# SPECIES OF *STORTHYNGURA* (ISOPODA) FROM THE ANTARCTIC WITH DESCRIPTIONS OF SIX NEW SPECIES [1])

BY

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## INTRODUCTION

Eighty-five specimens of the genus *Storthyngura,* collected by the USNS "Eltanin" in and around Antarctica from fourteen stations, form the basis for this study. The specimens were studied at the Duke University Marine Laboratory, Beaufort, North Carolina. Many specimens were received by the authors through the auspices of the Smithsonian Institution Oceanographic Sorting Center in Washington, D. C., and others from the Allan Hancock Foundation of the University of Southern California. Type specimens have been sent to the U. S. National Museum (U.S.N.M.). The identified specimens of the "Eltanin" collections have been sent to the Allan Hancock Foundation and the "Vema" specimens to the American Museum of Natural History. This work was supported through NSF Grant GA-520 as a project sponsored by United States Antarctic Research Program.

## HISTORICAL RÉSUMÉ

The genus *Storthyngura* was established by Vanhöffen (1914) based upon the Antarctic species *Storthyngura elegans* Vanhöffen. Although Vanhöffen assigned other species from other genera to his genus it is evident that his new species and the first one mentioned by him constitutes the type of the genus.

Vanhöffen (1914) assigned the following added species, which were formerly in *Eurycope,* to his genus: 1, *S. intermedia* (Beddard, 1885); 2, *S. novaezelandiae* (Beddard, 1885); 3, *S. atlantica* (Beddard, 1885); 4, *S. fragilis* (Beddard, 1885); 5, *S. caribbea* (Richardson, 1901); 6, *S. truncata* (Richardson, 1908); 7, *S. magnispinis* (Richardson, 1908).

Hansen (1916) added *Storthyngura pulchra* (Hansen, 1897) to the genus. Monod (1925) added a new species, *S. robustissima.* Wolff (1956) described two added species *S. benti* and *S. furcata* but he placed *S. caribbea* (Richardson) in synonomy with *S. pulchra* (Hansen, 1897). Wolff (1962) in response to cor-

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[1]) Contribution from the Department of Zoology, Duke University, Durham, North Carolina, and the Duke University Marine Laboratory, Beaufort, North Carolina.

respondence relating to his 1956 paper with the junior author, which suggested differences between *S. caribbea* and *S. pulchra,* established three subspecies of *S. pulchra,* namely *S. pulchra pulchra* (Hansen), *S. pulchra caribbea* Benedict and *S. pulchra kermadecensis* Wolff (1962). He also confirmed that Beddard had confused three species with his *Eurycope fragilis,* and restricted *S. fragilis* to the North Pacific specimen and described *S. challengeri* and *S. gordonae* as new species from the Indian Ocean and the Indian Antarctic, which were previously contained in Beddard's *S. fragilis.*

Birstein (1957) added six new species and one new subspecies to the genus as follows: 1, *S. chelata*; 2, *S. bicornis*; 3, *S. vitjazi*; 4, *S. herculea*; 5, *S. brachycephala*; 6, *S. tenuispinis tenuispinis*; 7, *S. tenuispinis kurilica.*

Menzies (1962) added the six following species: 1, *S. digitata*; 2, *S. triplispinosa*; 3, *S. symmetrica*; 4, *S. vemae*; 5, *S. birsteini*; 6, *S. snanoi.*

Wolff (1962) added two new species namely, *S. serrata* and *S. abyssalis.* The authors Menzies & George (in press) added two new species.

Our study herein adds six more species to the increasing list of species of *Storthyngura.*

## TAXONOMIC REVISION AT THE SPECIES LEVEL

Some comments are required regarding the assignment of subspecific designation to abyssal animals such as has been done by Wolff (1956, 1962) and Birstein (1957). The concept of subspecies implies interbreeding by populations of the parent species and hence genetic contact along some continuous geographic pathway. Cases in which a subspecies is geographically close to a related one (Birstein) seem more realistic than cases in which populations are separated by a land mass (Wolff, 1962). All instances, however, deserve re-examination because to date we lack extensive knowledge of the range of variation of a single population of deep-sea animals from a single location. This absence of knowledge leads to assumptions which may or may not be correct. We prefer to consider different morphological entities distinct species until it can be demonstrated by geographic proximity, variation studies, and biological interbreeding tests that they are equal.

The three subspecies established by Wolff (1962) are all geographically widely separated, e.g. *S. pulchra pulchra,* abyssal depths of eastern Pacific Ocean off Central America; *S. pulchra caribbea* Richardson (not Benedict), bathyal depths in the Caribbean, and *S. pulchra kermadecensis* Wolff, trench depth southwestern Pacific Ocean. In addition decided morphologic differences exist as follows:

| | *S. p. pulchra* | *S. p. caribbea* | *S. p. kermadecensis* |
|---|---|---|---|
| 1. number of spines on dorsum of cephalon | 3 | 1 | 0 |
| 2. number of middorsal spines on first peraeonite | 1 | 0 | 0 |
| 3. direction of posterolateral spines of pleotelson | caudad | straight | caudad |

The subspecies of *S. tenuispinis* established by Birstein are geographically near one another but show decided difference in the morphology of the pleotelson. Thus the pleotelson of *S. tenuispinis tenuispinis* has only two pairs of lateral spines; whereas, that of *S. tenuispinis kurilica* has three pairs of lateral spines. We consider these differences significant and treat these as distinct species.

Wolff (1956) transferred *E. spinosa* Beddard, 1885, to the genus *Storthyngura.* Beddard (1886) had described *E. spinosa* on the basis of a single mutilated female without the pleon and posterior 3 peraeonal somites. His illustrations (pl. 10, pp. 6, 7) of dorsal and lateral view do not agree since the two long spines on the cephalon are anteriorly located at the base of antennae in dorsal view, but they are shown emerging from the posterior margin of cephalon in the lateral view. One spine on the first somite, shown in dorsal view, is missing in the lateral view. Wolff (1956) who examined the type, reported that the side view is nearly correct but also pointed out a few mistakes such as the absence of spines on the second article of the second antenna and presence of three spines on the third article. In the generic diagnosis elaborated in the present study, the most important characteristics appear to be the produced lateral margin of the posterior three peraeonal somites and pleonal configuration. The absence of these parts from the only fragment of *E. spinosa* makes it impossible to include this under *Storthyngura.* The presence of dorsal spines on the body more or less comparable to those on *S. triplispinosa* Menzies (1962) may or may not necessarily be a generic characteristic of *Storthyngura* because there are certain species which lack such spines on the cephalon and peraeon. Further, the presence of triangular forward directed coxal plates on the anterior four peraeonal somites are not found in *E. spinosa.* In view of this state of knowledge, Wolff's placement of *E. spinosa* does not appear justified. This problem should await further clarification when entire specimens of the species in question become available for study.

## **Storthyngura** Vanhöffen (fig. 1)

Type species. — *Storthyngura elegans* Vanhöffen, 1914.

Generic characterization (numbers refer to numbers on fig. 1). — Cephalon wider than long, lacking lateral expansion or spines (1); invariably with a median frontal projection in between the antennae (2); eyes always absent (3).

All peraeonal somites wider than long (4), anterior four somites of more or less the same width (5), always fully separated and loosely articulated (6), first somite never fused with cephalon (7). Posterior three peraeonal somites with a concave posterior margin (8), lateral margins produced into a spine-like process (9), somites 5 to 7 tightly articulated or fused as a unit of chevrons (10).

Coxal plates on peraeonal somites 2 to 4 dorsally visible (11), always bilobed (12), and triangular and directed forward (13).

Pleon longer than wide (14), ventrally with a terminal well-defined anal cavity outside branchial chamber (15).

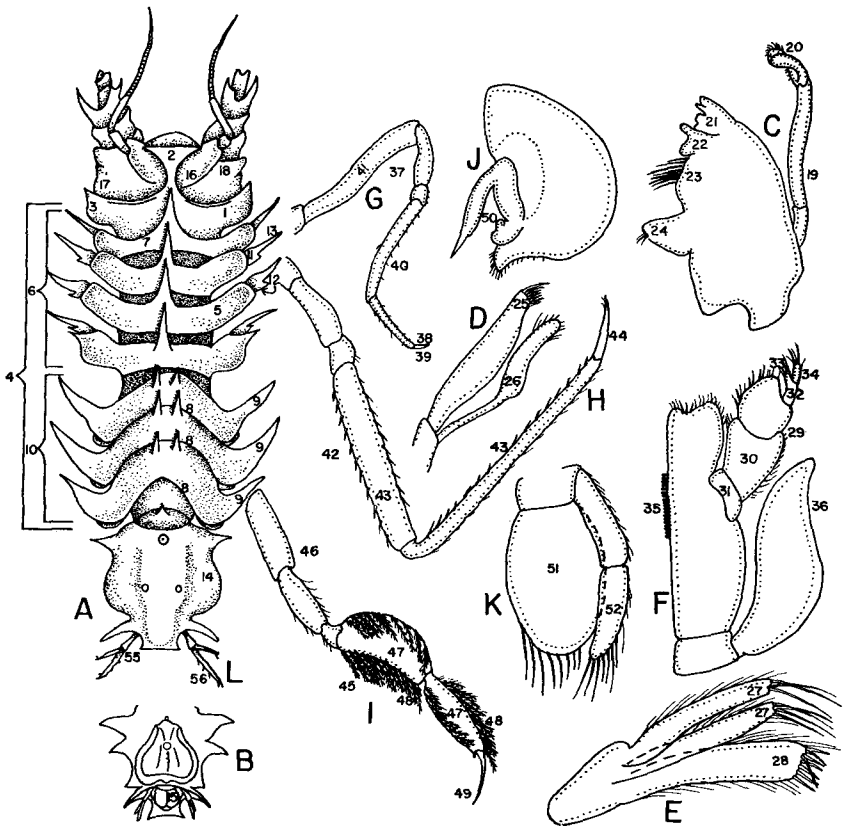


Fig. 1. A generalized species of *Storthyngura*. A, dorsal view of whole animal; B, ventral view of pleotelson; C, mandible; D, first maxilla; E, second maxilla; F, maxilliped; G, first peraeopod; H, second peraeopod; I, seventh peraeopod; J, second male pleopod; K, third pleopod; L, uropod (A, G, I, K, and L drawn from *S. tenuispinis* Birstein; B and H, from *S. tenuispinis kurilica* Birstein; C and F, from *S. abyssalis* Wolff; D and E, from *S. sepigia* George & Menzies; J, from *S. bicornis* Birstein).

