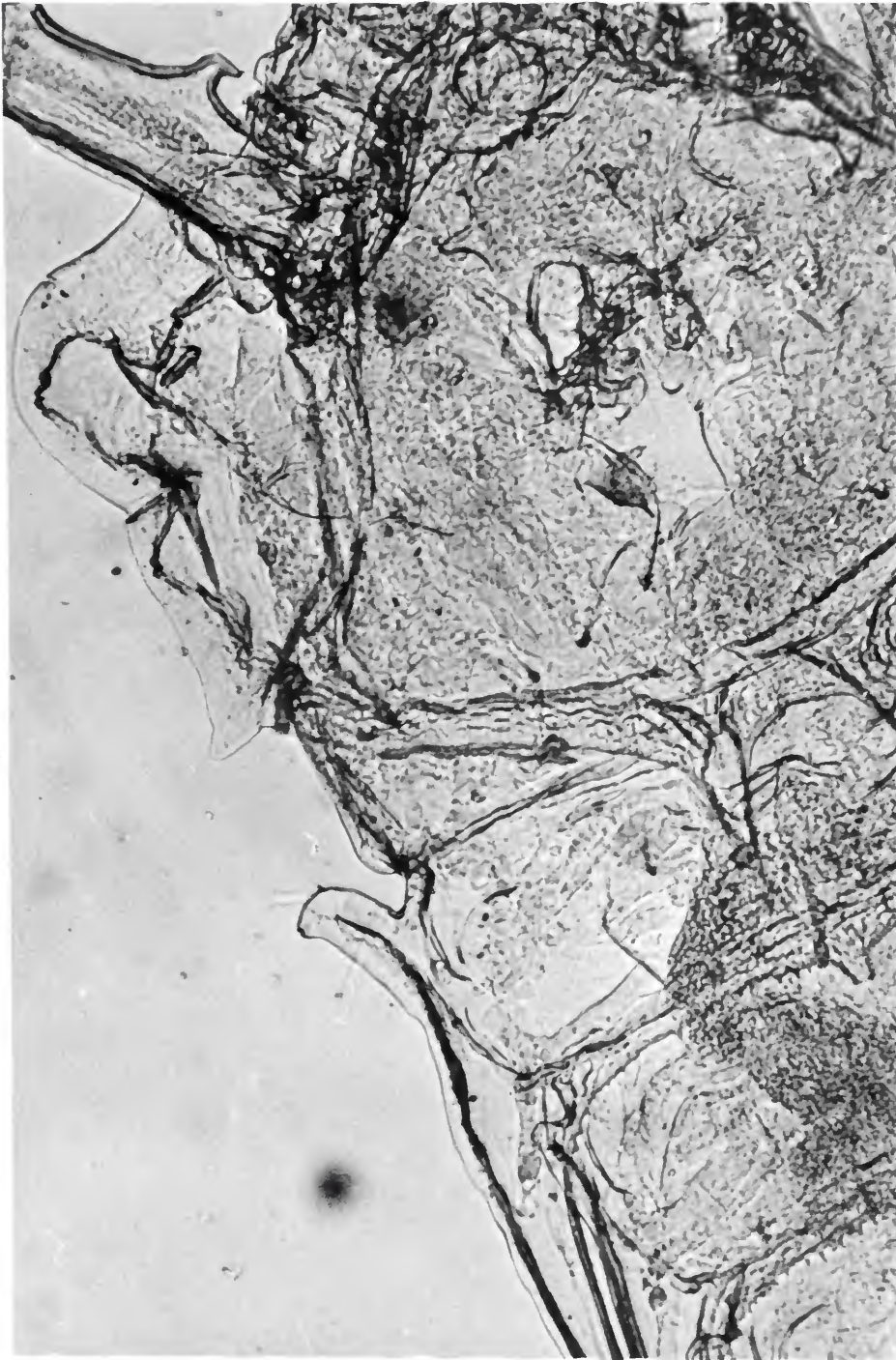


FIGURE 172.—*Pontostratiotes pubescens*, new species, retinacula of the cephalothorax and of second thoracic segment.