First antennae dorsally inserted, with a broad basal article (16). Second antennae with stout proximal articles having lateral margin almost contiguous with lateral border of cephalon (17), and occupying lateral area on either side of frontal projection of cephalon (18). Mandible with triarticulate palp (19); terminal article of palp genuiflexed, shorter than the elongate middle article (20), incisor toothed (21); movable lacinia present (22); setal row well-developed (23), and molar stout, tapering (24). First maxilla with outer ramus, distal edge furnished with spines (25), inner ramus with a narrow proximal half and broad distal half having apical setae (26). Second maxilla with two narrow outer lobes bearing 3 to 5 stout distal setae (27) and an inner ramus, about five times as long as wide; distal edge with many spine-like setae (28). Maxilliped with palp pentarticulate (29), first three articles expanded, nearly as broad as endite (30), basal article

very short (31), penultimate article narrow (32), inner distal angle of article produced (33); terminal article narrow and short (34), maxilliped endite with many coupling hooks (35) and epipod with concave outer distal margin (36).

First peraeopod prehensile, shorter and narrower than other peraeopods (37), dactyl very short (38), lacking claw (39); carpus longer than merus and ischium combined (40); basis elongate (41). Peraeopods 2 to 4 walking legs, slender, nearly twice the length of first peraeopod (42), both propodus and carpus much elongated (43), dactyl about one fourth the length of propodus (44). Peraeopods 5 to 7 natatory, shorter than peraeopods 2 to 4 (45), subequal, and slightly longer than first peraeopod (46), both propodus and carpus somewhat dilated (47) and fringed with marginal plumose setae (48) and dactyl slender with distal tip sharp (49).

Second male pleopod with a short stout copulatory organ emerging slightly above the inner distal angle of sympod (50). Third pleopod with an oblong endopod (51), and a narrow bi-articulate exopod bearing distal setae (52). Fourth and fifth pleopods with broad endopod having convex outer margin (53) and narrow exopod with concave inner margin for enclosing outer part of endopod (54). Uropod biramous (55) with endopod much longer and slightly broader than exopod, both having distal setae (56). A generalized "species" of *Storthyngura* having the above 56 characteristics is shown on fig. 1.

### **Storthyngura falcata** n. sp. (fig. 2)

Diagnosis. — *Storthyngura* with cephalon having convergent lateral margins posteriorly and a pair of widely separated dorsal spines. Peraeonal somites 1 to 4 each with a median spine; fifth somite with a pair of stout spines and an additional conical spine inbetween at the midline; somites 6 and 7 each with only a pair of dorsal spines. First pleonal somite with a median spine. Pleotelson with rounded bulging anterolateral angles and two short triangulate lateral spines; dorsum with two anterior median spines in a row and a pair of smaller posterior spines, caudad of these; entire surface having minute granules. Pleonal apex pointed, and curved upwards. First antenna with a conical spine on inner margin of the broad basal article. First article of second antenna with a spine on outer distal angle and second article with a stout long spine on inner distal angle.

Measurements. — Holotype male, length 30 mm, width 12 mm.

Type locality. — Western Scotia Sea, Eltanin Cruise 5, Sta. 268-25, 20 October, 1962; 64°01.2′-64°07.8′S 67°44.7′-67°44.3′W; 2816-2761 meters; 2020-2350 hrs; 1 ♂ (U.S.N.M. cat. no. 120541).

Distribution. — In addition to the holotype, a specimen was found at Western Scotia Sea, Eltanin Cruise 9, Sta. 722-32; 8 September 1963; 56°04′-56°00′S 33°58.9′-33°56.5′W; 3136-3237 meters; 0115-0435 hrs; one specimen (damaged, sex undeterminable, pleopods missing), length 36 mm, width 16 mm.

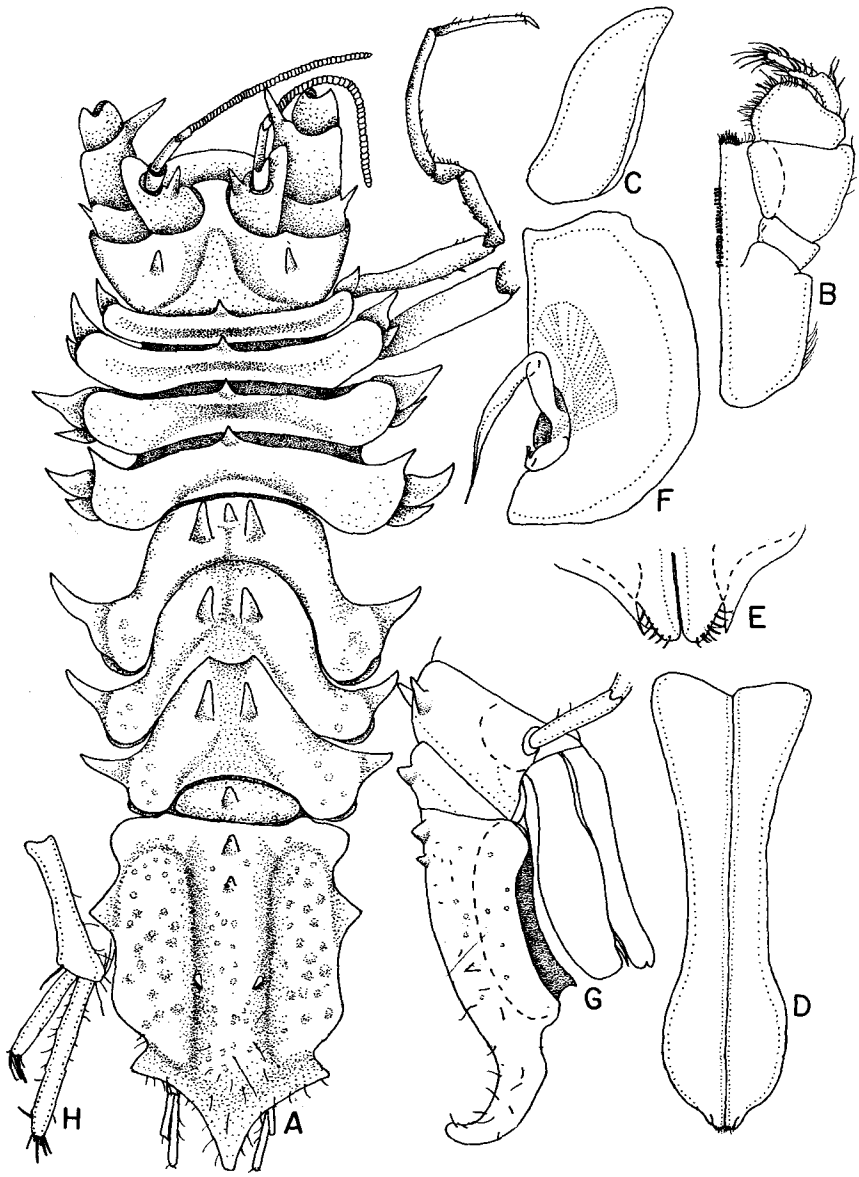


Fig. 2. *Storthyngura falcata* n. sp., holotype male, length 30 mm. A, dorsal view; B, maxilliped; C, epipod of maxilliped; D-E, first pleopod; F, second pleopod; G, lateral view of pleon; H, uropod.

Affinities. — The presence of three dorsal spines on fifth peraeonal somite makes this species unique in the genus.

Additional descriptive notes. — General body form nearly three times as long as broad. Median frontal projection less than one-half the width of basal article

of first antenna. Dorsal spines separated by more than half the width of the cephalon. Both antero- and posterolateral angles of somites 1 to 3 rounded and only anterolateral angle of fourth somite acutely produced. Coxal plates of somites 1 to 4 large and triangular; all bilobed except that of first somite.

Fifth to seventh peraeonal somites arranged in the characteristic chevron pattern of tightly articulated somites, each with a pair of stout conical spines on either side of midline. Lateral margin of fifth somite produced forward, coxal plates visible at the rounded posterolateral angles. Articles of flagellum of first antenna annulate. Pleotelson longer than posterior three peraeonal somites combined. Anterolateral angles rounded, slightly bulging.

The microscopic examination of oral appendages (mandible, first and second maxilla, maxilliped) indicates the common pattern of shape and structure typical of the genus. Variations of these mouth parts between species are scarce and those such as the number of coupling hooks in maxilliped endite, ranging from a minimum of 7 to a maximum of 25 in this species could probably be attributed to ontogenetic change.

First peraeopod slender and shorter, compared to the other peraeopods, propodus two-thirds as long as carpus, dactyl short.

Male pleopod one narrower at the middle, apex with outer sharply pointed lobes and inner rounded setiferous lobe. Ventral surface with a furrow to accomodate the well-developed copulatory organ of second pleopod. The outer margin of second male pleopod lacking setae and inner distal angle blunt. Uropod with basis widest distally, exopod as broad as endopod, nearly two-thirds the length of endopod.

### **Storthyngura sepigia** n. sp. (figs. 3, 4)

Diagnosis. — *Storthyngura* with cephalon lacking dorsal spines. Peraeonal somites 1 to 4 each with a median dorsal spine at anterior margin, somites 5 to 7 with a pair of dorsal spines. First short pleonal somite lacking dorsal spine. Pleotelson with two sharp lateral spines and dorsally with an anterior median spine followed by two rounded median processes, on midline posteriorly with a pair of dorsal spines. Pleonal apex medially incised. Uropodal exopod about the same width of endopod and more than one half the length of endopod.

Measurements. — Holotype male, length 42 mm, width 20 mm.