FIGURE 173.—*Pontostratiotes alatus*, new species, retinaculum and posterior edge of cephalothorax.



FIGURE 174. — *Pontostratiotes alatus*, new species, thoracic segments of female.



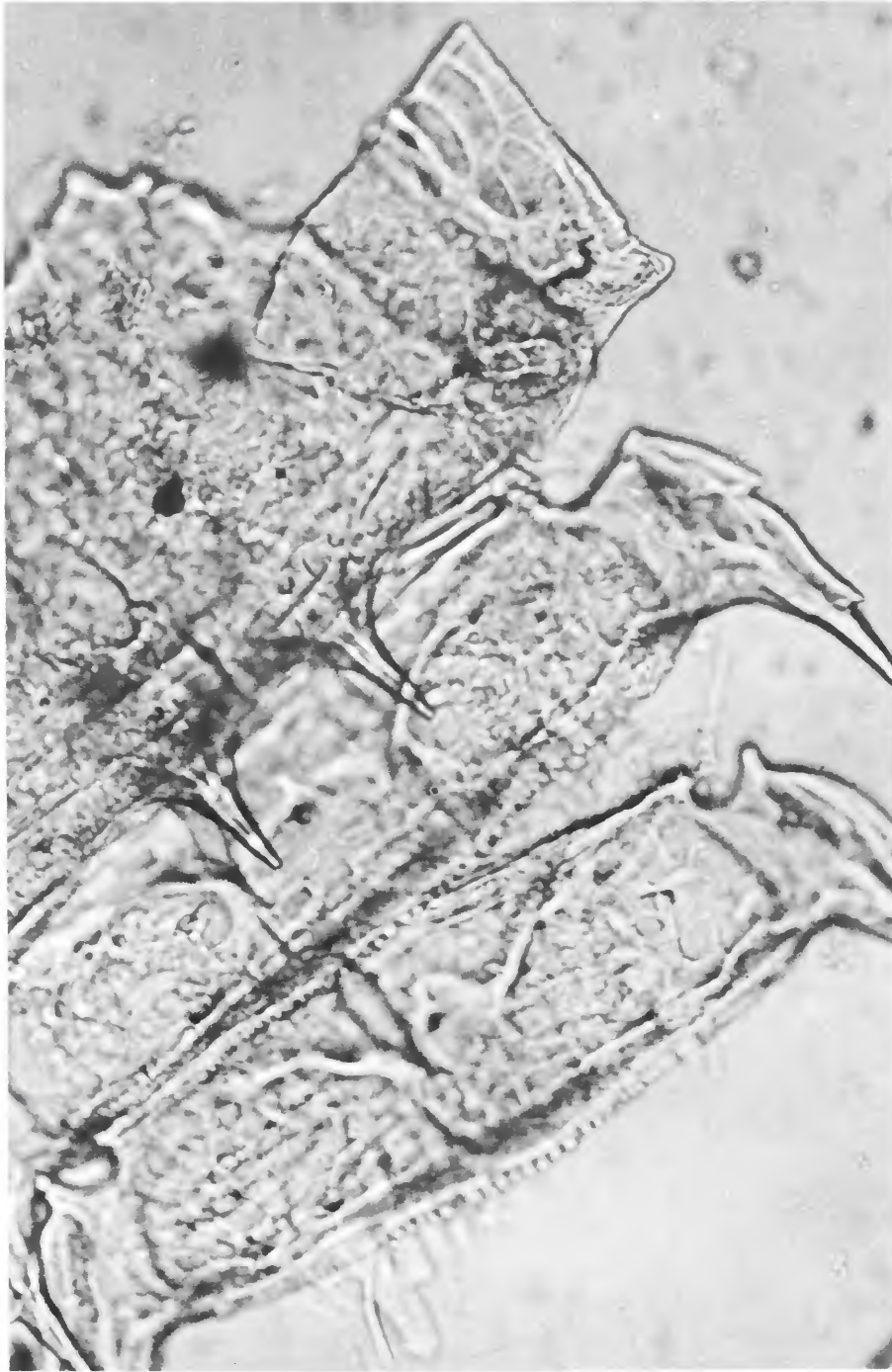


FIGURE 175.—*Pontostratiotes sixtorum*, new species, cephalothorax and first thoracic segments.