Type locality. — Off South Sandwich Islands, Eltanin Cr. 8, Sta. 591; 29 April 1963; 55°07.2′-55°10′S 25°58.8′-25°55.3′W; 5431-5449 meters; 0320-0940 hrs; 1 ♂ plus three fragments (U.S.N.M. cat. no. 120542).

Distribution. — Known only from type locality.

Affinities. — This species is somewhat allied to *S. brachycephala* Birstein, both species having a medially incised pleonal apex, lacking spines on cephalon and similar number of spines on peraeonal somites. However the present species differs from *S. brachycephala* in having uropods extending much beyond the

pleonal apex and having the proximal articles of second antenna lacking spines, coxal plates devoid of setae and median spines of peraeonal somites 5 to 7 conical and not long and directed caudad as in *S. brachycephala.*

Additional descriptive notes. — General body form two times as long as wide. Median frontal projection about as wide as basal article of first antenna.

First two somites of peraeon have both the antero- and posterolateral angles rounded, third and fourth somites with anterolateral angles acute. Third somite longest of the first four somites. Coxal plates of peraeonal somites 1 to 4 are all bilobed.

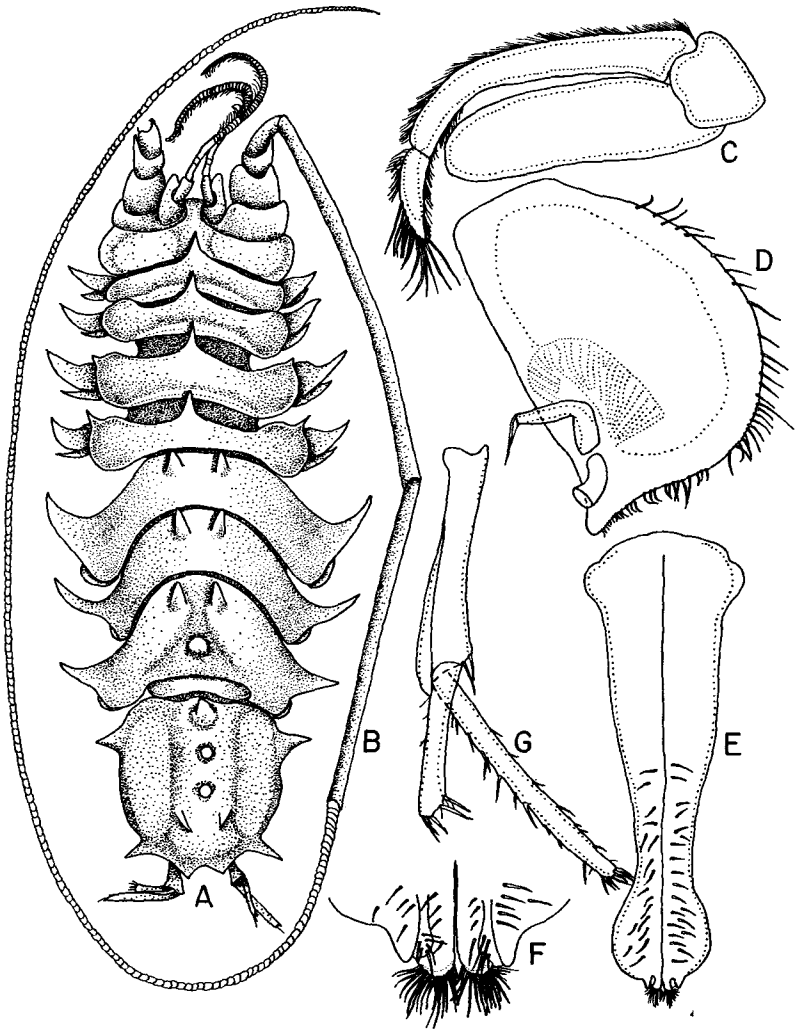


Fig. 3. *Storthyngura sepigia* n. sp., holotype male, length 42 mm. A, dorsal view; B, second antenna; C, third pleopod; D, second male pleopod E-F, first male pleopod; G, uropod.

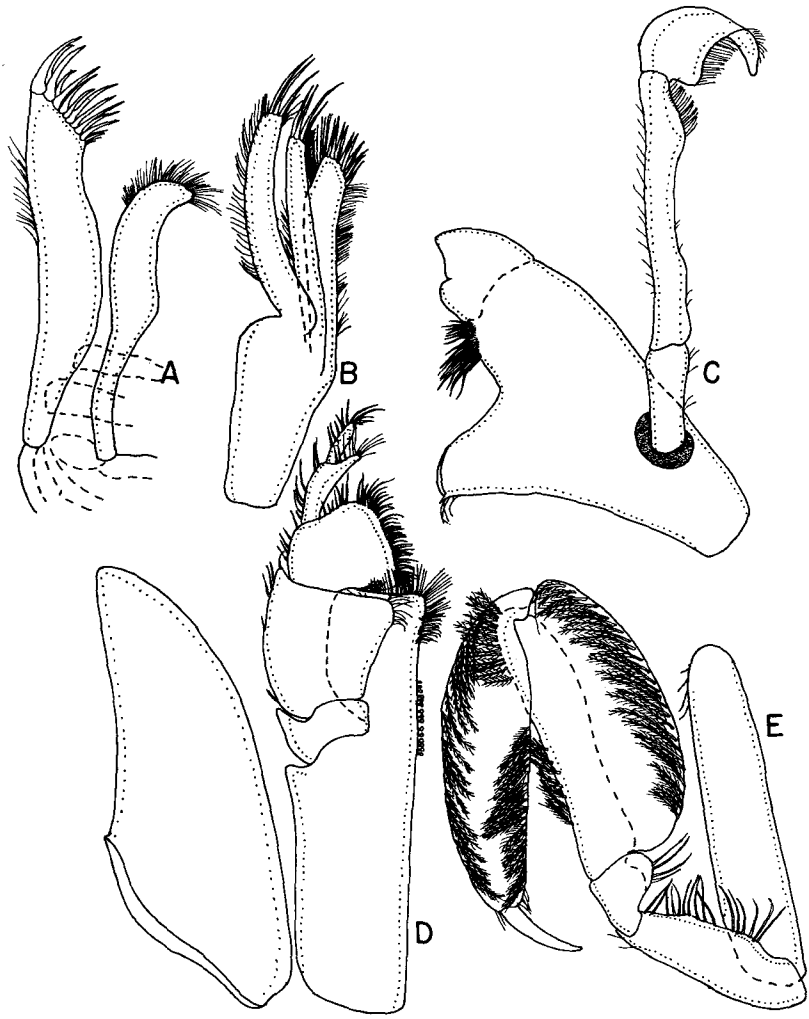


Fig. 4. *Storthyngura sepigia* n. sp., holotype male. A, first maxilla; B, second maxilla; C, mandible; D, maxilliped; E, seventh peraeopod.

Fifth to seventh peraeonal somites arranged in a closely articulated chevron pattern, lateral margin produced and directed forward. Anteriorly each somite with a pair of conical dorsal spines on either side of midline. Seventh somite nearly as long as two preceding somites together and with a posterior median blunt rounded tubercle in addition to the pair of anterior spines. Semi-circular coxal plates visible at posterolateral angles of 5 to 7 somites.

The short disc-like first pleonal somite lacking dorsal spine.

*First antenna with a stout basal article, twice as long as wide;* flagellum composed of numerous annulate articles. Second antenna more than two-times the body length. Proximal four articles lacking spines, fifth and sixth elongate;

flagellum consisting of more than a hundred articles. Mandibular incisor toothed, setal row with about fifteen setae, molar stout, with a spine and a few setae on lower distal edge. Palp triarticulate, second article nearly three times the length of first. Terminal article genuiflexed as is characteristic of the genus in general. Entire inner margin of third article and inner distal margin of second article with a regular row of closely arranged setae. First maxilla with exopodite bearing about 12 stout distal spines, endopodite with a narrow proximal part and broad distal half apically rounded, bearing dense setae. Second maxilla with the two slender long outer lobes bearing 3 to 5 distal setae and an equally long and slightly broader inner ramus with about 10 distal spine-like setae. Maxilliped typical of the genus.

Seventh peraeopod with broad flattened propodus and carpus both having plumose setae along margin, dactyl short.

Male first pleopod wide at base, narrower at the middle and distally broad; apex with a pair of tapering blunt outer lobes and rounded inner lobes bearing short setae. Second male pleopod with a well-developed copulatory process which has strong muscles at its base; inner distal angle blunt, outer margin with short setae. Uropod basis slightly shorter than endopod, exopod nearly as broad as endopod and more than half its length.

### **Storthyngura scotia** n. sp. (figs. 5, 6)

Diagnosis. — *Storthyngura* with cephalon lacking dorsal spines, lateral borders convex. Peraeonal somites 2 to 4 each with one median dorsal spine on anterior margins, somites 5 to 7 with a pair of dorsal spines. Anterior flat pleonal somite present, lacking dorsal spines. Pleotelson with two pairs of lateral spines, both directed forward. Dorsum with an anterior median spine and a pair of small spine-like tubercles close to midline of posterior one-third. Pleonal apex round, median part produced, bearing sharp marginal tubercles. Second article of second antenna with a small spine at the outer distal angle. Dactyl of first peraeopod less than one-fifth the length of propodus. Basis of uropod distally broad and as long as endopod. Uropodal exopod more than two-thirds the length of endopod.

Measurements. — Holotype female, length 17 mm, width 6 mm. Three juvenile female paratypes, length range: 3.2-5.1 mm, width range: 1.2-2.3 mm.

Type locality. — Scotia Sea, Eltanin Cr. 6, Sta. 350-22; 4 December 1962; 55°02.7′-55°00.1′S 58°57.4′-58°51.2′W; 2450 meters; 1817-2216 hrs; 1 ♀ holotype (U.S.N.M. cat. no. 120543), 3 young ♀ paratypes (U.S.N.M. cat. no. 120544).

Distribution. — Scotia Sea, Eltanin Cr. 5, Sta. 268-25; 20 October 1962; 64°01.2′-64°07.8′S 67°44.7′-67°44.3′W; 2816-2761 meters; 2020-2350 hrs; four females (3 young and 1 gravid — 24 mm × 7 mm, 14-16 mm, 4-5 mm) and 3 fragments.

Affinities. — This species is very closely related to *S. birsteini* Menzies, 1962.

A careful comparison between the two species reveals the differences in the posterior border of pleon and also the uropod, because in *S. scotia* the posterior border is produced and sharply tuberculate whereas in *S. birsteini* it is evenly rounded and smooth. The distal part of the basis of the uropod is expanded in *S. scotia* and not expanded in *S. birsteini*. These are the major differences between the two species. With the availability of juveniles of different stages, it is possible to show how characters such as the general configurations of pleon and particularly the posterior margin of the pleotelson, the degree of dorsal body spination and number of antennal articles vary before attaining the adult condition in addition to the usual post-embryonic changes in the seventh peraeonal somite and peraeopods.

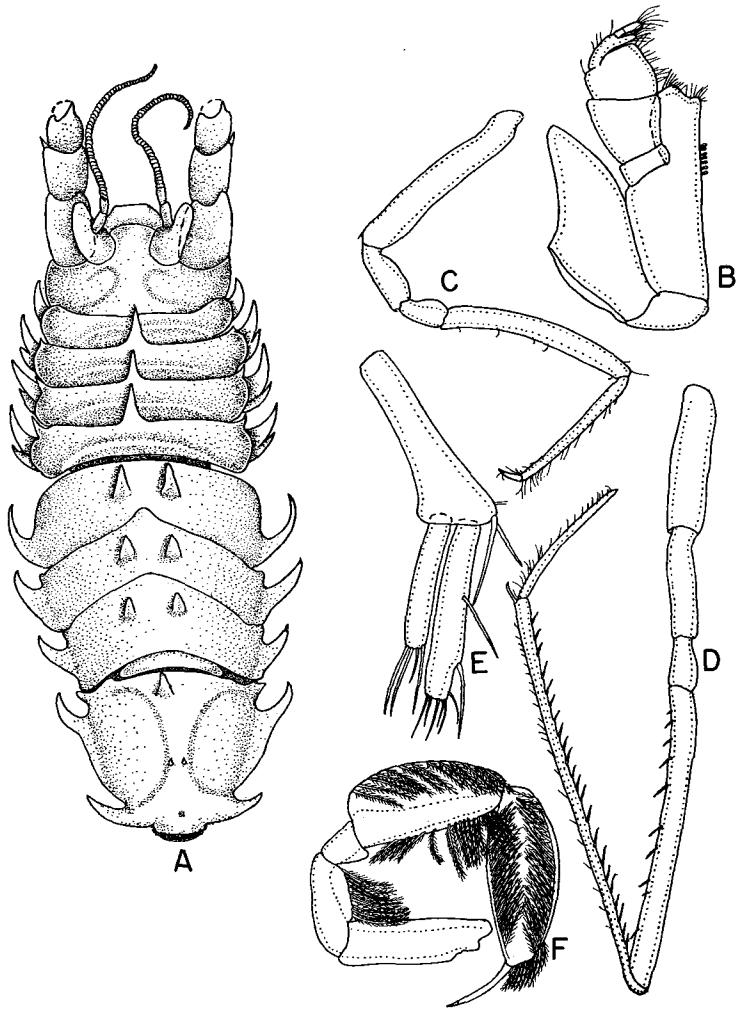


Fig. 5. *Storthyngura scotia* n. sp., holotype female, length 17 mm. A, dorsal view; B, maxilliped; C, first peraeopod; D, second peraeopod; E, uropod; F, seventh peraeopod.

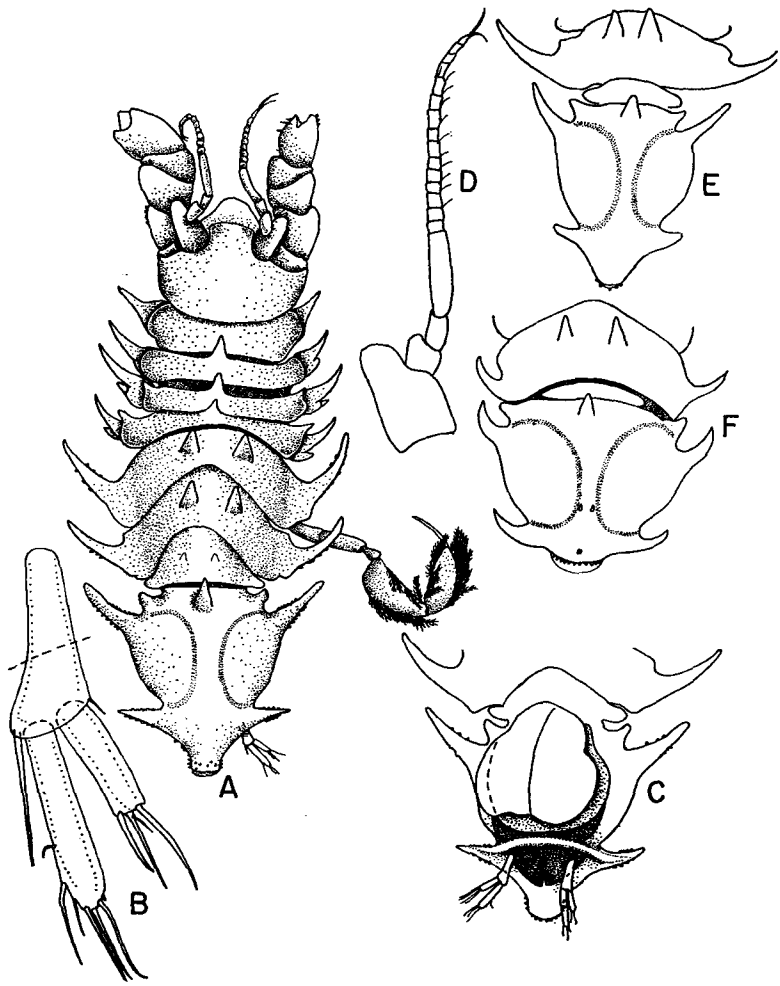


Fig. 6. *Storthyngura scotia* n. sp. A, dorsal view of juvenile female, length 3.2 mm; B, uropod; C, ventral view of pleon; D-E, second stage of juvenile, length 5.2 mm; D, first antenna; E, pleon and last peraeonal somite; F, holotype, adult pleon and last peraeonal somite (see also fig. 5).

Additional descriptive notes. — Body form same as the typical configuration of the genus, about 2.5 times as long as broad. Cephalon with a convex lateral margin, median frontal projection wider than first article of first antenna. Dorsum devoid of spines.

First peraeonal somite without median dorsal spines, anterolateral angles rounded; slightly shorter than second somite. Somites 2 to 4 subequal, anterolateral angles produced in the form of a short acute spine. Coxal plates on first four somites triangular, directed forward, those on somites 2 to 4 bilobed. Fifth to seventh somites coalesced into tight chevrons with lateral margin produced,

directed forward acute, each somite with a pair of median dorsal spines. Coxal plates dorsally not visible.

Anterolateral angles of pleotelson slightly produced, dorsum with anterior median spines and a pair of posterior minute tubercles, with two recurved pairs of lateral spines directed forward. First antenna with broad basal article lacking spine, flagellar articles annulate. Second antenna with a short spine at the outer distal angle of second article. Maxilliped typical of genus, with about six coupling hooks on endite. Peraeopods typical of genus.

Uropods biramous, basis distally broader, as long as the endopod; exopod two-thirds the length of endopod, slightly narrower than endopod.

### **Storthyngura argentica** n. sp. (fig. 7)

Diagnosis. — *Storthyngura* having cephalon with a pair of dorsal spines, lateral margin concave, or bilobed, peraeonal somites 1 to 4 each with a short median dorsal spine, fourth anterolateral angles produced into a spine, others rounded. Anterior pleonal somite with a dorsal spine. Pleotelson with two pairs of lateral triangulate spines and dorsally an anteriorly located spine and a pair of posteriorly located small spine-like tubercles. Pleonal apex pointed. Basal article of first antenna produced at inner distal angle. Third article of peduncle of second antenna having a spine at both inner and outer distal angles. Uropodal endopod as long as basis, exopod slightly more than one-half the length of endopod.

Measurements. — Holotype male, length 22 mm, width 9 mm. Allotype female, length 24 mm, width 10 mm (with developed oostegites). One male fragment (pleon intact).

Type locality. — Eastern Scotia Sea, Eltanin Cr. 9, Sta. 734; 12 September 1963; 53°22.7′-53°23.4′S 37°11.1′-37°20.9′W; 1372-1399 meters; 1545-1625 hrs; 1 ♂ holotype (U.S.N.M. cat. no. 120545), 1 ♀ allotype (U.S.N.M. cat. no. 120546); 1 ♂ fragment, paratype (U.S.N.M. cat. no. 120547).

Distribution. — Known only from type locality.

Affinities. —This species has an identical number of dorsal spines on cephalon and peraeon as in *S. benti* Wolff. However, the pleotelson has only two distinct lateral spines and dorsally a single anterior blunt process and a pair of posterior small spine-like tubercles. The first short pleonal somite also has a conical spine which is not present in *S. benti*. It can also be distinguished from the other related species, *S. abyssalis* Wolff, 1962, because the present species lacks a median process or spine on the center of the dorsum of the pleotelson.

Additional descriptive notes. — General body form about 2.5 times as long as broad. Cephalon with the median frontal projection about equal to the width of basal articles of first antenna. Coxal plates large and triangular, bilobed in somites 2 to 4. Fifth to seventh somites each with a pair of median dorsal spines, lateral margins produced, pointed and directed forward. Seventh somite nearly equal to the length of fifth and sixth together. Pleon with anterior short pleonal

somite having a conical dorsal spine. Pleotelson with anterolateral angles rounded, slightly bulging, lateral margin with two short triangulate sharp spines. Pleonal apex produced, terminating into a blunt tapering process directed upwards; dorsum with median anterior process and a posterior pair of spine-like tubercles.