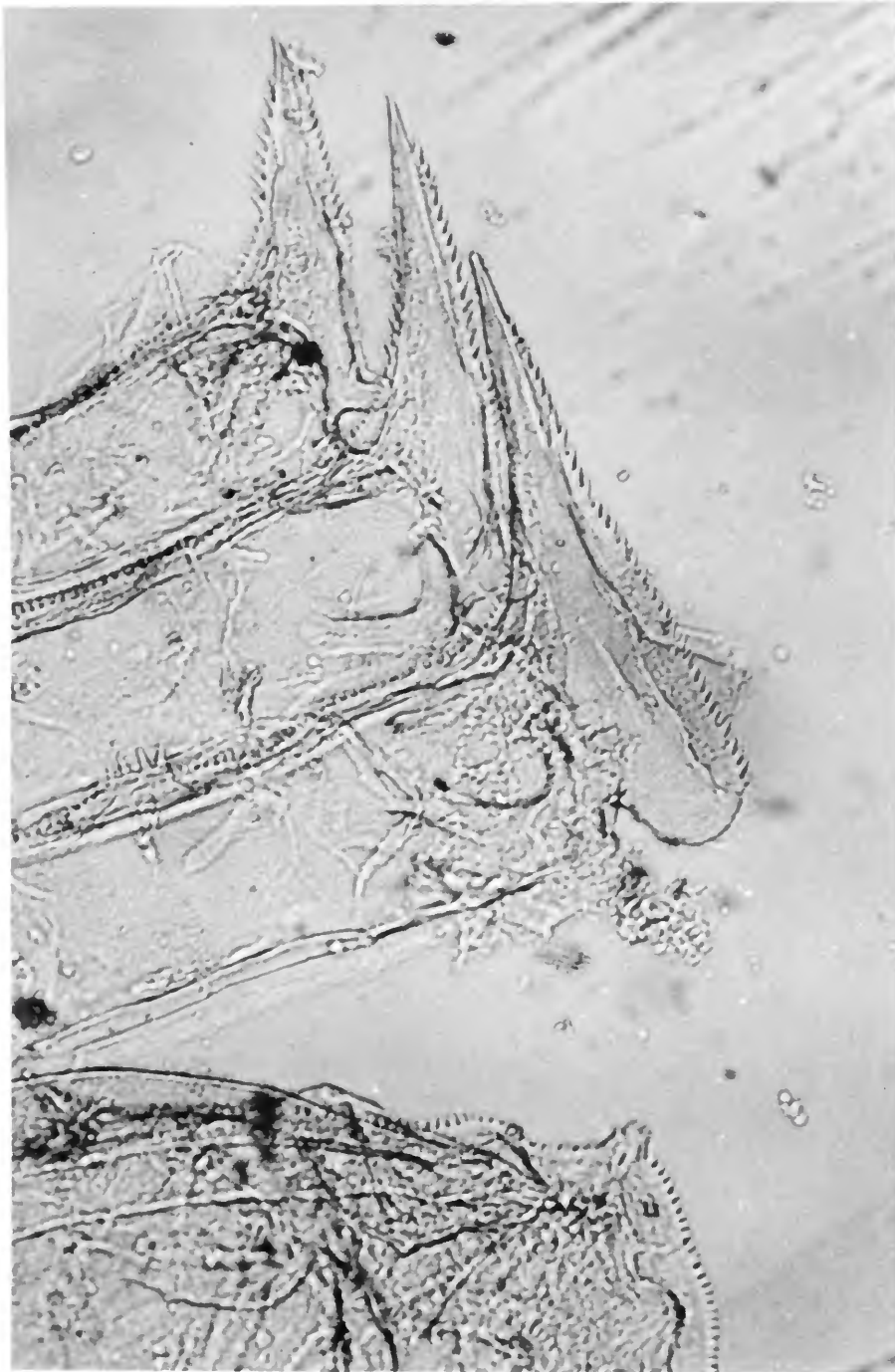


FIGURE 176.—*Pontostratiotes microserrulatus*, new species, retinacular edge of cephalothorax and thoracic segments.