First antenna with large basal article produced into one spine at the inner distal angle, flagellum composed of annulate articles. Second antenna with basal article having a spine on outer margin and the third article possessing a spine at both outer and inner distal angles, flagellum is lost in all the specimens. Mandibular

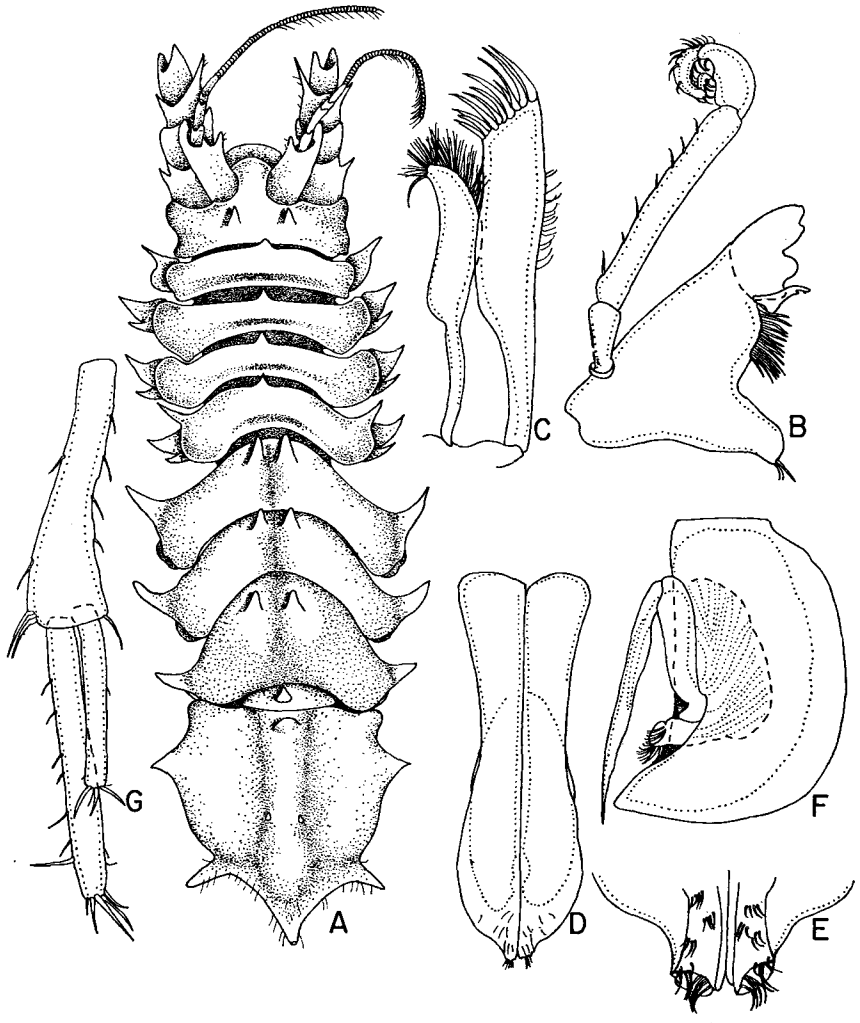


Fig. 7. *Storthyngura argentica* n. sp., holotype male, length 22 mm. A, dorsal view; B, left mandible; C, first maxilla; D-E, first pleopod; F, second pleopod; G, uropod.

incisor toothed, stronger than molar, movable lacinia bidentate, setal row of about fifteen setae, molar stout, lower distal corner bearing a spine and a few setae.

Male pleopod one with a narrow part in the middle, apex with a pair of truncated inner lobes, produced and having a row of setae at base. Outer pair of lobes triangular and closely pressed to the margin of the sympod. Second male pleopod with a well-developed copulatory organ, which has a setiferous process at its base. The acute tip of endite reaching beyond the inner distal corner of sympod. Uropods with a basis as long as endopod. Exopod nearly two-thirds the length of endopod and somewhat narrower.

### **Storthyngura eltaniae** n. sp. (fig. 8)

Diagnosis. — *Storthyngura* with cephalon having a single median dorsal spine; first peraeonal somite lacking dorsal spine, somites 2 to 4 with a median dorsal spine, somites 5 to 7 with a pair of median spines. Pleon lacking lateral spines, apex triangular. Pleotelson with an anterior conical spine and a posterior pair of minute spines or tubercles. Basis of uropod longer than endopod. Exopod slightly more than one half the length and width of endopod.

Measurements. — Holotype male, length 23 mm, width 10 mm. Allotype female, length 25 mm, width 10 mm.

Type locality. — Off South Sandwich Islands, Eltanin Cr. 8, Sta. 591; 29 April 1963; 55°07.2′-55°10′S 25°58.8′-25°55.3′W; 5431-5449 meters; 0320-0940 hrs; 1 ♂ holotype (U.S.N.M. cat. no. 120548), 1 ♀ allotype (U.S.N.M. cat. no. 120549), 4 fragmentary paratypes (U.S.N.M. cat. no. 120550).

Distribution. — Known only from type locality.

Affinities. — The general configuration of pleon, without any lateral spines, is unique in this genus.

Additional descriptive notes. — General body form oblong-ovate, about 2.5 times longer than wide. Cephalon wider than long, lateral margin slightly concave; median frontal projection less than one half the width of first article of first antenna. There is a single conspicuous, sharp, median dorsal spine.

First peraeonal somite slightly shorter than second, dorsum devoid of spines, lateral margin rounded, coxal plate dorsally visible, pointed not bilobed. Second peraeonal somite slightly longer than third, with a prominent median spine, both antero- and posterolateral angles rounded. Third and fourth peraeonal somites subequal, both having a median dorsal spine, anterolateral angles produced, with an acute tip. Coxal plates of somites 2-4 bilobed. Fifth to seventh peraeonal somites loosely articulated at margins but tightly articulated mesially, with lateral margin produced into sharp curved spines which are directed forward and with a pair of median conical dorsal spines. Fifth somite anteriorly having a pair of mesial lobes overlapping the posterolateral angles of fourth somite.

Pleon with a short flat anterior somite bearing a median tubercle and a broad

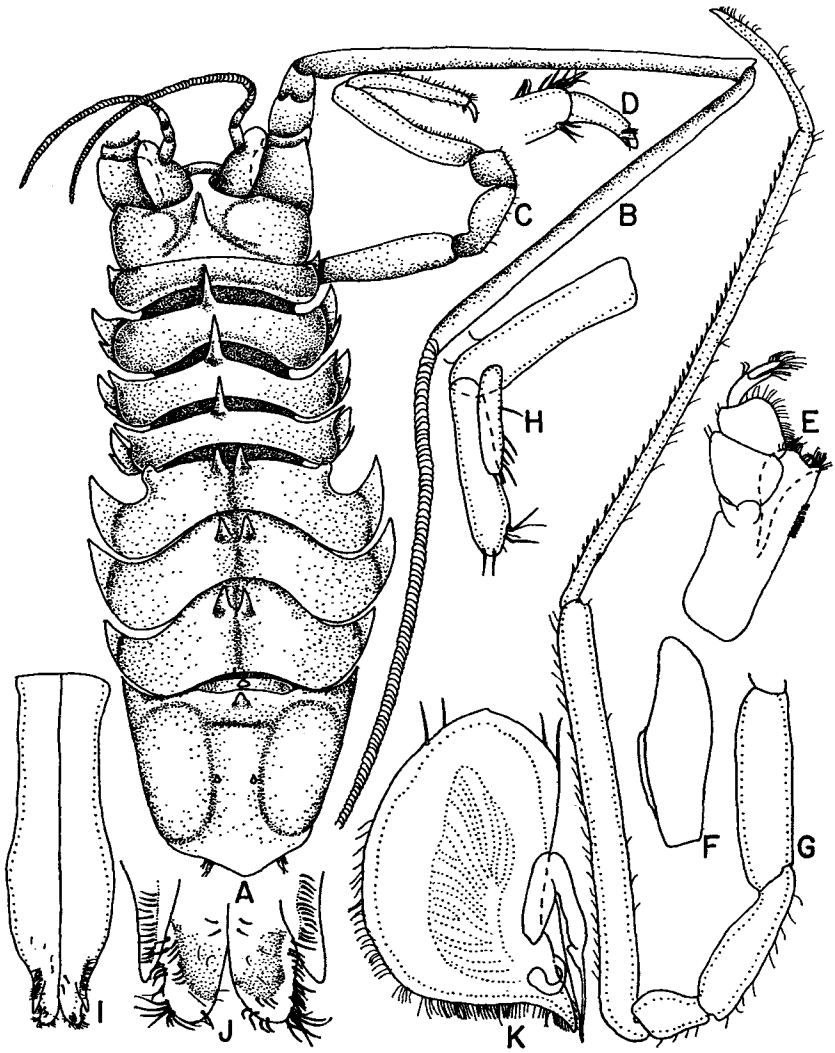


Fig. 8. *Storthyngura eltaniae* n. sp., holotype male, length 23 mm. A, dorsal view; B, second antenna; C, first peraeopod; D, apical articles, first peraeopod; E, maxilliped; F, maxillipedal epipod; G, second peraeopod; H, uropod; I, first male pleopod; J, apex, first male pleopod; K, second male pleopod.

shield-like pleotelson. Anterolateral angle of pleotelson produced into sharp long spine, lateral margin entire, without spines or projections, dorsally near front margin it has a stout conical spine emerging from a raised area, posteriorly there is a pair of small tubercles, one on either side of the median raised area. Posterior margin somewhat triangular, apex blunt. It would appear that a posterolateral pair of spines have fused almost completely with the lateral margin.

The broad basal article of first antenna lacking spines, flagellar articles

annulate, composed of more than forty articles. Second antenna about two times as long as entire body length. Fifth and sixth articles elongate, each more than one half the body length, flagellum multiarticulate. Maxillipedal palp with broad basal three articles and narrow terminal two articles as characteristic of the genus, endite as broad as epipod, the latter with a concave distal outer margin.

First peraeopod with short dactylus, claw-like, propodus narrower and slightly shorter than carpus, margins having scattered setae. First male pleopod broadens distally and apex having a pair of outer tapering lobes and inner rounded lobes, all bearing setae. Second male pleopod with projecting inner distal corner, copulatory organ well-developed, extending slightly beyond distal tip of sympod. Uropod with basis somewhat longer and stouter than exopod which is slightly more than one half the length and width of endopod.

**Storthyngura praegrandis** n. sp. (figs. 9, 10)

Diagnosis. — *Storthyngura* with cephalon having a pair of dorsal spines, lateral margin concave and converging posteriorly. First four somites of peraeon each with a median dorsal spine. Somites 5 to 7 each with a pair of spines, anterior margin of fifth somite with a median concavity. Seventh somite shorter than sixth. Anterior flat pleonal somite with a conical spine. Pleotelson with anterolateral angles bulging and rounded, lateral margin with two sharp spines on either side, dorsum with two anterior median spines in longitudinal row and two pairs of posterior tubercles. Basal article of first antenna with a stout spine at inner distal angle which equals the length of spine at outer distal angle. Uropod with a basis shorter than endopod.

Measurements. — Holotype female (ovigerous), length 49 mm, width 18 mm; paratype female (pleon damaged) length 30 mm, width 8 mm.

Type locality. — Drake Passage, Eltanin Cr. 12, Sta. 991; 13 March 1964; 60°57′-60°53.6′S 56°51.7′-56°57.8′W; 2670-3017 meters; 1102-1400 hrs; 1 ♀ holotype (U.S.N.M. cat. no. 120551), 1 ♀ paratype (U.S.N.M. cat. no. 120552).

Distribution. — Known only from the type locality.

Affinities. — This species is rather close to *S. argentica* described earlier as a new species in this paper. But the pattern of spination and tubercles on the dorsum of pleotelson, the relatively shorter seventh peraeonal somite and the median concavity of the anterior margin of fifth peraeonal somite are features which distinguish this species from *S. argentica.* This latter species also has the basis of uropod as long as endopod.

Additional descriptive notes. — General body form more than two times as long as broad. Cephalon with median frontal projection wider than first article of first antenna. Lateral margin concave, dorsum with a pair of spines. Anterior four peraeonal somites each with a median dorsal spine on anterior margin. Anterolateral angles of first three somites rounded but that of fourth somite strongly produced. Coxal plates visible on somites 1 to 6. Fifth and sixth somites

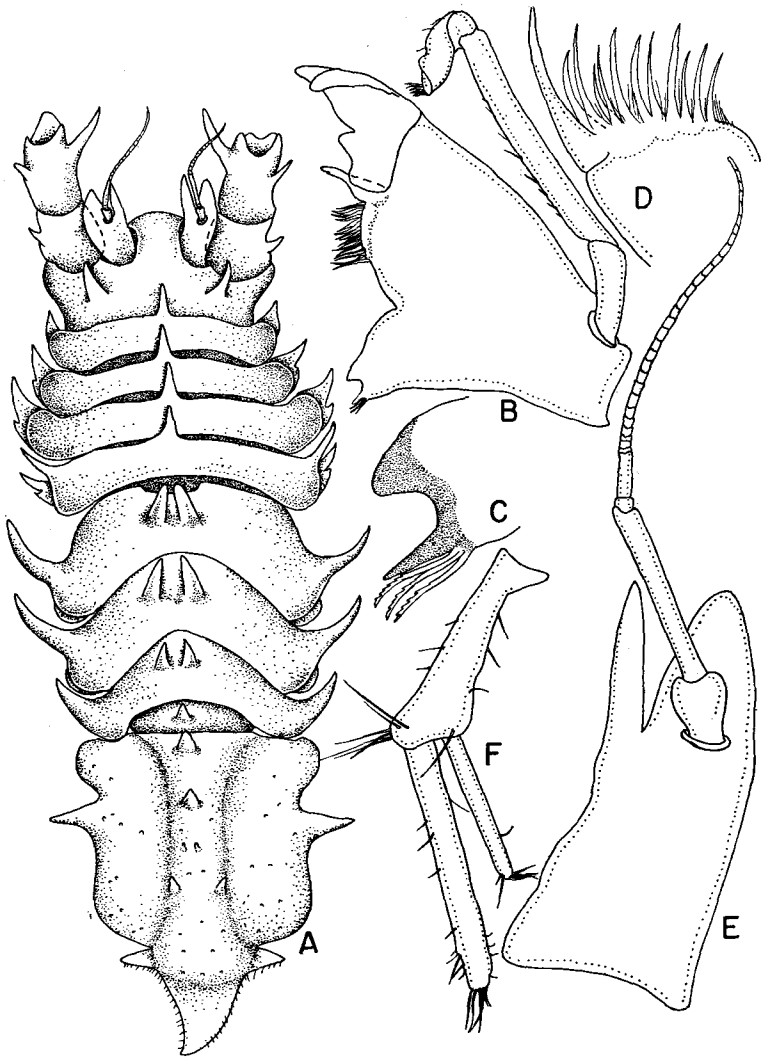


Fig. 9. *Storthyngura praegrandis* n. sp., holotype female, length 49 mm. A, dorsal view; B, mandible; C, molar of mandible; D, apex of endopod of first maxilla; E, first antenna, dorsal view; F, uropod.

subequal, seventh somite shorter than sixth somite. Fifth somite with anterior margin having a median concavity.

Pleon with anterior flat somite possessing a median conical spine. Pleotelson with anterolateral angle rounded, somewhat bulging; lateral margin with two sharp and straight spines. Apex produced, pointed and raised upwards, and with minute setae along lateral margin. Dorsum with two median anterior spines and two pairs of posterior tubercles; entire surface granulate.

First antenna with an expanded basal article bearing a stout spine at inner distal angle, second article short, third elongated, flagellum of 30 articles, only slightly longer than basal article. Second antenna with basal article having a spine on outer margin and second article with a spine on both inner and outer distal angles, that of inner the stouter and longer.

Mandible incisor strong, tridentate, movable lacinia weak, setal row of more than 17 setae, molar stout lower distal end with a sharp spine and long serrated setae. Palp triarticulate, second article 3 times longer than first. First and second maxilla typical of genus.

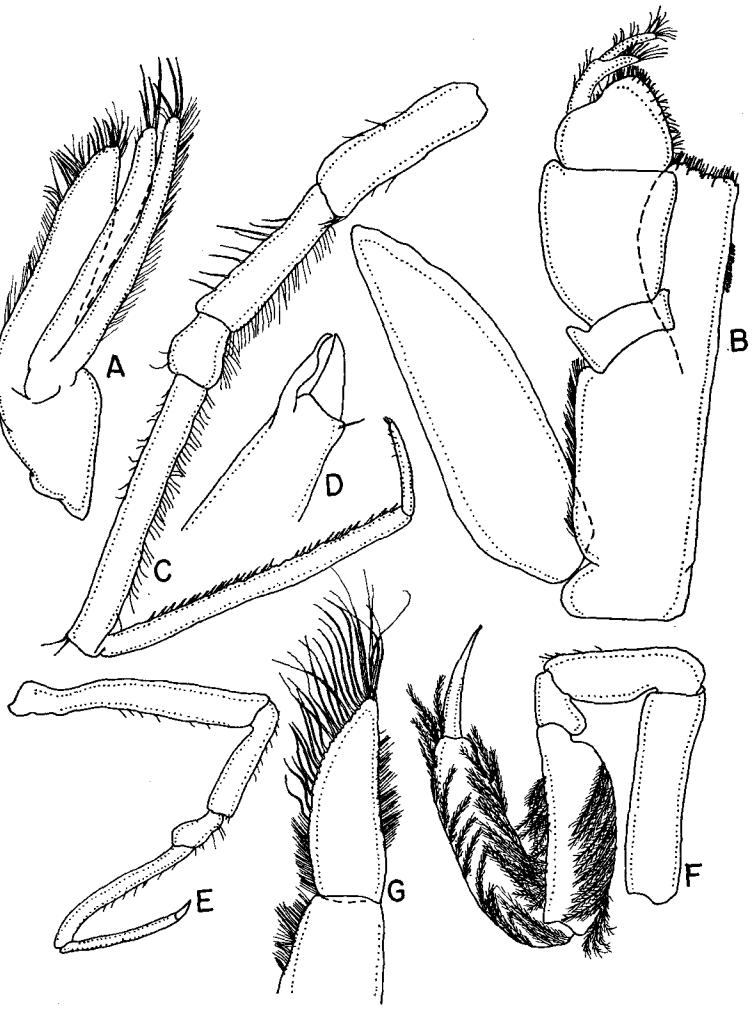


Fig. 10. *Storthyngura praegrandis* n. sp., holotype female, length 49 mm. A, second maxilla; B, maxilliped; C, second peraeopod; D, apex of second peraeopod; E, first peraeopod; F. seventh peraeopod; G, exopod of third pleopod.

Maxilliped endite with 13 coupling hooks. Second peraeopod with dactylus having a claw and an accessory club-shaped spine, propodus longer than carpus, inner margin beset with short stout setae.

Uropods with basis shorter than endopod, exopod narrower and nearly two-thirds the length of endopod.

### Storthyngura birsteini Menzies, 1962 (fig. 11)

*Storthyngura birsteini* Menzies, 1962b: 149, fig. 40 A-B.

Diagnosis. — *Storthyngura* with cephalon devoid of dorsal spines. Peraeonal somites 2 to 4 each with a single dorsal spine at midline of anterior margin; somites 5 to 7 each with a pair of median dorsal spines. Anterior triangular pleonal somite lacking dorsal spine. Pleotelson with a pair of short lateral spines directed forward and bearing an apical seta on anterior pair, dorsum with a conical anterior spine and a pair of minute posterior tubercles. Pleonal apex broadly rounded with central depression near apex. Basal articles of first and second antenna without lateral spines. Uropodal exopod and endopod about equal in width, exopod more than one-half the length of endopod, basis as long as endopod.

Type locality. — South Atlantic, L.G.O. Biotrawl 202 (holotype female and one juvenile paratype female), cf. Menzies, 1962.