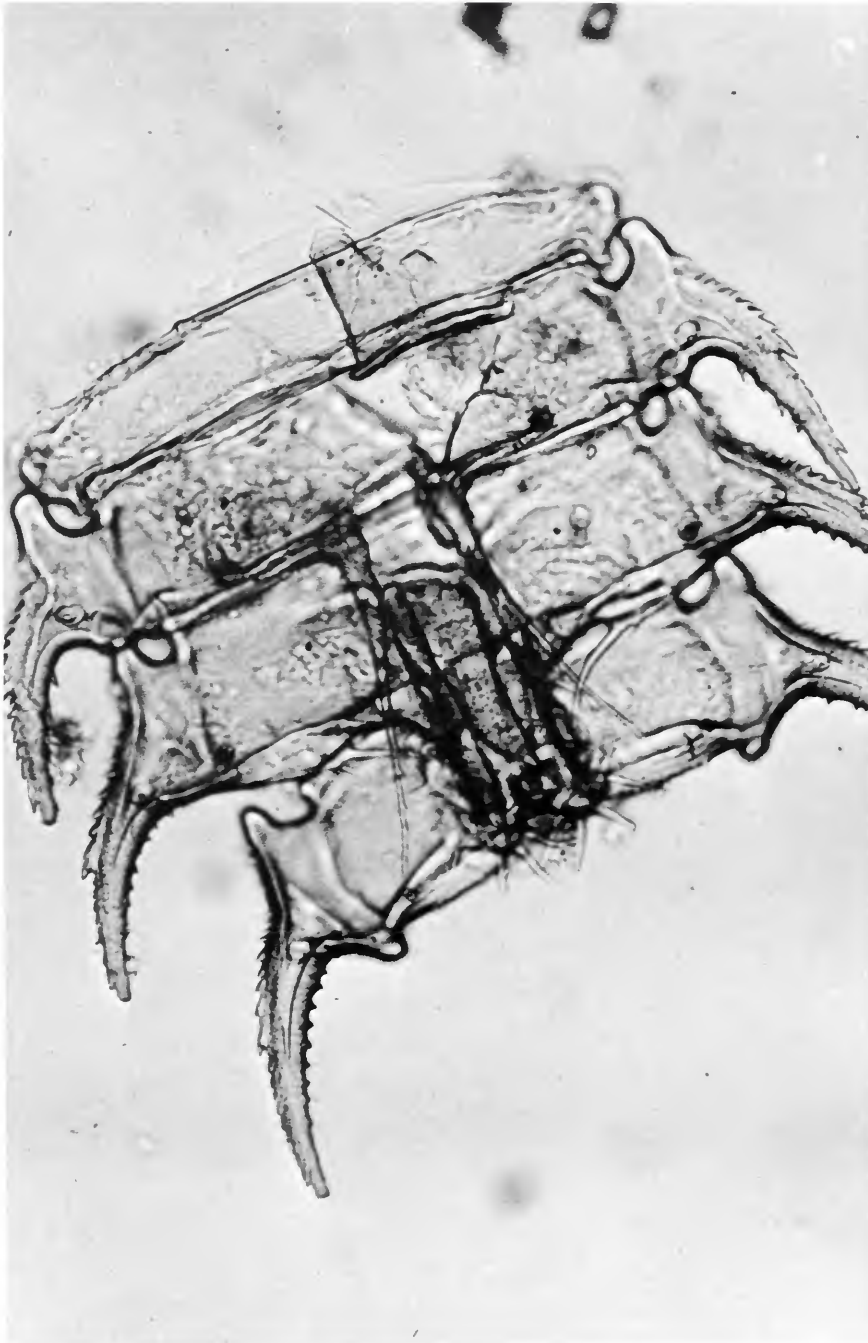


FIGURE 177.—*Pontostratiotes horrida* Brodskaya, first four thoracic segments.