Present record. — Northwest Scotia Sea, Vema Cr. 15, Sta. 114; 14 March 1959; 55°02.6′S 64°17′W; 1737 meters; one male and five females; male, length 15 mm, width 6 mm; females, length range: 16-19 mm; width range: 6-8 mm.

Northwest Scotia Sea, Eltanin Cr. 4, Sta. 126-25; 29 July 1962; 57°12′-57°14′S 62°45′-62°50′W; 3804-3731 meters; 1720-2230 hrs.; one gravid female without pleon (length 17 mm, width 9 mm), plus two fragments; moreover six specimens (four females) with the following measurements:

| | Length | Width |
|---|---|---|
| 1. gravid female with more than 200 eggs | 18 mm | 8 mm |
| 2. gravid female with oostegites | 24 | 10 |
| 3. gravid female (head missing) | 23 | 10 |
| 4. female specimen | 22 | 9 |
| 5, 6. two small specimens (pleon missing) | 14 | 6 |

Northwest Scotia Sea, Eltanin Cr. 11, Sta. 973-11; 11 February 1964; 55°18.2′-55°19.5′S 64°47′-64°42.2′W; 1920-2210 meters; 1420-1640 hrs.; sixteen females plus eight fragments: length range 18-22 mm; width range 8-10 mm.

Additional descriptive notes. — The original description is based on a single female holotype and one juvenile female paratype. The present record of the first male specimens of this species with many female specimens from four different stations comes from the vicinity of the type locality.

The dorsal view of the illustrated male specimen is shown in fig. 11 A.

First peraeonal somite without median dorsal spine, anterolateral angles rounded. Anterior pleonal somite triangular, dorsum smooth. Pleotelson with a pair of

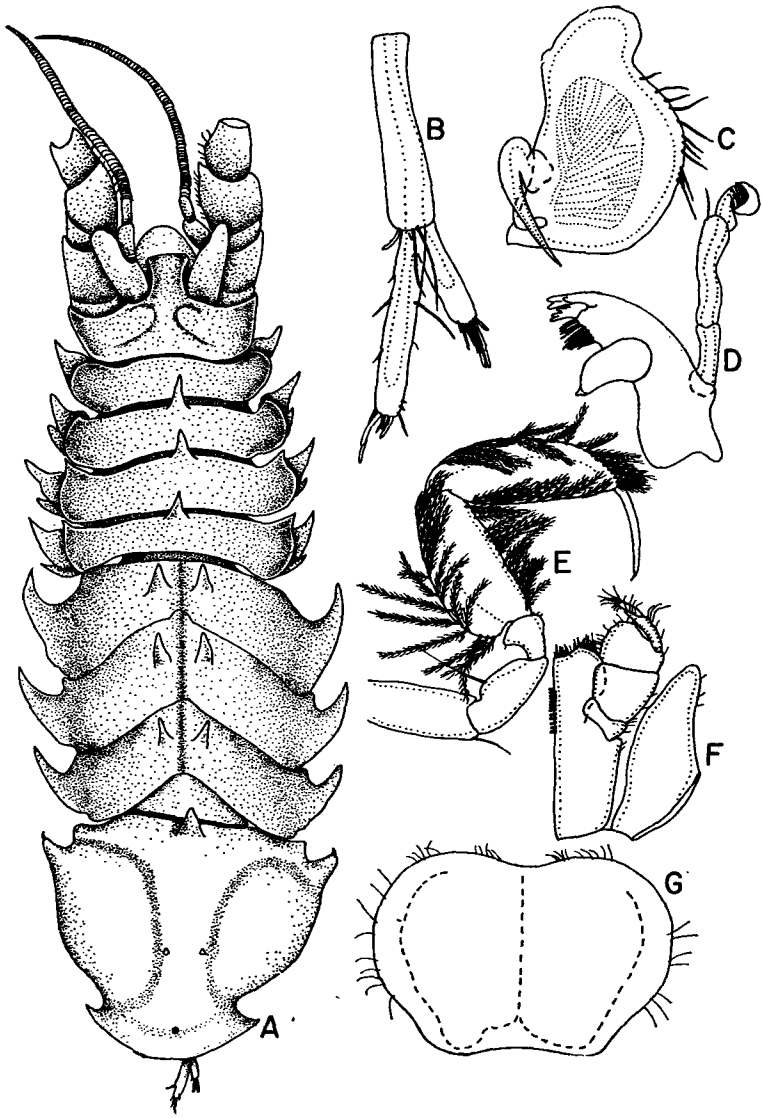


Fig. 11. *Storthyngura birsteini* Menzies, 1962, male 15 mm length. A, dorsal view; B, uropod; C, second male pleopod; D, mandible; E, sixth peraeopod; F, maxilliped; G, female operculum.

short lateral spines, directed forward, apex broadly rounded. Dorsal surface with a stout spine on middorsal line of anterior part and a pair of minute posterior tubercles which were probably missed by Menzies (1962) in the original diagnosis of this species.

Basal article of first antenna lacking spines, flagellum of several articles all wider than long, annulate. Proximal articles of second antenna without lateral

spines. Mandible with a stout tapering molar, having a spine at distal lower angle. First article of palp more than one-half the length of middle article. Peraeopods typical of genus.

Second male pleopod with the tip of copulatory organ extending beyond inner distal angle of sympod. The male first pleopod was missing from the specimen. Female operculum much broader than long, median distal border concave. Uropod with basis of uniform width, as long as endopod. Exopod as broad as endopod and slightly more than one-half the length of the latter.

### **Storthyngura robustissima** Monod (figs. 12 A, 13)

*Storthyngura robustissima* Monod, 1925: 18; Stephensen 1947: 9, fig. 1.

Diagnosis. — *Storthyngura* with cephalon having a pair of median dorsal spines, lateral margin slanted toward body, slightly bilobed. Peraeonal somites 1-4 each

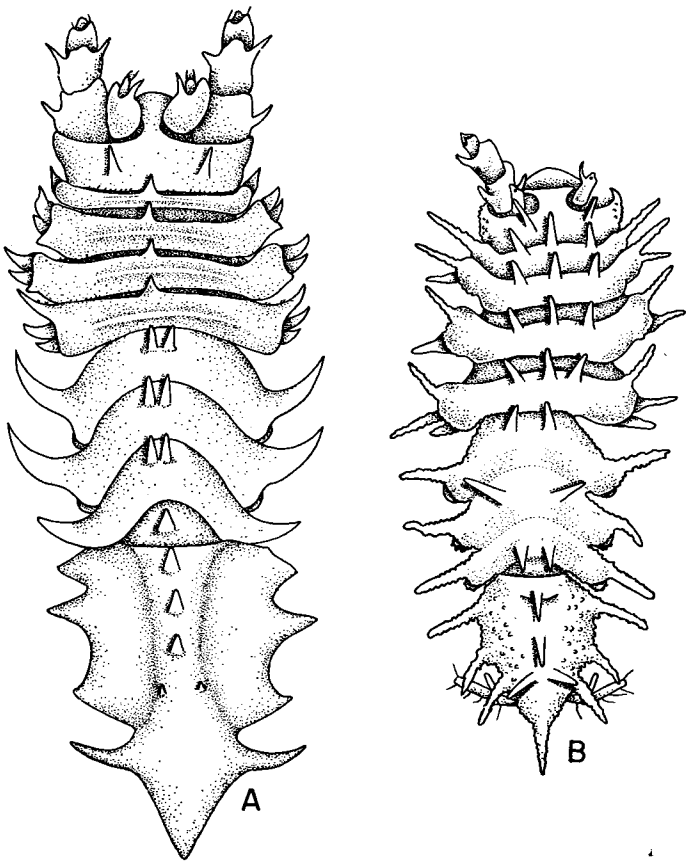


Fig. 12. A, dorsal view of *Storthyngura robustissima* Monod, 1925; B, *Storthyngura triplispinosa* Menzies, 1962.

with a median spine emerging from anterior margin, anterolateral angle of fourth somite produced in the form of a long spine; somites 5 to 7 with a pair of median spines, lateral spines large and pointed, coxal plates visible. Anterior short pleonal somite with a stout median dorsal spine. Pleon on either side with three blunt spines and an acute posterolateral angle or spine. Dorsal surface of pleotelson densely granulate, having three median spines in a longitudinal row in addition to a pair of smaller posterior spines, pleonal apex produced, triangular. Basal article of first antenna with a spine at the inner distal angle. First and second


Fig. 13. *Storthyngura robustissima* Monod, 1925. A, maxilliped; B, epipod of maxilliped; C, apex of maxilliped; D, mandible; E, second maxilla; F, first peraeopod; G, apex of first peraeopod; H, first male pleopod; I, second male pleopod; J, uropod.

articles of second antenna each with a pair of spines, one on inner and one on outer margin. Uropodal endopod narrower but longer than basis; exopod more than half the length of endopod.

Type locality. — 71°41'S 89°14'W, 400 meters (cf. Monod, 1925).

Present record. — Southwest Scotia Sea, Eltanin Cr. 4, Sta. 138-25, 8 August 1962; 62°02'-62°04'S 61°08.5'-61°07.5'W; 1455-1290 meters; 1920 hrs. Three males and six females (one gravid):

| | Length | Width |
|---|---|---|
| first male | 22 mm | 18 mm |
| second male | 17 | 5 |
| third male | 17 | 6 |
| first female | 26 | 12 |
| second female | 24 | 9 |
| third female | 25 | 9 |
| fourth female | 26 | 9 |
| fifth female | 27 | 10 |
| sixth female (gravid) | 34 | 18 |

Southwest Scotia Sea, Eltanin Cr. 6, Sta. 432-25; 7 January 1963; 62°52'-62°54'S 59°27'-59°14'W; 935-884 meters; 2110-2250 hrs. One male, length 24 mm, width 9 mm; 1 female, length 22 mm, width 9 mm; 3 fragments (2 male pleons and 1 female pleon).

The species was reported by Stephensen (1947) at the South Shetland Islands, Bridgeman Island, at 750 meters, Norwegian Antarctic Expedition Station 86.