FIGURE 178.—*Pontostratiotes sixtorum*, new species, PIV.

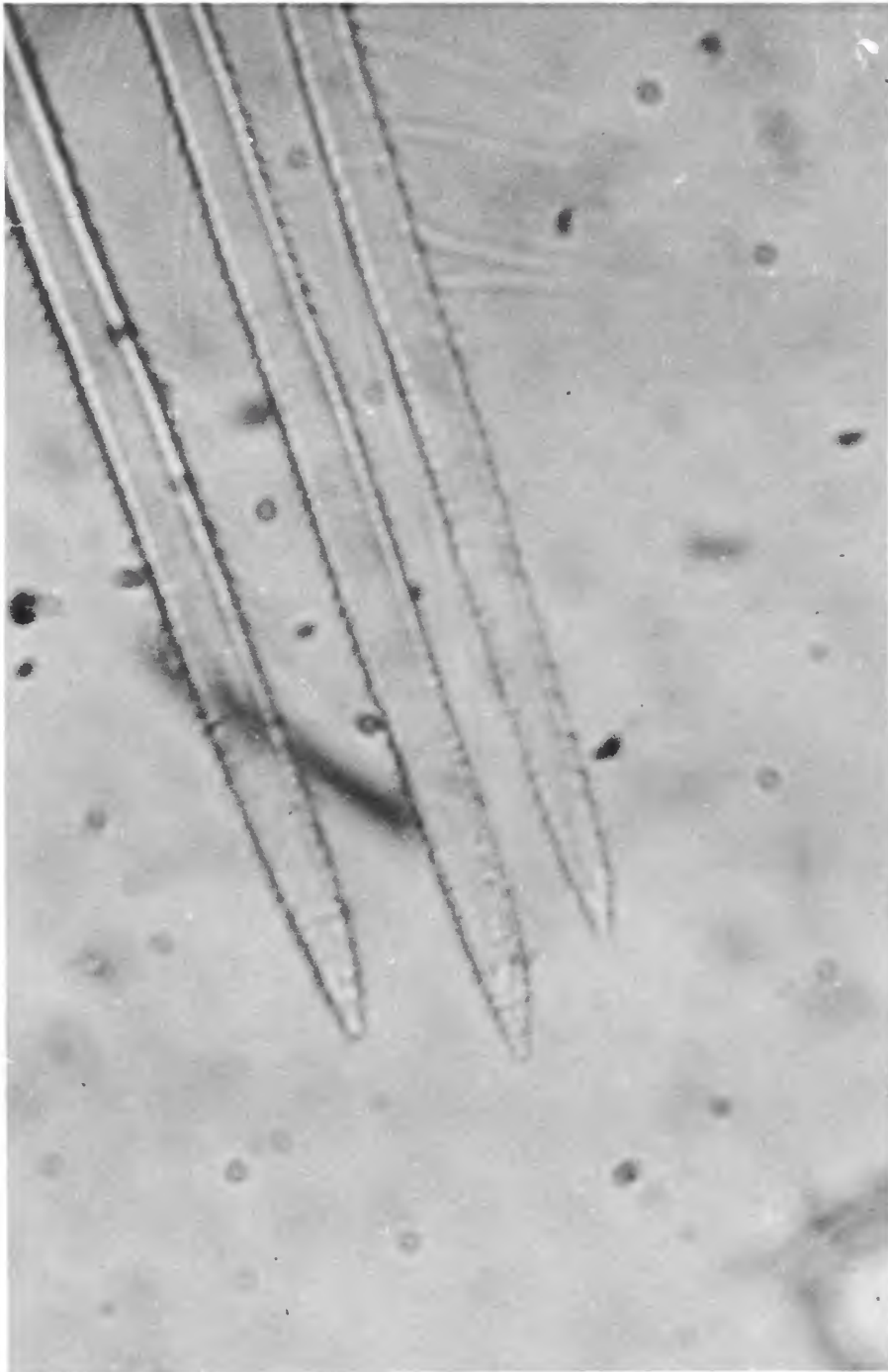


FIGURE 179.—*Pontostratiotes sixtorum*, new species, tips of rod-shaped setae on endopodite of PIV high magnification.