Affinities. — This species in having more than two lateral spines on pleotelson is related to *S. benti* Wolff, and *S. triplispinosa* Menzies; however, the anterior lateral spines are short and blunt. It also differs from the above two species in dorsal spination.

### **Storthyngura triplispinosa** Menzies, 1962 (fig. 12 B)

*Storthyngura triplispinosa* Menzies, 1962: 149, fig. 38 A-E.

Diagnosis. — *Storthyngura* with cephalon with two spines, one on either side of midline; lateral margin spinulate. Peraeonal somites 1 to 4 each with three spines in transverse row along anterior margin. Anterolateral angles of somites 1-4 produced in the form of spine, somites 5 to 7 each with two median dorsal spines, somites coalesced. Pleon with two anterior median spines in longitudinal row and a pair of posterior spines, with three pairs of lateral spines directed caudad. Pleonal apex produced, pointed; entire lateral margin spinulate; basal article of first antenna with a spine at inner distal angle. First and second article of second antenna having a spine at outer distal angle. Basis of uropod as long as endopod; exopod two-thirds the length of endopod.

Type locality. — South Atlantic, 45°34'S 06°02'W, 4588 meters (cf. Menzies, 1962).

Present record. — Pacific Ocean, western side of Isthmus of Panama, Eltanin Cr. 3, Sta. 50; 15 June 1962; 16°12′-16°10′S 74°40.5′-74°41′W; 2856-2596 meters; 0436-0748 hrs, one female, length 16 mm, width 6 mm. Off Lima, Peru, Vema Cr. 15, Sta. 58; 27 November 1958; 12°11′N 89°34′W; 5680-5690 meters; 2146-2346 hrs, one female (damaged) length 8 mm, width 3.5 mm.

Affinities. — The arrangement of three acute spines in a transverse row in somites 1 to 4 distinguishes this species from all other known species.

## **Storthyngura furcata** Wolff, 1956 (fig. 14)

*Storthyngura furcata* Wolff, 1956: 119-121, figs. 35, 36.

Diagnosis (based partly on original description). — *Storthyngura* with cephalon

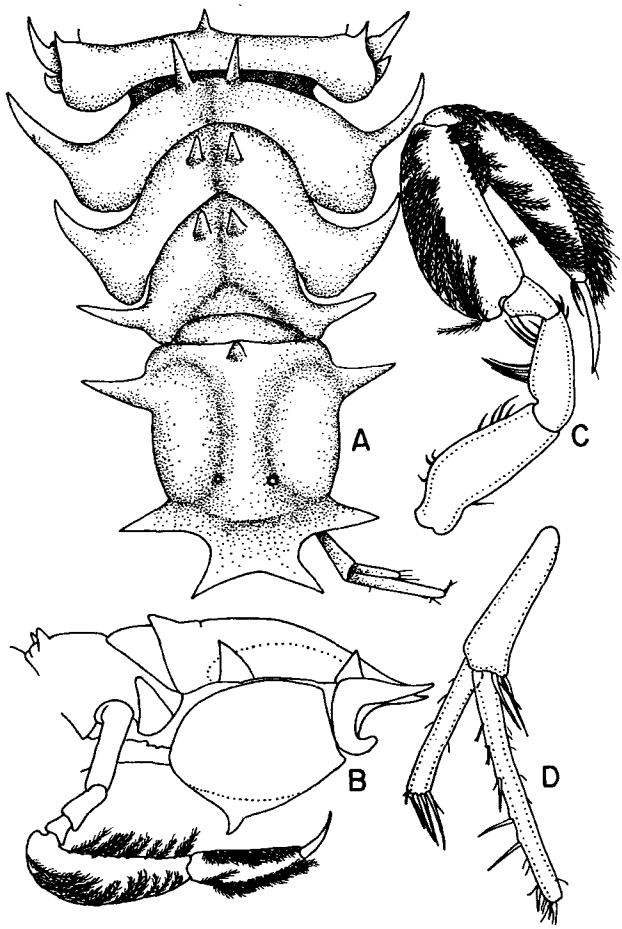


Fig. 14. *Storthyngura furcata* Wolff, 1956, female. A, pleon and posterior four peraeonal somites, dorsal view; B, pleon and posterior peraeonal somite, lateral view; C, seventh peraeopod; D, uropod.

lacking spines. Peraeonal somites 1-4 each with a median spine; fourth somite with a minute anterolateral spine. Somites 5-7 with a pair of median dorsal spines, those on somites 6-7 shorter, about half as long as those on somite 5. First pleonal somite lacking dorsal spine. Pleotelson with three pairs of laterally directed spines, including the terminal ones and with an anterior dorsal spine. Pleonal apex medially incised. Female operculum with a median keel having a ventral conical spine. Uropod reaching far beyond the two terminal spines on pleotelson. Uropodal endopod almost twice as long as basis.

Type locality. — Galathea Sta. 658, Kermadec Trench, 6660-6720 meters. (35°51'S 178°31'W) (cf. Wolff, 1956).

Present record. — Southwest of South Orkney Islands, Eltanin Cr. 11, Sta. 525-25; 2 March 1963; 64°07'-64°03.5'S 49°26.5'-49°15.2'W; 3367-3380 meters; 1800-2130 hrs; one posterior half of a female (pleon and posterior four peraeonal somites).

Affinities. — This species is rather close to *S. serrata* Wolff, 1962, but differs from it in having a median dorsal spine on first peraeonal somite and having a pronounced posterolateral terminal pair of spines.

Additional descriptive notes. — The exact resemblance of the posterior half with the descriptions and illustrations of *S. furcata* Wolff, 1956, justifies assigning this fragment to this species. The identical shape of peraeopods 5 to 7 and female opercular pleopod and the lack of ventral spine on the keel on peraeonal somites 5 to 7 agree with the earlier descriptions of this species (Wolff, 1956, 1962).

**Storthyngura** spec. (species indeterminable)

1. Damaged specimens of *Storthyngura* were taken from Eltanin Cr. 9, Sta. 690; 27 August 1963; 56°18'-56°23.1'S 37°04.3'-36°57.2'W; 3411-3447 meters; 0625-1025 hrs. (many fragments probably belonging to *S. scotia* n. sp. — with an identical pleon shape having the produced tuberculate apex).

2. One mutilated specimen, consisting of the cephalon and anterior four peraeonal somites, was taken from Eltanin Cr. 9, Sta. 711; 4 September 1963; 58°42.6'-58°43.3'S 33°30'-33°22.5'W; 2981-3329 meters; 0300-0520 hrs. Cephalon with 2 dorsal spines, peraeonal somites 1 to 4 each with a median dorsal spine; anterolateral angles of only fourth somite acutely produced; basal article of both the first and second antenna with spine. This specimen is collected close to the type locality of *S. argentica* n. sp., and the above characteristics are the same as *S. argentica* n. sp.

3. Posterior half, with pleon and last three peraeonal somites, taken from Eltanin Cr. 7, Sta. 480-32; 15 February 1963; 58°06'-58°10'S 44°55.5'-44°47'W; 2798 meters; 1500-1808 hrs. The pleonal characters are the same as in *S. triplispinosa* Menzies and probably this is a fragment of this species.

ZUSAMMENFASSUNG

Diese Veröffentlichung enthält Beschreibungen und Abbildungen von sechs neuen Arten aus der Antarktis (*Storthyngura eltaniae, S. falcata, S. sepigia, S. argentica, S. praegrandis, S. scotia*) sowie Mitteilungen über die vier bisher bekannten antarktischen Arten, die in der Sammlung der USNS "Eltanin" gefunden wurden: *S. furcata, S. robustissima, S. birsteini* und *S. triplispinosa.*

REFERENCES

BEDDARD, F. E., 1885. Preliminary notice of the Isopoda collected during the voyage of H.M.S. "Challenger", 2. Munnopsidae. Proc. zool. Soc. London, **1885**: 916-925.

——, 1886. Report on the Isopoda collected by H.M.S. "Challenger" during the years 1873-76, 2. Challenger Reps., (Zool.), **17**: 1-175.

BIRSTEIN, J. A., 1957. Certain peculiarities of the ultra-abyssal fauna at the example of the genus Storthyngura (Crustacea Isopoda Asellota). Zool. Zhur., **36**: 961-985. [In Russian].

HANSEN, H. J., 1897. Reports on the dredgings of the Albatross, 22. Isopoda. Bull. Mus. comp. Zool., **31**: 95-129.

——, 1916. Crustacea Malacostraca. The order Isopoda. Danish Ingolf Exped., **3** (5): 1-262.

MENZIES, R. J., 1962. The isopods of abyssal depths in the Atlantic Ocean. Vema Research Ser., **1**: 79-206.

MENZIES, R. J. & R. Y. GEORGE, in preparation. Systematics, distribution and origin of the marine isopod Crustacea of the Milne-Edwards Trench.

MONOD, TH., 1925. Isopodes et Amphipodes de l'Expedition Antarctique Belge (S. Y. Belgica), 2. Bull. Mus. nation. Hist. nat. Paris, **31**: 296-299.

RICHARDSON, H., 1901. Key to the isopods of the Atlantic coast of North America, with descriptions of new and little-known species. Proc. U. S. nation. Mus., **32**: 493-579.

——, 1905. A monograph on the isopods of North America. Bull. U. S. nation. Mus., **54**: 1-727.

——, 1908. Description of a new isopod of the genus Eurycope from Martha's Vineyard. Proc. U. S. nation. Mus., **34**: 67-69.

STEPHENSEN, K., 1947. Tanaidacea, Isopoda, Amphipoda, and Pycnogonida. Sci. Res. Norwegian Antarct. Exped., **2** (27): 1-90.

VANHÖFFEN, E., 1914. Die Isopoden der deutschen Südpolar-Expedition 1900-1903. Deutsch. Südpolar Exped., (Zool.) **7** (4): 449-598.

WOLFF, T., 1956. Isopoda from depths exceeding 6000 meters. Galathea Rep., **2**: 85-157.

——, 1962. The systematics and biology of bathyal and abyssal Isopoda Asellota. Galathea Rep., **6**: 7-320.

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