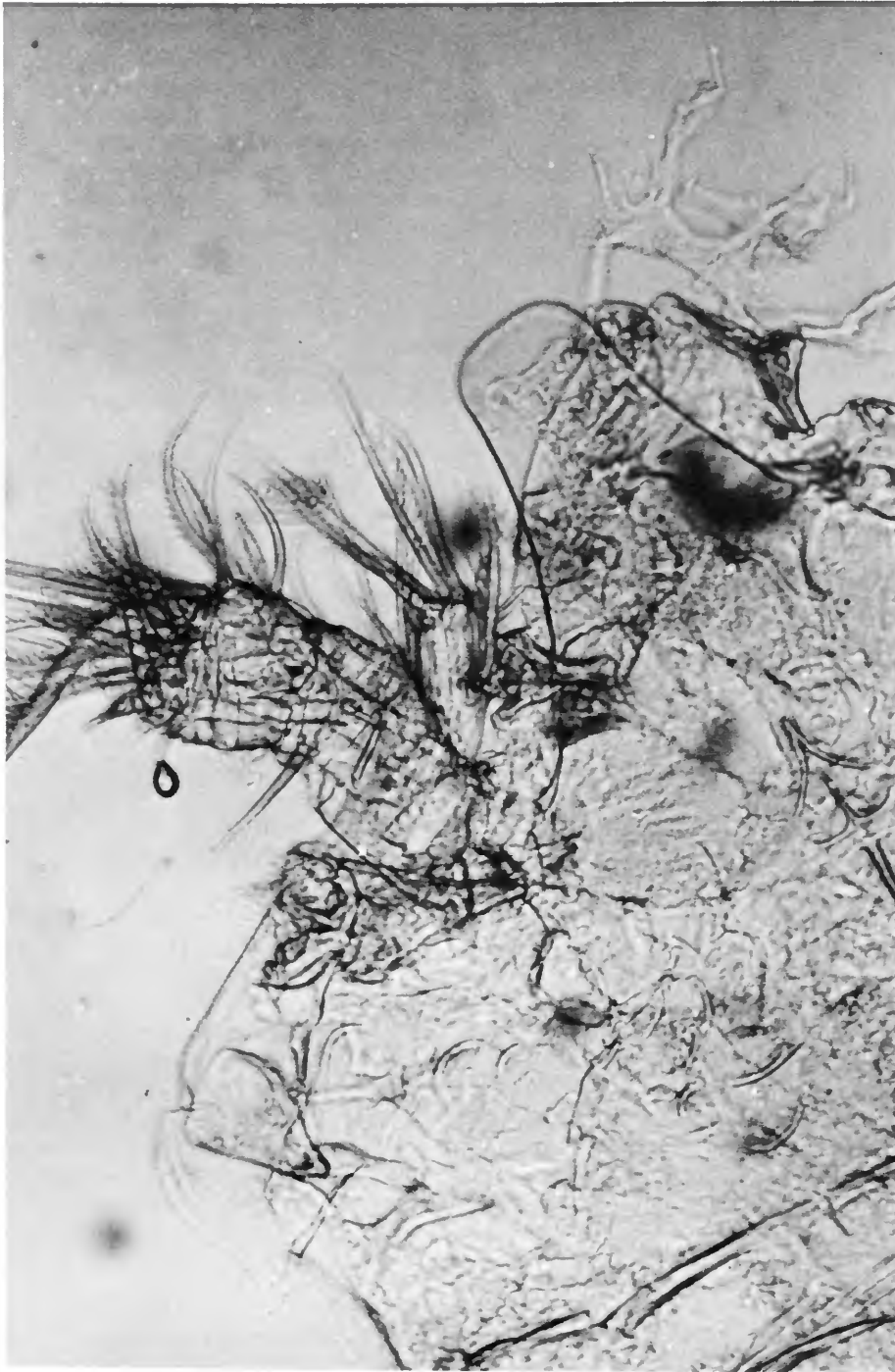


FIGURE 180.—*Cerviniopsis obtusirostris* Brodskaya, rostrum and antennula, left side.

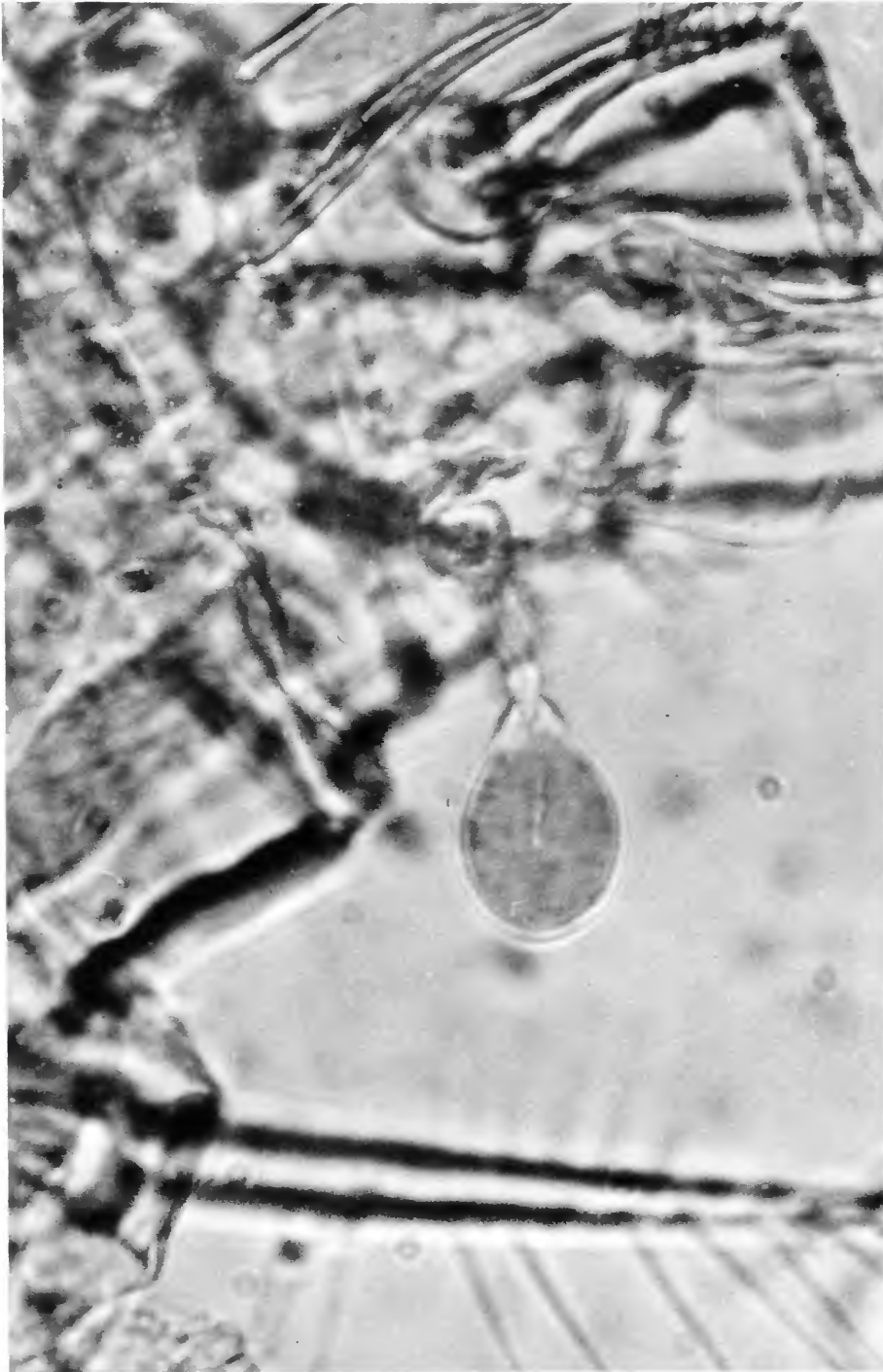


FIGURE 181.—*Cerviniopsis obtusirostris* Brodskaya, right antennula with "Brodskaya's organ."

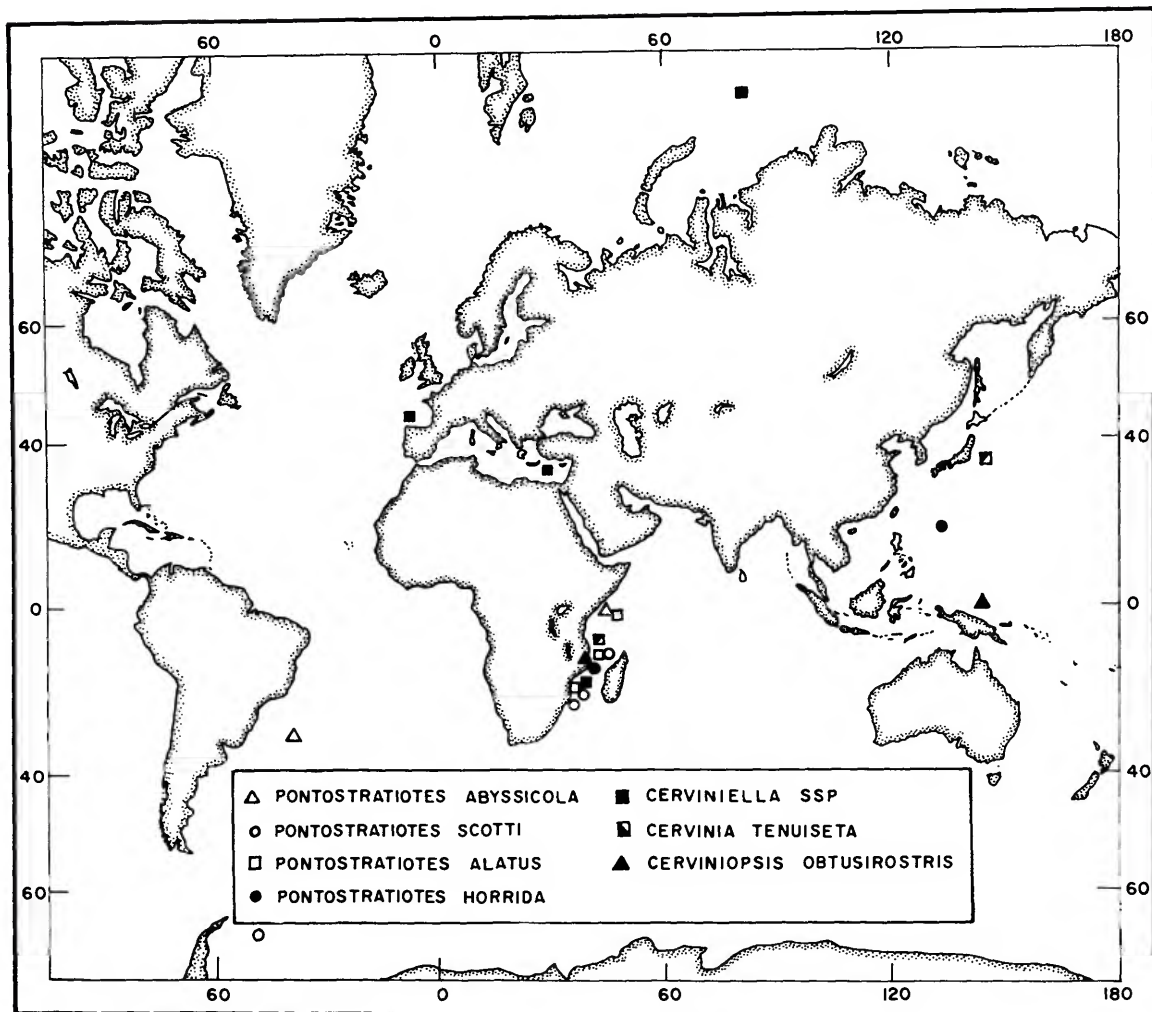


FIGURE 182.—Distribution map of some deep sea Cerviniidae.







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